REPORT ON WATER MANAGEMENT IN THE CZECH REPUBLIC IN **2015**

MINISTRY OF AGRICULTURE
OF THE CZECH REPUBLIC

Report on Water Management in the Czech Republic in 2015
As of 31 December 2015

Text
Department of State Administration of Water Management and River Basins
Ministry of Agriculture of the Czech Republic

Department of Water Protection
Ministry of the Environment of the Czech Republic

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Ministry of Agriculture of the Czech Republic
Ministry of Environment of the Czech Republic

Contents

Dear readers,

The Report on Water Management in the Czech Republic is known as the "Blue Report". This yearbook is one of essential materials the Ministry of Agriculture has been publishing on annual basis since 1997. As usual, it presents an overview of activities relating to water management within the scope of the Ministry of Agriculture and the Ministry of the Environment, who is the co-contributor. The Blue Report sums up information about the situation in water management in the previous year, development trends and the extent of changes made.

In comparison with previous years, the Blue Report for 2015 is larger as it contains a chapter called "Implementation of Programmes of Measures Adopted by River Basin Management Plans in 2009", which is presented to the Government, in accordance with the Water Act, every third year. It sums up information on the implementation of programmes of measures and the condition of surface water, groundwater and water management in district river basins.

In comparison with the previous year, this Blue Report contains other sub-chapters that respond to the current development in water management: sub-chapters dealing with hydrological extreme of drought, an interdepartmental commission WATER-DROUGHT, regulation of water supply and sewerage systems, strategic materials and research and development within the scope of the Ministry of the Environment.

Reading through the yearbook, you´ll learn many interesting facts. It is generally known that 2015 was a dry year: however, in the monitoring for the past consecutive 130 years, it was so below-average in terms of precipitation that it ranks among a group of approximately 20 dry years. The average annual precipitation was 531 mm, which amounts to 79% of precipitation average. Water consumption invoiced to households in 2015 increased in year-over-year comparison by 0.6 litres per person, daily to 87.9 litres. You will also learn that a total of 841 projects were funded at a cost of CZK 1,830 million in 2015 from the chapter of the Ministry of Agriculture, which means that the funding increased by CZK 254 million in comparison with 2014.

Dear friends, I believe that when you read the Blue Report for 2015, not only will you learn about the topics I have highlighted, but you will gain a deeper understanding of the actual extent of activities linked to water management, trends in its segments and the related vision of probable development. Caring for water is vitally important and it certainly deserves your attention.

Marian Jurečka
Minister of Agriculture
of the Czech Republic

Dear readers,

You are holding a publication called "Report on Water Management in the Czech Republic 2015" known to most of you as the "Blue Report". Just as in previous years, the Blue Report brings you a comprehensive overview of actions taken in water management and water care in the Czech Republic.

The most significant activities of both ministries in 2015 included the completion of the National River Basin Management Plans including the Flood Control Management Plans, two of the most important strategic documents for the following six-year period 2016–2021. These plans, approved by the Government in December 2015, identify the greatest problems concerning water protection, its use and flood control, but they also define objectives and measures that need to be taken in order to solve these problems. Although both strategic documents contain a wide range of measures, I am confident that we will succeed in meeting these objectives in a joint effort of state administration, local administrations and citizens with the support of European and National grants as well as our internal sources.

Significant legal steps taken by the Ministry of the Environment in 2015 included a draft amendment to the Water Act, which is the essential legislative tool in the field of water management. The aim of the amendment is to enhance the motivational function of fees paid for discharged volumes of waste waters, in surface waters and as charges for groundwater consumed as an economic tool in water management. The amendment draft will be presented to the Government by the end of summer 2016. With this amendment, the Ministry of the Environment responds to the current climate change that manifests in two extremes: floods and long-lasting drought, which both affect the condition and quality of our surface waters and groundwaters. This is the reason why the amount and quality of surface waters and groundwaters must be protected now more than ever. In addition to legislation, we also need to focus on improving the ability of our landscape to hold water, including increasing the efficiency of rainfall management and its further use, not only by households. The Ministry of the Environment is going to support these measures that should lead to more efficient water management, improving its quality and having sufficient supplies for the public by providing funds from the Operational Programme Environment to regions, cities, towns and municipalities: the Czech Republic may use over CZK 21 billion in 2014–2020 under this programme. Around CZK 7 billion is intended to be invested in fighting drought under this programme.

Drought in 2015, which has continued to occur in some place in the Czech Republic also in 2016, has certainly affected – to a various degree – each of us. Therefore, the Ministry of the Environment intensively focuses on performing the tasks resulting from Government Resolution No. 620/2015 "Preparation of Measures Aimed at Mitigating Negative Effects of Drought and Lack of Waters" and on creating a concept for protection against the consequences of drought in the Czech Republic. The Ministry concentrates on the issue of drought in a comprehensive and conceptual manner: from ensuring high-quality monitoring and providing information to the public, to defining drought indices and the relevant legislation changes, educating and raising awareness in children, youth, general and expert public to defining suitable measures aimed at increasing water retention in the landscape. Meeting these objectives is coordinated by the interdepartmental group WATER-DROUGHT, which I established shortly after taking office in 2014.

We are aware that whilst solving issues relating to water, flood and drought we are not alone and we know how important constructive international cooperation is, not only in this field. By the end of 2015, also thanks to participation of representatives of the Czech Republic in work teams and managing bodies of international committees for the Elbe, Oder and Danube protection, international river basin plans and international flood control plans were approved.

I believe that the "Blue Report 2015" will provide you with coherent information about water as a valuable component of natural riches and an irreplaceable element and about activities related to its protection, management, but also activities that may threaten it. We should value the work and effort of all those who contribute to quality protection and reasonable use of waters in everyday life.

Richard Brabec
Minister of Environment
of the Czech Republic

Magdalena Martinů – Hydrometeorologies – 2nd class, Primary school Trnávka 89, Příbor, Moravian-Silesian Region

1. Hydrological balance

1.1 Temperature and precipitation

In terms of temperature, 2015 was again markedly above the average in the Czech Republic. The annual mean air temperature of 9.4 °C exceeded the value of the long-term average (1961–1990) by 1.9 °C, which is the same as in the previous year. In the past 23 years it was the ninth year with positive variation exceeding 1 °C and together with 2014 it has been the warmest year in the last 54 year history of temperature monitoring.

Almost all months of 2015 were above average, a small negative variation (–0.1 °C) was only in October. Most of the months in the first half of the year were normal in terms of temperature, in the second half of the year very warm months prevailed, while only September and October were around the average. 2015 was characterised by fluctuations in temperatures, when the annual average was significantly influenced by 5 months (I, VII, VIII, XI, XII) with variations ranging between 3 and 4.9 °C.

Winter season 2014/2015 with the positive average of 0.8 °C (2.4 °C above the long-term average) was relatively very warm, only by 0.5 °C colder than the previous winter. The coldest periods of the year were short: 6–7 January and 5–7 February, with the mean daily temperature varying between –3 and –4.5 °C.

The spring season was average in terms of temperatures without any fluctuations and with the mean temperature of 8.1 °C it was almost by one degree warmer than the long-term average.

During the summer season, when the average rose to 19.2 °C (2.9 °C above the long-term average), the temperature in June showed values ranging around the average, but July and August were exceptionally warm months with a lot of tropical days. The mean temperature in July was 20.2 °C (3.3 °C above the long-term average) and in August it was even one degree higher with 21.3 °C (4.9 °C above the long-term average). August was the warmest month of 2015, but it was also a record breaking month in the 54 year history of temperature monitoring surpassing August 1992 (4.5 °C above the long-term average) and August 2003 (3.8 °C above the long-term average). The mean daily air temperature reached the highest values in the several days of the first and third ten-day period of July (25 to 26.5 °C) and later especially from 6 to 14 August when it moved between 25 and 27 °C.

Temperatures in the growing season were noticeably above-average with mean temperature of 15.2 °C, which is by one degree warmer than in the previous year and only by 0.5 °C colder than in the warmest growing season in 2003.

The autumn season was about a degree warmer than the average with 8.9 °C, which wad particularly due to very warm December with 5.8 °C. Also December was warm, as it has become the "tradition", this time it was even record breaking and with mean temperature of 3.7 °C and exceeded the average by almost 5 °C. Similarly to 2014, freezing weather only arrived at the very end of December when on 31 December the mean temperature fell to –4 °C, which was the lowest value recorded in February.

In terms of precipitation, 2015 in the Czech Republic was below the average. The mean precipitation amount was 531 mm, which corresponded to 79% of the long-term precipitation average (1961–1990). 2015 was, after a long time, a year that was not only exceptionally warm, but also exceptionally dry in the Czech Republic when compared to other years in the 54 history of monitoring: the precipitation deficit was second highest, just below 2003 with the mean precipitation amount of 516 mm (78% of the long-term precipitation average). Similar amounts of precipitation were recorded in dry years of 1982 and 1973 (81% and 83% respectively of the long-term precipitation average). From the perspective of a more extensive history of monitoring (approximately 130 years) on the territory of the Czech Republic, 2015 can be included in the group of some 20 dry years with precipitation amounts lower or similar to 2015 and with precipitation deficits ranging between 20 and 30% of the long-term precipitation average, which means that such a dry year occurs once in approximately 8 years.

In 2015 there were relatively more humid only four months when the precipitation amounts achieved above-average values of 120 to 151% of the long-term precipitation average (I, III, X, XI), in other months only below-average precipitation amounts fell (86 to 32% the long-term precipitation average). The driest months in 2015 were February (32% the long-term precipitation average), July (46% the long-term precipitation average) and December (42% the long-term precipitation average).

The winter season was only slightly below-average in terms of precipitation and in comparison with winter 2013/14 it was almost as twice as abundant. Weak February precipitation was very similar to 2014, especially in Bohemia, where it showed the lowest values in history of monitoring with less than 20% of the long-term precipitation average. However, the annual precipitation deficit rose mainly during the growing season, when dry months, with the exception of August (86%), achieved only 46 to 69% the long-term precipitation average. The highest deficit was in September when it was only 22% of the annual average. The two following months that were above-average in terms of precipitation improved this value, but after very dry December it eventually dropped to 21% the long-term precipitation average. The growing season was the driest in the Czech Republic since 1961 and its deficit of 34% of the long-term precipitation average was reminiscent of the situation in 2003 (30% of the long-term precipitation average).

In terms of territory, the precipitation amounts were quite evenly distributed, although the eastern part of the Czech Republic was relatively poorer, by approximately 7% the long-term precipitation average. The differences between Bohemia and Moravia were not very significant when classified by months, the only greater difference was recorded only in February (40% of the long-term precipitation average), when precipitation amount was higher in Moravia and Silesia and in June (37% of the long-term precipitation average), October (41% of the long-term precipitation average) and especially in November (75% of the long-term precipitation average), when more precipitation amounts fell in Bohemia. From regional perspective, there was relatively most rainfall in the Ústí nad Labem and Karlovy Vary Regions: 97 and 95% respectively of the long-term precipitation average and least in the Moravian-Silesian and the Olomouc Regions with 68 and 71% respectively.

Reconstruction of the weir Černošice, the Berounka River – part of a work Fish crossing (author: Jan Šimůnek)

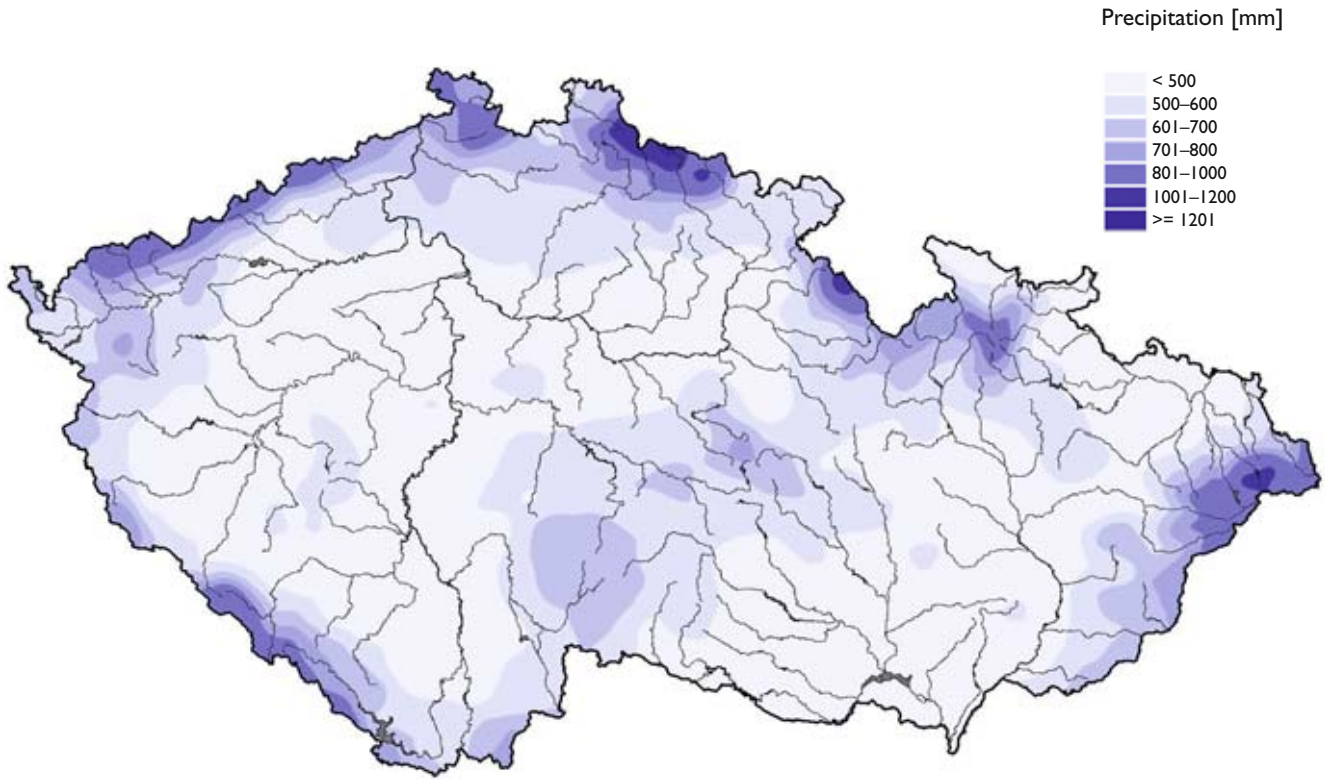
Water reservoir Koryčany – Autumn (resources: Morava River Board, s. e.)

Table 1.1.1
Renewable water resources in the years 2008–2015

Item	Annual values – millions of m³							
	2008	2009	2010	2011	2012	2013	2014	2015
Precipitation	48,818	58,676	68,692	49,449	54,812	57,336	51,815	41,957
Evapotranspiration	37,394	44,090	46,824	35,511	42,239	38,296	41,542	32,165
Annual inflow [1)]	462	714	781	482	492	845	388	398
Annual runoff [2)]	11,886	15,300	22,649	14,420	13,065	19,885	10,661	10,190
Surface water resources [3)]	4,503	5,112	8,788	5,770	5,195	6,626	5,273	3,591
Usable groundwater resources [4)]	1,209	1,266	1,594	1,340	1,311	1,657	1,077	939

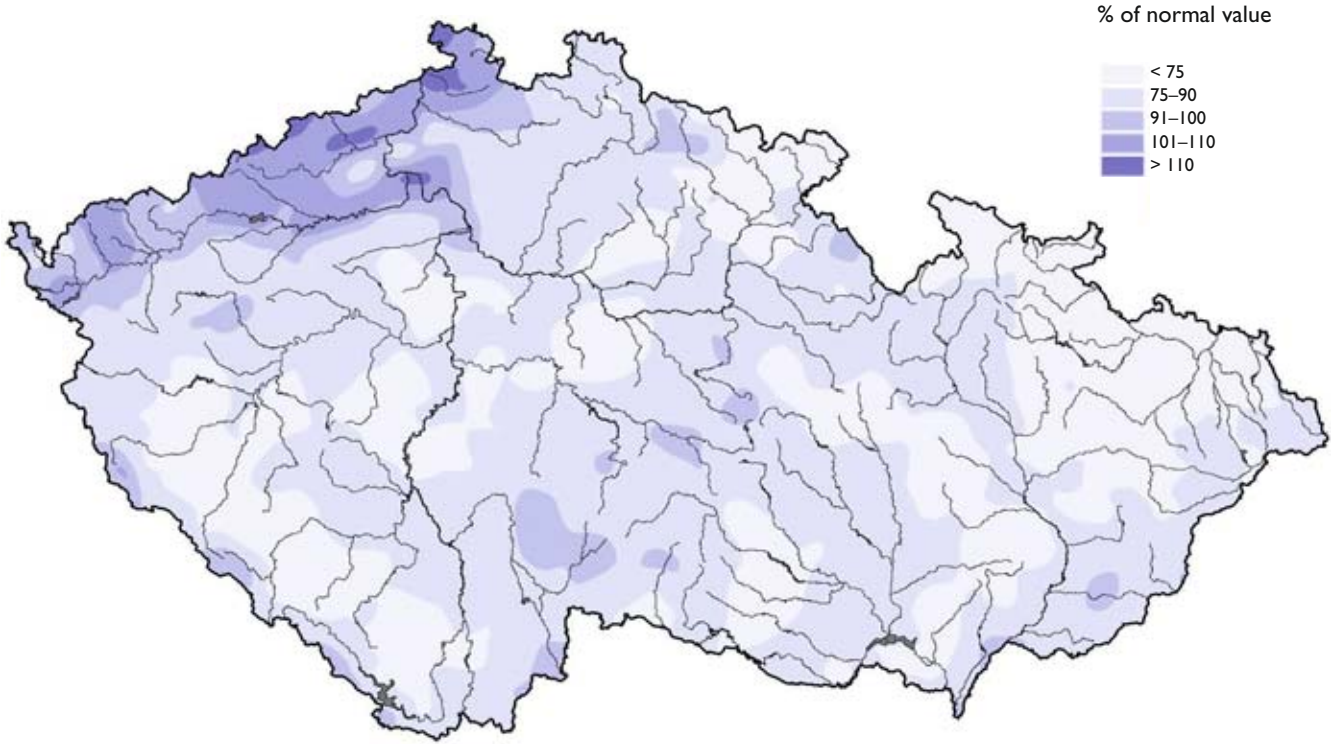
Source: Czech Hydrometeorological Institute
Note: [1)] *Annual inflow to the territory of the Czech Republic from the neighbouring states.*
[2)] *Annual runoff from the territory of the Czech Republic.*
[3)] *Determined as the flow in the main catchment areas with 95% probability.*
[4)] *A qualified estimate. specification in more detail is published by the Czech Hydrometeorological Institute not sooner than the second half of 2016.*

Figure 1.1.1
Total precipitation amount in the Czech Republic in 2015 in mm



Source: Czech Hydrometeorological Institute

Figure 1.1.2
Total precipitation amount in the Czech Republic in 2015 by % of the average in 1961–1990



Source: Czech Hydrometeorological Institute

1.2 Runoff

In terms of runoff, 2015 reached below-average values in most of the territory of the Czech Republic. As regards the main river basins, the flows ranged mostly between 55 and 70% Q_a of the long-term annual average. The exception was the winter months when the mean annual flows were around the long-term average (75–140% Q_m of the long-term annual average). Only January was above-average in terms of flow (140% Q_I of the long-term January average), by contrast, substantially below-average flow was the period between July and September (35–40% Q_m of the long-term monthly average). The most water was in the Dyje River Basin with flow values of 65–85% Q_a of the long-term annual average. Lower values (50–60% Q_a of the long-term annual average) were in the Vltava River Basin. Values of other river basins ranged between 60 and 70% Q_a of the long-term annual average. Water levels tended to fall at the beginning of the year, later they remained around the same levels or decreased slowly. Towards the end of the year water levels started to rise. Due to rainfall or melting snow there were only several water level fluctuations that caused more significant runoff situations, but most river basins were extraordinarily below-average throughout the year. There were more significant flood situations only in January, March and December, when the water levels of some watercourses reached levels $Q_{2–5}$ at the most.

Winter months (January, February) had the most water of all months, their values were around the average or slightly above-average. In comparison with long-term averages, water levels were most often within the rang of 50 to 140% Q_m. In winter, the water levels in the monitored watercourses had constant or slightly decreasing trends. The highest water levels were recorded in January with values between 60 and 150% Q_I, which made January slightly above-average. Higher water levels were recorded especially in the Dyje River Basin (up to 190% Q_I). Water levels of the monitored watercourses in January were mostly $Q_{240d–150d}$. In most of the watercourses monitored there was constant or slightly decreasing trend with the exception of the second week in January, when there were water level rises or fluctuations. Those were due to warming and subsequent melting of snow cover together with rainfall (8 to 10 January). After the water level rose, the average flows were mostly between 105 and 190% Q_I. Flows in most river basins reached maximum values on 10 or 11 January, when many flood reporting profiles were exceeded. FAD III was transiently exceeded on the Vydra River in Modrava (Q_5) and on the Otava River in Sušice (Q_5). Since then most water levels slowly decreased and returned to original values by the end of January. February was above-average in terms of flow. Flow values ranged mainly between 40 and 130% Q_{II}. The trend of the water levels in rivers was constant or slightly decreasing. In the first week of February there was formation of ice due to very low temperatures in the watercourses at middle and higher altitudes, however, these formations disappeared in the following week. Precipitation in the east of the Czech Republic together with melting of snow cover resulted in the rising of water levels in the Morava River and Oder River Basins at the end of February (22 to 26 February). The mean flows then reached values of 110 to 150% Q_{II}. Other sporadic fluctuations of water levels were due mainly to the melting of snow cover.

Spring (March to May) was, in terms of flow, a below-average period with values around $Q_{270d–120d}$. Flows in the majority of the monitored watercourses ranged between 20 and 90% Q_m. Water levels were slightly fluctuating in this period with a slowly decreasing trend. Short-term rises were linked mainly with melting of snow cover and rainfall. At the beginning of March, after February precipitation, the Morava River and Oder River Basins showed higher and higher values of flow (60–100% Q_{III}). At the end of March (29 March) there was a more significant rainfall which, together with melting of snow cover, led to significant rises of water levels, especially in watercourses flowing from mountainous areas. In the Krkonoše

Mountains and in the Šumava Mountains there were short-term exceedances of flood activity degrees. FAD III was recorded in the Upper Elbe in the Vestřev profile (Q_2) and in the Otava River in Sušice (Q_2). Water level of the affected watercourses increased after this event for a short term up to Q_{60d}. In April there were mainly drops of flows to the values before the rainfall episode. In the watercourses in the mountains the trend was fluctuating during April, which was due to gradual melting of snow cover, in comparison with long-term averages the flows showed mainly values between 30 and 100% Q_{IV}. At the end of April (27 to 28 April) watercourse levels in the Northeast Bohemia and in the Oder River and Olše River Basins were increased due to abundant rainfall. Watercourse levels continued to decrease in May and they reached on average 20 to 85% Q_V. In the second ten-day period of the month (20 to 24 May), rainfall affected the Olše River Basin and the Moravian part of the Oder River Basin. However, the rising water levels did not reach FAD limits at any of the profiles.

In total, the summer season (June to August) was also below-average in terms of flow. The trend of water levels was mostly constant at the beginning of June. Then the water levels slightly decreased most of the time until the end of June. The decreasing tendency was only sometimes interrupted by sporadic convective rainfall. The most significant rises of water levels were recorded at the end of June in smaller watercourses and in watercourses draining mountainous areas, the highest values were recorded in the Upper Jizera River, the Upper Vltava River, the Klabava River and the Blanice River (up to +70 cm in 24 hours). On the whole, June was significantly below-average in terms of runoff. At the beginning of the month, runoff values ranged between 20 and 60% Q_{VI}. After storm episodes in the second half of the month, the values rose to 40–80% Q_{VI}. Maximum values (250% Q_{VI}) were achieved in the second half of the month in the Litava River and the Hloučela River. The highest values of river content were recorded in the watercourses in the Bohemian part of the Oder River Basin ($Q_{60–30d}$). By contrast, the lowest values of river content with $Q_{364d–355d}$ were recorded in the Vrchlice River, Bulovský stream and the Rolava River. Constant and slightly decreasing tendency prevailed also in July. At the end of the month watercourse levels started fluctuating, which was due to storm activity, especially in watercourses in the Morava River Basin. Flow values usually ranged between 10 and 60% Q_{VII}. Higher values were recorded in watercourse in the Upper Vltava River and the Upper Elbe River Basins and the following Moravian watercourses: Kyjovka, Trkmanka, Svitávka and Litava, where the streamflow values ranged between Q_{270d} and Q_{180d}. The total streamflow values ranged between Q_{355d} and $_{270d}$. The lowest streamflow value of Q_{364d} was recorded in the watercourses of the Upper and Middle Elbe and in watercourses in the Berounka and the Upper Morava River Basins and in the Nežárka River and the Lužnice River. In August, the watercourses with lowest streamflows with Q_{364d} were also the Upper Otava River Basin, the Opava River, the Olše River and Jílovský steam. The total trend in watercourses was from slightly declining to constant. This trend was reversed by rainfall at the end of the second ten-day period, where there was up to 90 mm at some places and water levels on the watercourses rose. In the Lusatian Neisse River in Liberec and in the Jevíčka River in Chornice, FAD I was exceeded on 18 August for a short term. If this rainfall had occurred in a period of average or above-average runoff, the runoff response would have be much more significant. Overall, streamflow values at the beginning of the months ranged between 10 and 45% Q_{VIII}, the water levels of watercourses rose and streamflow values ranged typically between 15 and 65% Q_{VIII}. On the whole, streamflow values in watercourses in summer were often between Q_{355d} and Q_{300d}.

In September the watercourses tended to fluctuate depending on the occurrence of local rainfall. At the beginning of September water levels remained mostly around the same values. Later, due to rainfall (6 September) water levels started fluctuating slightly, temporary rises up to 15 cm in 24 hours were recorded, particularly in medium-sized watercourses (the Chrudimka River, the Skalice River, the Úhlava River, the Kamenice River). At the beginning of September, streamflow values ranged between Q_{355d} and Q_{270d}, in the second half of September the trend of streamflow in most watercourses was constant or slightly declining with values decreasing to $Q_{355d–300d}$. The only watercourses with higher streamflow were some rivers in Moravia: the Romže River, the Svratka River and the Svitava River (up to Q_{60d}). By contrast, the lowest values of streamflow were recorded in the Oder River Basin and in watercourses draining the Šumava Mountains and the Krušné Mountains (Q_{364d}). September flows reached mostly values of 15–75% Q_{IX}. The exception was some watercourses in the Morava River Basin: the Romže River, the Svratka River, the Juhyně River, the Jevišovka River and the Svitava River, where the flow values ranged from 75 to 105% Q_{IX}. The trend of water levels in October was constant at the beginning, later on in the half of the month rainfall occurred (14 and 18 September), which resulted in more significant rises in the watercourses in the Upper Jizera River Basin, in the Orlice River, in the Sázava River, in the Lužnice River and also in the Lower Dyje River (up to 40 cm in 24 hours). The trend for the remainder of September was slightly fluctuating or constant. Streamflow of watercourses did not change much during the month as it remained mostly within $Q_{364d–210d}$. Higher streamflow with values $Q_{90–30d}$ was in watercourses in the Upper Vltava River Basin, the Lužnice River, the Koštěnický stream, the Dyje River and the Haná River. Flow values in these watercourses exceeded 150% Q_X. Overall, average flows were within the range of 20–70% Q_X. Higher streamflow (35–80% Q_X) was only in the Vltava River and the Dyje River Basin. In November there were two rather significant rainfall episodes which caused watercourse fluctuations. In the middle of the month, rainfall led to sharp increase in the Upper Jizera River, the Upper Elbe and the Orlice River. FAD I was exceeded in some profiles for a short term, FAD II was exceeded in the Upper Jizera River. This rainfall episode did not increase the total streamflow of watercourses. By contrast, after the second rainfall episode (19–20 November), which occurred in the whole country, streamflow increased. There were significant increases especially in watercourses draining mountainous areas. Streamflow at the beginning of the month were mostly $Q_{364d–300d}$. At the end of November, streamflow values increased to $Q_{330d–120d}$. Highest streamflow values of $Q_{60d–30d}$ were in watercourses in the Oder River, the Bečva River and the Orlice River Basins and in the Upper Vltava River. Flows in watercourses were 15–70% Q_{XI} at the beginning of November, after rainfall episodes they rose to 40–150% Q_{XI}.

In December there was higher streamflow especially in mountainous watercourses, which was particularly due to occasional melting of snow cover. Flow values ranged mostly between 20 and 160% Q_{XII}. Watercourses showed highest streamflow values at the very beginning of the month in response to a rainfall episode and melting of snow cover at the end of November and beginning of December (29 November to 1 December). This runoff episode resulted in exceeding some FADs in many profiles. Most of the watercourses culminated on 1 or 2 December. FAD III was exceeded in the Vydra River in Modrava (Q_5), in the Otava River in Rejštejn (Q_5) and in Sušice (Q_2). For the remainder of the month, water levels mostly declined with the exception of slight increases after rainfall in 18 to 20 December.

1.3 Groundwater regime

When assessing groundwater in 2015, there is a striking deficit of shallow and deeper aquifers in the spring months (in the period when spring maxima are usually recorded) when the water level in shallow wells and yield of springs was slightly to strongly below-average in most of the Czech Republic. The driest period, in terms of the position of shallow wells on the monthly cumulative

frequency curve, was Week 33 (mid-August), in terms of yield it was the end of August (Week 40). The areas that were most affected by drought (in shallow as well as in deeper aquifers) were from July the Northeast Bohemia (the Upper and Middle Elbe Basin) and Northeast Moravia (the Oder River Basin).

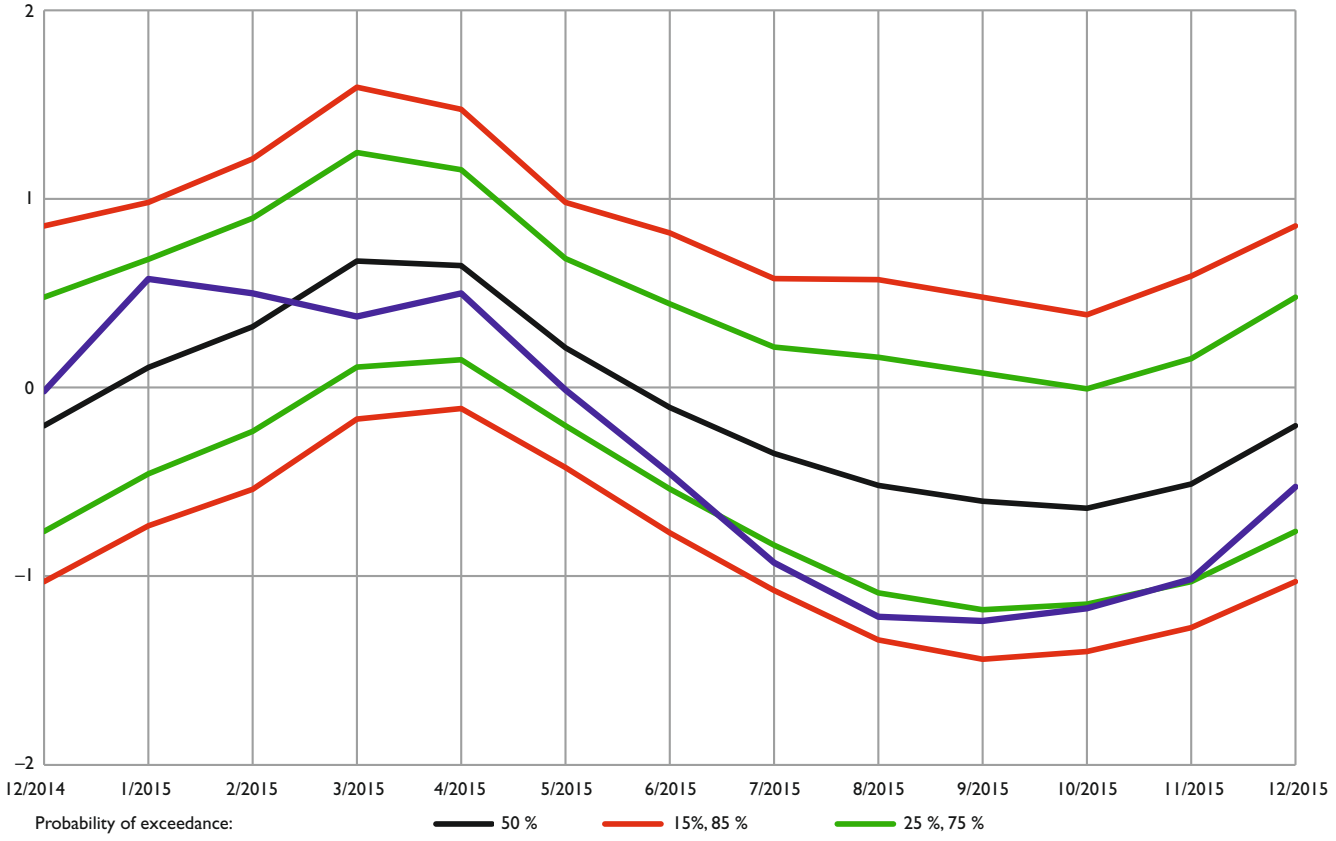
Shallow wells

At the beginning of the year, water level values in shallow wells in the whole Czech Republic were comparable with average values [the Upper and Middle Elbe: 36% of the monthly cumulative frequency curve (hereinafter referred to as the "MCFC")], or they were above-average (the Berounka River: 18% of the MCFC). However, the conditions for the most significant spring recharging were not favourable and low water level values were recorded as early as in March in shallow aquifers of the Upper and Middle Elbe (81% MCFC) and the Lower Vltava River (80% MCFC) basins. After a short-term improvement in April, the water level decreased in most shallow wells with more intensity that it is usual for these months and in July most areas in the Czech Republic were from slightly to strongly below-average with MCFC values ranging from 68% in the Lower Elbe basin to 88% in the Upper Elbe basin. The dries period in terms of the position of water levels in shallow well in monthly frequency curves was Week 33 (mid-August) and the areas that were most affected by the drought were Northeast and South Bohemia (the Upper and Middle Elbe basin: 88% MCFC and Upper Vltava River Basin: 87% MCFC) and Northeast Moravia (the Oder River Basin: 87% MCFC).

59% water levels in shallow wells dropped to strongly below-average or exceptionally below-average levels with the highest concentration in the northeast. Precipitation in the mid-August contributed to slowing the decline of water levels in the wells, at some places even their temporary increases were recorded. However, the monitored indicators were decreasing in the following weeks again, although not so sharply as in the previous period. From October the groundwater values started improving slightly in most of the Czech Republic. At the end of October 2015, the driest areas were in the Upper and Middle Elbe basins, where the total value of MCFC was 83% despite slight improvement and the Oder River Basin where the shallow aquifer values remained extraordinarily below-average (89% MCFC). Also, most of the lowest monthly water level values in history were recorded in these regions. Their number (26%) was higher than in the same period of 1992, which was a similar year in terms of drought. By contrast, the most favourable groundwater values were recorded in South Moravia (the Dyje River Basin: 67% MCFC) and in the eastern half of Bohemia (the Berounka River: 66% MCFC). The values of shallow aquifers improved slightly in most of the Czech Republic in the rest of the year, however, the values from the beginning of the year were not reached anywhere. The most favourable condition was in Central Bohemia and in the northwest where the water level in the Berounka River Basin, Lower Vltava and Lower Elbe reached the average values in most of the shallow wells by the end of the years – see Table 1.3.1. The situation in the Upper Elbe basin improved substantially, where the total situation improved by 20% and reached 63% MCFC. The driest area remained the Oder River Basin where the groundwater values were very low until the end of the year (90% MCFC). This area also had most wells (74%) with strongly or exceptionally below-average water level, with the total average being 24% probability of exceedance at the end of 2015.

The development of the average total water level in shallow wells of the monitoring network for the Czech Republic can be seen in Chart 1.3.1. The chart clearly shows the growing deficit of shallow aquifers of groundwaters from the spring (blue line) in comparison with monthly averages (black line).

Chart 1.3.1
The course of the evaluation of the average standardized state levels of shallow wells of the monitoring network (blue) in 2015 compared with the long-term monthly values in 1981–2010



Source: Czech Hydrometeorological Institute

Table 1.3.1
Inclusion levels in shallow wells exceeding the monthly curves for individual river basins in 2015

River Basins	Inclusion of the water level on a monthly curve crossing – %											
	January	February	March	April	May	June	July	August	September	October	November	December
Upper and Middle Elbe	36	60	81	66	76	82	**88**	**88**	83	84	81	63
Upper Vltava	29	45	67	69	67	71	82	**87**	**86**	77	74	63
Lower Vltava	18	51	80	65	74	70	77	76	74	69	64	41
Berounka	18	39	60	59	54	63	77	79	77	71	72	57
Lower Elbe	32	48	67	56	61	64	68	73	69	66	62	51
Oder	30	32	54	56	59	76	84	**87**	**89**	**89**	**89**	**90**
Morava	30	33	54	43	54	61	72	72	70	71	71	69
Dyje	21	27	44	49	56	68	77	75	68	67	64	58

Source: Czech Hydrometeorological Institute
Note: High levels of 75–84% MCFC are highlighted in bright very low levels below the limit for drought – 85% MCFC are in dark.

Springs

At the beginning of the year, the yield of springs in the Czech Republic was comparable with the long-term average (the Elbe River: 50% MCFC) or even above-average (the Berounka River: 16% MCFC). However, the conditions for the usual spring recharging of groundwaters were not favourable: although the yields grew slightly until April, MCFC values deteriorated. The groundwater yields in the Upper and Lower Elbe (76% MCFC) were below-average as early as in May, in June the values deteriorated in the Lower Vltava River and the Oder River Basins (76 and 75% MCFC). Only the groundwater yields in the Berounka River Basin were comparable with the long-term average (42% MCFC). From the perspective of the position on the monthly cumulative frequency curve the groundwater yield was lowest in September (Week 40). Other areas most affected with drought in deeper aquifers from July was northeast Bohemia (the Upper and Middle Elbe basin Elbe: 88% MCFC) and northeast Moravia (the Oder River Basin: 87% MCFC). In the Oder River Basin there was also the highest number of springs with yields under the limit for drought (85%). 70% of the springs in the Lower Vltava River and Elbe Basins showed yield values below the limit for drought, in the southern regions (the Upper Vltava River and the Dyje River) only a third of the yield values was below the limit. In October, the total decrease in yield was more moderate. In southern regions (the Upper Vltava River and the Dyje River) and in the west of Bohemia (the Berounka River and Lower Elbe basins) the yields were constants. In the northeast of the Czech Republic (the Upper and Middle Elbe and the Oder River Basins) and in Central Bohemia (the Lower Vltava River Basin) the yields continued to decrease slightly, or stagnated. However, the total number of average or above-average yields did not change significantly (18%), which is also true for the number of yield values under the limit for drought (85% MCFC) that remained at 60%. The driest areas thus remained the Oder River Basin, where the limits for drought were surpassed by 92% of the yields. In the Lower Vltava and the Lower Elbe basins 60–67% springs were under the limit for drought, whereas the lowest share (40%) was in the Berounka River and the Dyje River Basins. The lowest yield values were recorded in some parts of the Upper and Middle Elbe and the Oder River Basins with no average, or above-average, yield or reaching MCFC 87 and 88%. The yields were also low in year-on-year comparison when 95% of the monitored indicators did not reach the value of the previous year. From November until the end of the year, the situation in deeper aquifers improved in the most parts of the Czech Republic, however, the values from the beginning of the year were not reached anywhere. The most favourable situation with deeper aquifers remained in Central Bohemia and in the southeast where the yields in most watercourses of the Berounka River and the Dyje River Basins reached the average values (see Table 1.3.2). The situation improved significantly in the Upper Elbe basin, where the values rose to 66% MCFC (by 22%). The driest area remained the Oder River Basin where the yields were very low until the end of the year (84% MCFC); this area also had the most springs (71%) with strongly to exceptionally below-average yield values: at the end of 2015 these accounted for 41% of the total average.

Water reservoir Vranov (source: Morava River Board, s. e.)

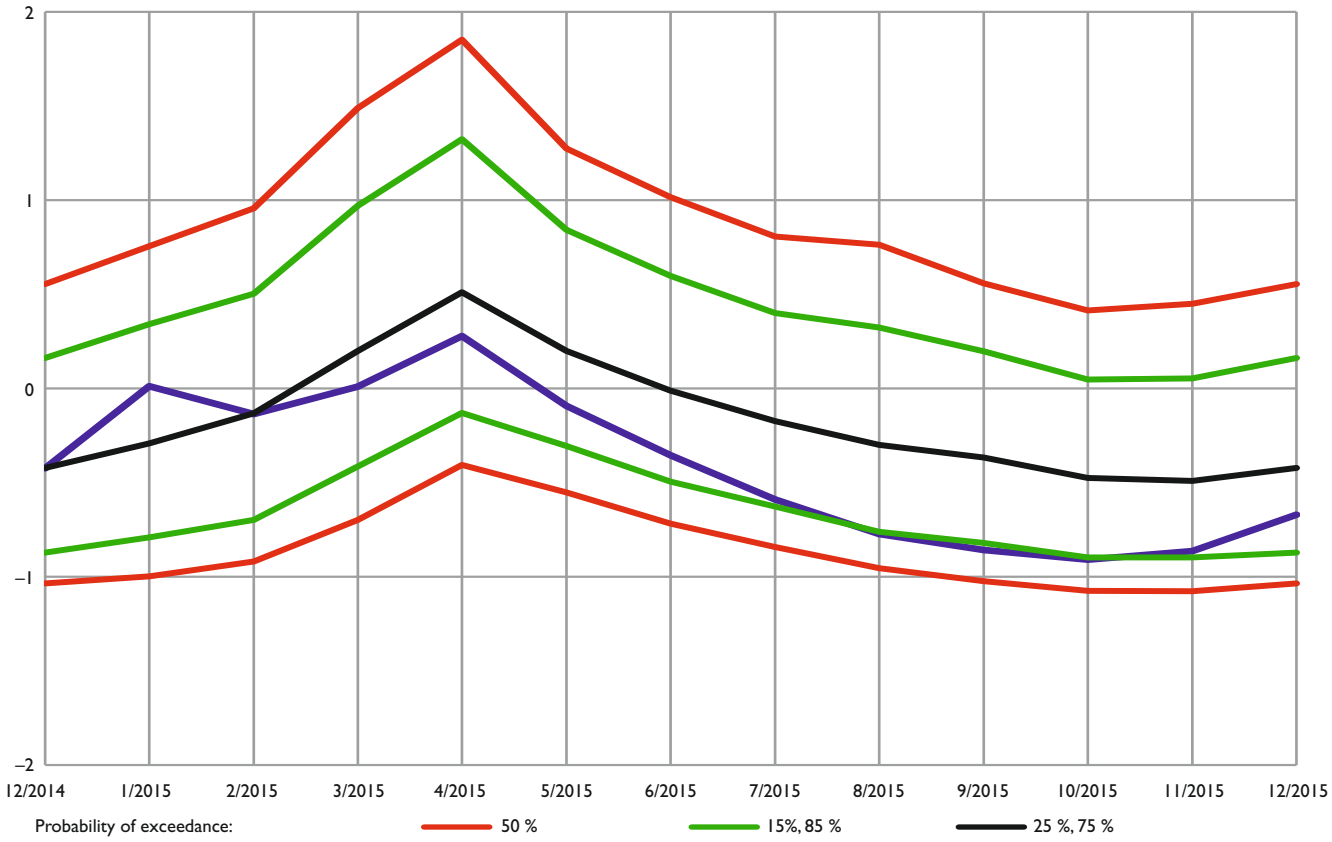
Table 1.3.2
Inclusion of spring yields to the monthly curves crossing for individual sub-basins in 2015

River Basins	Inclusion of the water level on a monthly curve crossing – %											
	January	February	March	April	May	June	July	August	September	October	November	December
Upper and Middle Elbe	48	62	74	72	76	80	84	**87**	**88**	**87**	**81**	66
Upper Vltava	27	39	56	61	68	63	67	76	80	77	81	67
Lower Vltava	44	60	71	66	70	76	78	82	83	82	84	77
Berounka	16	33	34	39	42	39	42	58	59	52	49	43
Lower Elbe	51	60	62	58	59	65	68	72	72	72	67	59
Oder	37	45	42	50	66	75	**85**	**86**	**87**	**88**	**87**	84
Morava	30	44	49	48	64	74	81	76	77	79	78	76
Dyje	35	42	54	59	60	65	71	69	68	69	62	51

Source: Czech Hydrometeorological Institute
Note:Values for low yields in the range 75–84% MCFC are highlighted in a bright color and yield very low, below the limit for drought – 85% MCFC are in dark.

The development of total yields of the springs of the monitoring network for the Czech Republic can be seen in Chart 1.3.2. The chart clearly shows the deficit of groundwater in deeper aquifers with values decreasing from 2015 (blue line) in comparison with annual averages (black line).

Chart 1.3.2
The course of the evaluation of the average standardized spring yield of the monitoring network (blue) in 2015 compared with long-term values in 1981–2010



Source: Czech Hydrometeorological Institute

Deep wells

The values of groundwater in deep aquifers were constant in most of the monitored area in the first half of the year, with only occasional slight decreases or increases. In year-on-year comparison this period was comparable with the previous year. The drop of water levels started to occur at the beginning of summer. In August, the drop in all monitored areas became evident in comparison with 2014, however the drop was not by far as significant as in the case of shallow aquifers. More significant drops were only recorded in the area of Permo-Carboniferous in Eastern Bohemia. In the following months the water levels either stagnated or decreased slightly. The situation changed at the end of the year in December when the water levels in the monitored areas decreased to various degrees.

Natálie Chumlenová – Water feeds us – 5th class, Primary Scholl of Karel Čapek 119, Habartov, Karlovy Vary Region

2. Hydrological extremes

2.1 Flood situations

Major floods occurred in 2015 in January, at the end of March / beginning of April and at the end of November / beginning of December. These situations were due to the combination of considerable rainfall and snow melting. The only episode in the summer period, that was otherwise below-average in terms of rainfall, was a situation in mid-August.

The generally above-average streamflow of watercourses in mid-January 2015 was mainly due to a runoff wave caused by thawing that occurred after marked warming in 8 to 10 January. From 9 to 15 January, most watercourses were overflowing and constant situations were replaced by runoff waves that reached peaks mostly on 10 or 11 January. The period of overflowing lasted until the end of the second third of January. The maximum values were recorded when flows reached Q_{1-5}. In many hydrometric profiles the water levels reached or exceeded FAD I, FAD II was exceeded in 25 reporting profiles (lasting for 24 hours at the most) and FAD III was slightly exceeded at two stations for a short term (the Vydra River in Modrava and the Otava River in Sušice). FAD II was reached by the Divoká Orlice River in Kostelec n. O., the Tichá Orlice River in Čermný n. O., the Chrudimka River in Hamry, the Doubrava River in Bílek and Pařížov, the Jizera River in Bakov n. J., the Libuňka River in Pelešany, the Skalice River in Zadní Poříčí and Varvažov, the Sázava River in Žďár n. S. and Chlístov, the Kamenice River in Hřensko, the Moravská Sázava River in Lupěné, the Březná River in Hoštejn, the Upper Dyje River in Janov and in Podhradí, in the Upper Svratka River Basin (at the following profiles: Borovnice, Dalečín and Loučka in Skryje) and the Balinka River in the Baliny profile.

At the end of 2015 a significant rainfall episode occurred. There were mainly rains, most of them were recorded on 29 March in the mountains: Labská Bouda 78.7 mm, Pec p. Sněžkou 66.3 mm, Kořenov-Jizerka 43.2 mm, which – in combination with snow melting, caused the rise of water levels in watercourses draining mountainous areas. Flood activity degrees were exceeded for a short term on 30 March in watercourses in the Krkonoše Mountains and the Šumava Mountains and especially in the Upper Elbe, the Divoká Orlice River, the Úpa River, the Jizera River, the Teplá Vltava River, the Vydra River, the Křemelná River and the Otava River with streamflow below Q_2. The culmination at the level of FAD III was reached in the Elbe River in the Vestřev profile at Q_2 and in the Otava River in the Sušice profile at Q_2.

Between 15 and 19 August, persistent rainfall occurred in a large part of the Czech Republic, in total reaching 50 to 90 mm/72 hours and increased the water level of most watercourses. This situation was the most noticeable not only in August, but in the whole summer. With respect to the previous long-term drought the increases were not substantial, the runoff waver was a little more intense only in a minority of profiles. The most distinctive response was recorded in the upper stream of the Lusatian Neisse River where FAD I was reached on 18 August. This was a short-lived episode, which, however, contributed significantly to mitigating the detrimental effects of drought. After the situation subsided, water levels returned to very low values rather quickly.

In mid-November there was a rainfall episode which resulted to an increase in flows particularly in the Upper Elbe and the Jizera River Basins. The most abundant rainfall occurred on 15 November, when 20 to 35 mm/24h fell in the windward of the northern mountains near the borders, in the Jizera Mountains and the Krkonoše Mountains it was 45 to 80 mm/24h, in some areas of the Orlice Mountains the values were even higher. This precipitation resulted in significant rise of water levels in the watercourses in the upper stream of the Jizera River, the Upper Elbe and the Upper Orlice River Basins. FAD II was exceeded in the Jizera River in Jablonec nad Jizerou and waves culminated at night on 16 November at $Q_{1/2-1}$. The most distinct response was recorded in the Jizerka River in the Jizerka profile where the culmination occurred at Q_2.

A more noticeable runoff episode occurred at the end of November 2015. On 29 to 30 November there was abundant rainfall on the whole Czech Republic. The highest totals were recorded in the southwest of the country with values around 70 mm/24h. In response to these rains, FAD was reached in several profiles. FAD III was reached on 1 December in the Vydra River at the Modrava profile and in the Otava River at the Rejštejn and Sušice profiles. FAD II was recorded in the Elber River in the Vestřev profile and in the Divoká Orlice River in the Orlické Zahoří profile. Culminations reached levels of streamwlo just below Q_2, in the case of the Vydra River in the Modrava profile the values were Q_5.

2.2 Remedying flood damage

Ministry of Agriculture

In 2015, the programme of remedying flood damage to state-owned water management property II as well as the programme of remedying flood damage to infrastructure of water supply systems and sewerage systems continued.

The programme 129 270 "Remedying flood damage to state-owned water management property II" continued in 2014 through the sub-programme:

129 272 "Remedying the impacts of floods in 2013", which was prepared in response to flood situations that occurred in 2013. Its implementation was launched on 11 September 2013 and will be terminated on 31 December 2016. The applicants for support are the River Boards, s. e. and Forests of the Czech Republic, s. e.

The programme 129 140 "Support for remedying flood damage to infrastructure of water supply systems and sewerage systems" continued in 2014 through the sub-programme:

129 144 "Support for remedying flood damage caused by floods in 2013" – this sub-programme was prepared in response to flood situations that occurred in 2013 and was launched on 17 September 2013, the expected date of completing this sub-programme is 31 December 2015. The applicants for support for remedying flood damage to the infrastructure of water supply systems and sewerage systems are municipalities and water management joint-stock companies with majority shareholdings of towns and municipalities.

The objective of the above-mentioned programme is to remedy flood damage to state-owned water management property in order to ensure the function of stream channels and water management structures.

More detailed information including the finances of both sub-programmes are provided in Chapter 9.1 of this Report.

Ministry of the Environment

The Ministry of the Environment continued in 2015 administering the grant programme "MoE Clean-up after natural disasters".

The programme was initiated by repeated natural disasters, in particular floods that have affected various regions of the Czech Republic in recent years and caused considerable damage. The main objective of the programme is to remedy damage caused by a natural disaster with the aim of restoring the damaged areas and property that is under the competence of the Ministry of the Environment hereinafter referred to as the "MoE").

The programme is divided into sub-programmes depending on the nature of the disaster and the period when such a disaster occurred.

In 2015 the grant programme "MoE Clean-up after natural disasters", sub-programme "MoE Floods 2013" continued to be implemented. Documents with instructions were issued and grants were paid to applicants after they met all required conditions. The Ministry of Finances approved the prolongation of the programme until 31 December 2017.

New documents for the sub-programme "Clean-up after natural disasters 2014" were issued. This sub-programme responds to events caused by short-term torrential rains in the South Moravian Region. According to Government Resolution of the Czech Republic No. 960 of 24 November 2014, the MoE Chapter was strengthened with CZK 50 million intended for remedying the damage.

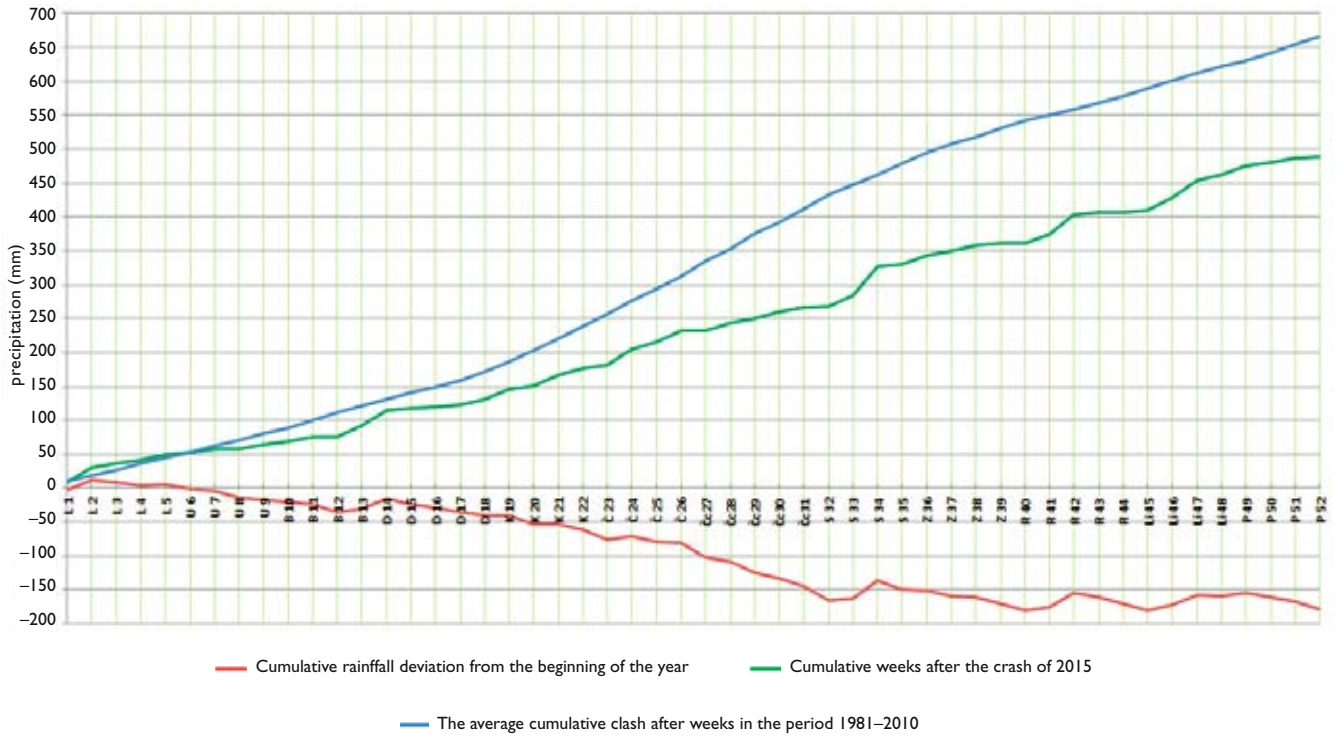
The MoE prepared new documents of so-called "Sleeping programme" intended to respond quickly to the new need for remedying damage caused by natural disasters. There is an effort to eliminate mistakes and obstacles that have occurred in the current documents of the programme and led to a delay of its approval and administrative complications during its implementation.

2.3 Drought situation

The dry episode that affected the whole Czech Republic in 2015 is one of the most significant periods of drought in history in our country.

Extreme drought that culminated in the Czech Republic in July and August started to demonstrate with the deficit of atmospheric precipitation in February 2015 and this deficit deepened in the following months reaching its maximum in November (see Graph 2.3.1). The precipitation deficit was caused by the circulation and anomalies in the atmosphere. The meteorological situation that caused the drought is described in a great detail in the "Evaluation of the drought in the Czech Republic in 2015". The report may be downloaded at the website of the Czech Hydrometeorological Institute.

Chart 2.3.1.
Comparison of rainfall in 2015 with the long-term average



Source: Czech Hydrometeorological Institute

Drought prediction is a very complex process as it involves interaction between the temperature and humidity of air as well as landscape (especially the soil) before the onset of drought. The CHI monitors basic indicators thanks to which it is possible to describe the current drought in the Czech Republic. The current values are available on the nationwide scale on the website of the CHI and they provide clear information about which part has been affected by what type of drought. You may also download "Weekly reports on hydrometeorological situation and drought in the Czech Republic" at its website. The reports can be found in the CHI archive from 2014.

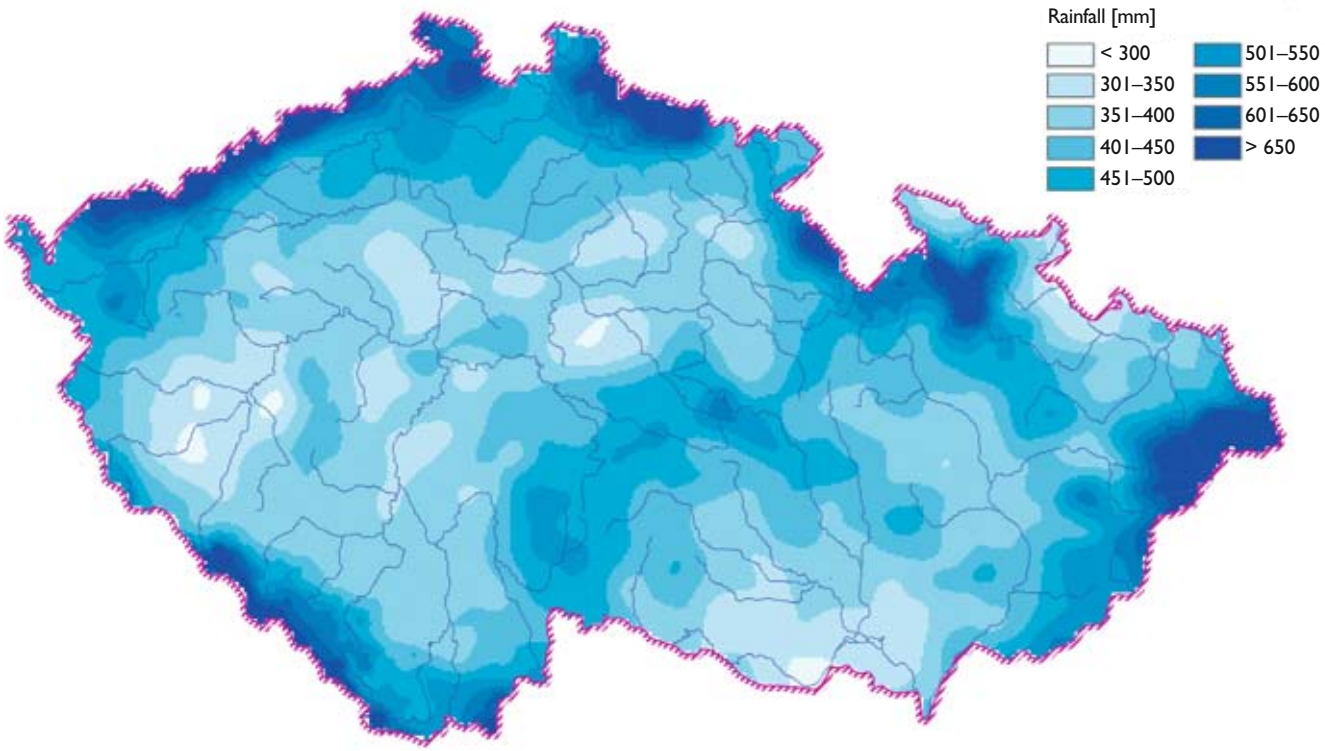
The assessment of drought intensity is based on the evaluation of precipitation and temperature characteristics, assessment of flows in watercourses, groundwaters, water balance, snow covers, etc.

2.3.1 Evaluation of precipitation and temperature characteristics

The decreased precipitation amount and increased air temperature caused drought in the Czech Republic. Figures 2.3.1.1 and 2.3.1.2 show the distribution of these characteristics in the Czech Republic in 2015.

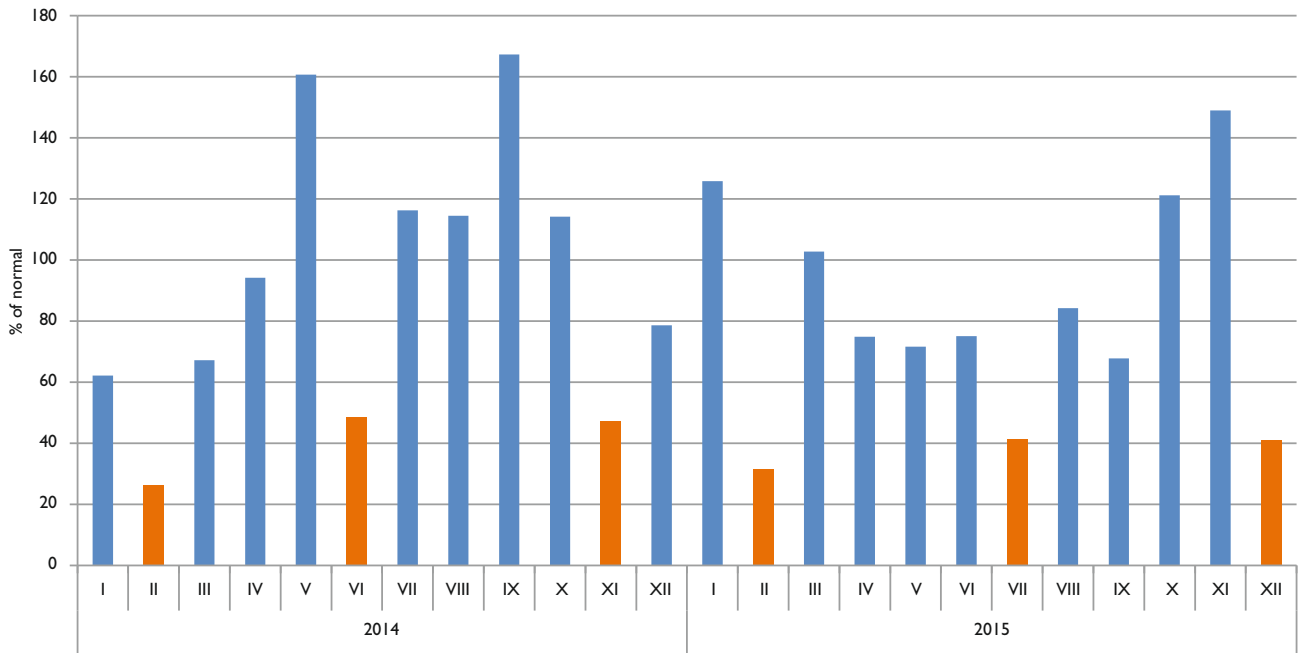
The lowest precipitation amount in 2015 fell in the cadastral units of Kutná Hora, Kolín, Domažlice, Znojmo, Pilsen and the surroundings. In 2015, precipitation amount in the Czech Republic was below-average with the average total below 500 mm (the long-term average value monitored in 1981–2010 is more than 650 mm – see Chart 2.3.1.1), the average precipitation deficit thus exceeded 150 mm. Chart 2.3.1.1 shows that most monthly precipitation totals were lower than in 2014, of which February, July and December were considerably below-average when compared with the long-term average. These deficits later reflected in the water levels of surface waters and groundwaters.

Figure 2.3.1.1
Distribution of rainfall in the Czech Republic in 2015



Source: Czech Hydrometeorological Institute

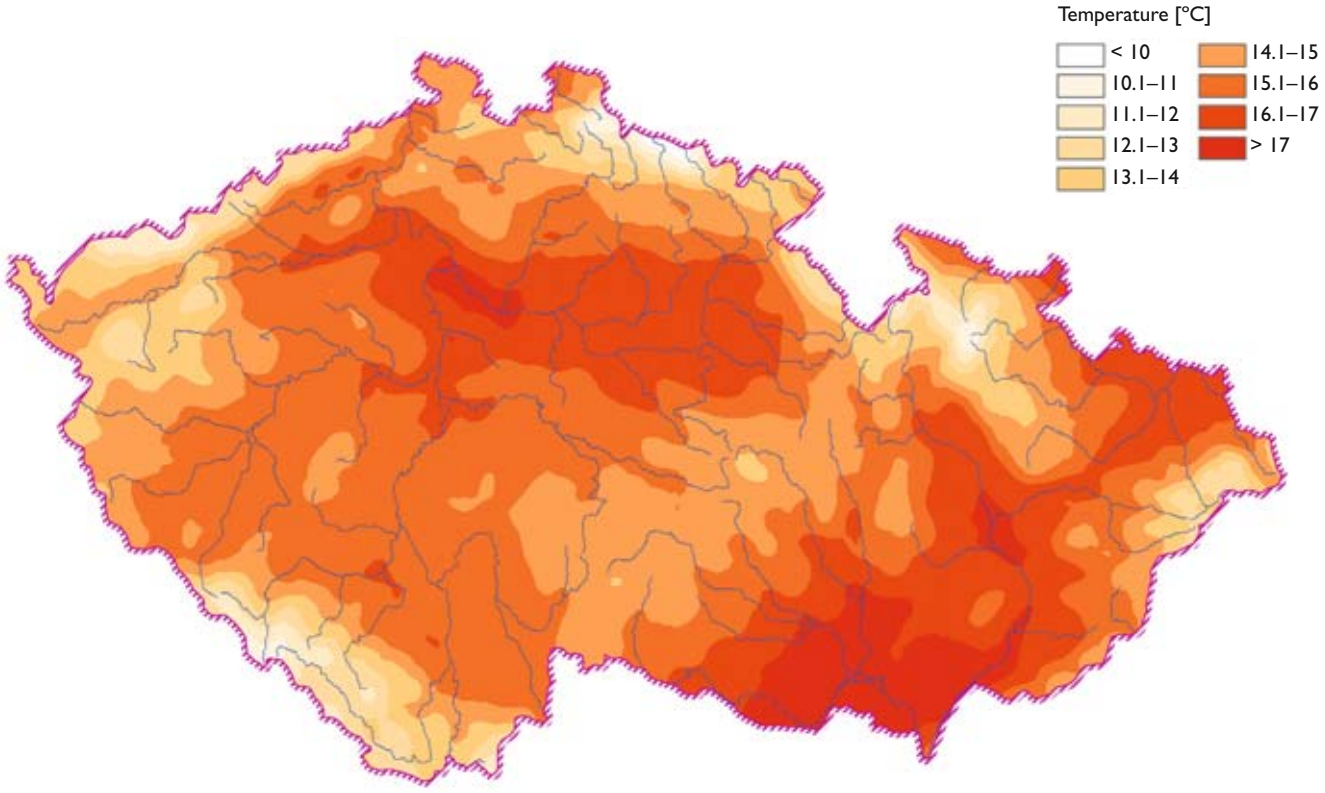
Chart 2.3.1.1
The course of monthly precipitation in the Czech Republic in% of normal for 1981–2010 in 2015



Source: Czech Hydrometeorological Institute
Note: Different colours are the months when rainfall was severely subnormal or extremely below normal.

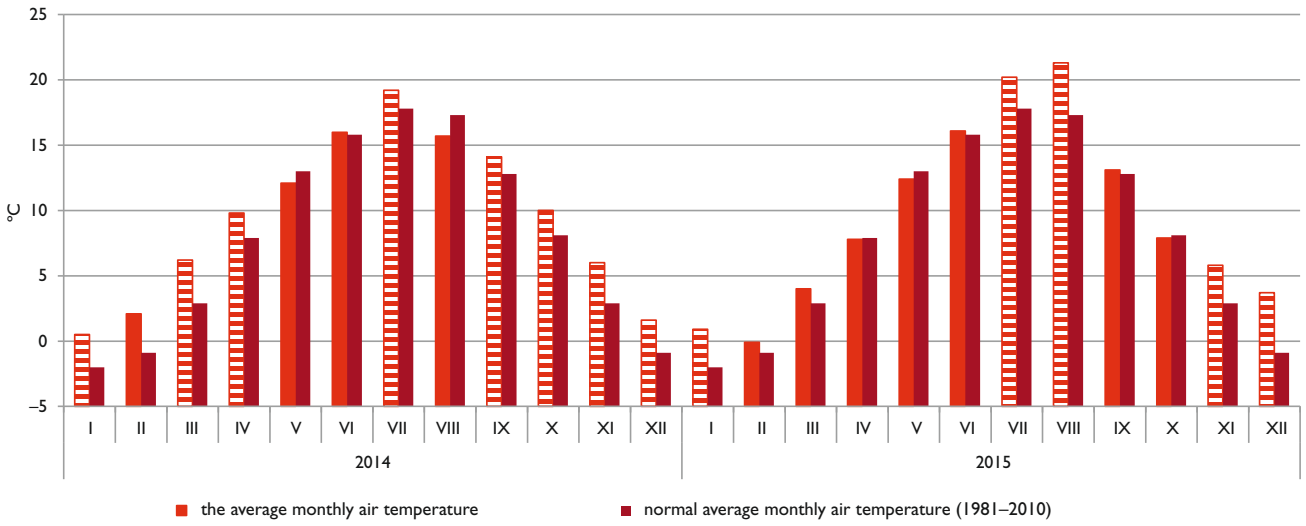
By contrast, in terms of temperature 2015 was highly above-average, which enhanced evaporation and intensified the drought. Chart 2.3.1.2 shows comparison of temperatures measured in the past two years with average values for 1981–2010. July, August and December were abnormally warm. The average temperature of the summer months (July and August) in the Czech Republic was 19.2 °C, which makes it the second warmest summer from 1961. The highest temperatures in 2015 were recorded in the following districts: Břeclav, Hodonín, Znojmo, Brno, Kroměříž, Přerov, Prague-East, Mělník (see Figure 2.3.1.2).

Figure 2.3.1.2
Distribution of mean annual air temperature in the Czech Republic in 2015



Source: Czech Hydrometeorological Institute

Chart 2.3.1.2
The course of the average monthly temperature in the Czech Republic in the period from January 2014 to December 2015



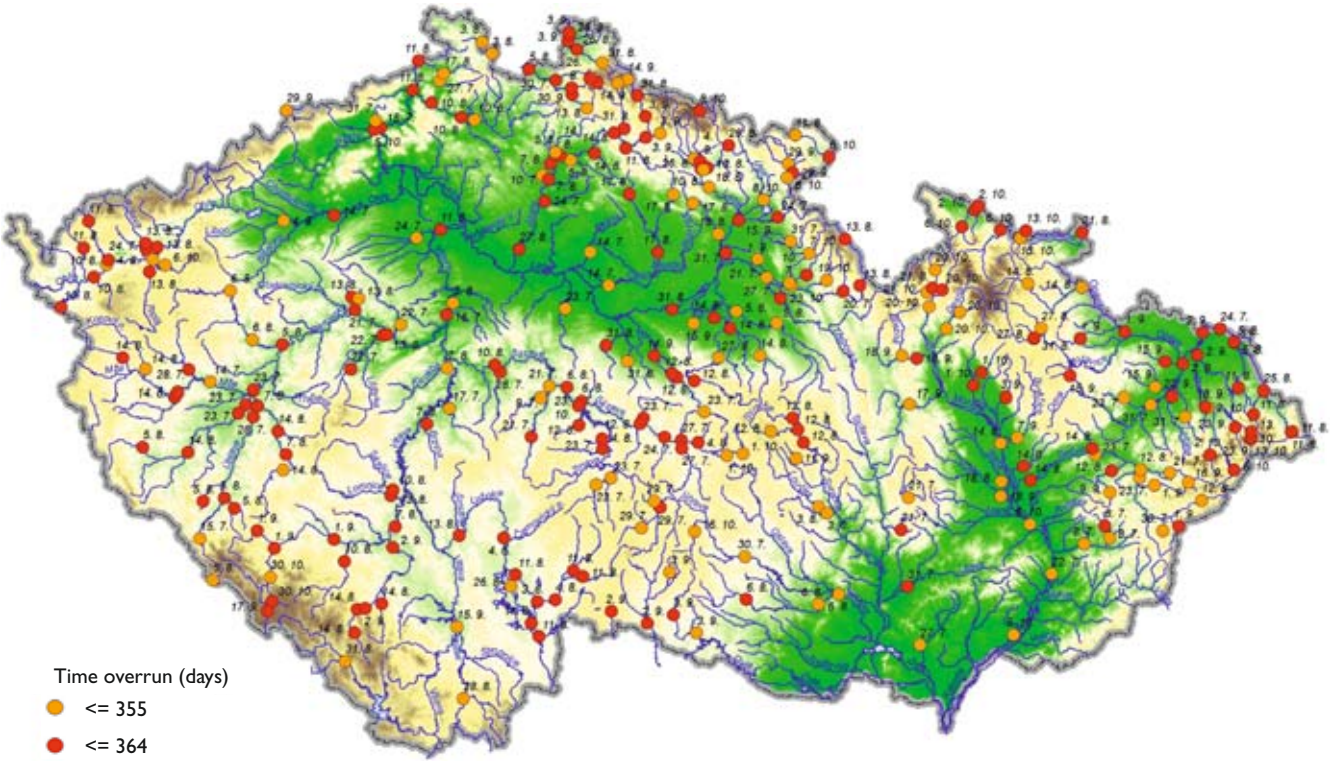
Source: Czech Hydrometeorological Institute
Note: Hatching the month, when monthly temperature was above normal, strongly oversized or extremely oversized.

2.3.2 Evaluation of minimum flows in surface waters

From the perspective of surface water deficit in the Elbe, Vltava and Oder River Basins, 2015 was one of the worst years.

The occurrence of minimum flows in watercourses is always linked to a considerable precipitation deficit and a gradual decrease in water amount in the basins. In watercourses with natural hydrologic regime, minimal rates of flow are constituted exclusively of the discharge of groundwaters. In segments of watercourses under hydraulic structures with accumulation space, their purpose is – among others – ensuring the minimum discharge, flows did not decline below the values of the pre-defined minima. Therefore, these hydraulic structures significantly mitigated the situation in watercourses. Hydrological manifestations of drought in 2015 affected almost the whole territory of the Czech Republic. The occurrence of hydrological drought is defined as a decline of a rate of flow below Q_{355d}. In case of another drop below Q_{364d} it is a very significant hydrological drought. The rate of flow in most watercourses dropped under Q_{355d}, even for several weeks. As can be seen in Figure 2.3.2.1, hydrological drought occurred virtually in the whole territory of the Czech Republic and its intensity is documented also by the number of profiles with rates of flow below Q_{364d}.

Figure 2.3.2.1
Overview of hydrometric profiles measured daily flow of 355 and less



Source: Czech Hydrometeorological Institute

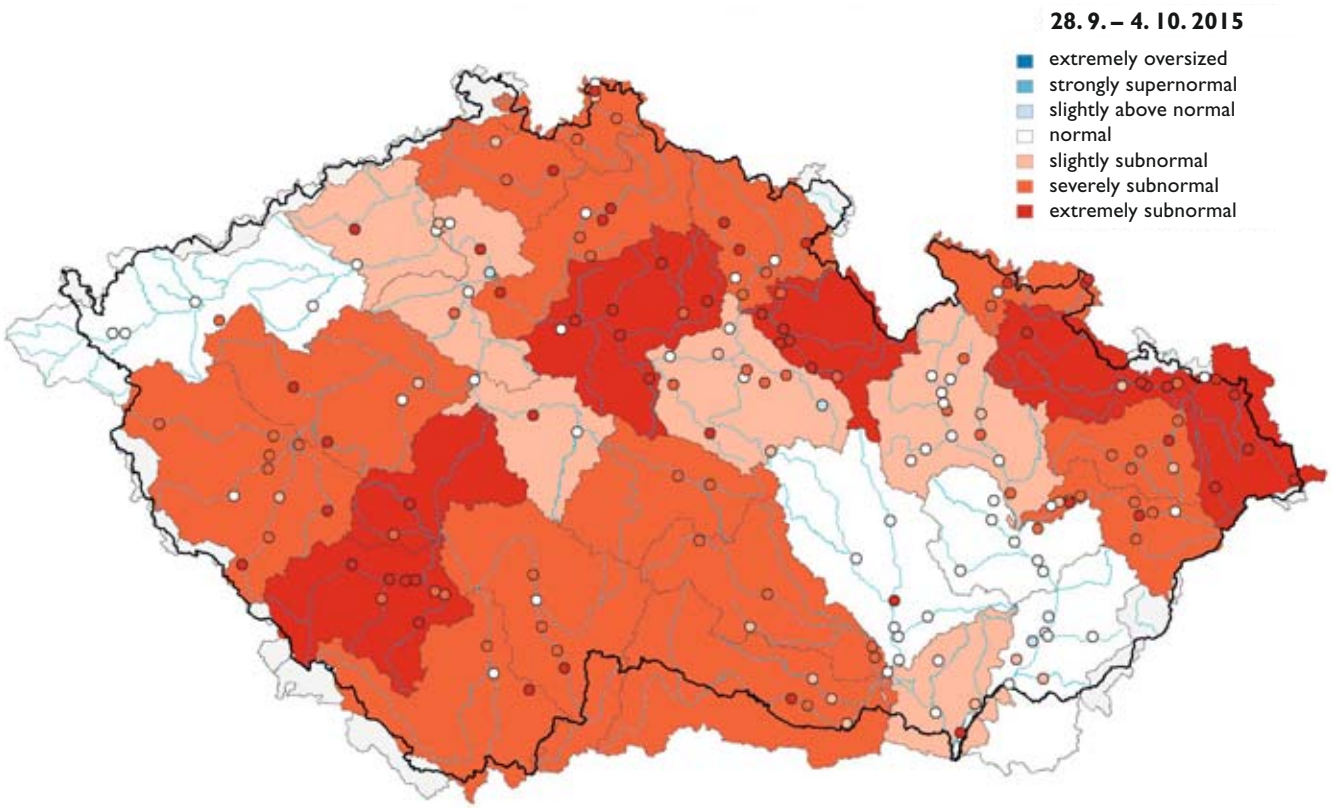
2.3.3 Evaluation of the groundwaters

Groundwater situation is evaluated according to the likelihood of exceeding the water level limit in a well in each calendar month. Drought is characterised by three categories of seriousness derived from the reference period 1981–2010.

Moderate drought are slightly below-average situations with 75–85% likelihood of exceeding the limit, strong drought are strongly below-average situations with 85–95% likelihood of exceeding the limit and exceptional drought are exceptionally below-average situations that correspond with the lowest 5% of observations. Analogically, 15–25% likelihood of exceeding the limit signals a slightly above-average water level, 5–15% likelihood is a strongly above-average water level and strongly above-average are situations that correspond with the highest 5% of observations. Evaluation is carried out for individual objects as well as for predefined segments of river basins. In terms of groundwaters, the most affected areas were northeast Bohemia and northeast Moravia. In mid-August drought was reported in 59% of shallow wells and 56% springs. It took longest time before groundwaters returned to average values. At the beginning of October, the water level of groundwaters in shallow wells was slightly, strongly or exceptionally below-average in most of the territory of the Czech Republic. With more and more rain, the situation of groundwaters started improving little by little. The number of wells where the groundwater level returned to normal by the beginning of December was recorded in 44% of the objects (see Figure 2.3.3.2). Unfortunately, December was below-average in terms of precipitation, which reflected again in slight deterioration (see Figure 2.3.3.3).

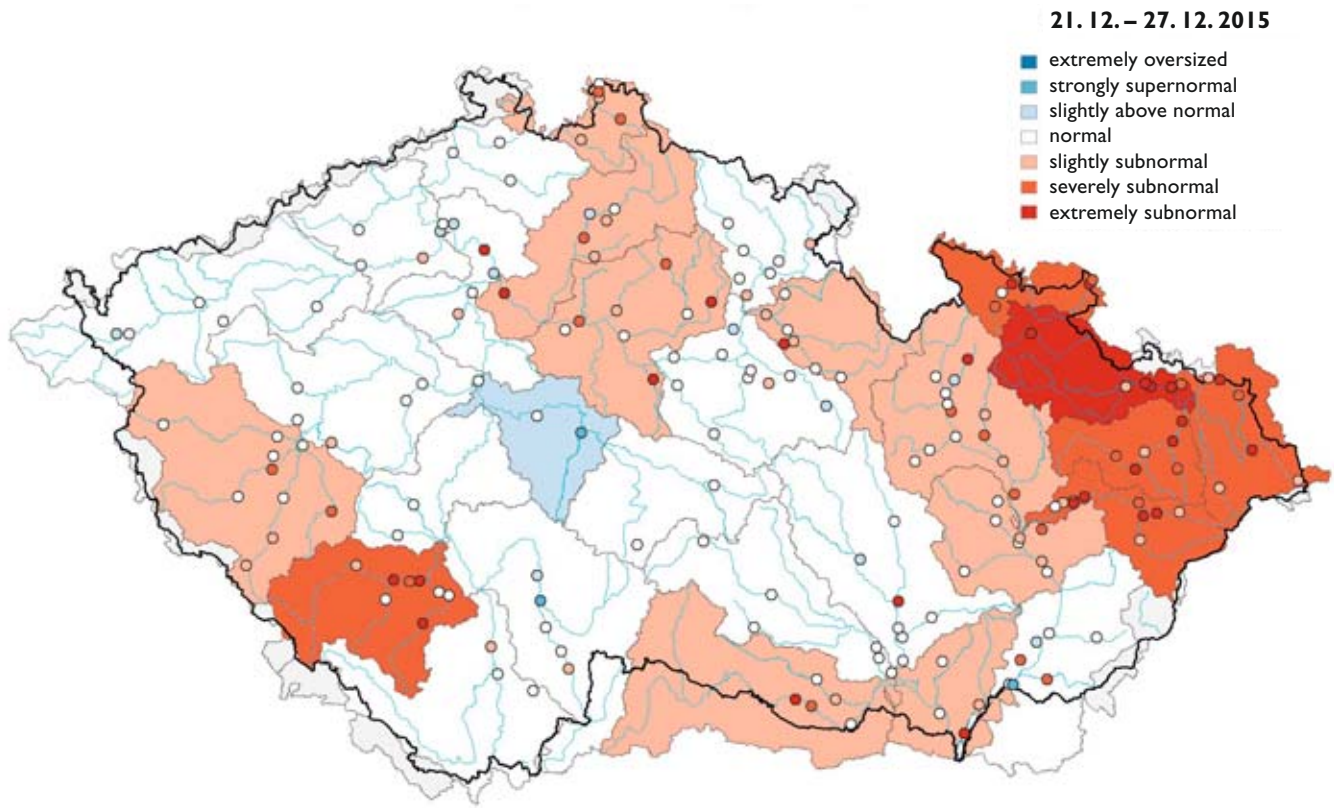
Water reservoir Obecnice, drought (author: Petr Vicenda)

Figure 2.3.3.1.
Status of groundwater levels in shallow wells, 40th week of 2015



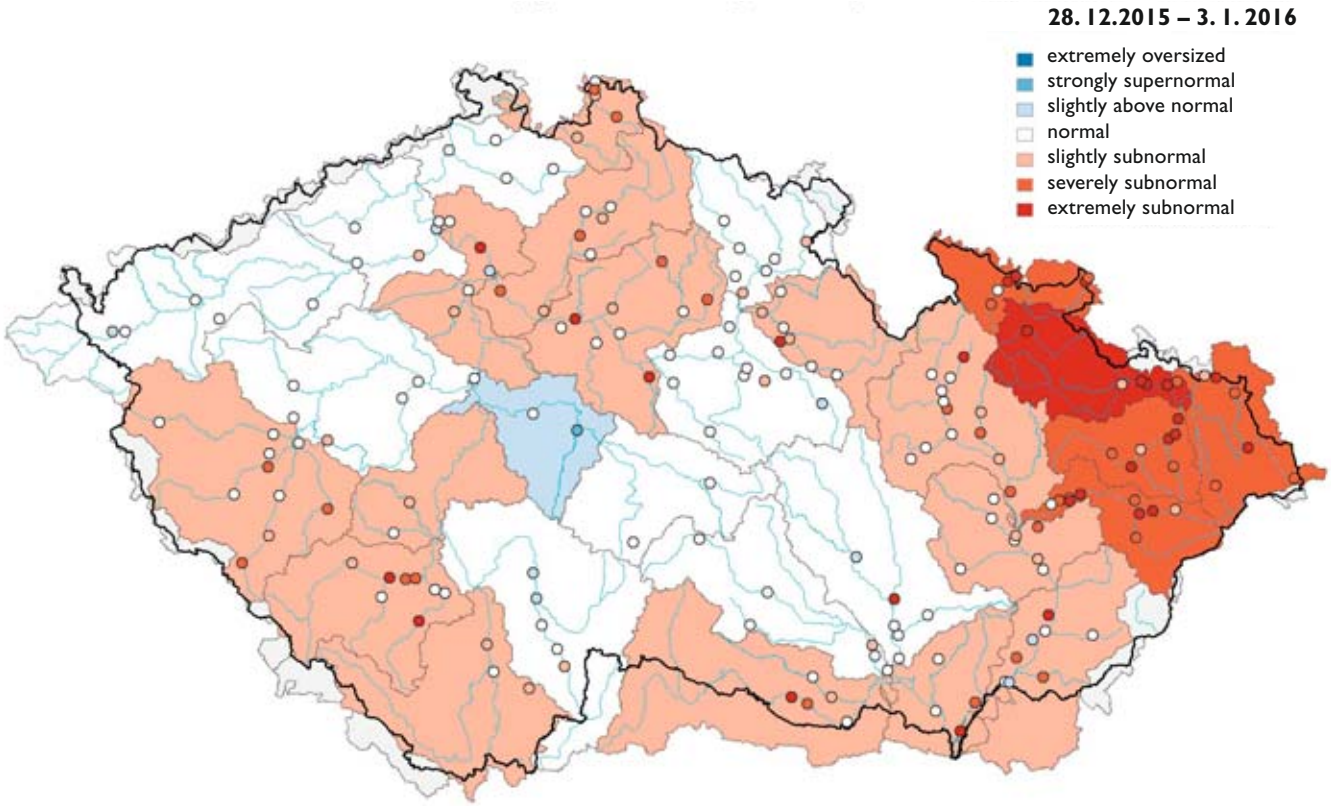
Source: Czech Hydrometeorological Institute

Figure 2.3.3.2
Status of groundwater levels in shallow wells, 52nd week of 2015



Source: Czech Hydrometeorological Institute

Figure2.3.3.3
Status of groundwater levels in shallow wells, 53rd week of 2015



Source: Czech Hydrometeorological Institute

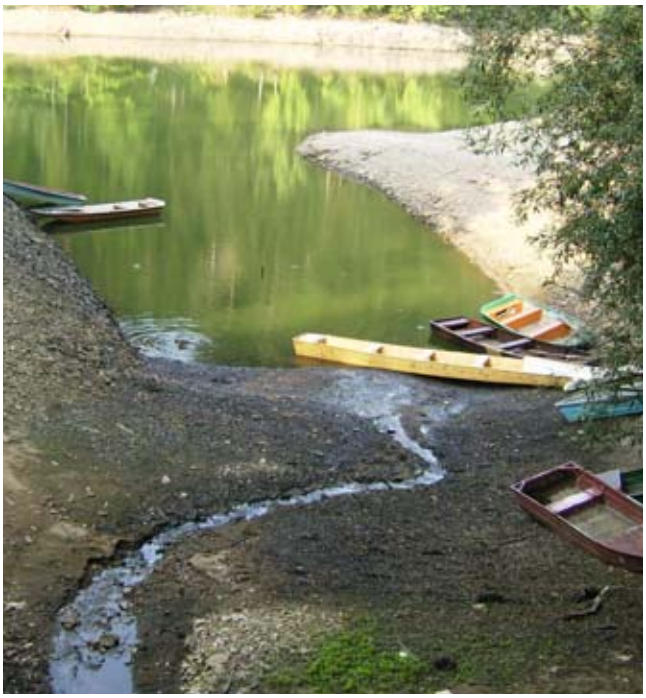
2.4 Interdepartmental committee WATER-DROUGHT

Interdepartmental committee WATER-DROUGHT was established with the purpose of finding rapidly and effectively suitable solutions that could mitigate the negative impacts of climate changes. First indications of the problem occurred in episodes of drought in 2013 and 2014. Out of the initiative of the Minister of the Environment Richard Brabec and the Minister of Agriculture Marian Jurečka, an intradepartmental committee was established in August 2014 and on 9 October 2014 the first founding meeting of the interdepartmental committee WATER-DROUGHT was held.

2015 was the year of intense work on carrying out the tasks resulting from the Government Resolution No. 620 of 29 July 2015 that includes a document called "Preparation of Taking Measures with the View of Mitigating Negative Impacts of Drought and Lack of Water". This document includes 50 tasks that are solved in cooperation by the MoE, the Ministry of Agriculture (hereinafter referred to as the "MoA"), the Ministry of Defence, the Ministry of the Interior, the Ministry of Industry and Trade and the Ministry of Regional Development. Solving the tasks comprises extensive analysis aimed at gaining information whether each proposed measure is or is not beneficial for mitigating the impacts of drought and how they can be applied.

The activities performed by the interdepartmental committee in 2015 were reported in the document "Information on carrying out tasks under Preparation of Taking Measures with the View of Mitigating Negative Impacts of Drought and Lack of Water" that will be submitted to the government as informative material in the first half of 2016. The document will include the solutions proposed by the ministries involved.

Results of this cooperation will be presented to the government by the end of 2016 and they will be used for compiling up a concept of protection against consequences of drought in the Czech Republic while taking advantage of the measure taken. The concept is to be presented to the government by 30 June 2017.



Water reservoir Pastviny, drought (source: Elbe River Board, s. e.)

Adéla Benediktová – Lifeguard –4th class, Primary school Mánesova 485, Stříbro, Pilsen Region

3. Quality of surface waters and groundwaters

3.1 Surface water quality

Current surface water quality in comparison with the 1991–1992 two-year period

The map of the quality of waters in selected watercourses of the Czech Republic was produced with regard to both the 1991–1992 two-year period and the 2014–2015 period, under CSN 75 72221 standard Water Quality – Classification of Surface Water Quality.

Every year the Report on Water Management in the Czech Republic compares the current status of water quality to the status of water quality in the 1991–1992 period. With regard to the scope of indicators monitored at that time, only a basic classification could be used for this comparison. Figure 3.1.2 shows that despite significant improvement of water quality, some watercourse stretches (though very short ones) in the Czech Republic are still classified in water quality Class V.

To produce the above presented map of quality of water in watercourses of the Czech Republic for the period 2014–2015, the resulting evaluation from selected profiles of the water quality monitoring network provided by the Czech Hydrometeorological Institute (from primary data sent by the individual River Boards, s. e.). The respective monitored hydrometric profiles are classified in the following water contamination classes under the CSN 75 7221 standard:

Class I unpolluted water – surface water status that was not significantly affected by human activity, with water quality indicators do not exceed values corresponding to the common natural background of the respective watercourse,

Class II slightly polluted water – surface water status that was affected by human activity to an extent that water quality indicators attain values allowing for the existence of a rich, balanced and sustainable ecosystem,

Class III polluted water – surface water status that was affected by human activity to an extent that water quality indicators attain values that may not be conducive to conditions allowing for the existence of a rich, balanced and sustainable ecosystem,

Class IV heavily polluted water – surface water status that was affected by human activity to an extent that water quality indicators attain values that are conductive to conditions allowing for the existence of only an unbalanced ecosystem,

Class V very heavily polluted water – surface water status that was affected by human activity to an extent that water quality indicators attain values that are conductive to conditions allowing for the existence of only a heavily unbalanced ecosystem.

Radioactivity

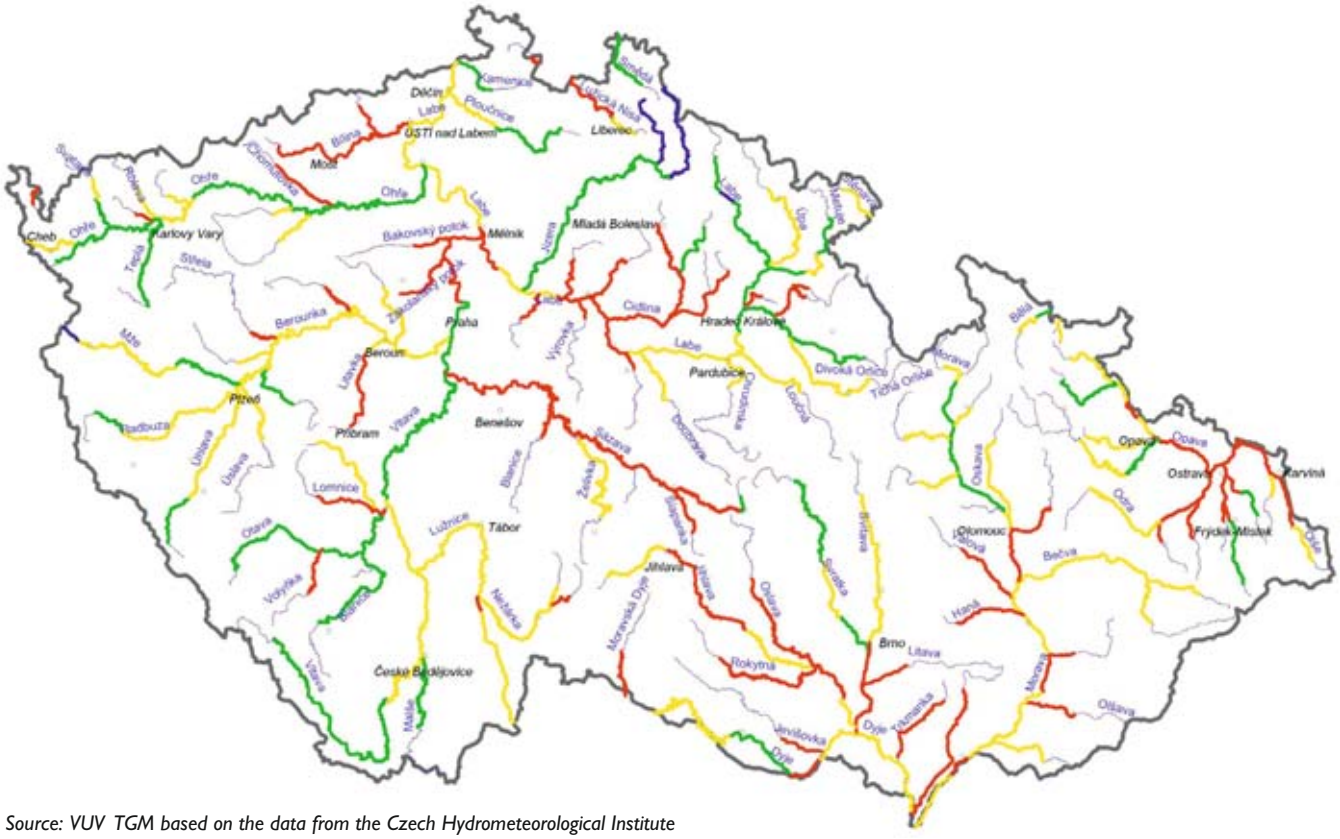
In surface waters radiological indicators are monitored on a long-term basis in selected hydrometric profiles of the national monitoring network. These profiles are situated at locations of nuclear facilities currently in operation and in watercourse stretches affected by the discharge of mine waters and by the seepage from refuse dumps at locations where uranium ores were formerly mined or treated.

In 2015, the annual average volume activity of tritium was 29.7 Bq/l in surface waters of the Vltava – Solenice hydrometric profile (downstream of the outlet of waste waters from the Temelín nuclear power plant), in the Vltava – Prague profile it was 18.8 Bq/l and before the mouth to the Elbe River in the Vltava – Zelčín the value was 15.6 Bq/l. These values are in compliance with the Environmental Quality Standards (EQS) for tritium in surface waters pursuant to Government Decree No. 61/2003 Coll., as amended, in force until 2015. The total volume activity alpha and beta was also detected in values entirely in compliance with the EQS. Other activation and fission products produced during nuclear power plant operation were not detected. Low volume activities of strontium 90 and cesium 137 corresponding to the residual contamination after atmospheric tests of nuclear weapons and the Chernobyl Nuclear Power Plant accident in last century were detected.

In the vicinity of uranium ore deposits in the Příbram area, increased values of radiological indicators (under CSN 75 7221 standard the surface water quality corresponds to Quality Class V) are found repeatedly every year in surface waters in the Kocába – Višňová profile and in the Drásovský stream – Drásov profile.

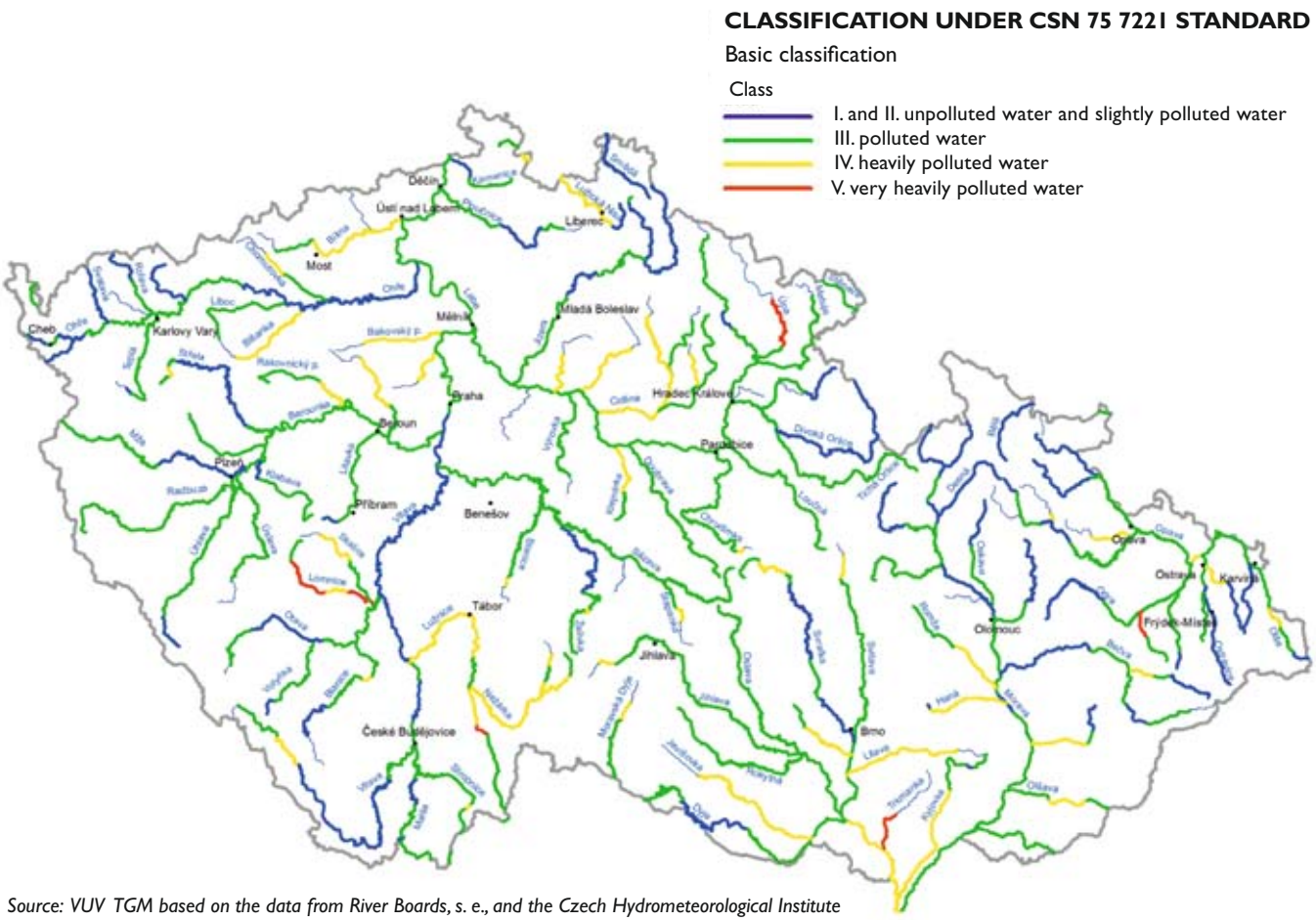
Water reservoir Pařížov, drought (source: Elbe River Board, s. e.)

Figure 3.1.1
Quality of water in watercourses in the Czech Republic in 1991–1992



Source: VUV TGM based on the data from the Czech Hydrometeorological Institute

Figure 3.1.2
Quality of water in watercourses in the Czech Republic in 2014–2015



Source: VUV TGM based on the data from River Boards, s. e., and the Czech Hydrometeorological Institute

Downstream of the outlet of waste waters from the Dukovany Nuclear Power Plant the average amount activity of tritium for 2014–2015 was 124.5 Bq/l in the Jihlava – Mohelno profile and 68.9 Bq/l in the Jihlava – Ivančice profile. The detected values are in compliance with EQS–AV and EQS–HAV for tritium in surface waters. The total amount activity beta was also detected in values entirely in compliance with the EQS. The resulting statistically calculated typical values of the total amount activity beta (as well as activity beta after correction to 40K) under CSN 75 7221 classified both profiles in Class I, tritium was classified in Class II of water quality.

In 2015, the quality of surface waters around the uranium mine in Dolní Rožínka downstream of the outlet of waste waters from uranium ore treatment was, according to the radiological values detected under CSN 75 7221 classified in Class V – very heavily polluted water.

With regard to the evaluation of monitoring radioactivity in surface waters in the area (in the Ploučnice River Basin) downstream of the uranium ore deposit in Stráž pod Ralskem it can be stated that for the total volume activity alpha and the total volume activity beta the values of environmental quality standards set by the Government Decree No. 61/2003 Coll., as amended, were not exceeded. Based on the evaluation according to CSN 75 7221 standard, the hydrometric profile Ploučnice – Česká Lípa can be classified in Class I of water quality. The highest class of water pollution, Class V, was detected in Stráž pod Ralskem - Mlýnský stream; in the Mimoň - Ploučnice the surface water was classified in Class IV. Pollution of surface waters was also detected in Jáchymovský stream, especially in respect of high value of the total volume activity alpha indicator corresponding, under CSN 75 7221, with Class V of water quality.

Water quality in water supply reservoirs and other reservoirs

On the territory of the Czech Republic, 2015 with the mean annual air temperature of 9.4 °C showed markedly above-average values. The average precipitation amount on the entire territory of the Czech Republic reached only 531 mm, which represents 79% of the long-term precipitation average. A number of water reservoirs (similarly to previous years) showed the presence of cyanobacterial bloom.

From the perspective of reservoirs administered by the Elbe River Board, s. e., 2015 is one of the driest years in the history of 37 years of monitoring total precipitation amount. Lower rainfall amounts caused water levels of some reservoirs (Souš, Rozkoš, Seč) to decrease markedly. A dramatic situation occurred especially in the Rozkoš Reservoir, where exceptional manipulation was considered in autumn. High water temperature and low amounts of inflow into reservoirs created favourable conditions for the development of algae and cyanobacteria. The situation in most reservoirs became only balanced with autumn temperature drop and slightly increased precipitation amount. In the Hamry water supply reservoir the surface water temperature exceeded 25 °C in summer. Increased concentration of total phosphorus (40–50 µg/l) caused intensive development of algae and cyanobacteria (in order to improve the water quality, regulatory catch of accompanying fish species was carried out). At the Křižanovice water supply reservoir the quality of water was relatively good (28 mg/l chlorophyll-a, transparency more than 200 cm, in August 120–200 cm). Surprisingly good water quality was also in Vrchlice water reservoir (transparency 200–440 cm). Higher concentration levels of chlorophyll-a were only detected at the place of raw water abstraction (exceeding 35 mg/l) at the end of summer. At the Josefův Důl water supply reservoir, unusually high numbers of picocyanobacteria of the Merismopedia family were found again. With respect to the distribution in layers underneath the surface and thanks to new technology at the Bedřichov water treatment plant, the quality of water supply was not endangered. In order to eliminate low pH values after spring thawing, alkalization of snow-water was repeatedly performed using aircraft at the Souš Reservoir. Problems also occurred in reservoirs that are significant for water supply system. At the Labská reservoir the water quality impaired at the beginning of summer (transparency fell to 150 cm in the second half of July), maximum concentrations of chlorophyll-a exceeded 35 mg/l in June. In the remainder of the period the water quality was satisfactory. At the Seč Reservoir, considerable development of cyanobacteria occurred in summer (on 29 June a warning of inappropriateness of bathing for sensitive individuals was issued). Due to the development of Aphanizomenon flos-aquae cyanobacteria, an interim ban was imposed on bathing on 30 July 2015 by taking a general preventive measure at the Rozkoš reservoir. At the Pastviny reservoir the water quality detrimented markedly in August. Low inflow into the reservoir in combination with high temperature caused intensive development of algae and cyanobacteria. A similar situation occurred at the Mšeno water reservoir in the second half of August. At the Harcov reservoir, there was a problem related to the occurrence of cyanobacteria and the water was not completely suitable for bathing. Water in Bedřichov reservoir was traditionally of excellent quality. Water quality at Fojtka reservoir was impaired (transparency for most of the period below 200 cm, the maximum concentrations of chlorophyll-a reached 52 mg/l). The poorest water quality was traditionally at reservoirs with frequent replacement of water such as Les Království and Pařížov.

At the beginning of 2015, water quality in reservoirs administered by the Vltava River Board, s. e., was affected by dry winter and spring, followed immediately by very dry summer, while higher rates of flow only occurred at the end of the year. Low rates of flow meant – to a certain extent – low input of nutrients in the monitored inflows, especially the content of phosphorus at point sources did not reach the values that could be expected in the algorithm of so-called mixing equation. In extremely low flows the favourable effect of self-cleaning processes was demonstrated much more intensely (especially in streams in a natural condition): these included, e.g., Střela that inflows in Žlutice reservoir, the Vltava River downstream of Lipno reservoir and the Mže River upstream Hracholusky reservoir. In some tributaries the phosphorus concentrations remained principally the same as in the previous years (at Orlík and Slapy reservoirs). Where the source of phosphorus emissions is situated just upstream of the inflows into a water reservoir (no self-cleaning process could occur), increased concentrations of this macrobiogenic element were detected (for instance at Římov supply water supply reservoir with respect of the waste water treatment plant in Kaplice and at Švihov water supply reservoir due to waste water treatment plant in Pelhřimov). Low rates of flow also reflected in the time how long water remained in reservoirs (it is a factor that is beneficial to water quality), which is why the water quality was not unfavourable in this extremely dry year. There were situations that caused short-term operational problems to water treatment plants. These included especially unusual development of some species of phytoplankton – at Římova reservoir there was a high autumn concentration of the Staurastrum sp., at Žlutice an extreme situation with cyanobacteria occurred. Oxygen regime deterioration occurred due to rather long lasting and stable temperature stratification (e.g. at Nýrsko reservoir). Significantly impaired water quality was detected at Karhov and České údolí water reservoirs. The former reservoir was intensely internally burdened with phosphorus and an alga from the Raphidophyceae sp. (Vacuolaria family) developed dramatically, which lead to substantial impairment of the quality of raw water used for treatment. České údolí reservoir is shallow,

Lednice-Valtice (author: Petr Soukup)

hypertrophic and used for recreational purposes: in summer 2015 an intense development of cyanobacterial bloom was detected here, which was also due to the intense internal phosphorus concentration. In terms of threats to water quality by pesticidal substances, constantly unfavourable situation remains at Švihov water supply reservoir. In the dry year of 2015, the inflow of these substances from supply sources was significantly decreased, but as the theoretic water retention time is approx. 1.5 years, the positive effect detected may be regarded as not very significant.

In reservoirs administered by the Ohře River Board, s. e., there were no serious threats to the raw water supplied. Between August and October, desludging consisting in the discharge of anoxic layer was carried out at Mariánské Lázně and Stanovice water supply reservoirs. Detailed information about any problems with water treatability are available at the operators of the water treatment plants (SčVK, a. s. Teplice, Vodárny a kanalizace Karlovy Vary, a. s., VOS Sokolov, a. s., CHEVAK, a. s.).

The quality of water in reservoirs administered by the Morava River Board, s. e., was affected by exceptionally warm and dry summer, there were precipitation deficits for the third year in a row, which reflected in very low rates of flows and subsequently in markedly impaired water quality in the inflow parts of the following reservoirs: Brno, Vír, Mostiště and Vranov. The most problematic is the continual deterioration of water quality (formerly almost oligotrophic) at Landštejn reservoir. With the exception of inflow parts of some dams, no mass water bloom was formed, only exceptionally cyanobacteria Woronichinia naegeliana developed in some reservoirs in late summer and autumn months. This growing season was also characterised by mass development of dinoflagellates (especially of the Ceratium furcoides family, e.g., at Brno and Mostiště water supply reservoirs) in summer. As for water supply reservoirs, the purest oligotrophic or slightly eutrophic ones were the following: Karolinka, Slušovice, Bojkovice and Koryčany. Worse mesotrophy occurred at Boskovice reservoir. Slightly eutrophic was Opatovice reservoir, eutrophic reservoirs were Znojmo, Hubenov and Landštejn, where – similarly to 2014 – cyanobacteria of the Dolichospermum family (formerly Anabaena) strongly developed in summer. Strong eutrophy and at the point of inflows even hypertrophy was detected at Vír, Mostiště and Fryšták reservoirs. The best recreational reservoirs were eutrophic Letovice, Horní Bečva, Bystřička, Plumlov reservoirs and the lake part of Vranov reservoir by the embankment which corresponded to mezotrophy. In strongly eutrophic Nové Mlýny reservoirs, the cyanobacterial bloom was not as intense as in 2014, most of the biomass consisted of diatoms, especially centric ones. Luhačovice reservoirs was strongly eutrophic, hypertrophic were the following: Jevišovice, Výrovice, Podhradský pond and the inflow part of Brno and Vranov reservoirs.

Quality of raw water in water supply reservoirs administered by the Oder River Board, s. e., was, despite long lasting drought and significant decrease of water levels very good and did not require any complicated treatment to potable water. Only a partial problem was encountered at Šance valley reservoirs, where the decreased water level caused sediment to flow in the water column with subsequent increase of the turbidity. On the other hand, the positives include an improved quality of water in Kružberk water supply reservoir, which was accompanied by abundant occurrence of macrophytes, especially at the end of the heave. In comparison with previous year, there was also a reduction in cyanobacteria at Morávka water supply reservoir. As for reservoirs used for other than water supply purposes in the sub-basin of the Upper Oder River, we can generally say that the quality of water in 2015 in most reservoirs was very good and the water was suitable for any recreational activities without restrictions. Only at the Olešná reservoir, a fairly massive occurrence of cyanobacterial cells was detected at the end of the bathing season which resulted in an impaired quality of the water.

Quality of water used for bathing during the 2015 bathing season

The most frequent problems with water quality are connected with a huge presence of cyanobacteria, which every year results in imposing ban on bathing in some localities.

Act No. 258/2000 Coll., on the Protection of Public Health, as amended, regulates the rights and obligations of natural and legal persons, which must be met in the area of protection and promotion of public health; the Act further establishes a system of public health protection bodies, their scope of activity and authority. One of the areas that is protected by this Act, is outdoor bathing, operation of outdoor bathing pools, artificial bathing pools, swimming pools and saunas. Decree No. 238/2011 Coll. regulates the equipment of outdoor bathing pools and the requirements for the sampling method and frequency of inspection and also bathing water quality requirements.

Under current legislation, the list of outdoor bathing sites to be subjected to the monitoring of the quality of water used for bathing is annually, before the start of summer recreational season, published, updated and complemented (mainly on the basis of comments made by the public) on the website of the Ministry of Health (list of outdoor bathing sites on surface waters where the bathing service is offered by operator, and other surface waters used for bathing in 2015. An important role in this area is played by an amendment to the Water Act, because one of the major changes compared to the former Directive 76/160/EEC is that Member States should not only monitor the quality of water and inform the residents, but where the quality of water used for bathing is not satisfactory, the Member State must take active measures to remedy the situation. For each bathing site that is included in the list of the monitored outdoor bathing sites there must be prepared the so-called "bathing water profile", in which, among other characteristics, sources of pollution, proposals for remedial measures in the river basin, etc. are described. A more specific legislative regulation to the Water Act is Decree No. 155/2011 Coll., on Profiles of Surface Waters Used for Bathing.

According to the website of the Ministry of Health public health protection authorities monitored 276 localities used for bathing in the 2015 bathing season, of which 157 were commercial outdoor bathing sites and 119 other outdoor bathing areas. Public health protection authorities took 930 samples for laboratory testing; bathing site operators took 805 samples. On the basis of the laboratory analysis, public health protection authorities imposed ban (black symbol) on 10 bathing sites in the Czech Republic in the 2015 holiday season. Water quality that was found unsuitable for swimming (black symbol) was detected in 33 localities.

Quality of suspended matter and sediments

Monitoring of the quality of solid abiotic matrices of the aquatic ecosystem such as suspended matter and sediments is an inseparable background material ofor comprehensive assessment of the chemical condition of surface waters. Solid matrices primarily bind a lot of pollutants whose detection in water samples is problematic and an analysis in an aqueous sample does not provide reliable information about the presence (or absence) of a certain substance in surface waters. In the case of substances with significant accumulative potential, EU directives recommend complementing the monitoring of surface water quality with the monitoring in solid matrices and require monitoring of long-term trends of a set of 20 substances.

Monitoring of the chemical situation concerning solid abiotic matrices and sediments was carried out in 2015 by the Czech Hydrometeorological Institute at 47 significant watercourse profiles in accordance with general programme of monitoring and updated programme of situational monitoring of solid matrices. Monitoring of stream sediments in the field and in laboratories was carried out in cooperation with river basin administrators. The monitored indicators included contents of heavy metals, metalloids and specific organic substances with a special focus on priority substances and priority hazardous substances (in accordance with Annex X to Directive 2013/39/EU) and substance relevance to solid matrices. Similarly to the previous year, the list of monitored substances was extended by potentially hazardous substances with probably endocrine and toxic effects, whose presence in water had been previously evidence under significant projects: bisphenol A, musk compounds, triclosan. Other substances monitored included organochlorinated pesticides from old contaminated sites and some currently used pesticides. Due to limited finances, the range of monitored substances for each matrix was reduced. A gamma spectrometric analysis of radionuclides in sediments was performed in 10 selected profiles.

Revitalization of the watercourse and floodplain Rájov (source: Ohře River Board, s. e.)

The sediments were analysed for a standard full range of indicators, i.e., 127 substances in a set of 78 samples. A part of data was taken over from the dataset of the operational monitoring of the river basin administrators for the purpose of the analysis. Only heavy metals and substances of the polyaromatic hydrocarbons (PAHs) group were detected in 8 profiles. In suspended matter, 83 substances were detected in the set of 144 samples (36 profiles with the sampling frequency of four times a year). Unlike in sediment analysis, this monitoring did not cover substances from the group of polybrominated diphenylethers (under the limit of determinability over the long term) and priority substance diethylhexyl phthalate (DEHP, under the qualitative limit over the long term).

The assessment of the results of monitoring of the quality of solid matrix and their chemical situation was carried out in accordance with amendment No. 23/2011 Coll., in force until the end of 2015. Not exceeding the EQS is one of the objectives required for achieving a good chemical condition in water vodních útvarů. The presence of selected priority substances and priority hazardous substances was subjected to monitoring in accordance with Annex X of Directive 2013/39/EU – anthracene, PBDE, cadmium, chloroalkanes C10-13, DEHP, fluoranthene, HCB, HCBD, HCH, lead, mercury, nickel, 4-nonylphenol, 4-tert octylphenol, pentachlorbenzene, pentachlorphenol, sum of 5 PAH and tributyltin. Assessment was carried out on with respect whether the EQS values exceeded or did not exceed by the annual averages of the standardized concentrations of the substances in the profiles: an analysis of long-term trends of selected substances that may accumulate in sediments and suspended matter was also performed.

Similarly to the previous years, EQS values were most often exceeded in the PAH group. In the fluoranthene indicator the concentrations exceeded the EQS limit in most profiles with the exception of the Lužnice – suspended matter profile. The highest multiples of limit exceeding for fluoranthene were detected in the Oder – Bohumín profile (49 times) and the Svitava – Bílovice n. S. profile (40 times). In the sum of 5 PAHs indicator, the concentrations exceeded the EQS limit in 26 profiles in sediments and in 15 profiles in suspended matter. The highest multiples of limit exceeding for the sum of 5 PAHs indicator was detected in both matrices in Svitava – Bílovice n. S. (5 time) and Oder – Bohumín (4 times). In the anthracene indicator, the concentrations exceeded the EQS limit in sediments in 19 profiles from all river basins with the exception of the Ohře River, in suspended matter in 5 profiles in the Morava River, the Oder River, the Dyje River and the Elbe River Basins. The highest multiple of exceeding the limit for the anthracene indicator was detected in the sediments from the Elbe – Valy (7 times).

Other organic substances exceeded the EQS limit only locally in connection with mostly point sources of pollution and old sites of pollution. These included hexachlorbenzene whose above-limit concentrations were dtected in sediments, suspended matter and sedimentable suspended matter in Bílina – Ústí n. L. and in the Elbe downstream of Děčín and in sediments in the Elbe – Obříství and Ohře – Terezín. The highest multiple of limit exceeding for the hexachlorbenzene indicator was detected in both matrices Bílina – Ústí n. L. (89 times in sediments). Similarly to 2014, above-limit contents of the HCH gamma pesticide were detected in the sediments of the Ohře River, the Bílina River and the Ploučnice River with the highest multiple of exceeding in the Ploučnice – Březiny profile (7 times). The concentration of tributyltin cation monitored only in sedimented matter did not comply with the EQS values in two profiles (Lužická Nisa – Hrádek n. N., Svratka – Židlochovice) in extremely high multimles of the limit (200 times). Concentrations of other organic substances (4-nonylphenol, 4-tert octylphenol, hexachlorbutadiene, chloroalkanes C10-13, di-(2-ethylhexyl)phthalate, pentachlorbenzene, pentachlorphenol and polybrominated diphenylethers) were in most cases detected under the limit for determinability, the EQS values were not exceeded in any of the monitored profiles.

In contents of metals, when taking into account their natural concentration levels – global geogenous background, the EQS values were most often exceeded with lead concentrations (in sediments in 15 profiles, in suspended matter and sedimented matters in 11 profiles), mostly with a low multiple of EQS values. Lead concentrations exceeded the EQS values in 5 profiles in sediments and in 5 profiles in suspended matters. The highest multiple of limit exceeding for lead was detected in sediments in Bílina – Ústí n. L. (3 times). Cadmium concentrations exceed the EQS limit in 4 profiles in sediments and in 6 profiles in suspended matter with the highest multiples of exceeding in Ostravice – Ostrava (5 times). Nickel concentrations only exceeded the EQS limit in Lusatian Neisse – Hrádek n. N. and in Bílina – Ústí n. L. The year-on-year comparison shows a slight increase in the number of exceedances of the EQS limits with lead and cadmium, whereas there is a decrease in the cases when the EQS limits were exceeded with mercury values in sediments. In the case of cadmium there was an obvious growth of its concentrations in sediments and suspended matter in the second half of the year during the period of hydrological drought.

The EQS values were exceeded in all partial areas of river basins with at least one indicator. The highest number of indicators exceeded the EQS limit in the partial area of the Ohře River Basin and in the Lower Elbe (cadmium, lead, nickel, mercury, hexachlorbenzene, hexachlorbutadiene, hexachlorcyklohexan, fluoranthene, anthracene, sum of 5 PAHs) and in the partial area of the Lusatian Neisse River Basin (cadmium, lead, nickel, mercury, tributyltine, anthracen, fluoranthene, sum of 5 PAHs). In the partial area of the Lower Vltava River Basin the EQS limit was not met by lead, mercury, anthracene, fluoranthene and sum of 5 PAHs. In a partial area of the Morava River Basin, the Dyje River Basin and the Upper Oder River Basin, overall exceedance of EQS limit in solid matrices hasbeen observed in the long term in substances from the group of polyaromatic hydrocarbons – anthracene, fluoranthene, sum of 5 PAHs, exceedances in other substances are local and occur only in episodically. The lowest number of above-limit concentrations was detected in the profiles in the Upper Vltava River. The most burdened profiles are Bílina – Ústí n. L. and Lužická Nisa – Hrádek n. N., where the EQS limits were exceeded in total by 8 indicators in solid matrices.

Bio-accumulation monitoring of surface waters

The programme of bio-accumulation monitoring allows to comprehensively determine the status of the sites in question and significantly contributes to an increase in knowledge of the state of contamination by biota. Monitoring uses not only fish and fry, but also other suitable matrices accumulating poisonous pollutants in connection with the manner of feeding and the type of habitat.

In 2015, as in the previous years, the contamination of aquatic organisms with harmful substances was monitored in 22 river profiles in the Czech Republic that are a part of situation monitoring of surface waters. The following biotic matrices were monitogred: Dreissena polymorpha (7 sites), biofilm (22 sites), fish – Leuciscus cephalus (15 sites), juvenile stages of fish (the fry /22 sites /) and benthic organisms (benthos – Hydropsyche sp., Erpobdella sp., Gammarus sp. /22 sites /).

The assessed pollutants are mostly below the detection limit in water, but easily accumulate in fats and solid matrices. Among heavy metals the monitored pollutants are lead, cadmium, mercury, chromium, zinc, copper, nickel and arsenic. Among specific organic substances the monitored pollutants included the sum of PCB (PCB-28, PCB-52, PCB-101, PCB-138, PCB-153, PCB-180), chlorinated pesticides (o,p and p,p DDT isomers and HCH isomers), hexachlorbenzene (HCB), hexachlorbutadiene (HCBD), polybromated diphenyletheres (PBDE – sum of congeners 28, 47, 99, 100, 153 and 154), PAH (fluoranthene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, benzo(ghi)perylene, indenol(1,2,3–cd)pyren), bis(2-ethylhexyl)phthalate (DEHP), perfluorooctanesulfonic acid (PFOS), dioxines and components with dioxine effect, hexabromocyclododecane (HBCDD), heptachlor and heptachlor epoxide. Most of these pollutants are included in the list of priority substances that is part of 2013/39/EU Directive of the European Parliament and of the Council, where EQS for biota are determined for some of them. The assessment was carried out in fish, the fry and benthic organisms.

As regards the PAHs, these pollutants were assessed in the benthos matrix, as it is better suited for accumulation of these substances than fish and the fry. In the quarter of the sites monitored, the EQS values were exceeded in fluoranthene (30 $\mu g.kg^{-1}$). The highest concentration was detected in Ohře – Želina (798 $\mu g.kg^{-1}$). The highest concentrations of perfluorooctane sulphonate acid were in the fry, where the EQS (9.1 $\mu g.kg^{-1}$) was exceeded in more than half of the profiles with highest values in the Ohře River in Želina (105.8 $\mu g.kg^{-1}$). Significantly higher concentrations were in the fish blood with values within the range of 14–451 $\mu g.l^{-1}$ – with the maximum value again in the Ohře – Želina profile. The highest value of 40.2 $\mu g.kg^{-1}$ in the DDT sum (indicator congeneres o,p´a p,p´) was detected in adult fish muscle tissue at the Elbe – Křešice profile. The bromated difenyletheres (PBDE) exceeded EQS (0.0085 $\mu g.kg^{-1}$) in all localities multiple times. In the fish muslce tissue the values were 0.1–3.0 $\mu g.kg^{-1}$ with highest values at the Elbe – Křešice profile. The EQS limit for mercury (0.02 $mg.kg^{-1}$) was exceeded in the fish muscle tissue in all monitored profiles. The highest value (0.24 $mg.kg^{-1}$) was detected at the Elbe – Hradec Králové profile. The highest values of hexachlorobenzene (HCB) was detected at the Elbe – Křešice profile (0.6 $\mu g.kg^{-1}$). The EQS limit (10 $\mu g.kg^{-1}$) was not exceeded in any of the monitored site.

The results of bio-accumulation monitoring clearly show that the aquatic ecosystem contains (often in high concentrations) priority hazardous substances, which in many cases exceed EQS limits (even where they are not detected in water samples). With respect to the necessity to perform a comprehensive analysis of surface water pollution it is obvious that values detected only in one of the matrices would not provide sufficient information about the contamination of the entire aquatic ecosystem.

3.2 Groundwater quality

A total of 663 sites were monitored in the national groundwater quality monitoring network. They comprised 175 springs (the monitoring of springs documents natural drainage of groundwaters particularly in the Crystalline complex and local drainage of Cretaceous structures), 221 shallow wells (the wells are largely located in alluvial plains of the Elbe, Orlice, Jizera, Ohře, Dyje, Morava, Bečva, Oder and Opava Rivers – these groundwaters are highly vulnerable with a rapid pace of pollution) and 267 deep wells (the wells are concentrated mainly in the Bohemian Cretaceous Basin, the České Budějovice Basin and the Třeboň Basin – groundwater in deep aquifers with low direct vulnerability). In 2015, a total of 250 indicators were analyzed.

Evaluation of the results of groundwater quality in 2015 due to the requirements of Directive 2000/60/EC focused especially on hazardous substances. The measured values of the groundwater quality indicators were compared with the reference values for groundwater under Decree No. 5/2011 Coll., defining groundwater zones and groundwater bodies, the method of groundwater status assessment and the requirements of the programmes of groundwater status assessment. This decree establishes reference values of indicators as limits for the groundwater quality assessment. Prior to the below-mentioned evaluation it is also necessary to mention that in addition to the limits for monitored indicators in the form of numeric values (whose exceedances indicate poor groundwater status) there were mandatorily established reference values directly equalling to the quantification limits of the analyzed indicators (such limits are often unreasonably strict – they may be different for different laboratories carrying out analyses of these substances).

Concentrations that exceeded limit values were in the following substances: ammonia ions (12.5% of samples), nitrates (10.6%), sulphates (2.9%), chlorides (2.6%), fluorides (2.4%) and sodium (2.4%). Increased concentrations of the above stated inorganic substances are more frequent in shallow wells (with the exception sodium and fluorides that are found more frequently in deep wells.

In terms of indicators showing generally the presence of organic substances, those found in concentrations exceeding the limit values mainly included chemical oxygen demand by permanganate (13.4%) and dissolved organic carbon (5.5% of samples).

Water reservoir Obecnice, drought (author: Petr Vicenda)

Regarding the group of metals, it is necessary to mention in particular barium (46.2% of samples above the limit values), arsenic (4.3%), cobalt (4.2%), nickel (1.7%), cadmium (1.3%), aluminium (1.2%) and molybden (1.1%).

As regards the numerous group of pesticidal substances, the limits for groundwater are often exceeded not by directly active substances in pesticides, but their metabolites. Therefore, it is necessary to include in the extensive range of the monitored indicators also substances, which the pesticides by interactions with the environment are converted to. Although the surveillance monitoring in 2015 was less extensive, almost all pesticidal substances monitored were detected in all water samples. In accordance with previous years of 2013 and 2014, also in 2015 the substances that exceeded most often groundwater limits (reference value: 0.1 µg/l) were particularly metabolites of herbicide chloridazon: chloridazon desphenyl (26.7%) and chloridazon methyl desphenyl (10.9% of samples above the limit values) and metabolites of herbicides from the group of chloracetanilides: alachlor ESA (13.4%), metazachlor ESA (10.3%), metolachlor ESA (9.9%), acetochlor ESA (5.8%), metazachlor OA (3.7%), metolachlor OA (3.0%) and acetochlor OA (1.6% of samples above the limit values). Pesticides used mainly for treating "energetic" crops (rape and maize) contaminate underground waters in a greater extent than herbicides used for treating cereals. Other pesticides that occur frequently are triazine pesticides, especially metabolites of herbicide atrazine such as atrazine 2-hydroxy (1.3%) and atrazine desethyl (1.0% of samples above the limit values). Other pesticides showing above-limit values were hexazinone (1.1%) and bentazone (1.0% of samples above the limit values). The above-limit concentrations of pesticidal substances are also reflected in increased number of 25.7% of above-limit samples for the indicator "sum of pesticides with reference value of 0.5 µg/l". Groundwater samples with above-limit pesticide concentrations were taken mainly from shallow wells.

As for PAH group, in terms of limits for groundwater, more significant occurrences were shown by phenantrene (18.3% of samples above the limit values), chrysene (5.3%), pyrene (1.7%), benzo(a)pyrene (1.7%), fluoranthene (1.7%) and fluorene (1.0% of samples above the limit values). The above-limit concentrations of these substances were also reflected in the number of 3.8% of above-limit samples for the PAH indicator with the reference value of 0.15 µg/l.

As for the group of volatile organic compounds, concentrations exceeding the limit occurred most markedly for 1,2-cis-dichloroethene (4.9% of samples), toluene (4.0%), chloretene (2.1%), tetrachlormethane (1.9%), 1,1-dichloretene (1.7%) and the sum of trichloroethene and tetrachloroethene (1.7% of samples). Exceedance of reference values was also detected in the sum of m-xylene and p-xylene (12.0%) and in 1,2-trans-dichloroethene (4.0% of samples).

Radiochemical properties of groundwater were monitored using a single general indicator, the total volume activity alpha (19.9% of samples above the limit values). The fact that the percentage value of exceeding the limit is twice as big as in 2014 reflect that this determination was only made in samples taken from only a half of selected sites as the monitoring was narrower in 2015 and this fact cannot be interpreted as impairment of the quality of the groundwaters monitored. Moreover, since this limit is, according to Decree No. 307/2002 Coll., an indicative (not a limit) value, it is appropriate also for the reference value according to Decree No. 5/2011 Coll., to understand an exceedance of the limit as a recommendation to carry out a supplementary analysis of the volume activities of individual radionuclides.

A typical and also most frequently occurring representative of the group of synthetic complexing agents in groundwaters is ethylenediaminetetraacetic acid EDTA (9.1% of samples above the limit values). Because of its wide use in industry and agriculture this acid gets to the environment in large quantities. Di(2-ethylhexyl) phthalate DEHP (16.7% of samples above the limit values) is a substance used as a softening agent in plastic products.

The occurrence of above-limit concentrations of most of organic substances from the group of polycyclic aromatic hydrocarbons and volatile organic compounds can be described as scarce to sporadic and it corresponds with the areas affected by industrial pollution. The exception, however, includes p+m-xylene (VOC), isomers of 1,2-dichloroethene (VOC), phenantrene (PAH) and chrysene (PAH), whose concentrations exceeding the limit were detected at a larger number of sites.

The most problematic monitored indicators of groundwater pollution (with respect to the reference values established by Decree No. 5/2011 Coll.) are inorganic substances (nitrates and ammonia ions), metals (barium, manganese, arsenic, cobalt and nickel), VOCs (isomers of xylene, isomers of 1,2-dichloroethene, toluene and chlorehene), PAHs (phenantrene, chrysene and pyrene), pesticides (mostly metabolites of herbicides used in preparations for plant protection, especially for treating energetic crops – oilseed rape and maize) and EDTA.

The summary of the number of sites where exceedances of the limit values for groundwater were analytically found for at least one indicator is presented in table 3.2.1.

Table 3.2.1
The summary of the number of sites with exceedances of the limit values for groundwater for at least one indicator in 2015 (comparision with years 2014 and 2013)

Sites	Number of sites	Number of sites with exceedances of limit values for groundwater	% of sites with exceedances of limit values for groundwater		
			2013	2014	2015
Shallow wells	221	212	94.1	95.5	95.9
Deep wells and springs	442	332	75.8	77.8	75.1
All sites	**663**	**544**	**82.0**	**83.8**	**82.1**

Source: Czech Hydrometeorological Institute

Dusky mirroring on the Vranovská reservoir (author: Martin Nejezchleb)

The table shows that the number of sites with exceedances of the limit values for at least one groundwater indicator for 2015 is almost identical with values for previous years of 2013 and 2014. The truth is that in 2015 there was a narrowed surveillance monitoring when compared with a vast situational monitoring from 2013–2014, however, samples were taken at almost identical sites and virtually identical indicators of pollution were subjected to analysis (while some substances were only subjected to analysis in selected relevant sites). This overall summary witnesses of the fact that in general there was no detrimental in groundwater pollution in the monitored network sites of the Czech Hydrometeorological Institute, while we cannot speak about any improvement either.

Figure3.2.1
Concentrations of nitrogenous substances in groundwaters in 2015 (exceedances of reference values under Decree No. 5/2011 Coll.)

Source: Czech Hydrometeorological Institute

Sabina Škrabalová – Water reservoir Bystřička captures water. Fishermen catch fishes – 4th class, Primary school Školní 355, Dřevohostice, Olomouc Region

4. Water use

The monitoring of data on groundwater and surface water abstractions and on discharged waters is governed by Decree No. 431/2001 Coll., on the content of water balance, the method of its compiling and on the water balance data.

Pursuant to the provision in Section 10 of this Decree, the scope of reported data changed after 2001, so that now the registered abstractions (as well as waste water and mine water discharges) only include abstractions exceeding 6,000 m³ per year or 500 m³ per month. The source documents for retrieving the data are the reports submitted to the Czech Statistical Office by the respective river basin administrators before the deadline of 31 March of the following year. The data for 2014 were classified based on the NACE according to Eurostat (incomplete acronym of the French expression "Nomenclature statistique des activités économiques dans la Communauté européenne"). Before 2008, older classification according to the so-called SCEA (sector classification of economic activities by the Czech Statistical Office, Prague 1998) was used. Similarly to the preceding years, with a view to integrating the data provided by the individual River Boards, state enterprises, no water transfers and waters abstracted for fishpond systems were included in surface water abstractions. The comparison of data for 2013 and 2014 was based on final official data of the Czech Statistical Office (www.czso.cz).

Table 4.1 shows detailed information on the NACE classification of surface water abstractions and groundwater abstractions and discharges of waste waters and mine waters into surface waters based on user groups. The classification applies to Tables 4.1.1, 4.2.1 and 4.3.1.

Table 4.1
Classification of users in the individual user groups according to the NACE classification

Public water supply networks	NACE 36
Public sewerage systems (excl. transfers)	NACE 37
Agriculture (incl. irrigation)	NACE 01 – 03
Energy sector (electricity and heat generation and distribution)	NACE 35
Industry (incl. extraction of mineral resources – excl. energy sector)	NACE 05 – 33
Other (incl. construction industry)	NACE 38 – 96
Total (excl. fishponds and transfers)	NACE 01 – 96

Source: Czech Statistical Office

4.1 Surface water abstractions

The Reports on Water Management in the Czech Republic in the past decade largely stated that a year-over-year decrease in the total amount of surface water abstractions rather ceased. The exception was the year 2009, in which, compared to 2008, a temporary decline of surface water abstractions occurred, and also the previous year 2013, in 2014 there occurred stagnation. In 2015 there was another decrease from 1,288.7 million m³ (reported for 2014) to 1,236.8 million m³ (by 4.0%, partly in connection with significantly dry period).

In comparison with 2014, a rather insignificant, growth was recorded in public water supply systems as well as in other consumers of surface water (including construction industry). As for industry (including extraction), the situation stagnated. Energy sector showed a significant drop in the total of abstracted amounts of surface water throughout the country. Agriculture (including irrigation) showed a slight growth again, especially in the area administered by the Elbe River Board, s. e., the Vltava River Board, s. e., and the Morava River Board, s. e. (however, the category of agriculture is difficult to assess exactly with respect to legal regulations concerning the possibility of so-called balancing water deficit of agricultural crops without relevant payments for the amounts of surface water abstracted).

As regards surface water abstractions for public water supply networks, it can be concluded that in 2015, compared to 2014, there was an insignificant increase by 2.4% (an increase from 309.6 million m³ to 316.0 million m³). Energy sector showed a significant drop (from 710.4 million m³ to 645.7 million m³). In industry (including extraction of mineral resources) there was stagnation (as the same amount was reported in 2015 as in 2014: 225.8 million m³). An increase was recorded for the group of other consumers (including construction industry), from 7.7 million m³ to 9.0 million m³. The highest increase (statistically rather problematic with regard to the provision of Section 101 of Act No. 254/2001 Coll.) occurred in agriculture (including irrigation), from 35.2 million m³ to 40.3 million m³ (by 14.5%).

As regards surface water abstractions across the country, in 2015 there was a decrease (in comparison with data for 2014) in the Elbe River Board, s. e. (by 9.3%) and in the Ohře River Board, s. e. (by 0.9%), while there was an increase in the Vltava River Board, s. e. (by 1.8%), and the Oder River Board, s. e. (by 0.9%) and the Morava River Board, s. e. (by 1.1%).

As regards surface water abstractions for public water supply network, a slight decrease was reported by the Oder River Board, s. e. (by 0.1%), while there was an increase reported by the Elbe River Board, s. e. (by 3.6%), the Vltava River Board, s. e. (by 3.3%), the Ohře River Board, s. e. (by 0.5%), the Oder River Board, s. e. (by 0.6%) and the Morava River Board, s. e. (by 2.1%). As regards surface water abstractions for agriculture, an increase (insignificant in absolute Charts, however, a marked increase in percentage), compared to 2014, was reported especially by the Vltava River Board, s. e. (from 0.8 million m³ to 1.4 million m³, i.e. by 75%); an increase in absolute Charts was also reported by the Elbe River Board, s. e. (from 8.3 million m³ to 11.7 million m³, i.e. by 41.0%). An increase was also reported by the Morava River Board, s. e. (from 19.8 million m³ to 23.8 million m³, i.e. by 20.2%). Abstractions for the energy sector decreased most significantly in the Elbe River Board, s. e. (by 13.6%).

The total charged abstractions, compared to 2014, decreased from 1,236.3 million m³ in 2014 to 1,179.1 million m³. The proportion of charged abstractions in 2015 amounted to 95.3% of the registered abstractions in total. The structure of the registered surface water abstractions in the respective river basins is shown in Table 4.1.1. The overall development of surface water abstractions since the year 1980 is shown in Chart 4.1.1. After the year 1990 the improvement of price ratios in water services provided and also the change in the structure of industrial and agricultural production resulted in a significant decrease of water resources use in all water use areas. For example, we can see that surface

water abstractions for public water supply networks decreased, compared to 1990, from 744.9 million m³ to 316.0 million m³. Thus, the abstractions in 2015 amounted only to 42.4% of the volume abstracted in 1990. The most significant decrease occurred in the industrial sector, from 830.1 million m³ in 1990 to 225.8 million m³ in 2015, i.e. to mere 27.2% of the volume abstracted in 1990. Less significant decrease can be observed in energy sector, surface water abstractions decreased from 1,060.9 million m³ to 645.7 million m³, i.e. to 60.9%; in agriculture, surface water abstractions decreased from 97.2 million m³ to 40.3 million m³, i.e. to mere 41.5% of the volume abstracted in 1990. This fact does not mean, however, that water resources would always and clearly be less exposed to anthropogenic impacts. On the contrary, in the energy sector, for example, there was an increase (with respect to continuously increasing electric power generation in the Czech Republic) in so-called consumptive water use (i.e. the difference between abstraction and discharge, caused primarily by evaporation in cooling towers of thermal and nuclear power plants).

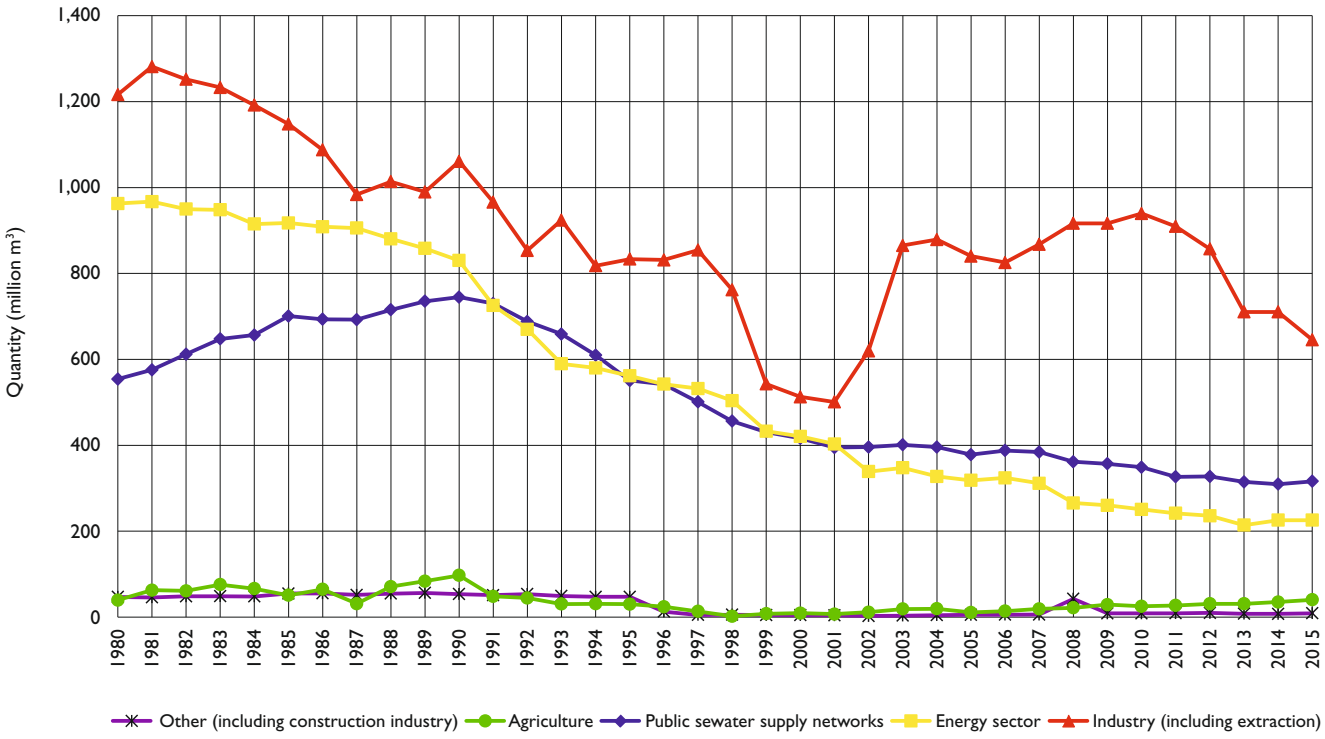
Annual assessment of impacts on water resources is regularly performed as a part of water balance, compiled under Decree No. 431/2001 Coll. The principle of water management evaluation through water balance is the aggregated assessment of the requirements for maintaining the minimum discharge with the respective flow rates in control profiles. They involve all water management activities.

Table 4.1.1
Surface water abstractions in 2015 exceeding 6,000 m³/year or 500 m³/month in millions of m³

River Board, s. e.	Public water supply networks		Agriculture incl. irrigation		Energy sector		Industry incl. extraction		Other incl. construction industry		Total	
	Volume	Number	Volume	Number	Volume	Number	Volume	Number	Volume	Number	Volume	Number
Elbe	37.4	25	11.7	57	416.5	12	94.4	67	1.8	64	**561.8**	**225**
Vltava	136.0	42	1.4	17	50.9	14	27.0	62	5.6	49	**220.9**	**184**
Ohře	41.0	20	3.4	31	43.4	9	37.5	53	0.3	20	**125.6**	**133**
Oder	68.0	26	0.0	0	16.2	16	56.9	38	0.4	36	**141.5**	**116**
Morava	33.6	33	23.8	47	118.7	12	10.0	63	0.9	45	**187.0**	**200**
Total	**316.0**	**146**	**40.3**	**152**	**645.7**	**63**	**225.8**	**283**	**9.0**	**214**	**1,236.8**	**858**

Source: VUV TGM using data provided by River Boards, s. e.

Chart 4.1.1
Surface water abstractions in the Czech Republic in 1980–2015



Source: VUV TGM using data provided by River Boards, s. e.

4.2 Groundwater abstractions

In 2015, there was – after many years of decreases – again an increase in the total amount of groundwater extracted: 366.4 million m³ (371.2 million m³ in 2013, 361.0 million m³ in 2014).

The structure of registered water abstractions in the respective river basins in 2015 is shown in table 4.2.1. In 2015, in total 366.4 million m³ were registered (this Chart includes only abstractions exceeding 6,000 m³ per year or 500 m³ per month). As regards groundwater abstractions for public water supply networks, it can be stated that in 2015, compared to 2014, there was an increase from 292.4 million m³ to 296.8 million m³, i.e. by 1.5%. As regards industry (including extraction of mineral resources), there was stagnation (from 35.9 million m³ to 36.0 million m³). In agriculture, compared to 2013, the abstractions increased from 13.3 million m³ to 14.0 million m³, i.e. by 5.3%. The energy sector showed a decrease (2.6 million m³ in 2014 and 2.2 million m³ in 2015). The overall trend of groundwater abstractions from 1980 is presented in chart 4.2.1.

The highest percentage of total groundwater abstractions in river basins was recorded in the river basins administered by the Morava River Board, s. e. (34.3%); the lowest percentage of groundwater abstractions was recorded in the river basins administered by the Oder River Board, s. e. (4.7%).

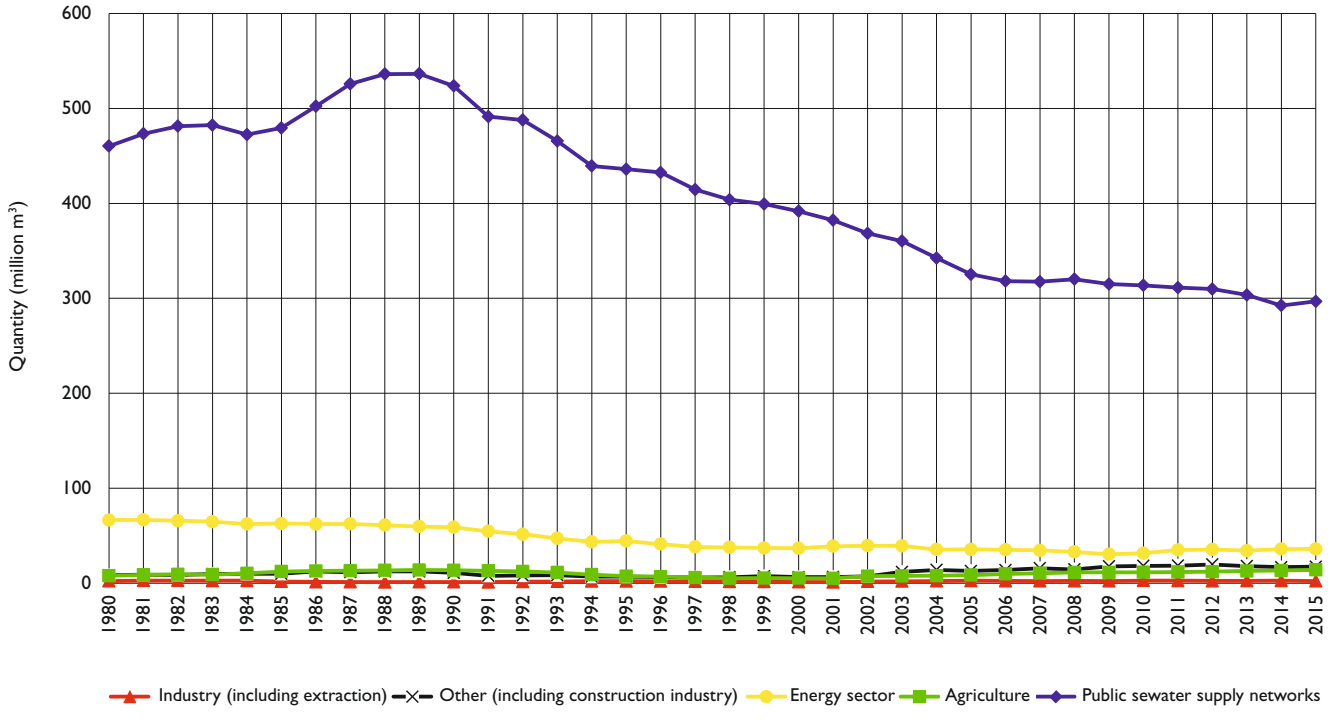
Looking at the territorial structure, the registered groundwater abstractions totals increased in the following river basins administered by: the Elbe River Board, s. e. (by 2.5%), the Vltava River Board, s. e. (by 1.3%) and the Morava River Board, s. e. (by 3.6%). A decrease was recorded only by the Ohře River Board, s. e. (by 2.9%) and the Oder River Board, s. e. (by 2.8%).

Table 4.2.1
Groundwater abstractions in 2015 exceeding 6,000 m³/year or 500 m³/month in millions of m³

River Board, s. e.	Public water supply networks		Agriculture incl. irrigation		Energy sector		Industry incl. extraction		Other incl. construction industry		Total	
	Volume	Number	Volume	Number	Volume	Number	Volume	Number	Volume	Number	Volume	Number
Elbe	94.2	659	2.8	197	0.8	8	7.8	126	3.0	61	**108.6**	**1,072**
Vltava	31.8	576	4.9	336	0.4	10	8.1	115	8.3	403	**53.5**	**1,440**
Ohře	47.3	310	0.7	20	0.9	6	10.2	114	2.2	25	**61.3**	**475**
Oder	15.6	145	0.4	26	0.0	2	0.9	32	0.4	23	**17.3**	**228**
Morava	107.9	696	5.2	305	0.1	7	9.0	165	3.5	101	**125.7**	**1,274**
Total	**296.8**	**2,386**	**14.0**	**884**	**2.2**	**33**	**36.0**	**552**	**17.4**	**634**	**366.4**	**4,489**

Source: VUV TGM using data provided by River Boards, s. e.

Chart 4.2.1
Groundwater abstractions in the Czech Republic in 1980–2015



Source: VUV TGM using data provided by River Boards, s. e.

4.3 Waste water discharges

In 2015, in total 1,621.4 million m³ of waste waters and mine waters were discharged into surface waters. Compared to 2014, this represented a decrease of 6.6%. Similarly to the preceding years (with regard to the integration of data provided by the individual River Boards, state enterprises) these water discharges did not include waters discharged from fishpond systems.

Evaluation of the quantity and quality of discharged waste waters until 2001 was based on the data reported by water users under Directive No. 7/1977 of Official Bulletin issued by the former Ministry of Forestry and Water Management, on registration and evaluation of the balance of the resources and the quality of surface waters and groundwaters. Since 2002 this evaluation has been carried out under Decree No. 431/2001 Coll., on the content of water balance, the method of its compilation and on data for water balance. Pursuant to the provision in Section 10 of this Decree, the scope of reported data changed so that now the registered abstractions (as well as waste water and mine water discharges) include abstractions exceeding 6,000 m³ per year or 500 m³ per month. This resulted in an increased number of the registered entities. These data, which are reported and registered every year, include information on the quantity of waste waters, including waters specified pursuant to the provision of Section 4 of Act No. 254/2001 Coll. (the Water Act), which were originally called special waters. These waters were, pursuant to Section 2 of Act No. 138/1973 Coll. (in force until 31 December 2001) mine waters and mineral waters. The obligation to report the above data concerned only the cases where the discharged water quantity exceeded 15,000 m³ per year.

Since 2003, the data on the quantity of waste waters discharged into surface waters has been taken only from the statistic records of the Czech Statistical Office. The structure and the total amounts identified from waste water discharges registered by River Boards, s. e. are presented in table 4.3.1. The overall trend of waste water discharges from 1980 is shown in chart 4.3.1.

Not a very significant percentage decrease in the quantity of discharged waste waters, compared to 2014, was observed in the category of public sewerage systems (by 2.6%). In the energy sector, by contrast, there was a rather significant drop (by 10.2%). In industry (including extraction of mineral resources) there was a decrease of the discharged amounts by 1.5%. A significant percentage decrease by 16.4% was recorded in the category "other" (including construction industry).

Table 4.3.1
Discharges of waste waters and mine waters into surface waters from sources exceeding 6,000 m³/year or 500 m³/month in 2015 in millions of m³

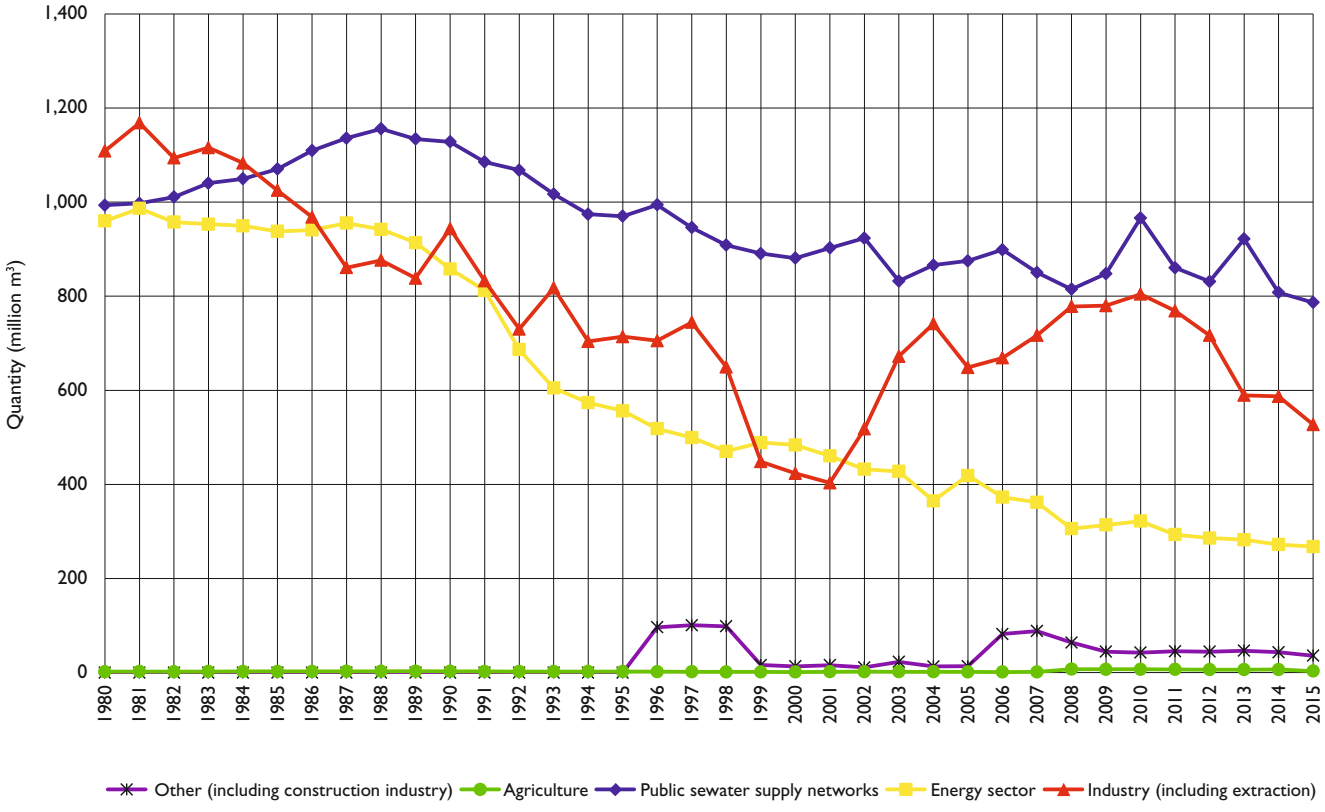
River Board, s. e.	Public sewerage systems		Agriculture incl. irrigation		Energy sector		Industry incl. extraction		Other incl. construction industry		Total	
	Volume	Number	Volume	Number	Volume	Number	Volume	Number	Volume	Number	Volume	Number
Elbe	165.3	664	0.0	3	388.3	24	86.9	165	3.0	90	**643.5**	**946**
Vltava	252.7	735	0.1	3	18.2	24	32.6	148	21.4	638	**325.0**	**1,548**
Ohře	78.3	284	2.9	1	24.0	25	72.7	161	2.5	32	**180.4**	**503**
Oder	93.4	308	0.0	2	9.0	14	57.8	77	5.9	83	**166.1**	**484**
Morava	197.1	1,118	0.4	6	87.6	13	18.0	131	3.3	111	**306.4**	**1,379**
Total	**786.8**	**3,109**	**3.4**	**15**	**527.1**	**100**	**268.0**	**682**	**36.1**	**826**	**1,621.4**	**4,860**

Source: VUV TGM using data provided by River Boards, s. e.

The Střela River over the pond Žlutice, drought (author: Pavel Veverka)

Water Laboratory Czech Budějovice – rearing fish fry (author: Jan Válek)

Chart 4.3.1
Discharges of waste waters in the Czech Republic in 1980–2015



Source: VUV TGM using data provided by River Boards, s. e.

Karolína Jiroušková – Hydroelectric power, water purification plant – 4th class A, Primary school Jiráskova 664, Sezemice, Pardubice Region

5. Sources of pollution

5.1 Point sources of pollution

Surface water quality is affected primarily by point sources of pollution (municipalities, industrial plants and farms with intensive agricultural animal production). The level of water protection against pollution is most often assessed based on the development of the produced and discharged pollution.

Produced pollution means the quantity of contamination contained in produced (untreated) waste waters. In the context of the EU and OECD requirements, increased attention in the Czech Republic in the recent years has been paid to the collection of the data and the analyses of the produced pollution development. In the first place the extended scope of the measured data collection from a larger number of entities is being ensured within the framework of the so-called water management balance, in line with the requirements set by Decree No. 431/2001 Coll., on the content of water balance, the method of its compilation and on data for the water balance.

Production of pollution in 2015, compared to 2014, did not change significantly. In organic pollution, BOD_5 indicator (biochemical oxygen demand in 5 days) in 2015, compared to 2014, increased by 10,677 tons (i.e. by 4.3%), the COD_{Cr} indicator (chemical oxygen demand by dichromate) increased by 27,826 tons (i.e. by 4.9%), the SS indicator (suspended solids dried at 105 °C) increased by 27,356 tons (i.e. by 10.8%). A decrease was shown by the DIS indicator (dissolved inorganic salts /solute annealed at 550 °C/), by 41,666 tons (i.e. by 5.1%). Most significant decrease in this indicator was shown by the Vltava River Board, s. e. (by 19.24 tons).

The reported level of production of pollution indicated by $N_{inorganic}$ (total inorganic nitrogen) in the whole of the country increased, compared to 2014, by 716 tons (i.e. by 2.5%). The most significant increase was shown by the P_{total} indicator (total phosphorus), by 389 tons (i.e. by 6.2%).

Discharged pollution is the contamination contained in waste waters discharged to surface waters. Compared to 2014, the discharged pollution in the Czech Republic slightly increased in 2015 by 15 tons (i.e. by 0.3%) in the BOD_5 indicator and in the COD_{Cr} indicator by 406 tons (i.e. by 1.1%). In the SS indicator can be observed a certain decrease by 309 tons (i.e. by 3.2%), in the DIS indicator there was a decrease by 34,616 tons (i.e. by 4.3%). This fact is directly related to a year-on-year variation in produced pollution in this indicator that shows the total amount of inorganic pollution (see above). The $N_{inorganic}$ indicator showed a decrease by 345 tons (i.e. by 3.4%). Similarly, a decrease was shown by the P_{total} indicator by 27 tons (i.e. by 2.3%). The development since 1990 in the discharged pollution and pollution on which charges are imposed is shown in chart 5.1.1.

Between 1990 and 2015 the discharged pollution decreased in the BOD_5 indicator by 96.4%, in the COD_{Cr} indicator by 90.9% and in the SS indicator by 94.8%.

In 1990–2015, the water management sector succeeded also in reducing the quantity of the discharged hazardous and especially hazardous harmful substances. A significant decrease was also observed for macronutrients (nitrogen, phosphorus) as a result of the fact that waste water treatment technologies in the new and intensified waste water treatment plants apply the focused use of biological removal of nitrogen and biological or chemical removal of phosphorus.

Table 5.1.1
Produced and discharged pollution in 2015

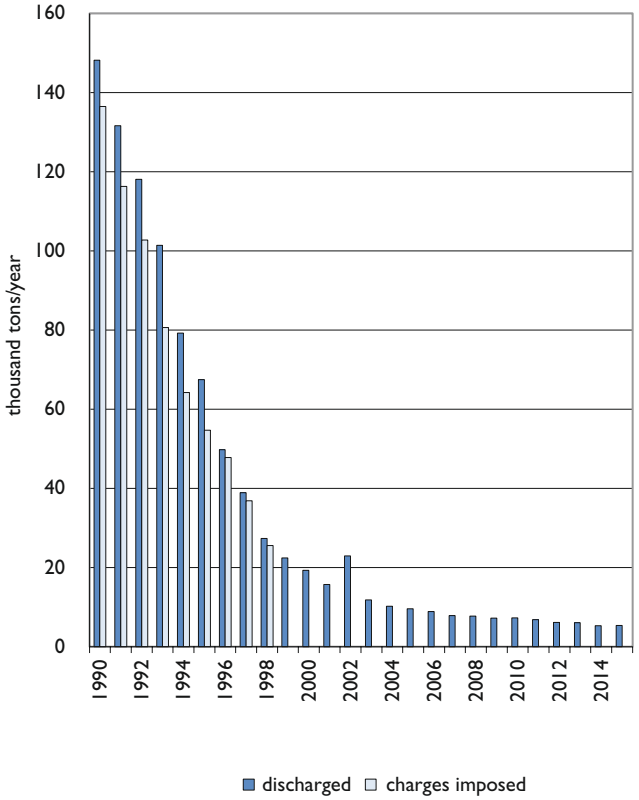
River Board, s. e.	Produced pollution in tons/year			Discharged pollution in tons/year								
	BOD_5	COD_{Cr}	NL	BOD_5	COD_{Cr}	P_{celk}	BOD_5	COD_{Cr}	NL	BOD_5	COD_{Cr}	P_{celk}
Elbe	52,387	127,205	55,803	195,349	7,137	1,300	1,274	10,191	2,471	191,571	2,102	236
Vltava	88,519	195,575	92,491	127,701	9,254	2,206	1,571	10,244	2,360	129,038	3,452	269
Ohře	20,720	47,483	19,614	98,837	2,590	846	382	3,606	1,310	99,179	1,439	282
Oder	34,153	67,202	28,525	212,688	3,470	653	663	5,272	1,972	212,688	1,061	140
Morava	65,229	153,610	84,433	133,370	7,174	1,625	1,435	7,654	1,823	129,672	1.834	203

Source: VUV TGM using data provided by the Czech Statistical Office and River Boards, s. e.

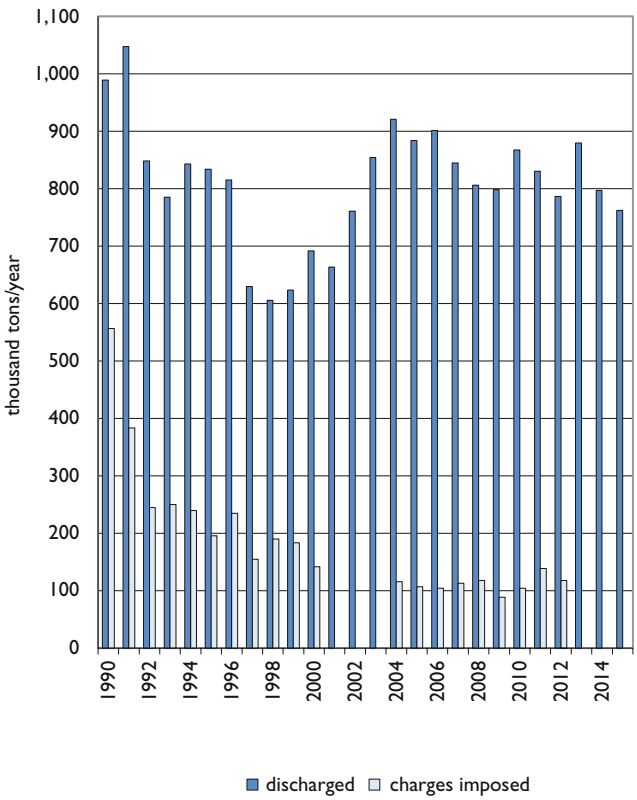
The weir Lhotka (source: Oder River Board, s. e.)

Chart 5.1.1
Discharged pollution and pollution on which charges were imposed in 1990–2015

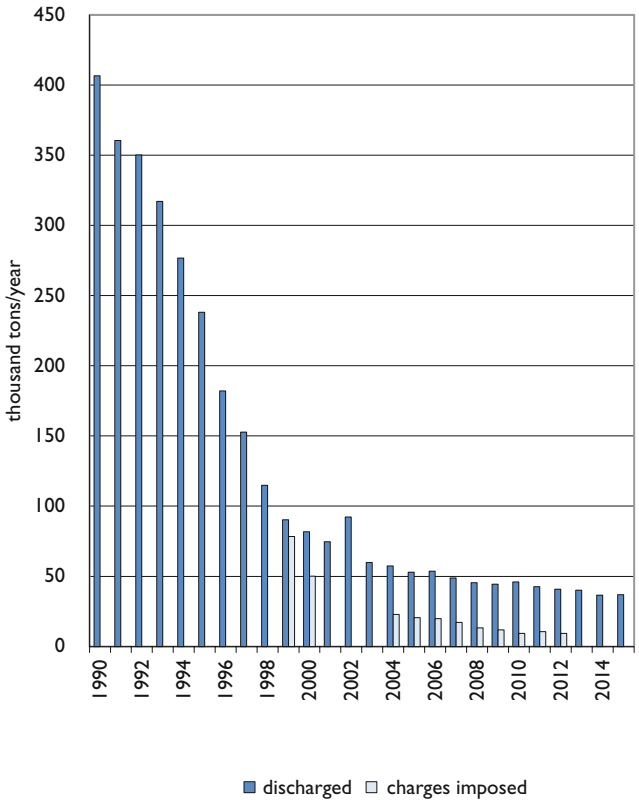
BOD_5 indicator



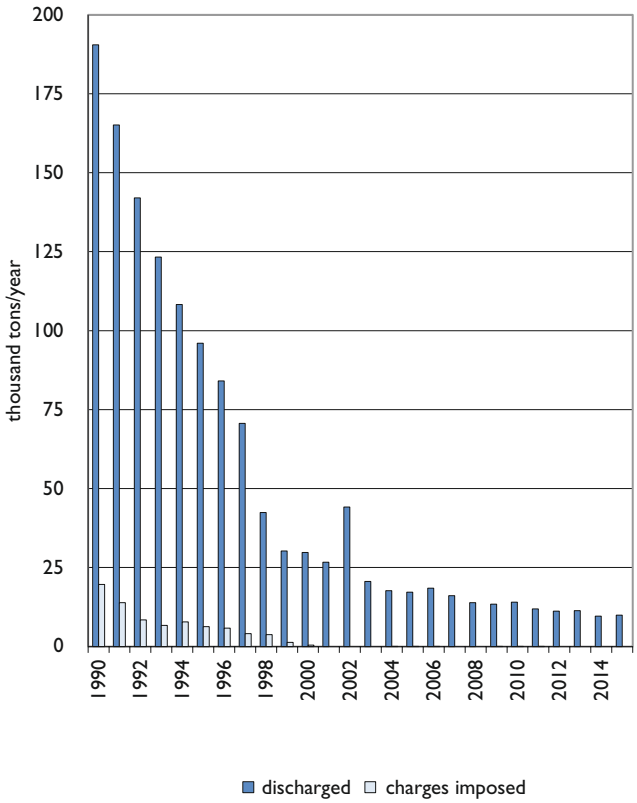
Dissolved inorganic salt



COD_{Cr} indicator



Suspened solids



Source: VUV TGM, based on the data from the Czech Statistical Office and River Boards, s. e.

5.2 Area sources of pollution

Surface water and groundwater quality is also significantly affected by area sources of pollution, in particular the pollution from farming, atmospheric depositions and erosive runoff in the landscape. The proportion of area pollution is increasing in parallel with the continued decrease in point source pollution. The most significant pollution is caused particularly by nitrates, pesticides and acidification, while it is less substantial as regards phosphorus.

The main measures aimed at reducing area pollution of waters from agricultural sources include the Government Order No. 262/2012 Coll., on delimitation of vulnerable areas and action programme, as amended. This government order imposes to the MoE the duty to review so-called the "vulnerable areas" and to the MoA the duty to declare so-called "action programme". Review of the definition of vulnerable areas and action programme is to be carry out once in every 4 years.

The review of vulnerable areas is conducted on the basis of the identification of surface waters or groundwaters polluted or endangered by nitrates from agricultural machinery and after assessing the following background materials:

- results of gathering information and subsequent assessment of the quality and amounts of surface waters and groundwaters performed by river basin administrators and expert entities authorised by Section 21 (4) of the Water Act,
- data from monitoring the quality of water abstracted pursuant to Section 22 of the Water Act,
- data on the quality of the raw water abstracted monitored by water supply system administrators pursuant to the Act on Water Supply and Sewerage Systems.

The basic criterion for including a new vulnerable area is a high concentration of nitrates in the monitored profiles with values exceeding 50 mg/l or within the range of 25–50 mg/l, but with a documented growth trend. After the review approved by the government in 2012, the vulnerable areas account for 41.6% of the surface area of the Czech Republic (49% of arable land). In 2015, there was the third review of vulnerable areas defined which will be – together with the proposal of an action programme - introduced by a government order in 2016. On the basis of the output proposal, the proportion of the vulnerable area should be increased by 0.3% to 41.9% (or by 1.2% of the total area of arable land to 50.2% of the arable land).

Table 5.2.1
Vulnerable areas

Share demarcated areas	Demarcation in 2003	The first revision of the definition in 2007	The second revision of the definition 2011	Proposal based on the outputs of the third revision of the definition of 2015
	%			
Proportion of vulnerable areas in the area of the Czech Republic	36.7	39.9	41.6	41.9
Share of agricultural land in vulnerable areas in the total agricultural land in the Czech Republic	42.5	47.7	49.0	50.2
The share of agricultural land out of the total area of vulnerable areas	71.0	69.3	68.4	68.4
Share of arable land in total area of vulnerable areas	57.0	58.0	54.9	53.9

Source: VUV TGM

The action programme concerns physical or legal entities (so-called entrepreneurs in agriculture), who run farms in vulnerable areas. From the perspective of its focus, the action programme only concerns agricultural land (arable land, vineyards, hop-fields, orchards, constant grasslands) and selected sites (barnyard manure deposits).

The action programme includes the following binding provisions:

a) measures included in Annex III of Directive No. 91/676/EEC:
   - period of ban on fertilization,
   - barnyard manure deposit capacities,
   - restriction of fertilizer application with respect to soil and climatic conditions,
   - maximum limit of 170 kg N/ha per business,
b) measures included by the Member States in the principles of good agricultural practice, with the exception of those that have been superseded with the measures included in Annex III:
   - application of nitrogen fertilizers on hillsides,
   - application of nitrogen fertilizers on soil that is waterlogged, flooded, frozen or covered in snow,
   - farming near waters.

On the basis of the requirements stipulated in the nitrate regulation, the action programme is monitored on annual basis and it is assessed once in every 4 years: the results of these assessments serve as grounds for proposing changes to the action programme. Changes to the action programme in 2016 will reflect requirements arising from the Pilot Inspection of the EU (4549/13/ENVI) aimed at the implementation of the nitrate regulation in the Czech Republic. Adjustments to the action programme for 2016–2020 should thus contain especially the following:

- extension of the period with ban on fertilizing,
- introducing yield levels for the purpose of differentiating fertilization for various crops,
- adjustment of the period when manure may be deposited in the field,
- adding light soils to areas where manure cannot be deposited.

Since 2010, there has been a gradual increase in the total amount of fertilizers used per hectare of farmland. In 2014, there was an increase of almost 1,200 kg/ha. This increase with mainly due to the inappropriate structure of crops (a decrease in areas with perennial forage crops, an increase in subsidized crops – particularly rape and maize).

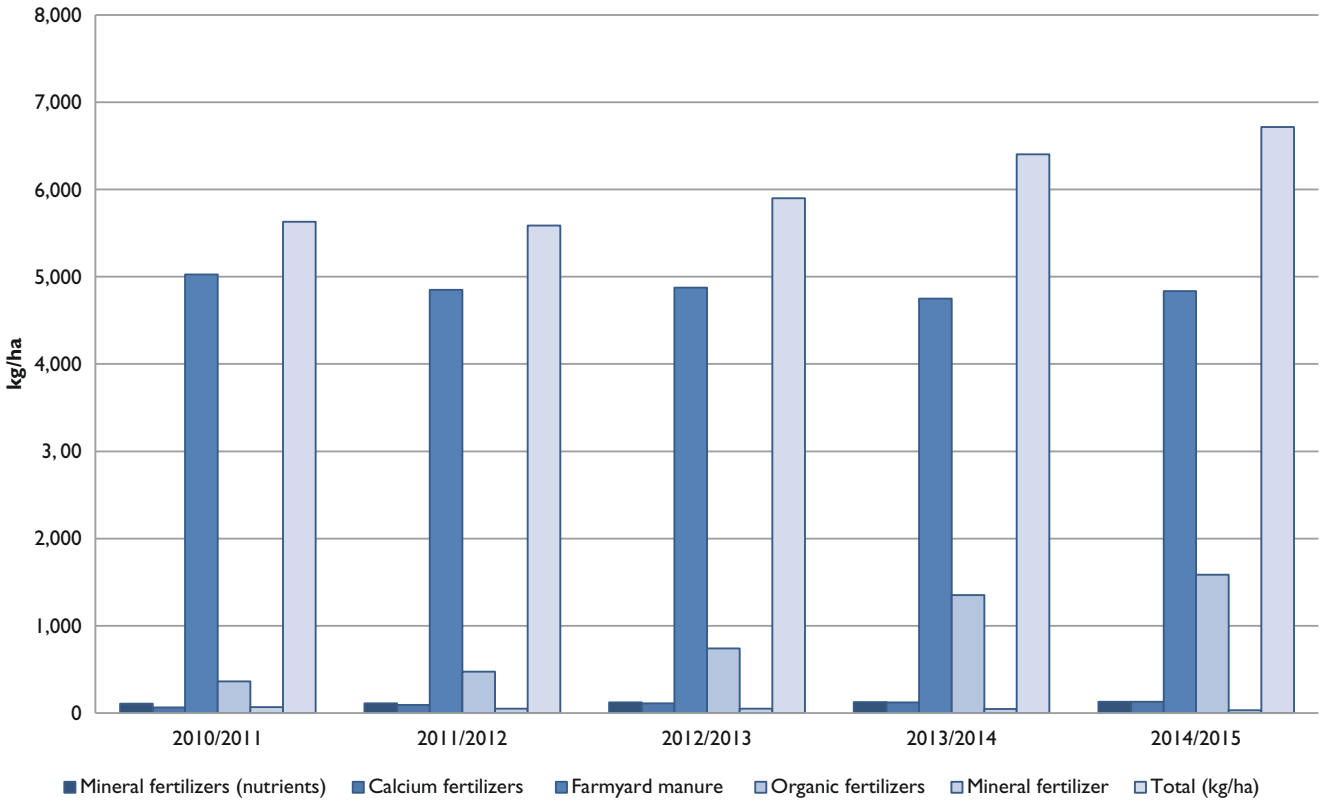
An increase in the total amount of fertilizers applied to agricultural land is mainly due to organic fertilizers, especially digestate. It is the residuum after the fermentation process, which is caused by anaerobic fermentation in biogas production of biogas plants (there are almost 500 biogas plants in the Czech Republic). The prevailing type of manure is organic fertilize (manure, slurry, suds etc.).

Table 5.2.2
Consumption of fertilizers

Fertilizers			2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
			kg/ha of UAA				
Mineral fertilizers (nutrients)	total		108	113	122	127	131
	of which	nitrogenous	85	88	94	97	99
		phosphoric	14	15	17	18	19
		potassic	9	10	11	12	13
Calcium fertilizers			65	94	111	124	129
Farmyard manure	total		5,026	4,851	4,874	4,751	4,837
	of which	manure	2,808	2,707	2,655	2,562	2,690
		slurry	1,247	1,147	1,165	1,094	1,109
		suds	662	634	607	600	542
		other	309	363	447	495	496
Organic fertilizers			363	476	741	1,354	1,585
Mineral fertilizer			68	53	53	47	34
Total			**5,630**	**5,587**	**5,901**	**6,403**	**6.716**

Source: Czech Statistical Office

Chart 5.2.1
Annual consumption of fertilizers



Source: Czech Statistical Office

Another significant factor negatively affecting the quality of surface waters and groundwaters are chemicals that are used to prevent loss of crops, so-called plant protection products. According to the biological activity they are divided into insecticides, herbicides, fungicides, rodenticides, and others. Each year, thousands of tons of chemical compounds, often toxic or with other undesirable effects get in circulation. Excessive use of these substances is reflected in the final phase of increased organism burden and disruption of physiological processes. Pesticides are now used in 95% of agricultural land.

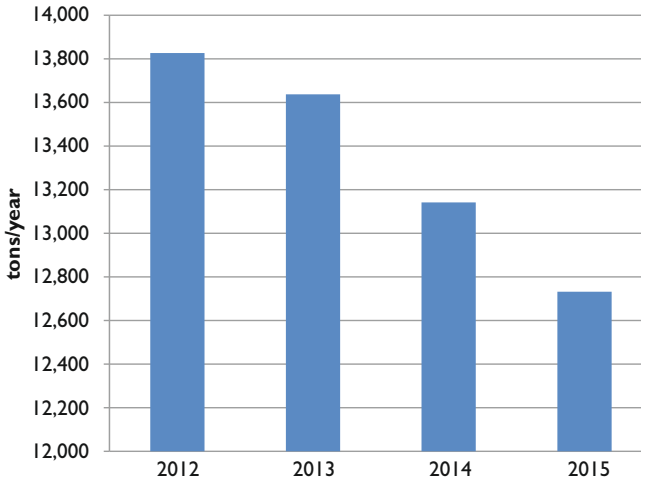
The incidence and concentration of active substance preparations and their metabolites in the aquatic environment influences, in addition to their properties such as water solubility, mobility and persistence in soil and rock environment, water, etc., also the amount and frequency of their use, vegetation period and the growth phase of the treated crops when applied, slope of land, soil and weather conditions and other factors, including application methods and application machinery used.

A recent increase in consumption of certain active substances (especially herbicides), which is due to changes in the cropping structure, correlates with the frequency of detection of these substances in surface waters (e.g. acetochlor, metazachlor, terbuthylazine). Further data from the Czech Republic provide more evidence; the same active substances from preparations have occurred in some localities exceeding the relevant limits for drinking water.

The main measure to be taken in order to ensure sustainable use of these substances is the National Action Plan aimed at reducing pesticide use in the Czech Republic. This is a set of measures intended to limit the adverse effects of preparations used for plant protection products on human health and the aquatic environment and non-target organisms in the Czech Republic. The National Action Plan in the Czech Republic defines quantitatively measurable reducing, interim and final targets, measures and schedules with the view of reducing risks and impacts of preparation use on human health and the environment. This plan is implemented by the Ministry of Agriculture in cooperation with the Ministry of Health and the Ministry of Environment. The National Action Plan is to be updated at least every fifth year.

Based on the statistics of the Central Control and Testing Institute of Agriculture, the consumption of plant protection preparations dropped by approximately 408 tons in 2015, which – in comparison with the previous year – is a decrease of 3.2%, whereas in comparison with 2012, the decrease is 7.9%.

Chart 5.2.2
Consumption of plant protection products



Source: Czech Statistical Office

The weir Český Mlýn on the Jihlava River (source: Morava River Board, s. e.)

5.3 Accidental pollution

Surface water and groundwater quality is also affected by the adverse impacts of accidental pollution. In 2015, the Czech Environmental Inspection registered in total 132 cases of accidental releases into surface waters and 9 releases into groundwaters in the Czech Republic.

Pursuant to Act No. 254/2001 Coll., the Czech Environmental Inspection keeps central records of accidents since 2002. In 2003, the Czech Environmental Inspection started to cooperate with the Fire Rescue Department, particularly in reporting information on accidents. In 2015, the Czech Environmental Inspection registered in total 221 accidents which in facts of the case met the definition of accidents under Section 40 of Act No. 254/2001 Coll. Additional accidents were reported to the Czech Environmental Inspection in 2015: these were investigated, but due to their inconsiderable extent with no impact on the water quality they were not registered in the central records of accidents.

The most common accidents continue to be those caused by transport. In 2015 there were registered 56 such accidents, which represents 25% of the total number of accidents. In total 42 accidents were accompanied by fish kill, which represents 19% of the total number of accidents. The accidents resulted in groundwater pollution in 9 cases. The cause (inflictor) of the accident was known in 138 events. In 94 cases the Czech Environmental Inspection investigated the accident or participated in the investigation. Fire Rescue Department units intervened in 124 accidents that are registered by the Czech Environmental Inspection.

The most numerous group of pollutants were oil and oil products: 48.9% of the total number of registered cases, followed by waste waters (15.4%) and chemical substances excl. heavy metals (8.6%). The character of the pollutants was not identified in 30 accidents (13.5%).

Classified by the cause (inflictor) of the accident (NACE), the most numerous group were accidents caused by land transport and pipeline transport (15.4%), followed by accidents in the area of agriculture, game management and related activities (5.8%) and accidents associated with waste water and solid waste disposal (3.6%). The inflictor was not identified in 55.2% of all events.

In terms of breach of legal regulations in the field of water management, in 2015 the Czech Environmental Inspection imposed in total 533 penalties, of which 477 penalties became fully effective (as of 31 December 2015) and the total sum of penalties (477 penalties) amounted to CZK 28,206 million.

5.4 Erosion of agricultural land

Currently, the Czech landscape is increasingly exposed to the action of hydrological extremes (flood episodes caused by extreme rainfall and hydrological drought). Farming is one of the key factors that can mitigate the effects of climate change. Areas affected by hydrological extremes caused by climate change are expected to expand significantly in the Czech Republic in the years to come.

Erosion of agricultural land

The main manifestation of water erosion is the loss of soil. Water erosion eliminates the most fertile part of agricultural land – topsoil. Soil particles released by water erosion are displaced on land due to the drag of surface runoff and deposited in the lower parts of the land block or farther in the catchment area, where they cause more damage in urban areas, line structures and in the water bodies through silting of river beds and reservoirs. Silting of river beds, amelioration structures (main and detailed drainage facilities) and water reservoirs with products of water erosion causes mainly a reduction of flow capacity of river beds and storage space in the reservoirs and affects their hydraulic function, which results in reduced retention time, increases the rate of flow through the reservoir and reduces pace of water abstractions. Generally, this leads to a reduction of accumulation of water in the area. Conversely, in the event of decline of water level in the reservoir (e.g. prolonged drought), large areas of deposited material are exposed and direct contact of these deposits with air causes their accelerated mineralization and the quality of water in the reservoir after re-flooding rapidly deteriorates. Moreover, the sediments contain significant amounts of nutrients and hazardous substances. Soil comes into contact with a large number of chemical substances of various kinds and various degrees of toxicity (fertilizers, pesticides, various agricultural wastes and industrial wastes deposited on land or in soil). Along with the soil particles there are brought into watercourses, amelioration structures and reservoirs large amounts of nutrients and other chemical substances that adversely affect the quality of water and cause the eutrophication, and through the infiltration into surface water and groundwater threaten their possible use. Eroded soil usually contains a higher concentration of nutrients than the original soil as nutrients are found in larger amounts in the upper layers of soil and fine soil fractions are easily washed out.

There are specific conditions for the occurrence of water erosion in the Czech Republic as the country has greatest original soil blocks from all EU Member States and partial anti-erosion protection is used for growing crops that present erosion risk. This protection is ensured in the Czech Republic particularly with the Good Agricultural and Environmental Condition standard (hereinafter referred to as the "GAEC").

GAEC standards ensure farming in accordance with environmental protection. They are defined in Government Decree No. 309/2014 Coll., on designation of consequences for breach of conditionality of provision of some agricultural subsidies: as of 2004, all farmers applying for agricultural grants in the Czech Republic are obliged to adhere to these standards. GAEC standards are individually defined by the EU Member States on the basis of general scope defined in Annex II to the Directive of the European Parliament and of the Councile (EU) No. 1306/2013 that includes the following thematic groups: water, soils and carbon reserves, landscape, minimum care level. Adhering to the monitored requirements and conditions stipulated by GAEC is a precondition for providing selected grants in full amounts. Sending direct payments, certain grants under the Rural Development Programme (hereinafter referred to as the "RDP") and some types of support under the uniform organization of the wine market are "preconditioned" by adhering to certain legislation. The precondition consists of two parts: GAEC standards and mandatory requirements concerning economy. Surveillance on compliance with GAEC standards is performed by the State Agricultural Intervention Fund.

The aim of GAEC 5 standard is mainly to protect soil from water erosion and to reduce the negative effects of erosion, such as damage to municipal and private property caused by flooding or silting with washed-out soil. For the purposes of this standard there were defined areas seriously and mildly endangered by soil erosion and the requirements for the method of growing selected major crops. Apart from professional point of view, this definition also takes into account economic aspects, in particular the cost of implementation of soil conservation technologies in areas endangered by erosion. For this reason, the Ministry of Agriculture under GAEC 5 standard accepts erosion reaching approx.

45 t/ha/year. The effectiveness of setting limits under GAEC 5 is regularly evaluated with a possibility to expand these areas, if necessary. Classification of soils by erosion risk (in accordance with the LPIS public land registry) is shown in table 5.4.1.

Table 5.4.1
Soil erosion risk categories under GAEC 5 – representation of categories of arable land in the Czech Republic

Soil erosion risk categories	Percentage (%)	Acreage (ha)
seriously endangered by soil erosion	0.42	10,494
mildly endangered by soil erosion	10.06	252,053
not endangered	89.52	2,242,508
Total	**100.00**	**2,505,055**

Source: Research Institute for Soil and Water Reclamation, public research institution

The applicant, on a part of a land block designated as:

a) seriously endangered by erosion, shall ensure that erosion risk crops of maize, potatoes, beet, sown beans, soy, sunflower and sorghum are not grown; cereals and rapeseed crops are to be planted on such areas using soil protective technologies; in the case of other cereals, the condition of soil protection technology need not be adhered to only if they are to be sown with a clover or clover-grass mixture under-sow.

b) mildly endangered by erosion, shall ensure that erosion risk crops of maize, potatoes, beet, sown beans, soy, sunflower and sorghum are to be planted on such areas only using soil protective technologies.

The conditions stipulated in a) and b) do not have to be met in areas where the total arable land does not exceed 0.40 ha of the land farmed by the applicant on the condition that the rows with erosion risk crops are in the direction of level curves with deviation less than 30 degrees and under the land with erosion risk crops there is a stripe of arable land at least 24 m wide that is next to the land with erosion risk crop and interrupts all the draining lines passing through the erosion risk crop in the land endangered by erosion and where there will be growth of grass, perennial fodder crops or any erosion risk crops.

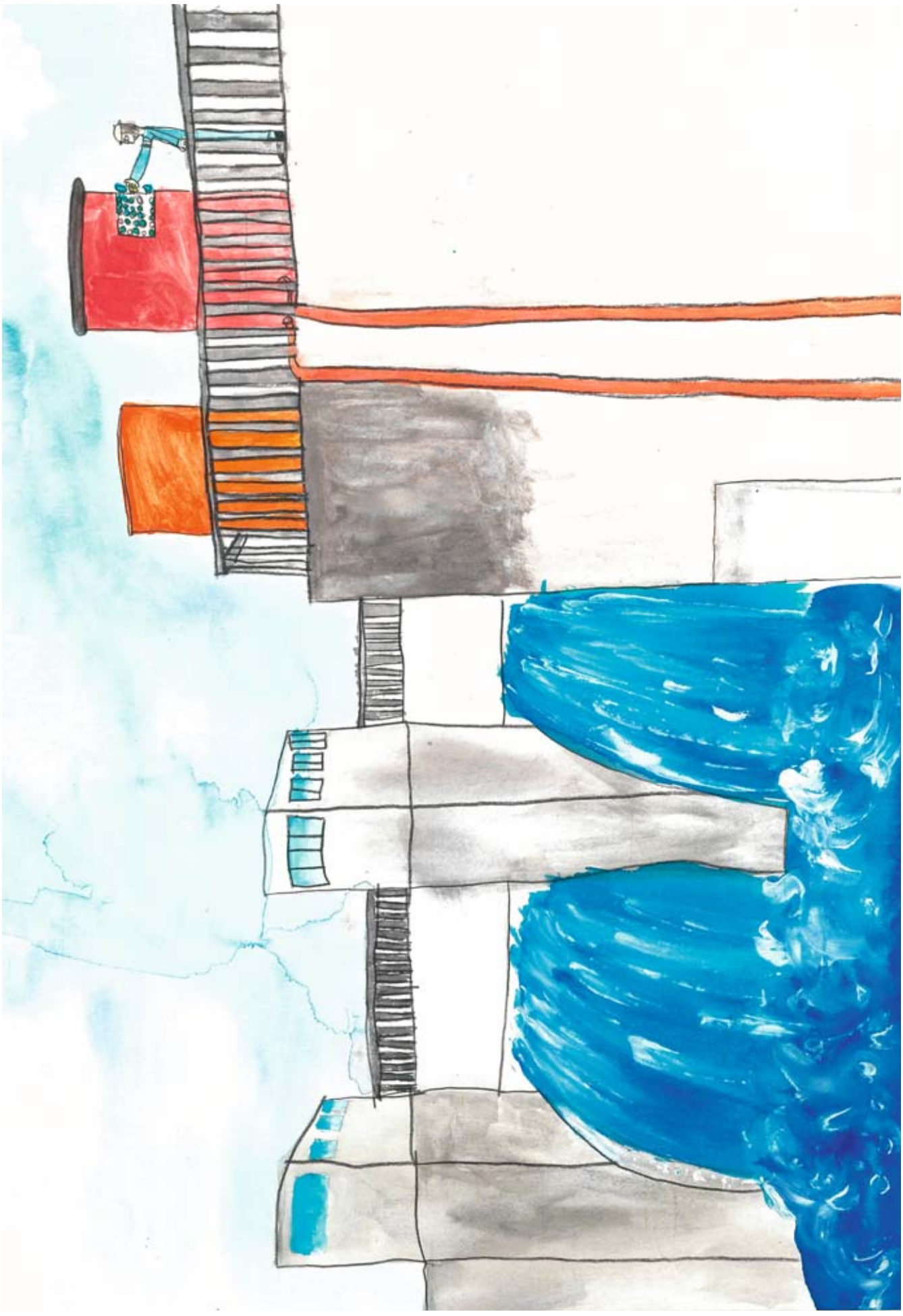
Monitoring of erosion of agricultural land has been carried out since 2012. Its main aim is to provide relevant information about the extent of the problem of erosion of agricultural land, about the causes of this condition, the accuracy of targeting existing policies in the fight against erosion and about the effectiveness or ineffectiveness of some of erosion control measures. The subject of monitoring is manifestations of water and wind erosion and shallow slope deformations, which cause damage to agricultural land. Means for recording, managing and viewing information about monitored events is a web portal accessible from http://me.vumop.cz. Records of events are kept by employees of the State Land Office in cooperation with the Research Institute for Soil and Water Reclamation, public research institution. Obtained information is further used in the design of effective erosion control measures and in drafting new policies in this area. Erosion events by regions of the Czech Republic are shown in Table 5.4.2.

Table 5.4.2
Monitoring erosion – overview of erosion events in the regions of the Czech Republic

Region	Total number of reported events	Number of reported events in 2015
City of Prague	0	0
South Bohemia	76	4
South-Moravia	56	4
Karlovy Vary	4	0
Hradec Králové	75	2
Liberec	22	0
Moravia-Silesia	6	0
Olomouc	12	0
Pardubice	22	3
Pilsen	59	3
Central Bohemian	76	3
Ústí	6	0
Vysočina	127	7
Zlín	10	0
Czech Republic	**551**	**26**

Source: Research Institute for Soil and Water Reclamation, public research institution.

Torrential rains in most cases cause intensive surface runoff from agricultural land, which results in intensive erosion and subsequent accumulation of soil. Currently, in the Czech Republic more than 50% of agricultural land is threatened by water erosion and about 10% by wind erosion. Over the last 30 years, land degradation due to erosion dramatically accelerated. The main reason is particularly the intensification of agriculture and change in the preferences of growing some crops.



Kristýna Jandová – Operator at the reservoir turns on the water – 5th class A, Primary school of T. G. Masaryk, Prague 4, City of Prague

6. Watercourse management

6.1 Professional management of watercourses

The inland position of the Czech Republic in the heart of Central Europe predetermines its relation to the European river network. From the hydrological viewpoint it may be called "the roof of Europe". The basic hydrographic system is constituted by approximately 100,800 km of watercourses with both natural and regulated watercourse beds. Watercourses in the Czech Republic are divided according to the Water Act into two categories: significant watercourses and minor watercourses. Professional management of watercourses is carried out in accordance with the provisions of Section 47 of the Water Act.

The main watercourse administrators are the River Boards, state enterprises, and Forests of the Czech Republic, state enterprise, who report directly to the Ministry of Agriculture. As of 1 January 2011, they are also responsible for the management of minor watercourses transferred from the Agricultural Water Management Administration. State-owned River Boards, s. e. and Forests of the Czech Republic are responsible for the management of about 94.2% of the total length of watercourses in the Czech Republic. Other entities involved, including the Ministry of Defence, the National Park Administrations and other natural and legal entities are responsible for 5.8% of watercourse management.

Professional management of watercourses broken down to the individual watercourse administrators is shown in table 6.1.1.

Table 6.1.1
Professional management of watercourses

Category	Administrator	Length of watercourses in km	
		2014	2015
Significant watercourses	Elbe River Board, s. e.	3,667	3,667
	Vltava River Board, s. e.	5,493	5,503
	Ohře River Board, s. e.	2,377	2,377
	Oder River Board, s. e.	1,111	1,111
	Morava River Board, s. e.	3,748	3,755
	Total	**16,396**	**16,413**
Minor watercourses	Forests of the Czech Republic, s. e.	38,491	38,495
	River Boards, s. e., in total	39,657	40,928
	Other administrators [1)]	5,857	4,962
	Other [2)]	5	3
	Total	**84,010**	**84,388**
Watercourses in total		**100,406**	**100,801**

Source: MoA
Note: Digital lengths of watercourses from the Central Register of Watercourses are presented.

[1)] *Including National Park Administrations, the Ministry of Defence (authorities of military districts), municipalities and other natural and legal persons.*

[2)] *From 2013 including sections of minor watercourses, for which the administrator has not yet been designated and which appear to be the solitary streams.*

The watercourse Maňavský, Southern Bohemian Region (source: Forests of the Czech Republic, s. e.)

All significant watercourses are listed in Annex 1 of Decree No. 178/2012 Coll., stipulating the list of significant watercourses and the method of carrying out the activities relating to watercourse administration. It provides an overview of 819 watercourses included in the "List of significant watercourses". This list also includes the identifier of watercourses (Central Register of Watercourses). Minor watercourses constituting the so-called "border" watercourses are also classified in this category. The significant watercourses, with a total length of 16,413 km, are administered under the provision of Section 4 of Act No. 305/2000 Coll., on river basins, by the respective River Boards, state enterprises: the Elbe River Board, the Morava River Board, the Oder River Board, the Ohře River Board and the Vltava River Board. The backbone watercourses are the Elbe (370 km), the Vltava River (431 km) and the Ohře River (254 km) in Bohemia, the Morava River (269 km) and the Dyje River (194 km) in the south of Moravia and the Oder River (135 km) with the Opava River (131 km) in the north of Moravia and in Silesia.

All the other watercourses (provision of Section 43 of the Water Act) are in the category of minor watercourses. The administration of minor watercourses is carried out under the provision of Section 48 of the Water Act, based on the respective appointment by the Ministry of Agriculture (the provision of Section 48 (2) of the Water Act). If no administrator of a minor watercourse is appointed, the watercourse in question is managed by the administrator of the receiving watercourse where the outfall of the minor watercourse is situated. It does so until the administration of the watercourse is established under Section 48 (2) of the Water Act. The administration of minor watercourses may be carried out by the municipalities through the territory of which the minor watercourses flow, by natural or legal persons or, as the case may be, by the state organizational units using these minor watercourses or carrying out activities with which these watercourses are connected. The form and the content of the application for establishment of the administration of a certain minor watercourse is published and specified in detail in the above mentioned Decree No. 178/2012 Coll. The total length of minor watercourses according to the Central Register of Watercourses is 84,041 km. The process of reassessment, refining and reclassification of the mapping of the designated minor watercourses continues to be underway.

After Act No. 15/2015 Coll., on the termination of the Brdy military training, on determining border of military district and on the change of the relevant acts (Act on Military District Border), came into force, military district border were optimized, which consisted in complete cancellation of the Brdy military district border and in changing borders of other military districts. In connection with the military district optimization, minor watercourses administration was updated in the benefit of other administrators, River Boards, s.e., and Forests of the Czech Republic, s.e.

The public administration bodies and the general public find detailed information on the establishment of the administration of the relevant watercourse in the web application "Central Register of Watercourses", which is available on the portal of the Ministry of Agriculture (www.eagri.cz) and on the Water Management Information Portal (www.voda.gov.cz).

The acquisition value of the non-current tangible assets relating to watercourses amounted in 2015 to CZK 51.75 billion, which is by CZK 0.63 billion more than in 2014.

The year-on-year growth is mainly caused by the increase in the non-current tangible assets generated by the renewal and planned development of entrusted property in the form of routine capital investment construction and by consecutive entries of the assets taken over, and the completed hydraulic structures in the accounting records. In 2014, none of the administrators of watercourses completed, approved and took over to the use a hydraulic structure that would significantly influence the indicators expressing the acquisition value of the non-current tangible assets. The non-current tangible asset values in purchase prices and the year-on-year development (increase in the non-current tangible assets) for the individual watercourse administrators are shown in Table 6.1.2.

Table 6.1.2
Acquisition value of non-current tangible assets relating to watercourses

Watercourse administrators directly responsible to the Ministry of Agriculture	2014	2015
	billions of CZK	
Elbe River Board, s. e.	10.28	10.33
Vltava River Board, s. e.	10.85	10.88
Ohře River Board, s. e.	9.85	9.97
Oder River Board, s. e.	6.02	6.07
Morava River Board, s. e.	8.59	8.60
River Boards, s. e., in total	**45.59**	**45.85**
Forests of the Czech Republic, s. e.	5.53	5.90
Total	**51.12**	**51.75**

Source: MoA

Auditing activities in the individual River Boards, state enterprises, are carried out by the respective controlling bodies. As every year, comprehensive and selective audits were carried out in 2015. Their overview and results are shown below.

Ministry of Agriculture

Ministry of Agriculture carried out ongoing public inspections focusing on compliance with the conditions, on the use of public funds and on economy of the relevant enterprise. In total 18 audits were carried out in 2015, at least one for every River Board, s. e. Audits were carried out by several departments of the Ministry of Agriculture (Department of Water Management Policy and Flood Control Measures, Department of Water in Landscape and Rehabilitation of Flood Damage, Department of Audit and Supervision, Establishment Policy Department). In five cases several shortcomings were found and based on the recommendation measures were taken to remedy the situation. In two preliminary inspections before providing a grant, missing documents were added. At the Vltava River Board, s. e., public inspection initiated in the previous year was terminated in 2015. Corrective measures were taken and subsequent extraordinary control inspections were carried out. All other audits showed no defects.

Tax Authorities

Tax authorities in 2015 carried out seven inspections, of which two inspections were conducted by a specialized tax authority. There were two tax audits and an audit of the calculation of surface water for 2012 and 2013. Except for the Oder River Board, s. e., inspections were carried out at all River Boards, s. e. None of the inspections found any shortcomings. An inspection in the Elbe River Board, s. e., is ongoing.

Regional Public Health Offices

The Regional Public Health Offices carried out in 2015 a total of 15 audits focusing on compliance with laws and regulations concerning safety and the protection of public health. At least one audit was carried out at every River Board, s. e. Only one audit found minor shortcomings which were remedied.

Health Insurance Company

The health insurance company carried out 6 audits of the obligations of the employer in the field of health insurance payments and adherence to other obligations of insurance payer in 2015. The audits were performed at two River Boards, state enterprises: the Elbe River Board, s. e., and the Oder River Board, s. e.). All audits were carried out with no shortcomings found.

Czech Environmental Inspection

In 2015, the Czech Environmental Inspection carried out in total four audits at the Vltava River Board, s. e., the Morava River Board, s. e., and the Ohře River Board, s. e., with focus on compliance with the law in connection with the management and performance of activities on watercourses and compliance with the law on nature conservation and water management. The audits found breach of the law at the Ohře River Board, s. e., where there way no consent of the natural conservation authority to modify the natural environment of a nature reserve. The audit immediately proposed measure to be taken, the outcome is not known at the moment. Other audits found no shortcomings.

State Office for Nuclear Safety

The State Office for Nuclear Safety carried out four audits in 2015: one at the Vltava River Board, s. e., and the Elbe River Board, s. e., and two at the Ohře River Board, s. e. Two shortcomings were found and these were remedied. One audit found no shortcomings, one audit is still ongoing.

Ministry of Finance

Ministry of Finance carried out two control financial audits in 2015: at the Elbe River Board, s. e., and at the Morava River Board, s. e., with no negative findings.

Fire Rescue Department

The Fire Rescue Department carried out six inspections on compliance with the obligations under the regulations on fire protection in 2015 at three River Boards, s. e.: the Vltava River Board, s. e., the Elbe River Board, s. e., and the Oder River Board, s. e. Minor shortcomings were found in one of the cases and they were remedied.

Regional Labour Inspectorate

In 2015, there were six checks on compliance with the obligations of occupational safety and obligations in employment relationship at all River Boards, s. e., one check was conducted by the Job Office. Five negative findings were reported. All the measures imposed were fulfilled. A check focused on investigating a job-related injury with hospitalization over 5 days led to one negative finding on the basis of which remedial measures were taken. One check found no shortcomings.

Centre for Regional Development of the Czech Republic

In 2015, the Centre for Regional Development of the Czech Republic carried out three inspections at the Morava River Board, s. e., focused on the implementation of the "Confluence of the Morava and Myjava Rivers – joint flood control systems on both banks of the Morava River", "Kopčany – Hodonín – joint flood control systems on both banks of the Morava River" and "Renaturalization of the Morava River from the Radějovka River to the Myjava River – joint flood control systems on both banks of the Morava River". The inspections did not report any negative findings, no corrective measures were taken.

Forest Management Institute

In 2015, the Forest Management Institute conducted two inspections at the Morava River Board, s. e. The inspections focused on the risk on the introduction of illegally extracted wood or wooden products on the Czech market. The audit initiated at the end of 2014 at the Upper Morava plant reported two negative findings and corrective measure to be taken were imposed. The other audit at the Dyje plant reported no shortcomings.

Regional Veterinary Administration

The Regional Veterinary Administration conducted five inspections in 2015, of which four at the Morava River Board, s. e., and one at the Oder River Board, s. e. No shortcomings were found.

Other government authorities

The Trade Union of Workers of Wood Processing Industries in Forest and Water Management of the Czech Republic, the Czech Meteorological Institute and the Czech Office for Standards, Metrology and Testing conducted one inspection at the Ohře River Board, s. e. None of the inspections found any shortcomings. The Morava River Board, s. e., was inspected by the Fund of microprojects, White Carpathians Region, the Czech Institute for Accreditation, o.p.s., the Moravian Provincial Archive in Brno and the Energy Regulatory Office. The Energy Regulatory Office reported negative findings concerning the failure to comply with obligations stipulated by the Energy Act. The Morava River Board, s. e., filed objections against the inspection protocol and expects to be exculpated from the liability in the current administrative proceedings. No other shortcomings were found at the Morava River Board, s. e., by all the above mentioned inspections.

The Customs Office and the State Environmental Fund each conducted one inspection at the Vltava River Board, s. e. Both inspections reported no negative findings. At the Elbe River Board, s. e., one inspection was conducted by an inspector from the Trade Union of Workers of Wood Processing Industries in Forest and Water Management of the Czech Republic and five inspections by Municipal Offices and/or Municipal Council. No shortcomings were found in three cases, in two cases some shortcomings were reported. Relevant corrective measures are currently being taken.

6.2 River Boards, state enterprises

In 2015, the total revenues generated by the River Boards, state enterprises, compared to 2014, reached a year-on-year increase amounting to 0.7%, in absolute figures this increase in total revenues was almost CZK 34 million. This increase was generated by four items of the revenue structure: electric energy generation, payments for surface water abstractions, non-investment grants from the state budget and other operational grants.

The year-on-year increase in total revenues of the River Boards, s. e., was mainly due to income from electric energy generation which increased by CZK 64 million (by 11.7% when compared with 2014). Other items that influence the total income in 2015 included non-investments grants from the state budget (increase by 3.5%, i.e. by CZK 10.9 million), other operating grants (an increase by 2%, i.e. by CZK 0.1 million) and payments for surface water abstraction (increase by 1.5%, i.e. by CZK 48.4 million). There was a significant year-on-year decrease of 19% (i.e. CZK 85 million) in the "other income" item. 4% decrease was reported in income from the use of impounding structures (i.e. CZK 4.8 million).

The structure of the revenues of the River Boards, state enterprises, in 2015 is shown in table 6.2.1. Table 6.2.1 shows the distribution of revenue types in the total revenue of the River Boards, state enterprises. The development of the total surface water supplies charged for in technical units over a longer period is shown in Table 6.2.2. Prices for the individual types of surface water abstractions are shown in Tables 6.2.3 and 6.2.4.

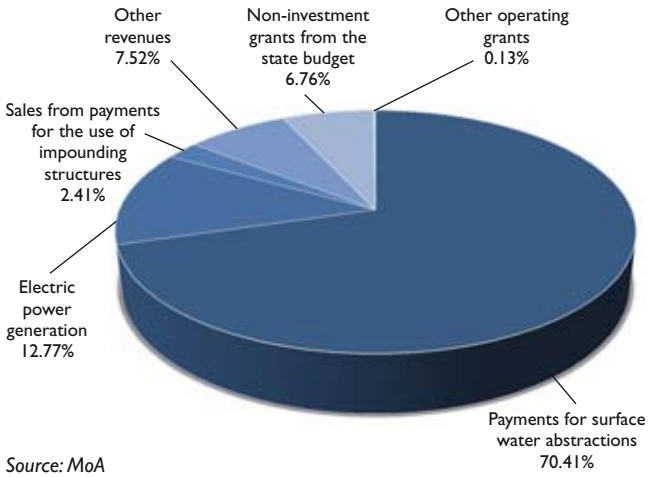
The watercourse Jelení, Moravian-Silesian Region (source: Forests of the Czech Republic, s. e.)

Table 6.2.1
Structure of the revenues of the River Boards, state enterprises, in 2015

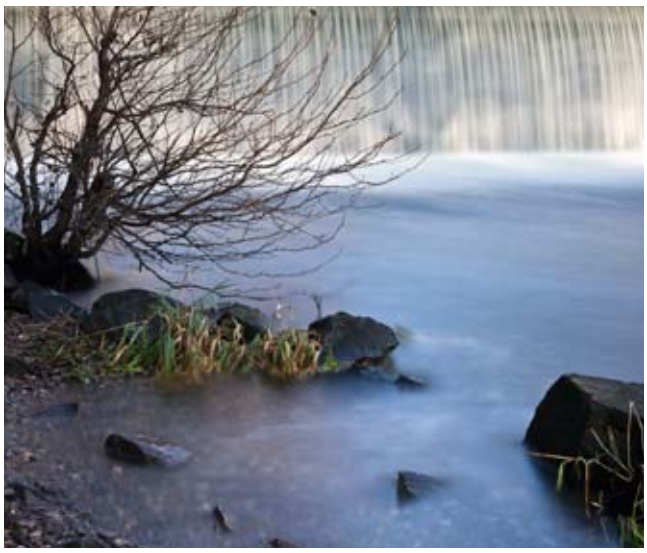
Indicator	River Board, s. e.					Total
	Elbe	Vltava	Ohře	Oder	Morava	
	thousands of CZK					
Payments for surface water abstractions	860,155	758,733	542,786	576,064	637,294	**3,375,032**
Electric power generation	39,390	244,146	232,565*)	65,509	30,432	**612,042**
Sales from payments for the use of impounding structures	6,900	102,101	1,769	0	4,956	**115,726**
Other revenues	86,346	93,132	79,965	43,221	57,799	**360,463**
Non-investment grants from the state budget	73,597	97,664	57,195	0	95,467	**323,923**
Other operating grants	87	498	0	500	5,181**)	**6,266**
River Boards, s. e., in total	**1,066,475**	**1,296,274**	**914,280**	**685,294**	**831,129**	**4,793,452**

Source: River Boards, s. e.
*Note: *) The item includes revenue from photovoltaic power plants.*
***) The item includes an estimate for the cost of the subsidy made in 2015 of 1,298 thousand of CZK. Received pumped and other operating subsidies in 2015 were 3,883 thousand of CZK.*

Chart 6.2.1
Structure of the revenues of the River Boards, state enterprises, in 2015



Source: MoA



Under Kamenomlýnský, the Svratka River (author: Vladimír Husák)

The weir on the Dyje River, Znojmo – Louka (source: Morava River Board, s. e.)

Table 6.2.2
Surface water supplies charged for in 2009–2015

River Board, s. e.		2009	2010	2011	2012	2013	2014	2015
		thousands of m³						
Elbe	a)	800,772	817,645	775,223	723,608	600,131	609,118	547,658
	b)	36,787	38,843	37,892	34,838	35,782	36,022	37,271
Vltava	a)	243,528	238,582	230,817	234,579	214,195	211,473	213,944
	b)	146,670	144,164	140,087	140,596	134,750	130,214	134,544
Ohře	a)	148,330	141,308	135,730	131,659	121,167	118,390	120,352
	b)	50,299	49,550	46,162	44,954	42,212	40,583	40,777
Oder	a)	138,961	144,155	138,942	139,124	136,614	135,223	136,832
	b)	68,171	66,936	64,179	67,102	65,105	64,920	65,045
Morava	a)	174,398	173,661	182,361	180,835	155,848	162,058	160,288
	b)	31,233	31,063	31,861	33,427	30,951	32,262	32,975
River Boards, s. e., in total	**a)**	**1,505,989**	**1,515,351**	**1,463,073**	**1,409,805**	**1,227,955**	**1,236,262**	**1,179,074**
	b)	**333,160**	**330,556**	**320,181**	**320,917**	**308,800**	**304,001**	**310,612**

Source: River Boards, s. e.
Note: a) charged for in total,
b) of which for public water supply systems.

In the River Boards, state enterprises, the average price of other abstractions of surface water in 2015 ranged around CZK 4.34 per m³, this means an increase by 2.1%, compared to the previous year. This price is the so-called factually regulated price, which may include only justified costs, reasonable profit and the tax pursuant to the relevant tax regulations.

In addition to through-flow cooling, since the year 2003 abstraction levels and prices of surface water have also been identified for the purposes of charged agricultural irrigation and flooding of artificial depressions in the landscape. In 2015, similarly to 2014, the Elbe River Board, s. e., and the Vltava River Board, s. e., were the only river boards to abstract water for the purposes of agricultural irrigation in the amount of 260 thousand m³, which represents an increase of 12.1%, compared to 2014. The Ohře River Board, s. e., similarly to the previous years, is the only one reporting surface water abstractions for flooding of artificial depressions in the landscape, in the amount significantly lower (by 1,210 thousand m³, i.e. a decrease by more than 75%), compared to 2014.

Table 6.2.3
Price for abstractions used for flow cooling in 2009–2015

River Board, s. e.	2009	2010	2011	2012	2013	2014	2015
	CZK/m³						
Elbe	0.53	0.55	0.60	0.64	0.65	0.68	0.70
Vltava	1.03	1.10	1.13	1.22	1.22	1.25	1.25
Morava	0.67	0.67	0.67	0.72	0.89	1.15	1.19

Source: River Boards, s. e.
Note: Unit price for m³ is quoted excluding VAT.

Table 6.2.4
Price for other surface water abstractions in 2009–2015

River Board, s. e.	2009	2010	2011	2012	2013	2014	2015
	CZK/m³						
Elbe	3.16	3.35	3.63	3.97	4.09	4.29	4.39
Vltava	2.68	2.94	3.15	3.40	3.45	3.55	3.62
Ohře	3.16	3.31	3.53	3.88	4.14	4.34	4.51
Oder	3.10	3.35	3.58	3.80	3.99	4.09	4.21
Morava	4.65	4.97	5.47	5.88	6.16	6.39	6.52
Average price quoted by River Boards, s. e. *)	**3.13**	**3.32**	**3.61**	**3.94**	**4.08**	**4.25**	**4.34**

Source: River Boards, s. e.
Note: Unit price for m³ excluding VAT.
**) Calculated by means of weighted average.*

In the current approach the current prices reflect the price of the service, i.e. enabling the provision of supplies ensured by River Boards, s. e. to water users, they do not reflect the value of surface water.

These prices are subject to regulation pursuant to Act No. 526/1990 Coll., on prices, and the rules stipulated by the decisions of the Ministry of Finance on price regulation, i.e. by the relevant notifications issuing the list of goods with regulated prices which are published in the Price Bulletin.

In 2015, the River Boards, state enterprises, reported in aggregate an increase in revenues from payments for surface water abstractions, in absolute figures amounting to CZK 48 million, which corresponds to a year-on-year increase in this revenue category by 1.4%, compared to 2014. Two River Boards, s. e., (the Elbe River Board, s. e., and the Morava River Board, s. e.) reported a decrease in revenues from these abstractions, while all the other ones recorded an increase of CZK 50 million, the Ohře River Board, s. e. an increase of CZK 29 million, the Oder River Board, s. e. an increase of CZK 23 million and the Vltava River Board, s. e. an increase of CZK 20 million. Received payments for surface water abstractions over a longer period are shown in Table 6.2.5.

Gauging station Držkovice (source: Elbe River Board, s. e.)

Table 6.2.5
Payments for surface water abstractions in 2009–2015

River Board, s. e.	2009	2010	2011	2012	2013	2014	2015
	millions of CZK						
Elbe	785	833	846	890	832	882	860
Vltava	640	686	707	778	725	739	759
Ohře[*)]	469	468	479	511	502	514	543
Oder	431	483	497	529	545	553	576
Morava	457	481	543	608	589	639	637
River Boards, s. e., in total	**2,782**	**2,951**	**3,072**	**3,316**	**3,193**	**3,327**	**3,375**

Source: River Boards, s. e.
Note: [*)] Excluding sales from transport and abstraction of water.

Water reservoir Souš (source: Elbe River Board, s. e.)

In 2015, revenues from sales of electric power from small hydroelectric power plants owned by the River Boards, s. e., showed an increase by almost CZK 64 million. The total revenues in this revenue category amounted to CZK 609.7 million.

Revenues from sales of electric power take the second place after the main source of revenues which are payments for surface water abstractions (almost 13% of the total revenue). The total number of small hydroelectric power plants in operation is 91. Rather constant revenues from sales of electric power are reported by the Vltava River Board, s. e., (CZK 244.1 million) which owns and operates 19 small hydroelectric power plants and the Ohře River Board, s. e., (CZK 230.3 million) with 21 small hydroelectric power plants.

Revenues from sales of electric power in 2015 increased significantly, compared to 2014, by almost CZK 64 million, which represents an increase of 11.7%. Compared to 2014, when the long-term maximum was reached (CZK 605.4 million), sales increased by 0.7%. The highest increase of revenues was reported by the Ohře River Board, s. e., with the year-on-year increase of 32% (almost CZK 56 million). A significant year-on-year increase by 17% (CZK 9.5 million) was reported by the Oder River Board, s. e.,

while the Elbe River Board, s. e., reported almost 8% increase (almost CZK 3 million). A slight decrease of revenues from sales of electric power was reported by the Vltava River Board, s. e., (a decrease by 1%) and the Morava River Board, s. e., (a decrease by 5%). More detailed information on the total number of small hydroelectric power plants owned by the individual River Boards, state enterprises, their installed capacity, electric power generation and sales is shown in table 6.2.6.

Table 6.2.6
Small hydroelectric power plants owned by River Boards, s. e., in 2009–2015

River Board, s. e.	Indicator	2009	2010	2011	2012	2013	2014	2015
Elbe	Number of small hydropower plants	20	20	20	20	20	20	20
	Installed capacity in kW	5,892	5,892	5,892	6,108	6,438	6,438	6,438
	Electric power generation in MWh	20,356	23,589	20,871	19,293	23,509	16,349	15,880
	Sales in thousands of CZK	40,497	49,299	44,387	41,222	52,257	36,532	39,390
Vltava	Number of small hydropower plants	18	18	18	19	19	19	19
	Installed capacity in kW	21,200	21,200	21,341	21,607	21,816	22,016	22,016
	Electric power generation in MWh	89,239	106,141	93,459	96,937	86,749	92,102	88,474
	Sales in thousands of CZK	208,580	238,981	217,348	242,709	219,464	246,837	244,146
Ohře	Number of small hydropower plants	21	21	21	21	21	21	21
	Installed capacity in kW	16,930	16,930	16,930	16,930	16,930	16,966	16,966
	Electric power generation in MWh	90,027	106,168	81,134	77,422	102,642	67,371	84,954
	Sales in thousands of CZK	194,911	214,290	167,297	171,112	229,545	174,342	230,236
Oder	Number of small hydropower plants	16	16	16	16	16	16	16
	Installed capacity in kW	5,731	5,731	5,731	5,809	5,809	5,809	5,809
	Electric power generation in MWh	28,662	30,937	28,113	26,068	27,201	20,656	24,535
	Sales in thousands of CZK	60,937	60,568	65,682	66,000	72,506	56,006	65,509
Morava	Number of small hydropower plants	14	14	15	15	15	15	15
	Installed capacity in kW	3,482	3,482	3,495	3,497	3,497	3,497	3,497
	Electric power generation in MWh	14,252	14,365	12,607	11,323	12,228	12,343	11,535
	Sales in thousands of CZK	36,024	35,623	30,831	29,331	31,592	32,014	30,432
River Boards, s. e., in total	**Number of small hydropower plants**	**89**	**89**	**90**	**91**	**91**	**91**	**91**
	Installed capacity in kW	**53,235**	**53,235**	**53,389**	**53,951**	**54,490**	**54,726**	**54,726**
	Electric power generation in MWh	**242,536**	**281,200**	**236,184**	**231,043**	**252,329**	**208,821**	**225,378**
	Sales in thousands of CZK	**540,949**	**598,761**	**525,545**	**550,374**	**605,364**	**545,731**	**609,713**

Source: River Boards, s. e.

Other revenues of the River Boards, state enterprises comprise a sum of less significant items including in particular the lease of land, non-residential premises and water bodies as well as revenues from other business activities. The most significant item is the revenue from sales of machinery services and automobile transport services, laboratory work and from design and engineering activities. Capital yields also contribute to the total of financial revenues.

The "other revenues" item is often significantly affected by a number of unplanned items such as insurance payments, increased interest rates received and the amount of transfers of certain specified sales which relate to the past periods but were not materialized until the monitored year. With regard to these unplanned items and variations that may not always be anticipated, other revenues may show considerable year-on-year variations. In 2015, the year-on-year decrease in other revenues of the River Boards, state enterprises, amounted to CZK 85 million. This decrease was significantly contributed to by the Elbe River Board, s. e., (decrease of CZK 61.5 million) and the Ohře River Board, s. e., (decrease of CZK 27.7 million). A slight increase was reported by the Oder River Board, s. e. Compared to 2014, a slight increase was reported by the Morava River Board, s. e., (a year-over-year increase of CZK 3.9 million) and the Vltava River Board, s. e. (an increase of CZK 1 million).

Water reservoir Starý Jičín (source: Oder River Board, s. e.)

The summary of other revenues of the River Boards, state enterprises, over a longer period is shown in table 6.2.7.

Table 6.2.7
Other revenues of River Boards, s. e., in 2009–2015

River Board, s. e.	2009	2010	2011	2012	2013	2014	2015
	thousands of CZK						
Elbe	129,663	89,889	80,646	98,258	83,184	147,863	86,346
Vltava	128,136	113,624	103,820	109,261	144,774	92,183	93,132
Ohře	117,623	101,250	109,694	94,847	90,474	107,668	79,965
Oder	58,163	108,667	93,210	48,316	39,639	43,802	43,221
Morava	69,306	56,000	50,719	62,345	74,491	53,933	57,799
River Boards, s. e., in total	**502,891**	**469,430**	**438,089**	**413,027**	**432,562**	**445,449**	**360,463**

Source: River Boards, s. e.

Financial needs regarding the key activities of the River Boards, state enterprises are every year supported by a number of grants of both operating and investment nature. State subsidies are necessary for remedying the impacts of floods as well as for systematic activities allowing for implementation of flood control measures, defining inundation areas and producing a number of conceptual studies.

In 2015, the total amount of grants slightly increased by 1.9%, compared to 2015, however, with a different proportion of the impacts of operating grants and investment grants. Grants of operating nature showed a slight year-on-year increase (by CZK 11.6 million, i.e. 3.6%) the same is true for investment subsidies (year-on-year increase by CZK 3.5 million, i.e. 0.7%). In 2015, the total amount of grants received was CZK 812.8 million. The grants were allocated for programmes focusing on both prevention and remedying of flood damages from previous years.

In addition to grants allocated through the budget of the Ministry of Agriculture, these subsidies also included support provided by the Ministry of the Environment through the funds of the Operational Programme Environment (OPE) and the EU. Flood control measures were also co-financed with the contribution of certain regional authorities. The total operating (non-investment) and investment grants allocated to the individual River Boards, s. e., in 2015 are shown in table 6.2.8.

Table 6.2.8
Grants used by River Boards, s. e., in 2015

River Board, s. e.	Operating grants	Investment grants	Grants in total
	thousands of CZK		
Elbe	73,684	36,392	**110,076**
Vltava	99,969	78,577	**178,546**
Ohře*)	57,195	88,689	**145,884**
Oder	500	166,269	**166,769**
Morava	99,350	112,215	**211,565**
River Boards, s. e., in total	**330,698**	**482,142**	**812,840**

Source: MoA, River Boards, s. e.
*Note.: *) Actual use of CZK 151,358 thousand (the difference of CZK 5,474 thousand – using was done in 2014 and settled in cash in 2015).*

Compared to 2014, the total costs in 2015 increased by CZK 12.4 million, i.e. the year-on-year increase amounted to 0.3%. The most significant year-on-year increase by almost 50.7% was shown in the "financial costs" item, although in absolute figures only by CZK 1.3 million. A significant increase in costs was also reported in the items: write-offs, repairs and personnel costs. Other cost items showed a year-on-year decrease. The most significant decrease was reported in the "energy and fuel" item (15.4%).

All River Boards, s. e., with the exception of the Elbe River Board, s. e., reported a year-on-year increase of total costs ranging between 0.9% and 8.4%. The Elbe River Board, s. e., reported almost a 10% year-on-year decrease in these costs. The summary of costs in 2014 reported by the River Boards, s. e., and their comparison with the previous year is shown in Table 6.2.9.

The weir on the Úpa River in Zlič (source: Elbe River Board, s. e.)

Table 6.2.9
Costs in 2014 and 2015 reported by River Boards, s. e.

Type of cost	Year	River Board, s. e.					River Boards, s. e., in total
		Elbe	Vltava	Ohře	Oder	Morava	
		millions of CZK					
Depreciation	2014	153.8	321.5	192.8	145.4	155.4	**969.0**
	2015	157.4	311.1	195.2	146.3	160.4	**970.5**
Repairs	2014	266.9	314.9	179.6	146.6	114.3	**1,022.3**
	2015	230.6	319.0	201.2	126.7	157.8	**1,035.3**
Material	2014	45.6	30.2	16.7	39.9	49.9	**182.3**
	2015	38.9	29.6	18.8	36.6	48.3	**172.2**
Energy and fuels	2014	40.5	40.1	35.2	5.8	13.0	**134.6**
	2015	34.4	37.4	23.7	5.8	12.5	**113.8**
Personnel costs	2014	479.3	427.3	327.8	234.4	306.2	**1,775.1**
	2015	488.2	434.7	337.3	240.4	319.0	**1,819.6**
Services	2014	66.6	81.5	32.3	33.1	26.4	**239.9**
	2015	60.2	79.8	29.8	33.8	32.3	**235.8**
Financial costs	2014	0.3	1.3	0.3	0.2	0.4	**2.5**
	2015	0.4	0.9	0.1	0.2	2.2	**3.8**
Other costs	2014	113.0	44.9	40.4	33.6	139.3	**371.2**
	2015	39.8	67.7	87.9	83.0	79.8	**1,368.4**
Total costs	**2014**	**1,166.0**	**1,261.8**	**825.0**	**639.2**	**804.9**	**4,696.9**
	2015	**1,050.0**	**1,280.2**	**894.0**	**672.8**	**812.3**	**4,709.3**

Source: River Boards, s. e.

In 2015, River Boards, s. e. expended on investments the amount of CZK 1.42 billion, of which 65.3% (CZK 928.3 million) was used from their own resources and 34.7% (in absolute Charts CZK 493.7 million) of investment funds were covered by external financial resources.

Compared to 2014, the total investments made by the River Boards, state enterprises, in 2015 increased by approximately 4%, in absolute figures by CZK 57.25 million. By comparing the values over a longer period, it may be concluded that investment construction significantly decrease in 2014-2015 in comparison with the previous period. The summary of investment funds is shown in Table 6.2.10 and Chart 6.2.2.

Investment expenditures of River Boards, s. e. in 2015 covered by external financial resources amounted to a total of CZK 493.7 million, of which almost 61% were financial resources from the state budget and 38.5% were other resources. Other resources included the OPE funds, the EU funds, municipal funds and free transfers. The largest amount of funding was used for flood control measures, the revitalization of river systems and restoration of hydraulic structures.

The largest volume of investment expenditures was shown by the Vltava River Board, s. e. (CZK 361.5 million), followed by the Morava River Board, s. e. (CZK 314.5 million), the Oder River Board, s. e. (CZK 313.7 million), the Ohře River Board, s. e. (CZK 242.5 million) and the Elbe River Board, s. e. (CZK 189.9 million). In terms of coverage of investment expenditures from external resources, the largest volume of funding was used by the Oder River Board, s. e. (CZK 171.3 million), followed by the Morava River Board, s. e. (CZK 112.2 million), the Ohře River Board, s. e. (CZK 88.7 million), the Vltava River Board, s. e. (CZK 78.6 million) and the Elbe River Board, s. e. (CZK 42.9 million). Chart 6.2.3 shows the structure of the use of investment funds by resource types in River Boards, s. e.

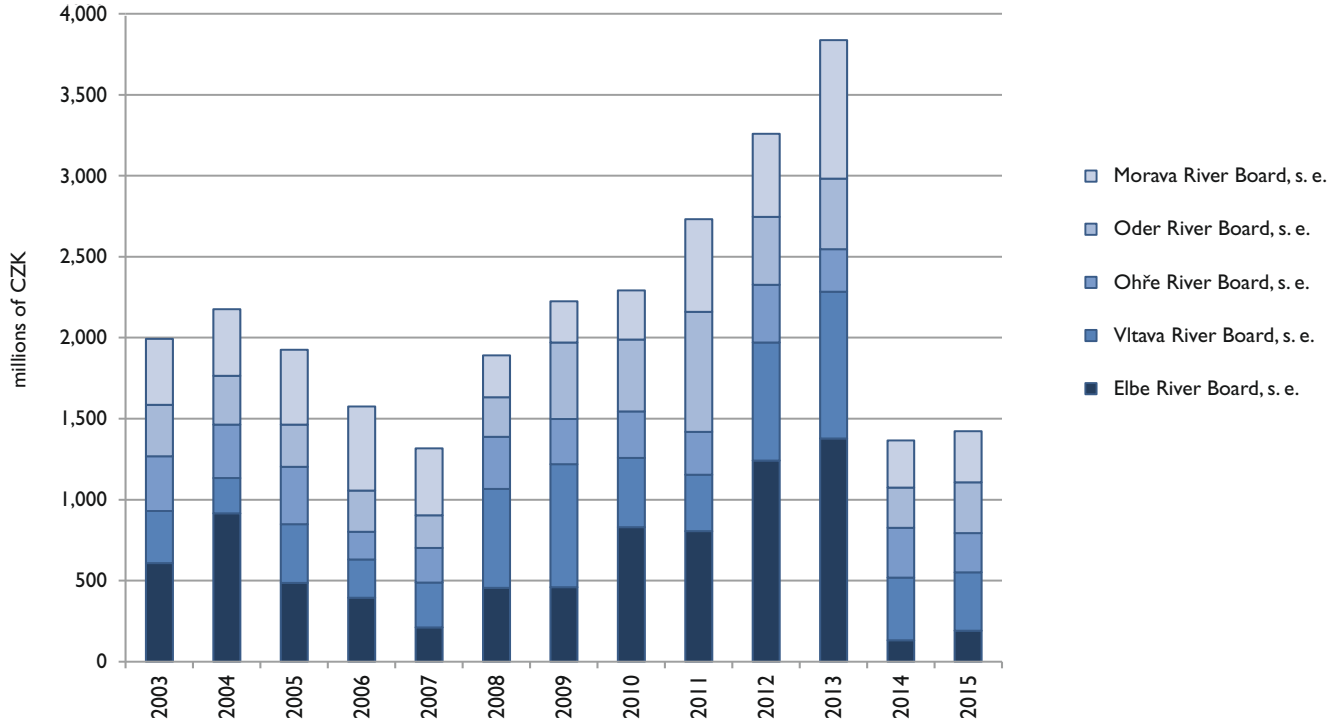
The Stream Úsobský – stabilization of the bank (author: Hana Žáčková)

Table 6.2.10
Investments made by River Boards, s. e., in 2009–2015

River Board, s. e.	2009	2010	2011	2012	2013	2014	2015
	millions of CZK						
Elbe	459.0	829.8	806.7	1,240.8	1,378.3	132.6	189.9
Vltava	761.1*)	428.3	346.7	729.5	905.2	386.7	361.5
Ohře	277.5	287.4	265.8	357.1	262.5	306.7	242.5
Oder	473.5	443.4	741.2	419.7	435.4	248.4	313.7
Morava	254.5	302.6	571.9	512.0	856.0	290.4	314.5
River Boards, s. e., in total	**2,225.6**	**2,291.5**	**2,732.3**	**3,259.0**	**3,837.4**	**1,364.8**	**1,422.1**

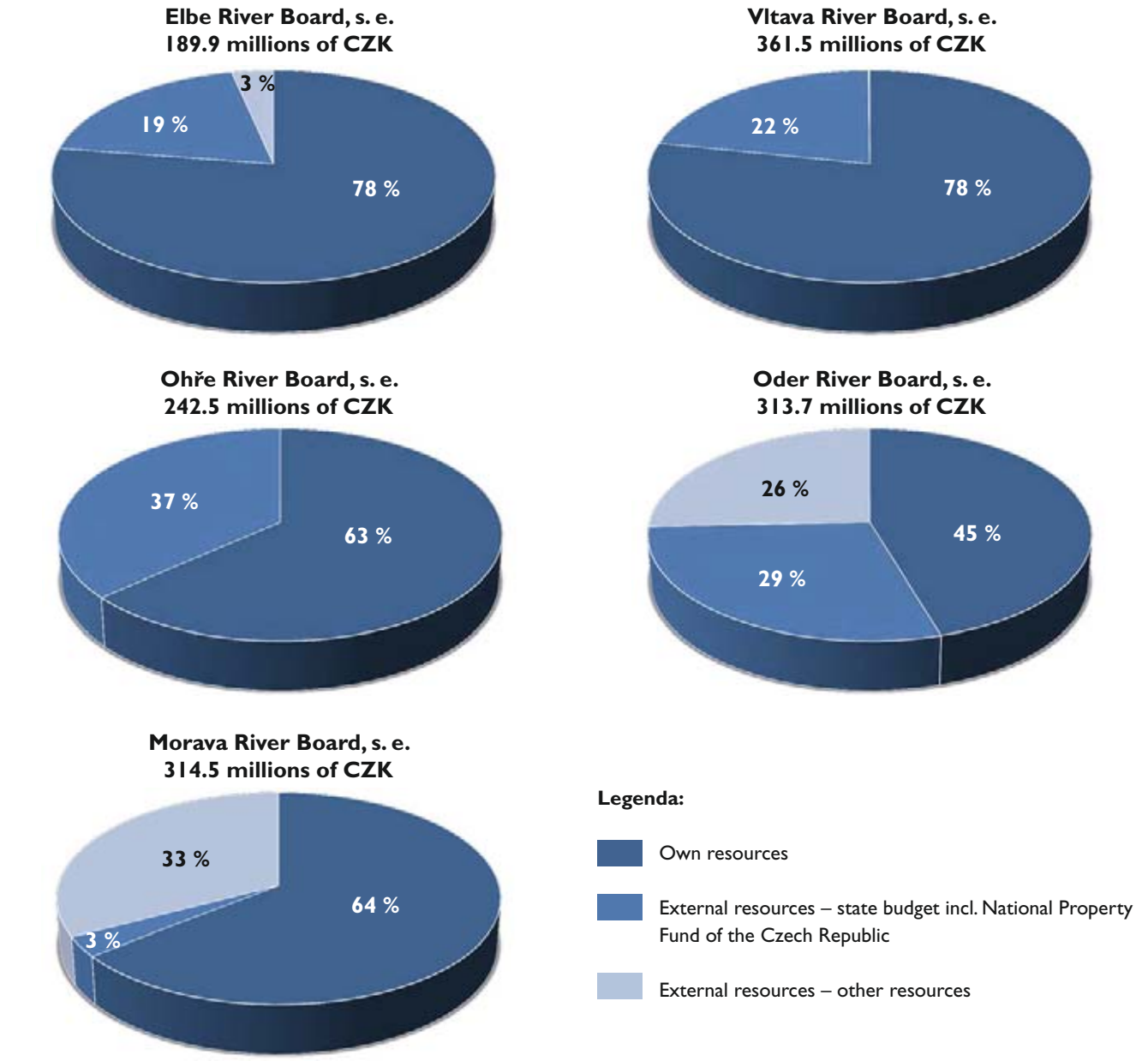
Source: River Boards, s. e.
*Note: *) Overall, the investments were made in 2008, but financially settled in January 2009 (the transfer of part of the grant programme 129 120 to the year 2009, the amount of CZK 19.5 million is included in 2008).*

Chart 6.2.2
The development of capital construction in River Boards, s. e., in 2003–2015



Source: MoA, River Boards, s. e.

Chart 6.2.3
The structure of the use of investment funds by resource types in River Boards, s. e., in 2015



Source: River Boards, s. e.

The Stream Bouřlivý, Mikulov – reconstruction of the streambed (source: Ohře River Basin, s. e.)

The financial results reached by all River Boards, state enterprises showed only a profit. The total profit reached by all the River Boards, s. e., together was more than CZK 84.1 million. In comparison with the previous year the profit grew by more than 34% (CZK 21.5 million).

The most significant increase in profit was reported by the Morava River Board, s. e., compared to 2014, its profit increased by CZK 11 million. As in the previous year, also in 2015 a decrease in profit was reported by the Oder River Board, s. e. (a decrease by 9%). All the remaining River Boards, s. e. show an improvement, compared to 2014.

Profit/loss development over the recent seven years and the share of the individual River Boards, s. e. in the total profit/loss is shown in Table 6.2.11. More detailed breakdown of profit into respective funds along with proposals for covering losses in the River Boards, s. e. is shown in Table 6.2.12.

Židova ditch, river km 0,290 – drought (author: Michal Zoubek)

Table 6.2.11
Profit/loss of River Boards, s. e., in 2009–2015

River Board, s. e.	2009	2010	2011	2012	2013	2014	2015
	thousands of CZK						
Elbe	30,050	27,509	29,908	21,488	770	12,100	16,471
Vltava	30,265	13,530	12,702	25,088	14,495	16,022	16,038
Ohře	30,371	11,776	4,758	11,284	12,624	13,008	20,300
Oder	13,964	13,785	12,721	15,247	16,603	13,718	12,495
Morava	15,295	8,171	5,355	5,114	6,200	7,786	18,830
River Boards, s. e., in total	**119,945**	**74,771**	**65,444**	**78,221**	**50,692**	**62,634**	**84,134**

Source: River Boards, s. e.

Table 6.2.12
Allocation of profit of River Boards, s. e., for 2015

River Board, s. e.	Profit	Allocation of profit or loss					
		Reserve Fund	Social Welfare Fund	Investment Fund	Social Fund	Remuneration Fund	Accumulated losses from previous years
	thousands of CZK						
Elbe	**16,471**	0	7,021	5,700	50	3,700	0
Vltava	**16,038**	4,038	8,000	0	0	4,000	0
Ohře	**20,300**	0	4,835	1,306	0	14,159	0
Oder	**12,495**	0	5,755	0	140	6,600	0
Morava	**18,830**	1,883	6,964	0	0	0	9,983

Source: River Boards, s. e.

The average recalculated number of employees in River Boards, state enterprises increased in 2015 by almost 12 employees to a total of 3,564 persons.

The number of employees was reduced in three River Boards, s. e. The highest increase was at the Elbe River Board, s. e., (by more than 5 employees), at the Oder River Board, s. e., (by more than 2 employees) and at the Vltava River Board, s. e., (by one employee). The Ohře River Board, s. e. reported an increase by one employee. There was a significant rise in the number of employees at the Morava River Board, s. e., (by almost 20 employees). Table 6.2.13 shows the trend in the number of employees in the River Boards, s. e., over a longer period of time.

Table 6.2.13
The number of employees of River Boards, s. e. in 2009–2015 (average recalculated number)

River Board, s. e.	2009	2010	2011	2012	2013	2014	2015
Elbe	943.7	939.7	947.1	927.5	920.7	924.8	919.2
Vltava	786.2	779.2	846.3	841.4	842.3	852.8	852.0
Ohře	605.2	604.9	620.7	616.1	617.5	617.7	618.6
Oder	461.7	457.2	464.3	463.5	467.1	464.2	461.6
Morava	706.9	673.9	698.0	694.0	683.3	692.7	712.6
River Boards, s. e., in total	**3,503.7**	**3,454.9**	**3,576.4**	**3,542.5**	**3,530.9**	**3,552.2**	**3,564.0**

Source: River Boards, s. e.

The average monthly salary in the River Boards, state enterprises, in 2015 amounted to CZK 30,650.

Compared to the previous year, the average monthly salary in the River Boards, s. e. increased by CZK 718, all River Boards, s. e., reported an increase in the average monthly salary. Relatively stable year-on-year increase in the salary of over CZK 1,000 is reported by the Oder River Board, s. e., and the Ohře River Board, s. e., an increase of over CZK 800 is reported by the Elbe River Board, s. e. The Vltava River Board, s. e., also recorded an increase in the average salary (by almost CZK 600). The average monthly salary increased by almost CZK 500 in the Morava River Board, s. e., while it still remains the lowest of all River Boards, s. e. The highest average salary has been repeatedly reported in the past years by the Ohře River Board, s. e. The average monthly salaries over a longer period are shown in Table 6.2.14.

Table 6.2.14
Average salaries in River Boards, s. e., in 2009–2015

River Board, s. e.	2009	2010	2011	2012	2013	2014	2015
	CZK/month						
Elbe	27,283	28,209	28,350	29,540	30,293	30,823	31,596
Vltava	28,300	28,864	28,311	29,285	29,808	29,809	30,398
Ohře	28,620	29,759	30,148	31,335	31,698	32,312	33,242
Oder	26,104	27,190	28,105	28,714	29,458	30,083	31,133
Morava	25,778	25,310	25,812	25,756	26,479	26,668	27,167
Average monthly salary in River Boards, s. e. *)	**27,283**	**27,905**	**28,126**	**28,942**	**29,574**	**29,932**	**30,650**

Source: River Boards, s. e.
*Note: *) Calculated weighted average.*

Baťa Canal (author: Luboš Vřešťál)

6.3 Forests of the Czech Republic, s. e.

Forests of the Czech Republic, s. e., carries out the management of the specified minor watercourses and torrents as one of non-production forest functions. In 2015, Forests of the Czech Republic administered more than 38 thousand km of watercourses.

Watercourse management carried out by Forests of the Czech Republic, s. e. includes the management of non-current assets relating to watercourses, with an acquisition value of CZK 5.90 billion (in particular watercourse regulation, torrent and ravine control, flood control measures and water reservoirs). The watercourse management is carried out by six Watercourse Administrations, with territorial responsibility according to the respective river basin districts, which are methodically controlled by the Water Management Department at the Head Office of Forests of the Czech Republic, s. e.

In 2015, the activities of Forests of the Czech Republic in the field of water management focused in particular on the following:

– remedying flood damage from 2013 and 2014,
– implementation of both capital investment projects and non-investment projects aimed at flood control measures, erosion control measures and also the public interest projects pursuant to Section 35 of the Forest Act,
– carrying out repairs and maintenance of property,
– preparation of documentation for the implementation of actions under the MoA subsidy programme Flood Prevention Stage III and Measure in minor watercourses and minor water reservoirs
– other activities aimed at riparian stand management, revitalization of watercourses which were improperly regulated in the past, non-productive forest functions, support of endangered species, elimination of non-indigenous invasive plant species, etc.,
– administering the Central Register of Watercourses and Water Reservoirs and inventory of assets.

The management of watercourses and the implemented measures (repairs, rehabilitation and new investments) were mainly financed from the organization's own resources and to a certain extent from grants and subsidies. As regards subsidies, the funds in question include measures carried out in the public interest pursuant to Section 35 of the Forest Act and financial resources from the state budget allocated for the programme of the Ministry of Agriculture "Support for Remedying Flood Damages to State-owned Water Management Property" and "Support of Prevention Against Floods III" and support for non-investment grants for minor watercourses pursuant to Section 102 of the Water Act. In addition, Forests of the Czech Republic, s. e., also used the EU funds from the "Operational Programme Environment" and the "Rural Development Programme". Measures relating to minor watercourses are also to a certain extent funded by the Regional Authorities. The activities carried out in connection with the management of watercourses are of a non-commercial nature and with regard to the overall funds expended they generate virtually no profit.

In connection with the management of watercourses, Forests of the Czech Republic, s. e., through its organizational units, the Watercourse Administrations, disbursed in 2015 a total of CZK 458.7 million, including expenditures of capital investment nature amounting to CZK 117.2 million. Its own funds used for these investments amounted to CZK 89.1 million. In total CZK 341.5 million, of which CZK 326.1 million of own funds, was used to perform the management of defined minor watercourses and repairs and maintenance of the relevant fixed assets. In total CZK 47.5 million, of which CZK 40.3 million of own funds were expended on remedying flood damage. The above mentioned amounts include all costs relating to the management of watercourses. Funding structure is shown in Table 6.3.1.

Table 6.3.1
Funding structure of watercourse management in 2015 (full costs)

Action	Total	Own resources in total	Subsidies in total	Of which flood damage	
				Subsidies	Own resources
	millions of CZK				
Investments	117.2	89.1	28.1	2.4	12.9
Non-investments	341.5	326.1	15.4	4.8	27.4
Total	**458.7**	**415.2**	**43.5**	**7.2**	**40.3**

Source: Forests of the Czech Republic, s. e.

Revenues obtained for surface water abstractions to cover the management of watercourses amounted to CZK 10.7 million in 2015. Revenues for surface water abstractions and unit prices are shown in Table 6.3.2.

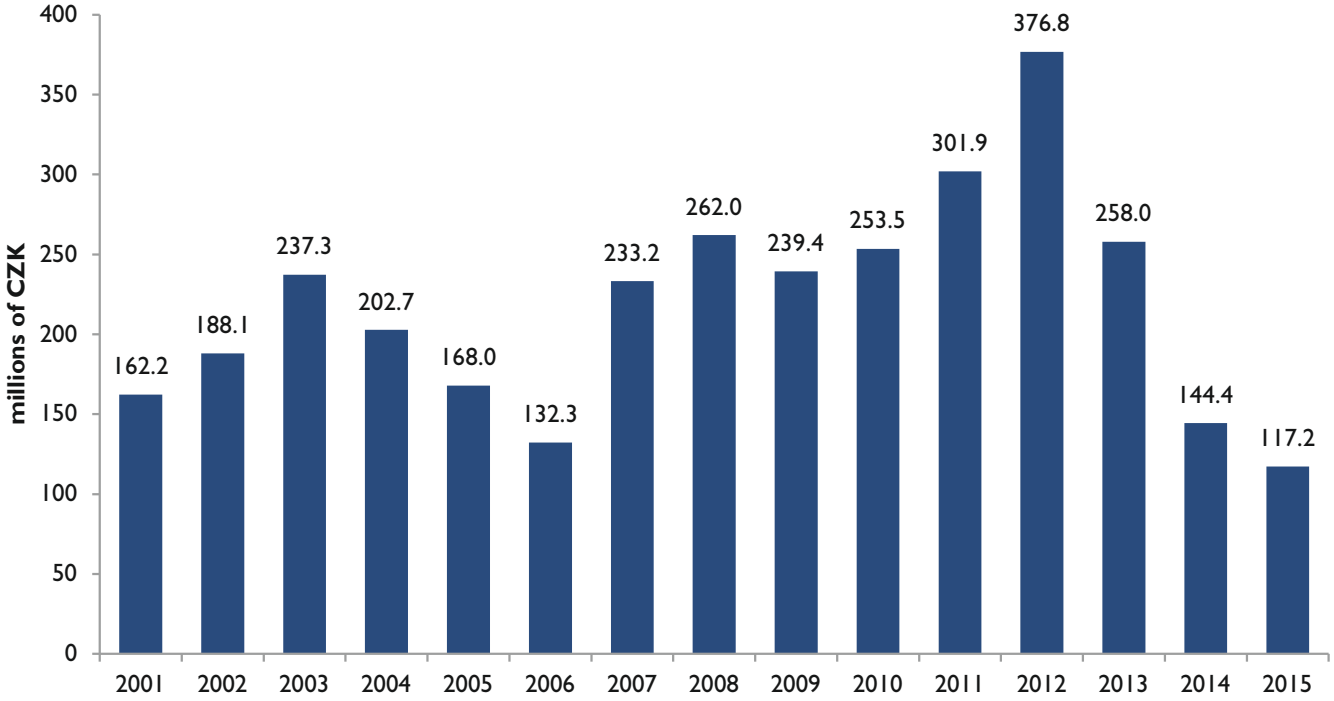
Table 6.3.2
Revenues obtained by the Forests of the Czech Republic, s. e., for surface water in 2009–2015

Year	2009	2010	2011	2012	2013	2014	2015
	thousands of CZK						
Revenues	10,542	11,239	12,969	13,679	12,211	11,544	10,682
Price per m^3 *)	1.55	1.6	1.9	1.96	2.00	2.05	2.06

Source: Forests of the Czech Republic, s. e.
*Note: *) Unit price per m^3 excluding VAT.*

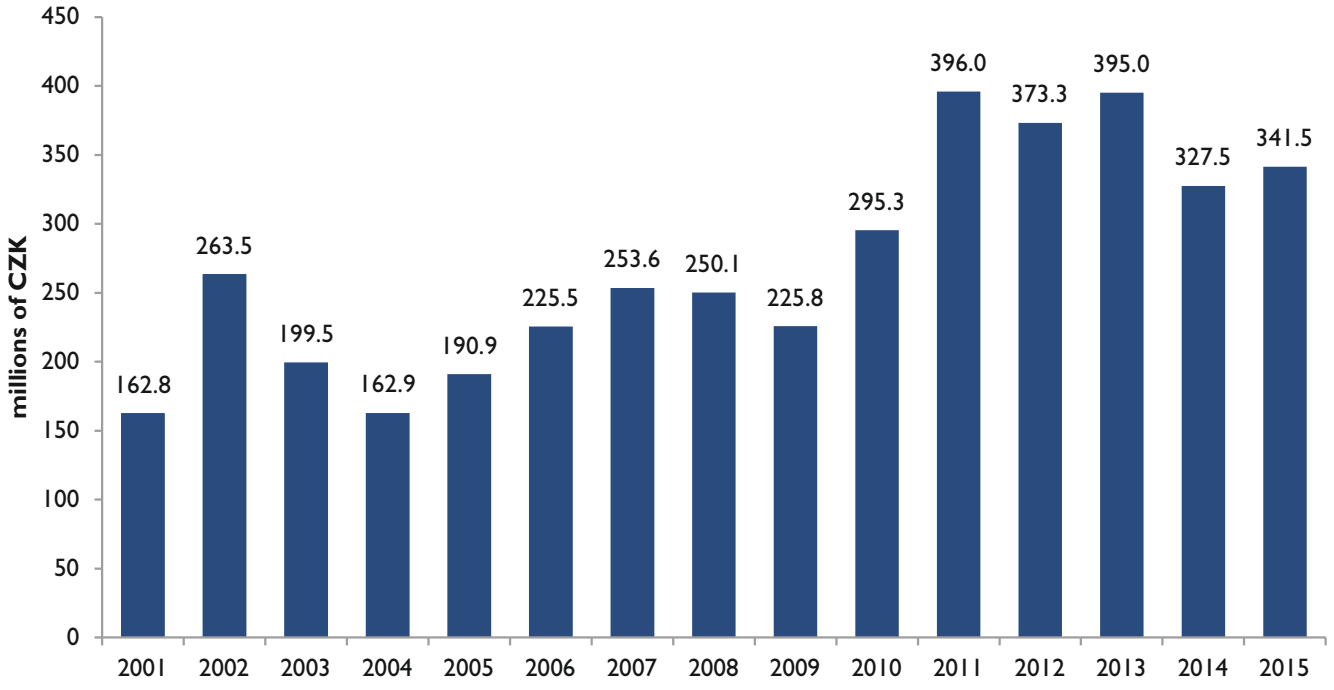
Charts 6.3.1 and 6.3.2 provide an overview of the overall annual capital expenditures and the funds spent on repairs and maintenance of property over a longer period.

Chart 6.3.1
Capital expenditures of the Forests of the Czech Republic, s. e., in 2001–2015 in millions of CZK – watercourses



Source: Forests of the Czech Republic, s. e.

Chart 6.3.2
Expenditures of the Forests of the Czech Republic, s. e., in 2001–2015 in millions of CZK – repair and maintenance of watercourses (total costs)



Source: Forests of the Czech Republic, s. e.

Measures in river basins

The Watercourse Administration for the Oder River Basin district completed constructions aimed at stabilizing and increasing the capacity of watercourse beds, especially modification of the Čuvný stream and Hluchý stream in Pražmo and modification of the Jestřábí stream in Dolní Lomná – all in the Frýdek-Místek Region and the Volský stream in Malá Morávka in the Bruntál Region.

Works focused on removing damage from May 2014 continued. In the Beskydy Mountains this concerned the Čeladenka stream in Čeladná, the Zrzávka stream in Bludovice near Nový Jičín, the Raduňka stream in Raduně, the Satina stream in Malenovice and also Bystrý stream in Janovice and in Lubno. In the Jeseníky Mountains, work on the Olešnice watercourse was completed as well as on the Olešnice stream and the Kolnovický stream, both in Mikulovice.

In 2015, work on flood control system under the gran programme "MoA – Flood Protection, Stage III" at the Kobylí stream in Karlovice and at the Děhylovský stream in Děhylov near Ostrava began.

As regards measures taken in the public interest pursuant to Section 35 of the Forest Act, retention damming was renewed in the Ropičný and Blatný streams in the Beskydy Mountains. In the Jeseníky Mountain area, barriers in the Komora stream in Holčovice and Solný stream in Město Albrechtice were renovated.

The Watercourse Administration for the Oder River Basin district used funds also for the repair and maintenance of flow capacity of the watercourse beds under direct grants intended for minor watercourses. The following projects were successfully completed: the Podolský stream in Rýmařov, Floodwater channel of the Frýdlantská Ondřejnice stream in Frýdlant nad Ostravicí, the Záviliší stream in Hradec nad Moravicí and the left bank tributary to the Opavice stream (Celňák) in Město Albrechtice.

The Watercourse Administration for the Dyje River Basin district, renovation and maintenance of structures owned by Forests of the Czech Republic concerned the Markvartický and Přibyslavický stream in the Třebíč district, the Křtinský stream and the Zemanův Žleb in Blanensko Region and the Ketkovický and Dílský stream in the Brno district.

As regards work in the public interest pursuant to Section 35 of the Forest Act, two water reservoirs were built at the Pustý zámek site in the Znojmo district.

With the use of the finances from the EU – RDP, the following river beds of watercourses in the Vysočina Region were repaired and renovated: the Slavonický stream in Slavonice, the Besénka in Brumov and Svatoslavský stream in Svatoslav.

Grants of MoA, provided as direct grants for the improvement of flow capacity of minor watercourses, were used for maintenance of a channel in Drnholec in the Břeclav district and maintenance of the Korejtka stream in Vítějeves in the Svitavy district.

The Watercourse Administration for the Elbe River Basin district completed work in the Vortovský stream in Vortová near Chrudim, the Chuchelenský stream in Chuchelná near Semily and in the Orlice Mountains in the Rybenský stream in Rybná, water resrvoir VN Těchlovice in Těchlovice, the Bačetínský stream in Val near Dobruška and the Bohdašínský stream near Nové Město nad Metují.

Measures intended to remedy flood damage from May 2014 were completed in the Brodec stream in Velká Skrovnice in the Ústí nad Orlicí district and in the Kundratický stream in Kundratice. No grants were used for this work.

As regards measures taken in the public interest pursuant to Section 35 of the Forest Act, the project "Smědavská mountain – diking of ravines in the Liberec Region" was completed.

Under the Programme 2020 aimed at meeting the objective in the public interest, the watercourse administration built on the territory owned by Forests of the Czech Republic a little bell tower in the Liberec Region, informative and relaxation facilities for the public (gazebos, seating and informative boards), establishing sumps with the purpose of supporting amphibians, etc. In 2015, measures with the view of reintroducing minnow (Phoxinus phoxinus) and brown trout in the Protected Landscape Area Jizera Mountains continued to be implemented.

The most important projects implemented by the Watercourse Administration for the Dyje River Basin district includes remedying flood damage from 2013 in the Svinařský stream near Beroun, the Úžický stream near Kutná Hora, the Zvolský and Ohrobecký streams near Vrané nad Vltavou, in the Trnová stream near Černošice and the Hrachovec stream near Příbram. The Kamenický stream in Čakovice and the Zahořanský stream in the Central Bohemian Region were renovated after floods.

Other significant projects worth mentioning are the renovation of the Maňavský stream and its left-sided tributary in the Český Krumlov district funded by the EU grants (the Environment Operational Programme). In order to enhance the revitalization effect, crossbars made of natural materials were used and accompanying vegetation was planted.

In 2015, the Sedlec stream was diked, the water reservoir Raška III in West Bohemia was renovated and the Jestřebický stream in the Vysočina Region was diked – these projects were funded by grants in the public interest pursuant to Section 35 of the Forest Act.

Under the sustainability of the project "Schwarzenberg Navigational Canal – Cultural Heritage Revives", co-funded by the EU, a "Day with Forests of the Czech Republic" took place in September 2015 under the patronage of The Watercourse Administration for the Vltava River Basin.

The Watercourse Administration for the Ohře River Basin completed, among others, Stage II of the restoration of the tributary to the Bynovecký stream in Nová Oleška in the Děčín district, the repair and renovation of the stream bed of the Černocký stream in Velká Černoc in the Louny area and the repair of the retaining wall in the Homolský stream in Velké Březno in the Ústí nad Labem Region.

In 2015, remedying flood damage from July 2013 was completed on the left-sided tributary to the Struhařský stream at Lubenec in the Louny area.

Two constructions in the public interest pursuant to Section 35 of the Forest Act were completed: adding dikes at the Falcká ravine near Nečemice in the Žatec district and construction of retention reservoirs in the Bečovský stream in the Karlovy Vary Region.

The Watercourse Administration for the Morava River Basin, a lot of partial projects aimed at removal of sediments in the stream beds were implemented together with repairs of hydraulic structures, e.g. in the Loučka – Nasobůrky stream at Litovel, in the Nemilka water reservoir in the Šumperk area and repair of gravitational walls in the Rokytenka stream in Vsetín.

As regards work in the public interest pursuant to Section 35 of the Forest Act, retention barrier in the tributary to the Jelení stream and reconstruction of the Hájenky retention reservoirs near Slavičín in the Zlín Region were constructed.

Under the new grant programme of the MoA intended for improving the flow capacity of the stream beds of minor watercourses, deposits were removed from the stream beds of the Biskupický stream in the Moravská Třebová district and in the RokytenkA stream in the Rokytnice stream in the Valašské Klobouky area.

In 2015, the preparation of projects eligible for grants by the MoA – Flood Protection, Stage III: the Bzovský stream and the Buchlovický stream in the Uherské Hradiště area, the implementation will begin at the Klášťov retention structure in the Valašské Klobouky area. Especially in the Uherské Hradiště area, but also in other areas, the Watercourse Administration for the Morava River Basin district needs to deal with the activities of the European beaver on watercourses, which causes damage to riparian vegetation and riverbed regulations.

Forests of the Czech Republic hold events for public, especially for children, focused on forest education and they regularly inform about their activities in press releases.

6.4 Land consolidation, structures used for amelioration

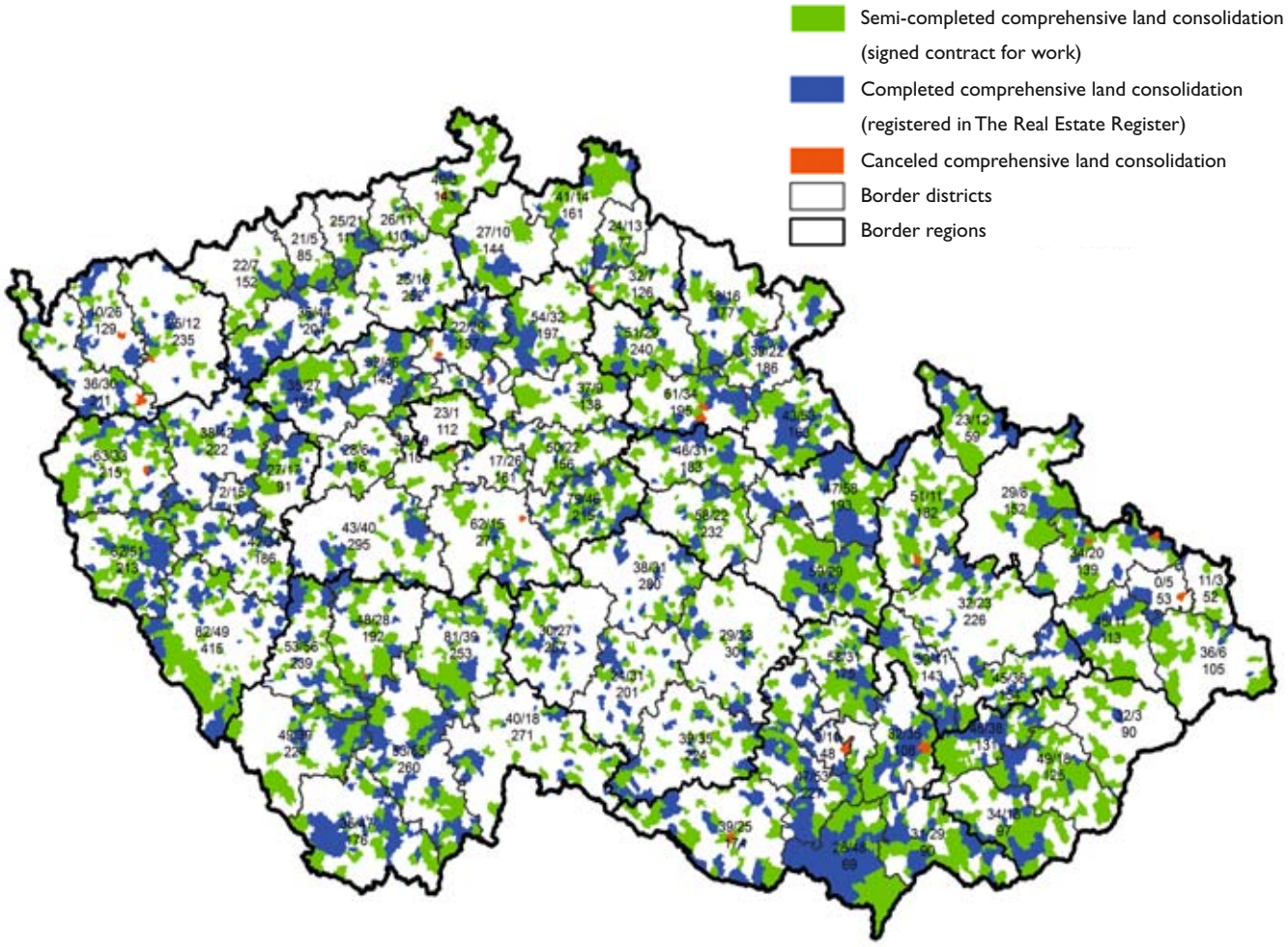
Land consolidation

To reduce the risks of soil erosion, the effects of drought and to improve protection from the negative effects of surface runoff it is necessary to design and implement measures, preferably in a comprehensive system. It is the most appropriate to combine organizational and agricultural measures with technical measures. The most effective instrument for the implementation of these measures in the landscape is the process of land consolidation, which is governed by Act No. 139/2002 Coll., on land consolidation and land offices, and amending Act No. 229/1991 Coll., regulating the ownership of land and other agricultural property, as amended, and by implementing Decree No. 13/2014 Coll.

Land consolidation in public interest means spatial and functional reparcelling or fragmentation of properties in order to ensure the accessibility and utilization of land properties and settlement of their boundaries so as to create conditions for rational management of landowners. Land consolidation also provides the conditions for improving the quality of life in rural areas, improving the competitiveness of agriculture, improving the environment, protection and reclamation of land resources, water management, particularly in reducing the adverse effects of floods and addressing runoff conditions in the landscape and improving the ecological stability of the landscape. Land consolidation is carried out as comprehensive or simple consolidation and for some cadastral territories (municipalities) it may be the pre-requisite for their further development. Currently, simple and comprehensive land consolidation has been completed for more than 29% of area of agricultural land resources, for less than 10% of this area land consolidation is underway. An overview of land consolidation by the state of completion is shown in Figure 6.4.1.

The watercourse Barovka, Vysočina Region (source: Forests of the Czech Republic, s. e.)

Figure6.4.1
Semi-completed and completed comprehensive land consolidation as of 30 December 2015



Sorce: State Land Office

The increased need of adaptation to climate change and the related most frequent occurrence of floods from torrential rainfall, droughts and significant manifestations of soil degradation is reflected primarily in the need to increase the number or landscape adjustments. At the same time, this need reflects the need for the development of the rural landscape.

Therefore, the State Land Office has defined the following processes to be taken:

- preferential solving of land adjustments in areas endangered by the impact of climate change; comprehensive land adjustments should focus particularly on areas endangered by water erosion and unforested areas with a high risk of accelerated drainage,
- arrangement of ownership of the land so that it allows for the construction of flood-control structures and implementation of plans of joint structures that serve, among others, the purpose of implementing water management and erosion control measures,
- focusing projects on enhancing the retention of water in the landscape, e.g., proposals for renovation and construction of water reservoirs and erosion control measures,
- to contribute, through simple as well as complex landscape adjustments, to the increase of the landscape retention capacity by conducting adjustments to the structure of lands suitable in terms of water management and erosion control,
- mapping and assessing the condition of drainage ratios in the given area (river board) and drafting relevant concept proposals of protection against erosion and floods – writing studies of drainage ratios.

One of the main results of comprehensive land consolidation, in addition to the new digital cadastral map, is the plan of joint facilities. This plan through the package of measures forms a multifunctional backbone of the area in question. Under the plan of joint facilities there are drafted measures to make land properties accessible, erosion control measures to protect agricultural land resources, water management measures to safely drain surface water and protect the area against floods and measures to protect and improve the environment. Plan of joint facilities is closely connected with the municipal land-use plan and is subject to approval by the municipal council. Land properties designated for joint facilities are transferred by the plan to the municipal ownership. Given the clarified property rights, the State Land Office can begin construction of these facilities. Within the framework of implementation of joint measures, inter alia, erosion control measures in the area of 701.7 ha and water management measures in the area of 489 ha were completed as of 31 December 2015.

The State Land Office uses for the design and subsequent implementation of the measures concerning landscape adjustments funds from the VPS and internal budget of the SLO and relevant EU funds. For the following programme period, the State Land Office defined a schedule of the use of funds from the PRV so that the first sum of CZK 3.51 billion allocated to landscape adjustment is used in a greater extent in projects aimed at reducing the impact of climate change. In 2015, implementation of erosion control measures received funding in the amount of more than CZK 7 million, water management measures received funding in the amount of more than CZK 121.5. General overview of funds spent on land consolidation measures in 2015 is shown in Table 6.4.1.

Table 6.4.1
The use of funds for land consolidation measures in 2015

Non-investment activities *)		Implementation						Total
Total	of which	Total	of which					
	land consolidation proposals		roads	erosion control measures	water management measures	ecological measures	other measures	
thousands of CZK								
329,779	224,986	1,148,686	978,550	7,154	121,616	15,978	25,388	**1,478,465**

Source: State Land Office
*Note: *) Land consolidation, identification of plots pursuant to Act No. 229/1991 Coll.*

Structures used for amelioration

The State Land Office is authorized to carry out the management of structures used for amelioration of land and related hydraulic structures pursuant to Section 56 (6) of Act No. 254/2001 Coll., the Water Act, as amended, and Section 4 (2) of Act No. 503/2012 Coll., on State Land Office and on the amendment to some relevant acts, as amended. The State Land Office thus ensures the management, maintenance, repairs and operation of major drainage facilities, major irrigation facilities and erosion control measures.

According to the data from 31 December 2015, the total acquisition value of the property administered by the State Land Office amounted to CZK 2,522 billion, consisting of 18,967 items, of which 8,888.913 km of channels (5,124.774 km of open channels and 3,764.139 of piped channels) 17 water reservoirs and 126 pumping stations (2 irrigation stations and 124 drainage stations). In 2015, maintenance and repairs of these amelioration structures amounted to CZK 29.3 million and CZK 12 million was spent on ensuring the operation of pumping stations including the consumption of electric power.

Information about amelioration can be found in the Public Administration Information System – WATER.

Repairing of the locks Brandýs nad Labem (source: Elbe River Board, s. e.)

6.5 Waterways

Pursuant to Act No. 114/1995 Coll., on Inland Navigation, as amended, the management of the development and modernization of waterways of importance to shipping is in the competence of the Ministry of Transport. This activity concerns, in particular, the management of the development of the Elbe-Vltava waterway, which is the most important waterway system in the Czech Republic and is the only navigable connection between the Czech Republic and the West European waterway system.

Under the "European Agreement on Main Inland Waterways of International Importance (AGN)" the E 20 main European waterway on the Elbe and its branch E 20-06 on the Vltava River, is a waterway of international importance. As defined in Regulation No. 1315/2013 the European Parliament and of the Council of 11 December 2013 on the main trends of the European Union for the development of trans-European transport network, the entire Elbe waterway from the state border between the Czech Republic and Germany to Pardubice and the Vltava waterway from Mělník to Třebenice is included in the system TEN-T. In Annex 1, Part 1 of this Regulation, this waterway is included in the "Eastern and Eastern-Mediterranean" corridor and into predetermined projects "Hamburg – Dresden – Prague – Pardubice" – "work on better navigability and modernization".

From the Ústí nad Labem hydraulic structure in Střekov to Přelouč on the Elbe and to Třebenice on the Vltava River, navigability is ensured by a system of hydraulic structures constituting a fully operational traffic system, independent of outer natural conditions. Navigation traffic on the regulated stretch from Střekov down the stream to the CR/FRG state border depends, however, on water levels based on the current flows and on the overall water situation in the entire Elbe and the Vltava River Basins.

The funds spent in the field of the development and modernization of waterways with significance to transport amounted in 2015 to CZK 412.5 million in total, of which, the amount of CZK 311.8 million was allocated from the budget of the State Transport Infrastructure Fund. and CZK 100.7 million from the EU grants through the Operational programme Transport and community programme TEN-T.

To ensure trouble-free navigation on the Elbe-Vltava waterway, in order to improve the navigation conditions in the 40 km long stretch between Ústí nad Labem and the state border, the construction of the Děčín Weir was proposed.

In 2015, significant amounts of funds were expended on the investment in the construction of a new lock chamber at the Hněvkovice with the relevant adjustment to the river bed that together meant completing of the Vltava waterway in the stretch from the Hněvkovice hydraulic structure to Týn nad Vltavou and the completed modernization of Velký Osek and Brandýs nad Labem lock chambers – which hade been until then the last lock chambers in the continually navigable stretch of the Elbe that had not been modernized. In 2015, the construction of the Recreational Harbour Petrov was completed on the Bata Canal, which significantly increases the harbour capacity and the extent and quality of harbour services in this waterway and the Purkarec Harbour on the Vltava River.

Significant funds were also expended on intensive preparation of other capital investment projects for comprehensive development of the waterway network. Tha main obstacle to the preparation of investment projects is the unsolved problems of using the land owned by the companies under the River Boards, s. e., necessary for the construction and the current EIA standpoint pursuant to Act No. 244/1992 Coll., on environmental impact assessment.

In 2015, River Boards, state enterprises, either expended their own funds on maintenance, construction, renovation and modernization of waterways, or used grants under the programme "Remedying the impacts of floods on state-owned water management property", sub-programme 129 272. In the Vltava River Board, s. e., these projects included, for example: removing the sediments in the Vltava River, Podbaba lock chamber (CZK 2.1 million) under the MoA programme, renovation of the bottom of the lock chamber of the Dolánky hydraulic structure using its own sources (CZK 17.1 million) or production and installation of telematic boards next to the Smíchov lock chamber (CZK 2.2 million). The Elbe River Board, s. e., renovated the gate springing of the lock chamber at the Lovosice hydraulic structure (CZK 1.2 million), repair of the surface protection and sealing of the tilting gate at the lock chamber at the Dolní Beřkovice hydraulic structure (CZK 1.3 million) or repair of three pieces of by-pass opening at the lock chamber at the Lovosice hydraulic structure (CZK 0.9 million). The Morava River Board, s. e., invested its own funds in construction work in the Bata Canal in the stretch Huštěnovice-Babice (CZK 1.5 million) and in the Strážnice junction (CZK 0.3 million) or in construction work at the Uherský Ostroh lock chamber (CZK 0.5 million).

Table 6.5.1 shows the funds that River Boards, s. e., spent in 2015 on water transport.

Table 6.5.1
Funds used in 2015 for repairs, maintenance, construction, reconstruction and modernization of waterways

River Board, s. e	Own funds	Operating grants	Investment grants	Grants	Own funds and grants in total
	thousands of CZK				
Elbe	69,304.1	31,090.7	0	**31,090.7**	100,394.8
Vltava	74,365.0	25,694.0	0	**25,694.0**	100,059.0
Morava	3,584.0	0	0	**0**	3,584.0
River Boards, s. e., in total	**147,253.0**	**56,785.0**	**0**	**56,785.0**	**204,037.8**

Source: River Boards, s. e.

Adam Hrabovský – Plumber – 3rd class – 5th class, Primary school Branky, Zlín Region

7. Public water supply and sewerage systems

7.1 Drinking water supply

In 2015, water supply systems supplied water to 9.93 million inhabitants in the Czech Republic, i. e. 94.2% of the total population.

All water supply systems produced in total 599.6 million m^3 of drinking water. 476.8 million m^3 of drinking water was supplied and charged for (invoiced), including 318.7 million m^3 of drinking water for households. Drinking water losses amounted to 99.1 million m^3, i.e. 16.8% of water intended for consumption.

The data provided by the Czech Statistical Office were collected on the basis of information provided by 1,436 reporting units, i.e. 282 professional water supply and sewerage system operators and a selected set of 1,154 municipalities operating the water management infrastructure on their own.

Trends and development of indicators in the field of drinking water supply are shown in Table 7.1.1 and Chart 7.1.1.

The watercourse Dražůvky, Olomouc Region (source: Forests of the Czech Republic, s. e.)

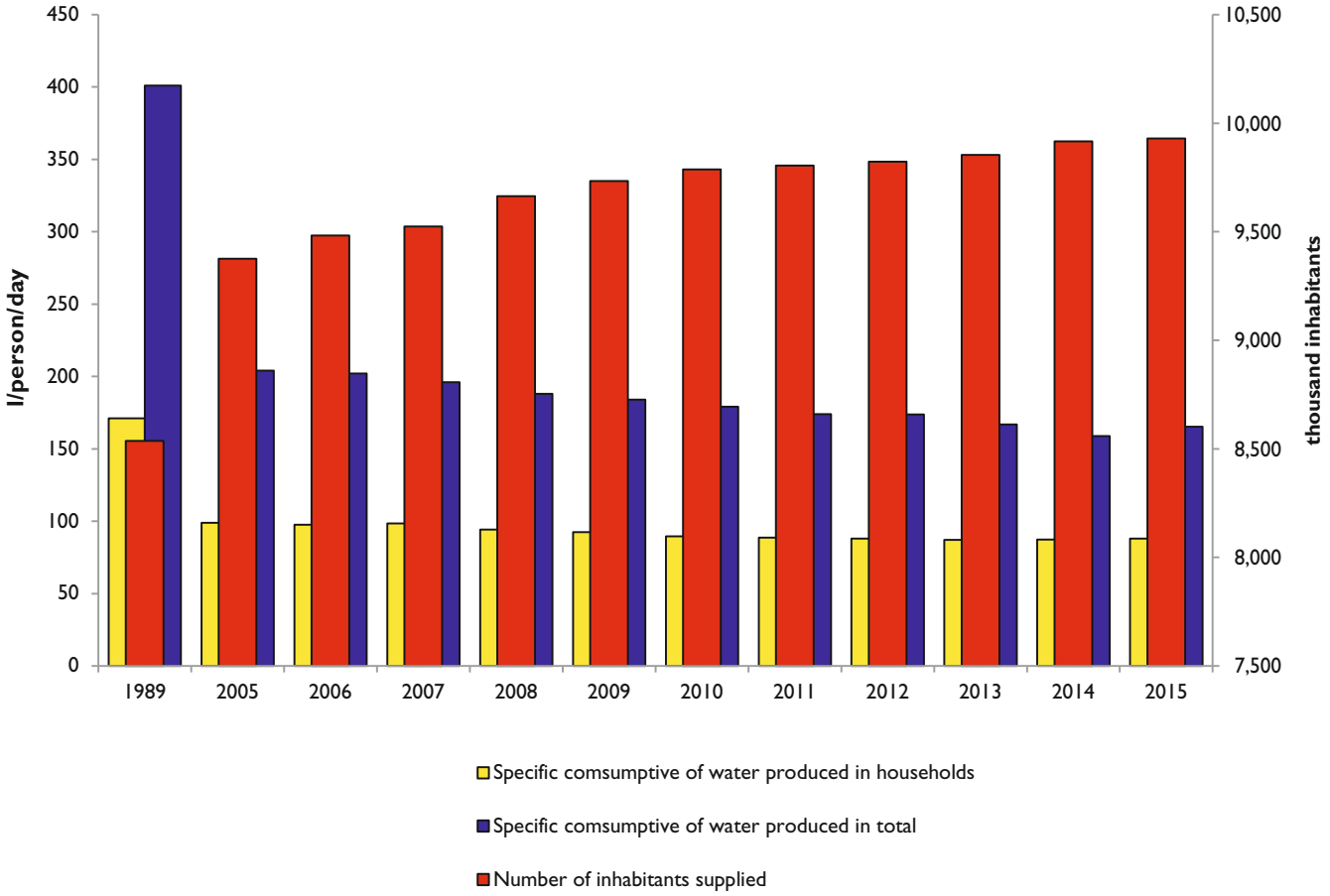
Table 7.1.1
Water supply from water supply systems in 1989 and 2009–2015

Indicator	Measurement unit	1989	2009	2010	2011	2012	2013	2014	2015
Inhabitants (mean)	thousand inhabitants	10,364.0	10,491.0	10,517.0	10,495.0	10,509.0	10,511.0	10,525.0	10,543.0
Inhabitants actually supplied with water from water supply systems	thousand inhabitants	8,537.0	9,733.0	9,787.5	9,805.4	9,823.1	9,854.4	9,917.2	9,929.7
	%	82.4	92.8	93.1	93.4	93.5	93.8	94.2	94.2
Water produced by water supply systems	million m^3/year	1,251.0	653.3	641.8	623.1	623.5	600.2	575.4	599.6
	% as of 1989	100.0	52.2	51.3	49.8	49.8	48.0	46.0	47.9
Water invoiced in total	million m^3/year	929.4	504.6	492.5	486.0	480.7	471.8	468.7	476.8
	% as of 1989	100.0	54.3	53.0	52.3	51.7	50.8	50.4	51.3
Specific consumptive use of water produced	l/person/day	401.0	184.0	180.0	174.0	173.8	166.8	158.9	165.4
	% as of 1989	100.0	45.8	44.8	43.4	43.3	41.6	39.6	41.2
Specific quantity of water invoiced in total	l/person/day	298.0	142.0	137.9	135.8	134.1	131.1	129.5	131.5
	% as of 1989	100.0	47.7	46.3	45.6	45.0	44.0	43.4	44.1
Specific quantity of water invoiced for households	l/person/day	171.0	92.5	89.5	88.6	88.1	87.1	87.3	87.9
	% as of 1989	100.0	54.1	52.3	51.8	51.5	50.9	51.0	51.4
Water losses per 1 km of water mains	l/km/day	16,842.0*)	4,705.0	4,673.0	4,220.0	4,351.0	3,856.9	3,417.2	3,519.3
Water losses per 1 inhabitant supplied	l/person/day	90.0*)	35.0	35.0	32.0	33.0	29.5	26.5	27.3

Source: Czech Statistical Office
*Note: *) Data for water supply systems run by the main operators.*

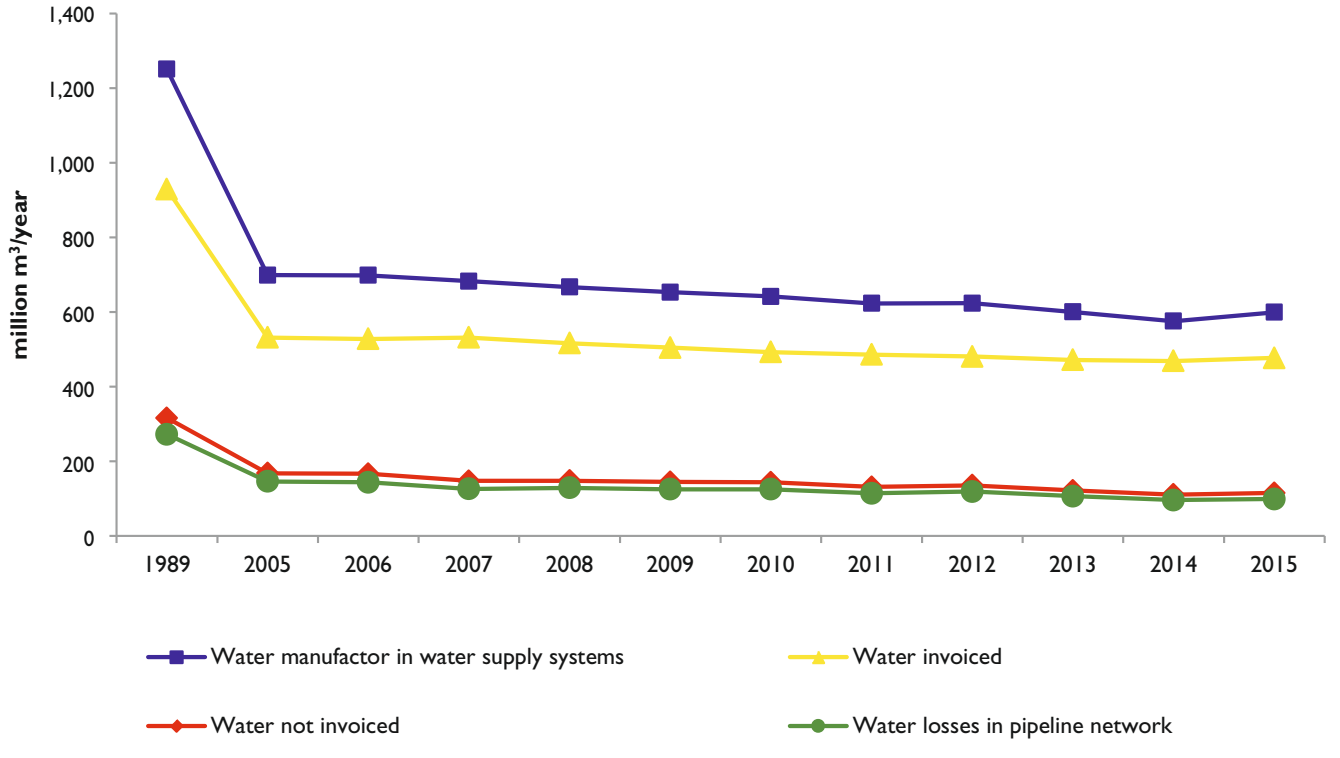
In 2015, water consumption rose. Specific quantity of water invoiced in total increased by 2.1 l/person/day to 131.5 l/person/day and water invoiced to households increased by 0.6 l/person/day to 87.9 l/person/day.

Chart 7.1.1
Development in the number of inhabitants supplied and the specific consumptive use of water invoiced in 1989 and 2005–2015



Source: Czech Statistical Office

Chart 7.1.2
Development in the quantity values of water produced in water supply systems and water invoiced in total in 1989 and 2005–2015



Source: Czech Statistical Office

The highest percentage of population supplied with drinking water from water supply systems in 2015, the same as in the previous year, was recorded in the Karlovy Vary Region (100%), in the City of Prague (100%) and in the Moravian-Silesian Region (99.9%), the lowest percentage of inhabitants supplied with drinking water was recorded in the Pilsen Region (83.9%) and in the Central Bohemian Region (84.6%).

Table 7.1.2
Inhabitants supplied, production and supply of water from water supply systems in 2015

Region	Inhabitants		water produced in water supply systems	Water invoiced	
	actually supplied with water from water supply systems	percentage of inhabitants supplied with water of the total number		Total	actually supplied with water from water supply systems
	(number)	(%)	(thousand m³)		
City of Prague	1,262,507	100.0	101,903	78,590	48,837
Central Bohemia	1,117,730	84.6	58,091	49,222	34,062
South Bohemia	579,003	90.9	33,559	25,893	18,045
Pilsen	482,949	83.9	29,443	24,440	15,435
Karlovy Vary	298,506	100.0	18,929	14,171	9,090
Ústí	802,561	97.5	50,218	36,903	26,103
Liberec	407,170	92.7	26,321	19,266	12,856
Hradec Králové	520,455	94.4	30,304	23,324	15,184
Pardubice	503,836	97.6	27,900	22,601	14,315
Vysočina	486,415	95.5	24,066	21,237	14,073
South Moravia	1,118,904	95.3	63,259	54,386	37,726
Olomouc	580,237	91.4	27,958	25,223	17,417
Zlín	555,249	94.9	28,773	22,947	15,315
Moravia-Silesia	1,214,156	99.9	78,827	58,573	40,221
Czech Republic	**9,929,678**	**94.2**	**599,551**	**476,775**	**318,680**

Source: Czech Statistical Office

In 2015, the length of water supply network was extended by a total of 198 km and reached the length of 77,146 km. New construction of new water supply systems and completion of the existing ones thus led in 2015 in an increase in the number of inhabitants supplied by water by 12,499. The length of water supply network per one inhabitant supplied was 7.77 m.

The number of water supply connections increased by 10,644 and amounted to 2,073,831. The number of water meters installed increased by 14,026 and amounted to 2,071,087. The number of connected inhabitants per one water supply connection is 5. Markedly shown in these figures are the results of rather intense building of family houses.

7.2 Discharge and treatment of municipal waste waters

In 2015, a total of 8,828 million people in the Czech Republic lived in buildings connected to sewerage systems, which was 84.2% of the total population. In total, 445.5 million m³ of waste waters (excluding rain water charged for) were discharged into sewerage systems. Out of this quantity, 97% of waste waters were treated (excluding rain water), which amounts to 432 million m³.

Trends of discharge and treatment of waste waters from sewerage systems over a longer period are shown in Table 7.2.1 and Chart 7.2.1.

Table 7.2.1
Discharge and treatment of waste waters from sewerage systems in 1989 and 2009–2015

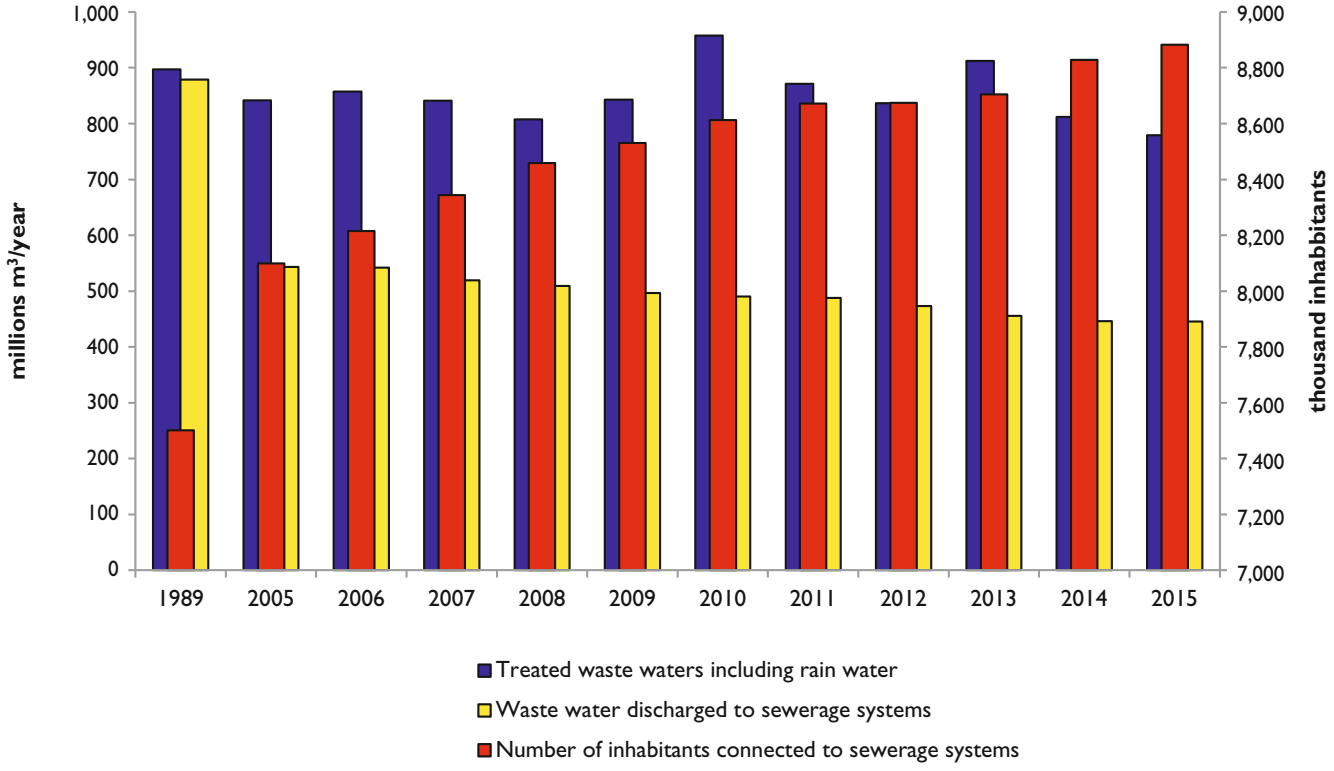
Indicator	Measurement unit	Rok							
		1989	2009	2010	2011	2012	2013	2014	2015
Inhabitants (mean)	thousands inhabitants	10,364	10,491	10,517	10,495	10,509	10,511	10,525	10,543
Inhabitants living in buildings connected to sewerage systems	thousands inhabitants	7,501	8,530	8,613	8,672	8,674	8,705	8,828	8,882
	%	72.4	81.3	81.9	82.6	82.5	82.8	83.9	84.2
Waste waters discharged to sewerage systems (excluding rain water charged for) in total	million m^3	877.8	496.4	490.3	487.6	473.2	455.3	446.1	445.5
	% as of 1989	100.0	56.6	55.9	55.5	53.9	51.9	50.8	50.8
Treated waste waters including rain water [1)]	million m^3	897.4	842.9	957.9	871	836.7	912.3	812.2	779.0
Treated waste waters in total excluding rain water	million m^3	627.6	472.7	471.5	472.2	459.4	443.4	432.3	432.0
	% as of 1989	100.0	75.4	75.2	75.3	73.2	70.6	68.9	68.8
Percentage of treated waste waters excluding rain water [2)]	%	71.5	95.2	96.2	96.8	97.1	97.4	96.9	97.0

Source: Czech Statistical Office
Note: [1)] In 1989 the data relate to sewerage systems run by the main operators.
[2)] This percentage relates to waters discharged to sewerage systems (excluding rain water charged for).

The number of inhabitants connected to sewerage systems increased by 53,812 in comparison with the previous year. The quantity of waste waters discharged to sewerage systems, without rain water, decreased in the year-on-year comparison by 0.6 million m^3.

The indicator of the percentage of the treated waste waters, without rain waters, remained in 2015 on the same levels as in the previous year.

Chart 7.2.1
Development in the number of inhabitants living in buildings connected to sewerage systems and the quantity of discharged and treated waste waters in 1989 and 2005–2015



Source: Czech Statistical Office

The highest percentage of inhabitants connected to sewerage systems in 2015 was recorded in the City of Prague (98.9%) and the Karlovy Vary Region (96.2%), the lowest percentage was recorded in Central Bohemian Region (70.5%) and the Liberec Region (68.9%).

Table 7.2.2
Number of inhabitants living in buildings connected to sewerage systems and the quantity of discharged and treated waste waters in 2015 in the individual regions

Region	Inhabitants living in buildings connected to public sewerage systems		Waste waters discharged to public sewerage systems (excluding rain water charged for)	Treated waste waters excluding rain water	
	Total	Percentage of the total number of inhabitants	Total	Total	Percentage
	number	%	thousand m³		%
City of Prague	1,248,014	98.9	76,809	76,809	100.0
Central Bohemia	930,914	70.5	47,960	47,859	99.8
South Bohemia	549,165	86.2	27,011	25,724	95.2
Pilsen	477,665	83.0	28,044	26,553	94.7
Karlovy Vary	287,273	96.2	13,938	13,936	100.0
Ústí	687,555	83.5	29,426	28,745	97.7
Liberec	302,722	68.9	14,044	13,750	97.9
Hradec Králové	430,392	78.1	19,656	18,708	95.2
Pardubice	380,485	73.7	17,939	17,677	98.5
Vysočina	447 350	87.8	18,909	16,733	88.5
South Moravia	1,055,220	89.9	51,527	49,788	96.6
Olomouc	523,532	82.4	26,743	25,225	94.3
Zlín	549,462	94.0	26,316	24,836	94.4
Moravia-Silesia	1,012,545	83.3	47,199	45,685	96,8
Czech Republic	**8,882,293**	**84.2**	**445,521**	**432,027**	**97.0**

Source: Czech Statistical Office

The number of inhabitants living in buildings connected to public sewerage systems increased in most of the regions, the decrease was recorded only in the South Moravian Region and Moravian-Silesian Region. This decrease is due to a change in methodology for monitoring the reporting of major operators.

In 2015, the sewerage network was extended by 627 km and reached the total length of 45,884 km. Based on the data provided by the Czech Statistical Office, the total number of waste water treatment plants in the Czech Republic increased in comparison with the previous year by 50 waste water treatment plants, i.e. to 2,495.

7.3 Development of water and sewerage charges

Based on the survey carried out by the Czech Statistical Office, the average price of water rate excluding VAT in 2015 amounted to 35.60 CZK/m³ and the average price of sewerage charge after refining the method of calculation amounted to 30.70 CZK/m³.

Prior to the Act No. 76/2006 Coll. coming into force, i.e. before 2006, the information on the average price of water rates and

sewerage charges was based on the information sent upon request of the Ministry of Agriculture by selected operators of water supply and sewerage systems. Through the amendment to this act, the owners or, as the case may be, the operators if authorized by the owner, pursuant to the provision in Section 36 (5) of the Act No. 274/2001 on Public Water Supply and Sewerage Systems and on amendments to some laws, were imposed the obligation to send to the Ministry of Agriculture every year by 30 April at the latest complete information on the comparison of all items for calculating the price according to price regulations for water and sewerage charges and the real data achieved in the previous calendar year. The data on prices collected by the Ministry of Agriculture include VAT and are obtained through a weighted average. With regard to the deadline for submitting the comparison, these data cannot be evaluated and processed before the closing date of this publication. For this reason, this publication states only the data established by the Czech Statistical Office as the percentage of revenues from sales to the consumers and the quantity of the drinking water supplied and the waste water discharged (from 2013 newly including rain water charged for). Aggregate data of the Czech Statistical Office for the Czech Republic are not obtained through a weighted average and cannot therefore be compared with the data collected by the Ministry of Agriculture.

Table 7.3.1
Strike prices of water and sewerage charges (excl. VAT) in 2014 and 2015

Indicator	Unit	2014	2015	Index 2015/2014
Water rates in total	CZK million	16,298.0	16,971.0	1.04
Water invoiced in total	million m³/year	468.7	476.8	1.02
Average price of water rate	CZK/m³	34.8	35.6	1.02
Sewerage charges in total	CZK million	15,376.0	15,810.0	1.03
Waste waters discharged to sewerage systems*)	million m³/year	515.2	515.6	1.00
Average price of sewerage charges	CZK/m³	29.8	30.7	1.03

Source: Czech Statistical Office
*Note: *) From 2013 including rain water charged for*

Based on the survey carried out by the Czech Statistical Office, the highest average price of water rate was established, similarly to the previous year, in the Ústí nad Labem Region, where it reached the amount of CZK 42.50/m³. Compared to the national average, this price was thus higher by 19.4%. The highest average price of sewerage charges was established, similarly to the previous year, in the Liberec Region amounting to CZK 40.40/m³ and thus exceeding the national average by 31.6%. On the contrary, the lowest average price of water rate (CZK 31.00/m³) was established in the Pardubice Region, while the lowest average price of sewerage charges (CZK 24.60/m³) was established in the Pilsen Region. Average prices in the respective regions are shown in Table 7.3.2.

Table 7.3.2
Water consumption, average prices of water and sewerage charges excluding VAT in 2015

Region	Specific quantity of water invoiced in total	Specific quantity of water invoiced to households	Average price of water rate	Average price of sewerage charge
	l/person/day		l/person/day	
City of Prague	170.5	106.0	38.6	28.6
Central Bohemia	120.7	83.5	38.4	30.2
South Bohemia	122.5	85.4	35.8	28.2
Pilsen	138.6	87.6	33.2	24.6
Karlovy Vary	130.1	83.4	36.1	31.9
Ústí	126.0	89.1	42.5	40.0
Liberec	129.6	86.5	39.8	40.4
Hradec Králové	122.8	79.9	32.6	32.6
Pardubice	122.9	77.8	31.0	34.1
Vysočina	119.6	79.3	34.7	25.6
South Moravia	133.2	92.4	32.5	32.4
Olomouc	119.1	82.2	31.8	29.3
Zlín	113.2	75.6	34.7	29.1
Moravia-Silesia	132.2	90.8	32.4	30.1
Czech Republic	**131.5**	**87.9**	**35.6**	**30.7**

Source: Czech Statistical Office

7.4 Regulation in water supply and sewerage systems

Ministry of Agriculture, in connection with carrying out Resolution No. 86 taken by the Government of the Czech Republic on 9 February 2015, established on 15 March 2015 a new department whose main task is the regulation of water supply and sewerage systems.

2015 was a significant year with respect to the amendment concerning the regulation in water supply and sewerage systems for public use in the Czech Republic (hereinafter referred to as the "W&S").

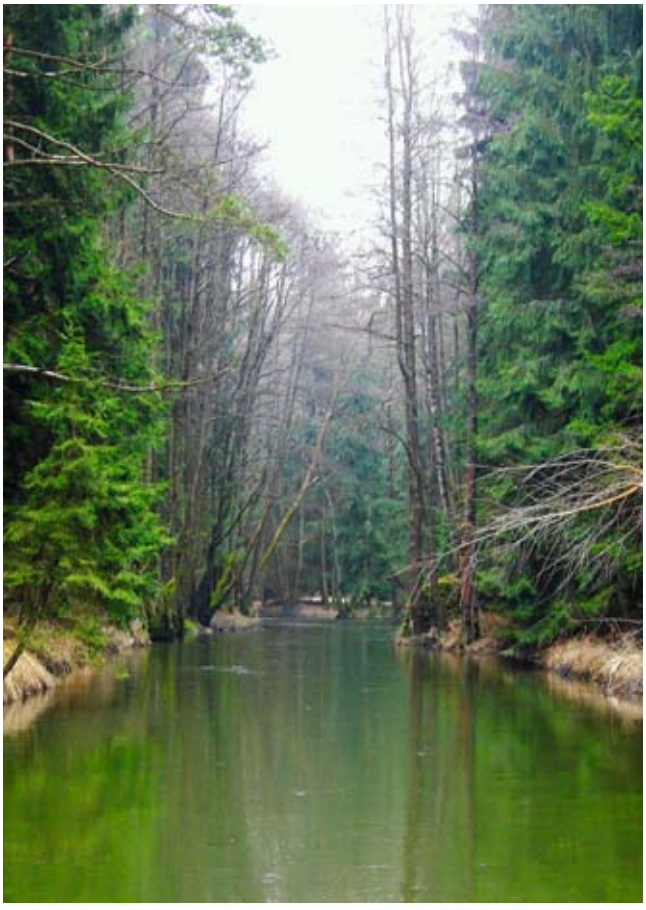
The amendment to the regulation in the W&S was based on discussions initiated in 2014 in relation the Programme Announcement of the Government of February 2014 in connection with the use of funds from the Operational Programme for the Environment and other subsequent talks of the Government of the Czech Republic, especially with respect to the preparation of the Partnership Agreement to be concluded between the Czech Republic and the European Commission and programmes for the following period of 2014–2020. One of the outcomes of the above mentioned discussion was the approval of the "Proposal of conceptual regulation in water industry" resulting from Resolution No. 86/2015. The objective of the resolution is to increase the effectiveness of the regulation in water market in the Czech Republic and safeguarding long-term sustainability of the water management infrastructures of the water supply and sewerage systems, especially with respect to increasing supervision and inspection activity, imposing sanctions on offences and ordering corrective measure, deepening the analytic activities including effective gathering and control of data, increasing the effectiveness of benchmarking for the W&S, publishing information about the condition, renovation and funding of the W&S including data on benchmarking for the owners of the water supply and sewerage system infrastructure, determining quality parameters of the services provided, ensuring effective protection of consumers including settling disputes between entities on the market, unification of the W&S data reported by various state administration bodies, all of the above mentioned without increase the administrative burden to the owners and operators on the Czech market.

On 27 February 2015, the order of the Minister of Agriculture entering into force on 15 March 2015, the Department of Supervision and Regulation in Water Industry was established under the section of MoA water management. The new department includes two divisions: Complaint, Control and Regulation Division and Division of Analysis and Benchmarking.

The Department of Supervision and Regulation in Water Industry has competences arising from Act No. 274/2001 Coll., on Water supply and sewerage systems for public use and on amendments to some acts (the Act on Water Supply and Sewerage Systems), especially pursuant to Section 29 (2) "it is within the authority of the Ministry to regulate the Water and Sewerage Industry, protect consumers and enhance competition in the environment of natural monopoly of this industry, satisfying demands for drinking water supply, drainage and cleaning of sewage waters including costs, ensuring the supervision over the processing and fulfilling plans of funding the renovation of water supply and sewerage systems and providing unbiased information from the water supply and sewerage system industry to the general public", and also within the meaning of Section 37 (3), i.e. ensuring the supreme supervision over the water supply and sewerage industry.

A significant and essential fact in connection with the regulation in the W&S in 2015 was the establishment of so-called Committee for Coordinating Regulation in the Water Supply and Sewerage System Industry (hereinafter referred to as the "W&S Committee"). The W&S Committee was established in accordance with Resolution No. 86/2015, as an independent coordinative entity for the water supply and sewerage industry whose main objective is to increase the effectiveness of regulatory mechanisms ensuring long-term sustainability of the water supply and sewerage industry and to improve consumer protection while preserving socially acceptable water and sewer charges. The W&S Committee complies with the Rules of procedure approved by the Resolution of the Government of the Czech Republic No. 386 of 25 May 2015 on establishing a coordinative body with the aim of enhancing regulation in water industry.

The W&S Committee consists of 13 members and a secretary and the following entities are represented: Ministry of Agriculture, Ministry of Finance, Ministry of the Environment, Ministry of Industry and Trade, the Office of the Government of the Czech Republic, the Czech Chamber of Commerce, the Union of Towns and Municipalities of the Czech Republic, the Union of Local administration of the Czech Republic, the Association of Independent Trade Unions of the Czech Republic, the Energy Regulatory Office and the Czech Statistical Office. The W&S Committee has been authorized by the Government of the Czech Republic to send to regulators in the water supply and sewerage industry in the Czech Republic its recommendations (approved by majority) and supervise the implementation of these recommendations. In relation to the European Commission, the W&S Committee is the national regulator in the industry of water supply and sewerage for public use. The W&S Committee began its activity with holding a meeting in November 2015. The priority item on the agenda was discussing the fulfilment of ten tasks defined in the annex to Resolution No. 86/2015.



Green Energy (author: Martin Nejezchleb)

Valentýna Séglová – Fishing pond – 4th class, Primary school and Kindergarten Tlustice 148, Hořovice, Central Bohemian Region

8. Fisheries and fishpond management

8.1 Fisheries and fishpond management

The term "fisheries" encompasses fishing, breeding, topping and protection of fish or any other water organisms. Czech fisheries include fish farming and recreation fishing, which are both regulated in the Czech Republic by Act No. 99/2004 Coll., on fish farming, performance of fishing right, fishing inspection, protection of marine fishing resources and on amendments to some acts (the Act on Fishing) and its implementing Decree No. 197/2004 Coll. Fish farming for production is a traditional part of agricultural production.

Fish farming is systematic, purposeful and professional care of fish stock and its protection when using reproduction and improvement of food conditions. Fish farming for production is represented mainly by fishpond management and it has been one of the elements of the stability and success of Czech agricultural business for many centuries. Fish farming for production in the Czech Republic does not only include the prevailing fishpond management (fishpond management is the most significant part of fisheries in the Czech Republic), but also breeding of salmoniform fish, fish farming in special fish breeding objects and breeding fish in floating cages used for the production of fish and fish meat, but also fish fry. Although fish farming is classified as livestock production, it is influence by many elements typical for vegetable production, e.g., the impact of climatic conditions (especially drought, floods) and of the quality of the soil of the pond bottom on the nourishment and growth of fish (especially mud in ponds) and the cycle and duration of the growing season.

First mentions of Czech fish farming date back to the 11th century when first ponds were built exclusively for the purpose of fish farming (fish farming was the most profitable agricultural activity). The golden years of Czech fish farming began in the 14th and 15th century and the greatest boom of Czech fish farming occurred in the 16th century when the nobility, towns and the church became more involved in pond building and the total area of ponds reached 180,000 ha. The fast expansion was stopped by the Thirty Years´ War in the first half of the 17th century that resulted in reduction in fish farming. Another factor that had a significant impact on the reduction of the area of ponds by approximately 50% is agriculture (extinction of ponds, formation of arable land). The above stated facts show that fish farming has long tradition in the Czech Republic and ponds were built in the pas exclusively with the purpose of fish farming. Ponds are not only intended for fish production, but they play a wide range of other important roles such as flood control and water retention, final treatment of surface waters, improving the landscape water balance, ecological function and others.

At present, there are approximately 24 thousand ponds and water reservoirs with total surface area of around 52 thousand ha in the Czech Republic, of which more than 41 thousand ha is used for fish farming. There are over 70 significant fish producers (i.e. companies producing more than 5 tons of fish per year) and several hundreds of minor breeders. Big producers of fish and waterfowl, fish processors, fish research and education institutes and fish associations are associated under the Czech Fish Farmers Association of the Czech Republic seated in České Budějovice.

Recreation fishing is the performance of fishing right in fishery districts in the Czech Republic. Husbandry in fishery districts consists of taking care of river system and water bodies with the purpose of preserving stable fish populations that are varied in terms of species and age. There are more than 2,000 official fishery districts in the Czech Republic with total area of approximately 42,000 ha and around 350,000 recreation fishermen registered. Fishery districts are classified as either extra-trout-fishing waters or trout-fishing waters. The greatest users of fishery districts in the Czech Republic are the Czech Fishing Union, interest association, and Moravian Fishing Union, interest association. Recreation fishermen catch every year in fishery districts around 4–5 thousand tons of fish, the most caught fish is common carp. The recreation fishing industry is linked to many other sectors such as tourism, sales of fishing gear, etc.

In the recent years, Czech fishery has been affected mainly by excessive predation by piscivorous predators (particularly by the great cormorant and the Eurasian otter), climate change (drought x floods) and restriction of husbandry due to the environment protection. Any damage the owner (or holder) incurs in connection with limitation to husbandry in a pond with fish or waterfowl resulting from the environment protection under Act No. 114/1992 Coll. may be financially compensated (see Section 58 (2) of Act No. 114/1992 Coll.).

Marketable fish production in 2015 reached a total of 20,200 tons, of which 19,570 tons come from fish farming in ponds. Special fish breeding facilities (mainly trout) yielded 594 tons and 36 tons of fish were fished out of storage reservoirs. Over the last decade, the production did not change significantly and fluctuated depending mainly on the climatic conditions, the pressure of piscivorous predators or restrictions relating to nature conservation requirements. Table 8.1.1 shows the production of marketable fish in the longer period of time.

Table 8.1.1
Market production of farmed fish in the Czech Republic

Species Carp	2008	2009	2010	2011	2012	2013	2014	2015
	tons							
Total	17,507	17,258	17,746	18,198	17,972	16,809	17,833	17,860
Species	**20,395**	**20,071**	**20,420**	**21,010**	**20,763**	**19,358**	**20,135**	**20,200**

Source: MoA and the Czech Fish Farmers Association

In total 9,154 tons of live fish were supplied to the domestic market in 2015, which means a decrease by 682 tons, compared to 2014. Exports of live fish reached 9,884 tons, representing an increase by 1,477 tons, compared to 2014. In 2015, a total of 1,949 tons of live-weight of fish were processed, i.e. 9.6% of the harvested quantity of marketable fish.

Table 8.1.2
The use of marketable fish produced by fish farming in the Czech Republic

Year	Production in total	Of this*)		
		sales of live fish on domestic market	processed fish (life weight)	sales of live fish on domestic market
	thousands of tons			
2008	20.4	8.4	1.7	9.0
2009	20.1	9.1	1.6	8.9
2010	20.4	9.5	1.8	9.1
2011	21.0	9.7	2.1	8.8
2012	20.8	9.5	2.3	8.6
2013	19.4	9.0	2.4	8.4
2014	20.1	8.5	2.1	8.4
2015	20.2	9.2	1.9	9.9

Source: MoA and the Czech Fish Farmers Association
*Note: *) Includes stocks at the beginning and end of the year, losses and imports of live freshwater fish.*

The species composition of marketable fish is relatively stable and has not changed significantly, compared to the previous years. Of the total volume of harvested fish, carp accounted for 88.4%, salmonids 3%, herbivorous fish 4.1%, tench 0.8% and predatory fish accounted for 1.1% of the total harvested quantity.

The domestic market continued to prefer supplies in the form of live fish, which in the past three years accounted for 42–47% of the production obtained by fish farming. Exports of live fish corresponded during the three previous years with 42–49% of the total catch in 2013–2015 and demonstrated stable interest in fish produced largely by member organizations of the professional association. Fish processing plants processed into products 10–12% of the freshwater marketable fish produced.

The consumption of freshwater fish produced by fish farming in 2015 reached the value of 1.03 kg/person/year. To calculate the total consumption of freshwater fish per capita in 2015, population number of 10,553,843 as of 31 December 2015 was considered.

Table 8.1.3
Fish consumption in the Czech Republic

Species	2008	2009	2010	2011	2012	2013	2014	2015
	kg/person/year							
Fish in total	5.5	5.5	5.1	5.0	4.7	3.7	3.7	0*)
of which freshwater fish	1.3	1.4	1.4	1.5	1.5	1.4	1.3	1.03**

Source: MoA and the Czech Fish Farmers Association
*Note: *) Figures for 2015 is not available.*
***) Catching fish on a hook is not included.*

Under the Operational Programme Fisheries 2007–2013, fishermen could use funds under Priority Axis 2 – Aquaculture, on investments in aquaculture production, compensation payments to improve the aquatic environment, measures in the area of fish health and investments in fish processing and marketing. The Operational Programme Fisheries 2007–2013 can also be funded by Priority Axis 3 – Measures of common interest concernc the development of new markets, promotion campaigns, reintroduction of European eel (Anguilla anguilla) and pilot projects.

Ministry of Agriculture issued in 2015 a decision to grant subsidies within Call 20 of accepting applications for subsidies from the Operational Programme Fisheries 2007–2013 in the following amounts:

- Under measure 2.1 Measures for Productive Investments in Aquaculture, in 2015 the decisions were issued to grant subsidies to 38 business plan projects a) with the aggregate subsidy amounting to approximately CZK 16.3 million, to 13 business plan projects b) with the aggregate subsidy amounting to approximately CZK 4.2 million and to 6 business plan projects c) with the aggregate subsidy amounting to approximately CZK 7.2 million. In 2015, under measure 2.1, the decisions were issued to grant subsidies in the total amount of approximately CZK 28.0 million to 57 projects.
- Under measure 3.1 Common Activities, in 2015 the decisions were issued to grant subsidies to 10 business plan projects a) with the aggregate subsidy amounting to approximately CZK 8.3 million.

- Under measure 3.3 Support and Development of New Markets and Promotion Campaigns, in 2015 the decisions were issued to grant subsidies to one business plan project a) with the subsidy amounting to CZK 4.5 million and to two business plan projects e) with the aggregate subsidy amounting to approximately CZK 4.0 million. In 2015, under measure 3.3, the decisions were issued to grant subsidies in the total amount of CZK 8.5 million to three projects.

In 2015, Ministry of Agriculture completed the pre-financing of the following projects under the Operational Programme Fisheries 2007–2013.

- under measure 2.1, subsidy amounting to CZK 128.9 million was paid to 168 projects,
- under measure 2.4, subsidy amounting to CZK 5.8 million was paid to 5 projects,
- under measure 3.1, subsidy amounting to CZK 21.5 million was paid to 37 projects,
- under measure 3.2, subsidy amounting to CZK 11.4 million was paid to 39 projects,
- under measure 3.3, subsidy amounting to CZK 11.3 million was paid to 5 projects,
- under measure 3.4, subsidy amounting to CZK 16.2 million was paid to 17 projects,
- under measure 5.1, subsidy amounting to CZK 13.2 million was paid to 23 projects.

Table 8.1.4
Operational Programme Fisheries 2007–2013

Priority Axis 2 – Aquaculture, fishery and aquaculture products processing and marketing	
Number of measure	**Name of measure**
Measure 2.1	Measures for productive investments in aquaculture
Measure 2.2	Measures for the protection of the aquatic environment
Measure 2.3	Measures in the area of fish health
Measure 2.4	Investments in fish processing and marketing
Priority Axis 3 – Measures of common interest	
Number of measure	**Name of measure**
Measure 3.1	Common activities
Measure 3.2	Measures for the protection and development of aquatic animals and plants
Measure 3.3	Support and development of new markets and promotion campaigns
Measure 3.4	Pilot projects

Source: MoA

Water reservoir Koryčany – fishing ponds (source: Morava River Board, s. e.)

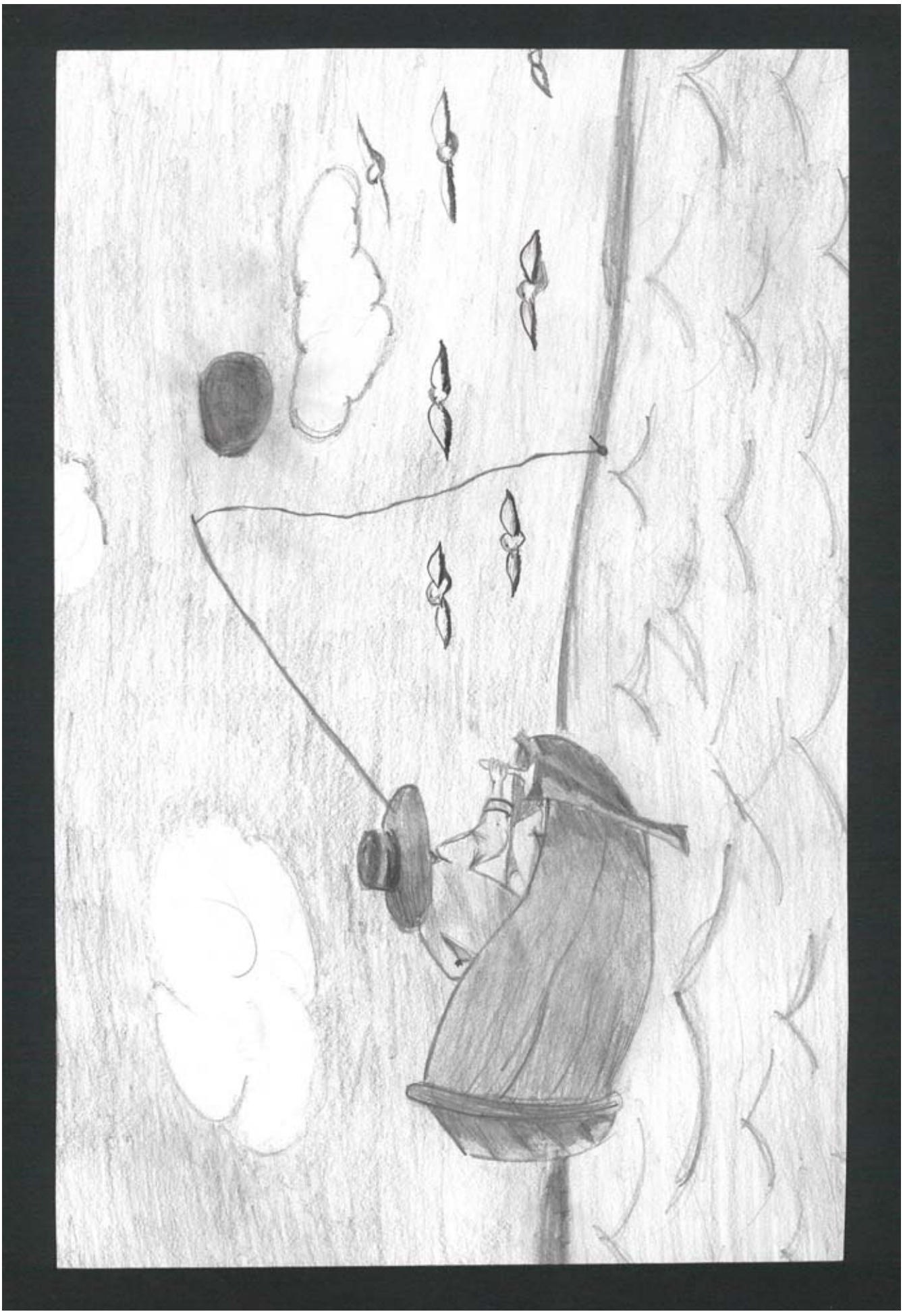
The programme period 2007–2013 is over, now fishermen may use funds under new provisions of the Operational Programme Fisheries 2014–2020, specifically under measure 2.1 Innovation, 2.2.a) Productive investment in aquaculture, 2.2. b) Aquaculture diversification, 2.3 Support for new breeders, 2.4 Recirculation devices and reclaim systems with final treatment, 2.5 Aquaculture providing environmental services, 3.1. Data gathering, 3.2 Product traceability, 5.1 Production plans, 5.2 a) Forming producers associations, 5.2 b) Promotion campaigns and 5.3 Investment in product processing. The programme has been launched with the first call for measures 2.1 Innovations, 2.2. a) Productive investment in aquaculture, 2.4 Recirculation devices and reclaim systems with final treatment and 5.3 Investment in product processing and with second call for measure 2.5 Aquaculture providing environmental services. Applications were accepted between 21 October 2015 and 18 November 2015.

8.2 Changes in the fishpond system

The programme 229 210 "Renewal, Dredging and Rehabilitation of Fishponds and Water Reservoirs" was followed by the programme of the Ministry of Agriculture 129 130 "Support for Renewal, Dredging and Rehabilitation of Fishponds and Construction of Water Reservoirs".

The objective of the programme 129 130 was the renewal and rehabilitation of fishponds and water reservoirs, aimed at improving their water management and non-productive functions. Emphasis was placed on strengthening the retention of water in the landscape and improving operational safety of fishponds and reservoirs in connection with flood situations.

Under the programme 129 130, eleven projects with the total expenditures amounting to CZK 52.35 million were completed in 2015. More detailed information on the funding of this programme is presented in Chapter 9.



Klára Forejtová – The old fisherman at the sea – 5th class, Primary school and Kindergarten Předslav 66, Klatovy, Pilsen Region

9. State financial support for water management

9.1 Financial support provided by the Ministry of Agriculture

The Ministry of Agriculture subsidies water management in the sector of water supply and sewerage systems, flood control, remedying damage caused by floods, administration of minor watercourses, water in the landscape – ponds, irrigation. This chapter describes the funds granted in 2015.

Water supply and sewerage systems

In 2015, investors received support in the form of grants as well as "subsidised loans". Under its programmes 129 180 "Construction and Rehabilitation of Water Supply and Sewerage System Infrastructure II" and 129 250 "Construction and Technical Betterment of Water Supply and Sewerage System Infrastructure" aimed at implementation of measures to meet the directives of the EU in the field of water supply and sewerage systems and at the development of this sector, grants were provided in the total amount of CZK 0.9 billion. The programme 129 180 was originally scheduled for the years 2009–2013 and subsequently extended until mid 2015. In 2015, this programme was only used to complete co-financing of multi-year projects and no funds were used from the state budget through this project. The follow-up subsidy programme 129 250 is schedule for 2013–2015.

In 2015, a total of 65 projects received support from the state budget in the form of subsidies amounting to approximately CZK 342 million under the sub-programme 129 252 (measures aimed at water supply systems) and 74 projects were granted support amounting to approximately CZK 510 million under the sub-programme 129 183 (measures aimed at sewerage systems).

"Subsidised loans" were provided for the projects under programmes 129 180 and 229 310 that are over now. These loans were granted in the form of compensation payments for a part of interest rates for commercial loans used by 102 projects requiring larger investments in the years 2008–2013 in total amounting to CZK 1,578 million and with less then ten year loan maturity. In 2015, a part of interests in the remaining 99 unpaid loans was paid amounting in total to CZK 25.1 million. These were non-investment funds that are not recorded in the programme funding.

Under the programme 129 140 "Support for Remedying Flood Damage to Infrastructure of Water Supply and Sewerage Systems", a total of 25 projects were subsidised in 2015 with the total amount of CZK 293,119 million under the sub-programme 129 144 "Support for Remedying Damage Caused by Floods in 2013". The implementation of this programme was terminated on 31 December 2015.

Table 9.1.1
State budget funds provided in the year 2015 under programmes 129 140, 129 250 of the Ministry of Agriculture, including subsidy for a part of interest on commercial loans

Form of support	Water supply systems and water treatment plants	Sewerage systems and waste water treatment plants	Renovation of water supply systems and sewerage systems after the floods	Ministry of Agriculture
	milions of CZK			
Subsidies under MoA programmes	341.514	510.441	293.119	1,145.074
Subsidies for a part of interest on commercial loans	7.628	17.471	0.000	25.099
Subsidies in total	**349.142**	**527.912**	**293.119**	**1,170.173**
Refundable financial assistance	0	0	0	0
Total	**349.142**	**527.912**	**293.119**	**1,170.173**

Source: MoA

Table 9.1.2
Development of the state support for construction of water supply systems, water treatment plants, sewerage systems and waste water treatment plants in the years 2011–2015, provided by the Ministry of Agriculture

Financial resource	2011	2012	2013	2014	2015
	milions of CZK				
Refundable financial assistance	0	0	0	0	0
State budget subsidies	2,194	1,631	1,151	1,448	1,170
Support from the state budget	**2,194**	**1,631**	**1,151**	**1,448**	**1,170**
Subsidised loan (EIB and CEB)	0	0	0	0	0
Support in total	**2,194**	**1,631**	**1,151**	**1,448**	**1,170**

Source: MoA

Flood control

In 2014, the Ministry of Agriculture presented for approval by the Government of the Czech Republic the Final Assessment of the programme 129 120 "Support for Flood Prevention II", which was carried out in 2007–2014. This material was approved by Resolution of the Government of the Czech Republic No. 982 on 2 December 2015.

During this Programme in 2007–2014, the total sum of CZK 11,543 million was invested in the construction of flood control measures, of which CZK 10,128 million was from the state budget and CZK 1,415 million from other investors and sources. In total, 549 projects were implemented, of which 379 were of building nature, whereas 170 were various studies. The outcome has direct impact on 466 thousand as it improves the protection of their lives and property, as well as property of cities, towns and municipalities by the average 77% decrease of risk in the areas where the Programme was implemented.

In 2015, programme 129 260 "Support for Flood Prevention III" continued to be implemented. The programme follows the previous stage, while its emphasis is on the implementation of measures with retentive effects.

The programme is divided into four sub-programmes thematically focusing on support for the preparatory project work for major construction, support for flood control measures with retention, support for flood control measures along watercourses.

Sub-programme 129 262 "Support for Project Documentation for Land Permit Proceeding" and sub-programme 129 263 "Support for Project Documentation for Building Permit Proceeding" are designed to support the preparation of project documentation for major flood control measures that will be implemented under other sub-programmes.

The subject matter of sub-programme 129 264 "Support for Flood Control Measures with Retention" is the establishment of new retention areas, modifications to existing water reservoirs with retention effect to improve the level of flood protection, measures for flooding and support for water retention in dry polders on minor watercourses.

Sub-programme 129 265 "Support for Flood Control Measures along Watercourses" is aimed at the construction of protective dikes, the increase in the capacity and the stabilization of watercourse channels (especially in urban areas).

The implementation of measures under programme 129 260 will be ensured, as in previous years, by watercourse administrators (the River Boards, state enterprises, Forests of the Czech Republic, s. e., and the minor watercourse administrators appointed by the Ministry of Agriculture pursuant to Section 48 (2) of the Water Act). Municipalities will be actively involved in the programme as applicants for support for the implementation of measures of local nature aimed at reducing the risk of flash flooding on minor watercourses.

Table 9.1.3
Funding of selected major events programme 129 260 „Flood prevention III"

Watercourse administrators	Project	Realization period	Total costs	Subsidies in 2015
			millions of CZK	
Elbe River Board, s. e.	Novohradka, Stíčany – Čankovice, flood defence	06/15–12/16	23.703	9.454
Ohře River Board. s. e.	Water Reservoir Horka – protection of safety spillway	05/15–03/16	5.585	3.661
Oder River Board. s. e.	Water Reservoir Šance – transformation of extreme floods	09/15–12/18	455.687	18.800

Source: MoA

Table 9.1.4
Funds of the state budget in 2015 under the program 129 260 by watercourse administrators

Owners and administrators	Use of funds in 2015	
	Investments	Non-investments
	milions of CZK	
Elbe River Board, s. e.	11.554	0
Vltava River Board, s. e.	0.865	0
Ohře River Board, s. e.	10.686	0
Oder River Board, s. e.	26.899	0
Morava River Board, s. e.	2.935	0
Forests of the Czech Republic, s. e.	1.585	0
Minor watercourse administrators - municipalities	0.500	0
Total	**55.024**	**0**

Source: MoA

Also this programme allows, through the institution of the so-called promoter, the involvement of municipalities, association of municipalities, towns and regions in the process of proposing flood control measures which will then be implemented by the watercourse administrators.

Under the programme 129 260 "Support for Flood Prevention III" 24 projects were funded with the use of investment funds from the state budget in the amount of CZK 55.024 million in 2015.

Flood control measures – the Brusnický stream (source: Elbe River Board, s. e.)

Remedying the Impacts of Floods

In 2015, under the programme 129 270 "Remedying the Impacts of Floods on State-owned Water Management Property II" the Ministry of Agriculture continued to implement the sub-programme 129 272 "Remedying the Impacts of Floods from 2013".

In 2015, under the sub-programme 129 272, financial support was granted to a total of 178 projects. The biggest investors were the Vltava River Board, s. e., with 72 projects implemented and the Elbe River Board, s. e., with 58 projects. The Ohře River Board, s. e., implemented 37 projects and Forests of the Czech Republic 11 projects.

Table 9.1.5
Summary of costs of selected major projects under the sub-programme 129 272

Number of project EDS 129D272 00	Project name	Investor	Realization		Total costs	Subsidy in 2015
			start	end	millions of CZK	
1006	OPŠ 06/2013 – Rožanský stream in Království, river km 6.200–7.000	Ohře River Board, s. e.	2014	2015	8,810	4,724
1016	OPŠ 06/2013 – Jiříkovský stream in Jiříkov, river km 4.210–4.700	Ohře River Board, s. e.	2015	2016	5,295	5,294
1025	OPŠ 06/2013 – Mandava in Varnsdorf (5.40 –5.900)	Ohře River Board, s. e.	2014	2016	13,451	8,951
1031	OPŠ 06/2013 – Mandava in Varnsdorf (0.650–1.000)	Ohře River Board, s. e.	2014	2016	17,599	9,495
1032	OPŠ 06/2013 – Mandava in Varnsdorf (1.180–1.310)	Ohře River Board, s. e.	2014	2016	10,696	6,863
1035	OPŠ 06/2013 – Mandava in Varnsdorf (3.160–3.450)	Ohře River Board, s. e.	2014	2015	9,959	6,010
1038	OPŠ 06/2013 – Kamenice in Česká Kamenice (21.840– 22.350)	Ohře River Board, s. e.	2015	2016	39,399	9,400
1042	OPŠ 06/2013 – Ještědský stream in Žibřidice (6.600–8.028)	Ohře River Board, s. e.	2014	2016	9,080	5,984
4121	Vltava river km 27.380–37.08 – deposits and fortification repair (cycling path)	Vltava River Board, s. e.	2015	2015	7,479	5,517
4146	Kocába, river km 0.000–4.600 cadastre Štěchovice u Prahy and cadastre Masečín – repair of river bed strengthening	Vltava River Board, s. e.	2015	2016	18,743	8,137
4168	Vltava, right bank, river km 83.700–84.000 – repair of bank stabilization and access road to Štěchovice reservoir	Vltava River Board, s. e.	2015	2015	4,879	4,879
4173	Berounka right bank, river km 1.700–1.900 – fortification repair	Vltava River Board, s. e.	2015	2015	4,659	4,601
6042	Water structure Střekov, removal of sediments and debris, river km 767.48	Elbe River Board, s. e.	2014	2015	5,028	4,022
6107	Labe, channel fortification, river km 741.70–767.40	Elbe River Board, s. e	2015	2015	6,407	6,406

Source: MoA

Table 9.1.6
Use of state budget funds in 2015 under the programme 129 272

Owners and administrators	Use of funds in 2015		
	Investments	Non-investments	Total
	millions of CZK		
Ohře River Board, s. e.	57.650	55.436	**113.086**
Forests of the Czech Republic, s. e.	2.377	4.101	**6.478**
Vltava River Board, s. e.	0	84.404	**84.404**
Elbe River Board, s. e.	13.952	64.697	**78.649**
Total	**73.979**	**208.638**	**282.617**

Source: MoA

Fish crossing Hřensko – construction work (source: Ohře River Board, s. e.)

Fish crossing Hřensko – after implementation (source: Ohře River Board, s. e.)

Minor watercourse management

In 2015, the Ministry of Agriculture partially compensated costs of the River Boards and Forests of the Czech Republic, state enterprises, relating to the maintenance of minor watercourses, especially those received under the transformation of the Agricultural Water Management Administration through direct non-investment subsidies "Support for Minor Watercourse Management".

Table 9.1.7
Spending of direct subsidies under the programme "Support to minor watercourses administration" in 2015

Administrator	Number of projects	Subsidy in millions of CZK
Forests of the Czech Republic, s. e.	9	3.810
Vltava River Board, s. e.	68	15.067
Elbe River Board, s. e.	26	11.706
Morava River Board, s. e.	17	12.392
Total	**120**	**42.975**

Source: MoA

Water in the landscape

In 2015, the Ministry of Agriculture continued to implement the programme 129 130 "Renewal, Dredging and Rehabilitation of Fishponds and Construction of Water Reservoirs".

The administration of the programme 129 130 was in the beginning postponed due to changes in the notification deadline and the consequent delays in the process of approving the programme documentation. For this reason, the funding of this programme did not begin until 2008.

Programme 129 130 includes three sub-programmes, namely sub-programme 129 132 "Renewal, Dredging and Rehabilitation of Fishponds and Construction of Water Reservoirs", which ended on 31 December 2013 and it was subjected to the final evaluation in 2014; furthermore, sub-programme 129 133 "Remedying Flood Damage to Dams and Structures of Fishponds and Water Reservoirs" and sub-programme 129 134 "Remedying Emergency Situations in Fishponds and Water Reservoirs". These sub-programmes were terminated in 2015.

The objective of this programme was to improve the technical condition of the fishpond system in the Czech Republic and to renew the water management functions of fishponds and water reservoirs with focus on increasing their safety during floods, including the prevention of the threat of special floods, as well as to dredge fishponds and water reservoirs in order to restore their storage capacity and thus fully renew their function. Another objective of this programme was to support the construction of new water reservoirs that would be included in the flood control system, in drought periods used for controlled increase of discharge and, at the same time, they would also be used for extensive fish farming. Both objectives of the programme were aimed at reducing the impacts of extreme hydrological situations, i.e. the floods and drought.

In 2015, eleven projects were funded from the Chapter 397 OSFA with non-capital investment funds amounting to CZK 6.964 million and investment funds amounting to CZK 45.385 million. No funds from the EIB loan were used.

The rules governing the submission of project applications for inclusion in the programme 129 130 lay down the detailed terms. The most important rules are:

– The applicant may only be an entity carrying out business in primary agricultural production, carrying out subsidized fish farming and fishing operations in a fishpond or water reservoir, which proves farming on more than 20 hectares of water bodies in the course of the last year and submits documents certifying the ownership, lease or other legal relationship in respect of at least 20 hectares of water bodies.

– For the prepared project, the applicant shall submit the documents of ownership (lease or other legal relationship) of the land affected by the construction, the affirmative standpoints of the river basin administrator (River Board, state enterprise), of the administrator of the watercourse downstream of the respective hydraulic structure, and of the competent water authority having subject-matter and local jurisdiction.

– In case of construction of a new water reservoir or a system of water reservoirs exceeding 2 hectares of surface area, the main purpose of such hydraulic structure was the protection against flood and drought, i.e. only extensive fish farming was permitted.

Table 9.1.8 shows major projects included in the programme 129 130.

Revitalization of the Ašský stream (source: Ohře River Board, s. e.)

Table 9.1.8
Spending of state budget funds in 2015 for selected major projects under the programme 129 130

Applicant	Project name	Realization period	Total costs	Subsidy in 2015
			millions of CZK	
Klatovské rybářství – správa a.s.	Merklínský pond – dam and other objects reconstruction	2/15–12/15	19.551	19.551
Czernin Dymokury s.r.o.	Komárovský pond – dam and other objects reconstruction	2/15–11/15	9.184	5.295

Source: MoA

The Elbe River in Špindlerův Mlýn (source: Elbe River Board, s. e.)

Sub-programme 129 162 "Support for the Renewal and Construction of Irrigation Detail and Optimization of Irrigation Systems".

The aim of the sub-programme is to reduce the need for water for irrigation, reduce energy intensity of irrigation and make use of positive environmental and non-economic effects of irrigation as one of the adaptation measures to mitigate the impacts of climate change, and thereby improve the competitiveness of agricultural enterprises and stabilize agricultural production.

Programme 129 160 "Support for Competitiveness of Agri-food Complex – Irrigation" including its sub-programme 129 162 was extended until 31 December 2016. The extension was discussed and approved by the European Commission. In 2014, the programme 129 160 including its sub-programme 129 162, was reopened and new applications for grants were accepted. In 2015, applications from 2014 were administered together with calls from 2015, while Chapter 397 OSFA supported 50 projects with investment funds amounting in total to CZK 44.394 million.

Table 9.1.9
Spending of state budget funds in 2015 for selected major projects under the programme

Applicant	Project name	Realization period	Total costs	Subsidy in 2015
			millions of CZK	
Předměřická a.s.	Modernization of irrigation system Sobětuchy	12/14–12/15	10.457	4.158
BRAMKO s.r.o.	Irrigation system for Sojovice, Skorkov. Repair of the pipe system	12/14–12/15	4.864	1.945

Source: MoA

Fish crossing Loket – construction work (source: Ohře River Board, s. e.)

Fish crossing Loket – after implementation (source: Ohře River Board, s. e.)

Table 9.1.10
State budget funds provided by the Ministry of Agriculture on capital and ordinary costs in 2015 in the form of subsidies under the programmes 129 260, 129 270, 129 130, 129 160

Register number of programme	Name of programme	Expenditure on programmes (millions of CZK)
129 260	Flood prevention III	55.024
129 270	Remedying the impacts of floods on state-owned water management property II	282.617
129 130	Renewal, dredging and rehabilitation of fish ponds and water reservoirs	52.351
129 160	Support for the renewal and construction of irrigation detail and optimization of irrigation systems	44.394

Source: MoA

9.2 Financial support provided by the Ministry of the Environment

9.2.1 Financial support provided under the programmes co-financed from the EU funds

Operational Programme Environment 2007–2013

The Operational Programme Environment is a sectoral operational programme for the programming period 2007–2013, which was approved on 20 December 2007. The funds started to be used in September 2008. The aim of the operational programme is the protection and improvement of the quality of the environment as a basic principle for sustainable development. The Operational Programme Environment is divided into a total of eight priority axes:

1. Improving Water Management Infrastructure and Reducing Flood Risks,
2. Improving Air Quality and Reducing Emissions of Pollutants,
3. Sustainable Use of Energy Sources,
4. Improving Waste Management and Rehabilitation of Contaminated Sites,
5. Reducing Industrial Pollution and Environmental Risks,
6. Improving the State of Nature and Landscape,
7. Development of Infrastructure for Environmental Education, Consultancy and Awareness,
8. Technical Assistance.

The Operational Programme Environment is managed and guaranteed by the Ministry of the Environment, the Intermediate Body is the State Environmental Fund of the Czech Republic (SEF CR). Applications for support are received by regional offices of the State Environmental Fund of the Czech Republic, those submitted under the priority axis 6 and under the intervention area 1.3.2 are also received by the Agency for Nature Conservation and Landscape Protection of the Czech Republic. Dates for submitting the applications are published in the form of Calls on the portal www.opzp.cz. For 2015, the receipt of applications for support under the Operational Programme Environment was opened within two Calls. Under the priority axis 6, there were Calls aimed at optimization of the landscape water regime (Call 64 with allocation of CZK 1.75 billion and Call 66 with allocation of CZK 0.2 billion).

Under the Operational Programme Environment, the priority axis 1 – Improving Water Management Infrastructure and Reducing Flood Risks, funds from the Cohesion Fund in the total amount of CZK 11,921.9 million were used in 2015. Under the priority axis 1 – Improving Water Management Infrastructure and Reducing Flood Risks (area of intervention 1.1 – Reducing Water Pollution), the Ministry of the Environment approved (registration sheet issued + positive status of the project) 1 project with total eligible costs amounting to CZK 185.4 million in 2015. Under the priority axis 6 – Improving the State of Nature and Landscape (area of intervention 6.4 – Optimization of the Landscape Water Regime), the Ministry of the Environment approved (registration sheet issued + positive status of the project) a total of 128 projects with total eligible costs amounting to CZK 422.7 million in 2015.

The Vltava River – Vrané – flood recovery (author: Hana Žáčková)

Table 9.2.1.1
Grant funds from the Operational Programme Environment for the financing of measures in the area water management in 2015

Priority axis	Area of support	Number	Total eligible costs	ERDF/CF	SEF grant	SEF loan
			CZK			
1	1,1	1	185,451,801	132,065,791	7,768,576	15,537,152
	1,2	–	–	–	–	–
	1,3	–	–	–	–	–
Priority axis 1 in total		**1**	**185,451,801**	**132,065,791**	**7,768,576**	**15,537,152**
6	6,4	128	422,726,813	313,579,932	18,246,802	0
Priority axis 6 in total		**128**	**422,726,813**	**313,579,932**	**18,246,802**	**0**
Total		**129**	**608,178,614**	**445,645,723**	**26,015,378**	**15,537,152**

Source: IS Central

Table 9.2.1.2
Use of funds from the Operational Programme Environment in 2015

Priority axis	EU grant	SEF co-financing	SEF loan	State budget co-financing
	CZK			
1.1 – Reducing Water Pollution	10,236,929,576	602,172,299	315,537,043	0
1.2 – Improving Drinking Water Quality	1,234,645,725	72,626 217	7,778,033	0
1.3 – Reducing Flood Risks	450,398,835	25,981,162	0	1,538,661
Priority axis 1 in total	**11,921,974,137**	**700,779,678**	**323,315,077**	**1,538,661**
Priority axis	944,545,754	58,769,946	0	0
Total	**12,866,519,891**	**759,549,625**	**323,315,077**	**1,538,661**

Source: IS Central

Operational Programme Environment 2014–2020

The Operational Programme Environment 2014–2020 was approved by the European Commission on 30 April 2015. The funds started to be used in December 2015. The Operational Programme Environment 2014–2020 follows the Operational Programme Environment 2007–2013. In comparison with the previous programme, there is a decrease in the number of activities supported by so-called priority axes. In 2014–2020, support from the programme may be received in one of the following fields:

1. Improving water quality and decreasing the risk of floods,
2. Improving air quality in urban areas,
3. Waster and material flows, ecological burden and risks,
4. Protection and care of the nature and landscape,
5. Energetic savings.

For 2015, applications for grants from the Operational Programme Environment 2014–2020 in the field of water management were received under the following calls:

Revitalization of the Bouřlivec stream – Lahošť (source: Ohře River Board, s. e.)

Table 9.2.1.3
Appeal under the Operational Programme Environment 2014–2020 in 2015

Appeal number	Number and name of specific aim	EU allocation in CZK	Start of admission of applications	End of admission of applications
1	1.1 To reduce the amount of pollution discharged into surface and ground water from municipal sources and the input of pollutants into surface and groundwater	750 millions	14. 8. 2015	13. 11. 2015
2	1.2 To ensure the supply of drinking water of an adequate quality and quantity	50 millions	14. 8. 2015	13. 11. 2015
3	1.3 To ensure flood protection of urban areas	300 millions	14. 8. 2015	13. 11. 2015
4	1.4 Promote flood prevention measures	200 millions	14. 8. 2015	13. 11. 2015
13	4.3 To strengthen natural landscape functions	1.25 billions	14. 8. 2015	31. 12. 2016
14	4.3 To strengthen natural landscape functions	500 millions	14. 8. 2015	31. 12. 2016
21	1.1 To reduce the amount of pollution discharged into surface and ground water from municipal sources and the input of pollutants into surface and groundwater	3.3 billions	15. 10. 2015	5. 1. 2016
22	1.2 To ensure the supply of drinking water of an adequate quality and quantity	1.6 billions	15. 10. 2015	5. 1. 2016

Source: SEF

Support under ISPA and Cohesion Fund

Based on Government Resolution No. 149 of 14 February 2001, the Ministry of the Environment of the Czech Republic was established the Intermediate Body and the State Environmental Fund of the Czech Republic the implementing agency for the implementation of ISPA projects. The pre-accession instrument ISPA was designed for sectors of transport and environment in EU candidate countries. Projects were submitted by applicants from the public sector and the total costs of implementation of the project could not be lower than € 5 million, with the exception of technical assistance projects.

In total 106 projects applying for grants under the ISPA programme or the Cohesion Fund were registered by the State Environmental Fund of the Czech Republic. As of 31 December 2006, the European Commission approved 40 projects, of which one was a project of technical assistance and one project aimed at remedying flood damage was approved by the European Commission in the non-standard procedure. In December 2006, the European Commission approved the last four applications for grants from the Cohesion Fund. These four approved projects are in the amount of € 89.9 million, i.e. CZK 2,518.1 million (using the exchange rate of 28 CZK/1 €) of the total costs, or € 80.0 million (CZK 2,241.2 million) of the eligible costs with the promised support in the amount of € 55.0 million (CZK 1,539.2 million). One of these four projects was the project "Reconstruction of existing and construction of new sewers and the provision of the quantity and quality of drinking water in Jihlava Region" (the eligible costs in the amount of € 15.0 million, promised support in the amount of € 10.0 million). Due to the failure to start the implementation of the project by the extended deadline for the eligibility of costs (31 December 2011), the project was formally terminated.

The total costs of 39 projects approved in the standard procedure amounted to € 959.7 million (CZK 26,871 million, of which the eligible costs amount to € 867.4 million (CZK 24,287 million). CF/ISPA support allocated to these projects amounted to € 596.6 million (CZK 16,750 million). As of 31 December 2014, support in the amount of € 583 million (CZK 16,324 million) was received from the European Commission.

In addition to the above mentioned, a project to remedy flood damage, comprising 13 sub-projects that were supported from ISPA fund, was implemented. The total costs of this project amounted to € 17.7 million (CZK 495.6 million), of which the funds granted by the European Commission amounted to € 14.6 million (CZK 408.8 million). The remaining part was covered by the final beneficiaries. The final report was approved by the European Commission at the end of 2004.

The use of ISPA and Cohesion Fund funds in 2015

In the sector of environment, the payments for the Cohesion Fund projects were effectuated through the chapter 315/MoE of the state budget. In 2015, the final beneficiary received from the state budget the final payment in the total amount of € 1.9 million: this was the last final payment after the approval of the final report the European Commission sent in December 2014 to the account of the National Fund of the Ministry of Finance.

Table 9.2.1.4
The allocation of funds for types of measures (approved ISPA and CF projects)

Type of measure	Number of projects	Subsidy from CF and ISPA
		millions of EUR
Projects ISPA/CF	38	596.6
Technical Assistance	1	1.7
Floods ISPA 2002	1 (13 sub-projects)	14.6
Total	**40**	**612.9**

Source: SEF

9.2.2 Overview of the administration of large projects submitted since the launch of the Operational Programme Environment

A large project under the Operational Programme Environment is defined as an operation comprising a series of works, activities or services intended to accomplish an indivisible task of a precise economic or technical nature, with clearly identified goals, whose total costs exceed the amount of € 50 million (hereinafter referred to as a "Large Project"). The main difference, compared to individual projects, is that large projects are to be, in addition, approved by the European Commission.

Since the launch of the Operational Programme Environment, so far 19 applications for the granting of support in the category of large projects have been submitted. Of this, one project belongs to the priority axis 3, six projects belong to the priority axis 4 and the remaining projects belong to the priority axis 1.

Priority Axis 1 – Improving Water Management Infrastructure and Reducing Flood Risks

The Elbe River under Dolní Beřkovice (source: Elbe River Basin, s. e.)

Table 9.2.2.1
Large projects approved by the European Commission – a decision to grant support was issued

Project ID	Project name	Area of support
541408	Improving water quality in the Jihlava River and the Svratka River upstream of the Nové Mlýny water reservoir*) (project expenditures were certified)	1.1 and 1.2
255577	Project of water protection in the Dyje River Basin – Stage II (project expenditures were certified)	1.1 a 1.2
222184	Cheb area – environmental measures*) (project expenditures were certified)	1.1
959882	Clean Bečva River II (project implementation)	1.1
569740	Reconstruction and extension of sewerage system in Brno (project expenditures were certified)	1.1
253217	Improving water quality in the Upper Morava River Basin – Stage II (project implementation)	1.1

Source: SEF
*Note: *) After approval of projects by the European Commission, fi nancial ceiling for the category of large projects was raised from € 25 million to € 50 million, which has not been reached by these projects.*

Table 9.2.2.2
Large projects reclassified from the category of large projects to the category of individual projects

Project ID	Project name	Area of support
248481	Modernization of biological waste water treatment plant Pardubice (project expenditures were certified)	1.1
1288601	Ústí nad Orlicí – sewerage system and waste water treatment plant (project realization terminated)	1.1
1612488	Sewerage system and water in the Křivoklát area (the project was abandoned)	1.1 and 1.2

Source: SEF

Table 9.2.2.3
Large projects – cancelled by the applicant/not accepted/not approved for funding

Project ID	Project name	Area of support
576008	Completion of the Ostrava sewerage system	1.1
374628	Ensuring the quality of drinking water in the water supply system in southwest Moravia, Žďár region	1.2
464737	Total reconstruction and extension of Central Waste Water Treatment Plant in Prague at Císařský ostrov, construction 1 – New water line including connection	1.1
31001615	Complete reconstruction and extension of Central Waste Water Treatment Plant at Císařský ostrov	1.1

Source: SEF

9.3 The State Environmental Fund of the Czech Republic

The State Environmental Fund (SEF) of the Czech Republic is a specifically oriented institution which is an important financial resource for support of implementation of measures to protect and improve the status of the environment in its respective compartments.

As of 31 December 2015, the revenues of the SEF reached 120.3% of the budgeted revenues, which means the SEF received CZK 2,065.5 million, of which CZK 1,443.2 million were the revenues from charges for environmental pollution.

Revenues from fines and financial penalties in 2015 amounted to CZK 59.2 million.

The revenues of the State Environmental Fund of the Czech Republic include collected charges for environmental pollution. In the area of the protection of waters they comprise a charge for waste water discharges into surface waters and a charge for abstracted groundwater quantities.

Fish crossing Černý Mlýn (source: Ohře River Board, s. e.)

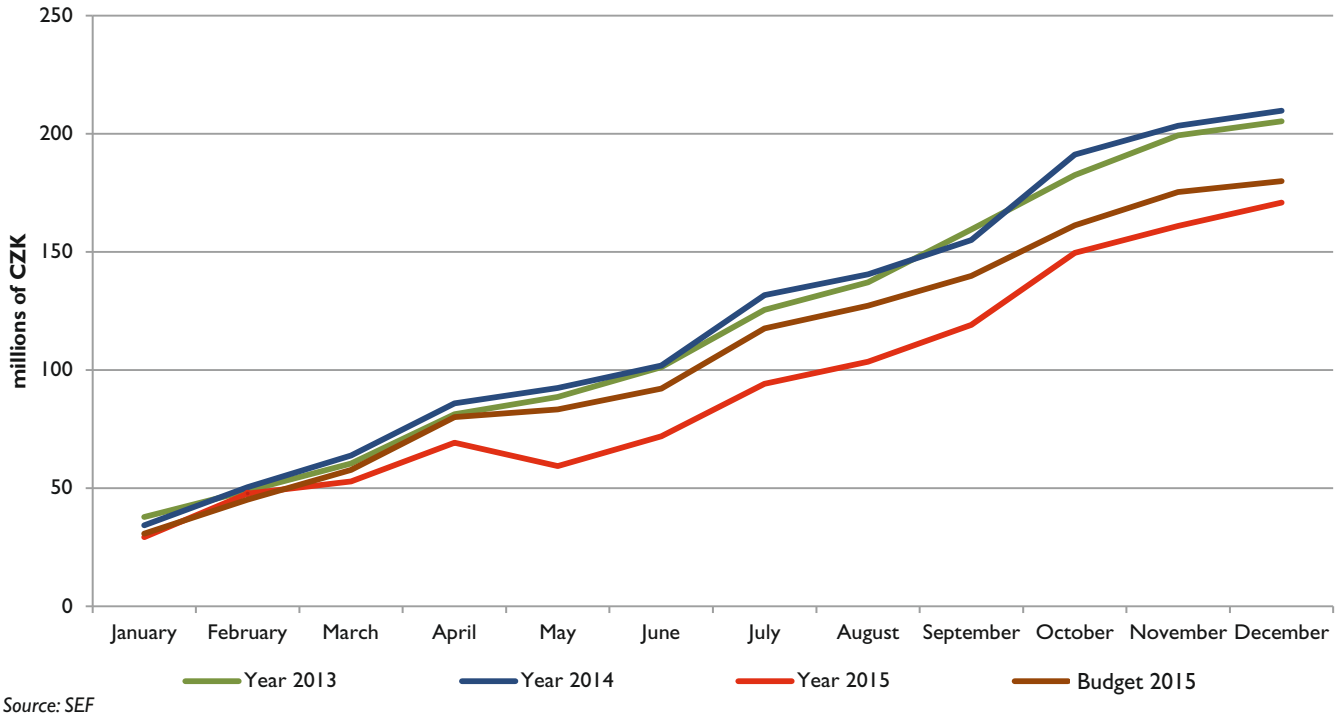
Table 9.3.1
The structure of the revenue part of the budget (only water-related)

Revenues from charges and penalties broken down to environmental compartments (water only)	Budget 2015	Revenues as of 31 December 2015	Reality	Difference
	milions of CZK		%	milions of CZK
Waste water	180.0	170.9	94.9	–9.1
Groundwater	290.0	357.0	123.1	67.0

Source: SEF

The collection of charges for waste water discharges into surface waters in 2015 amounted to 94.9% of the budgeted revenues. For 2014, the planned budget revenues were CZK 180 million. The amount of charges collected for waste water discharges was by CZK 9.1 million lower than planned.

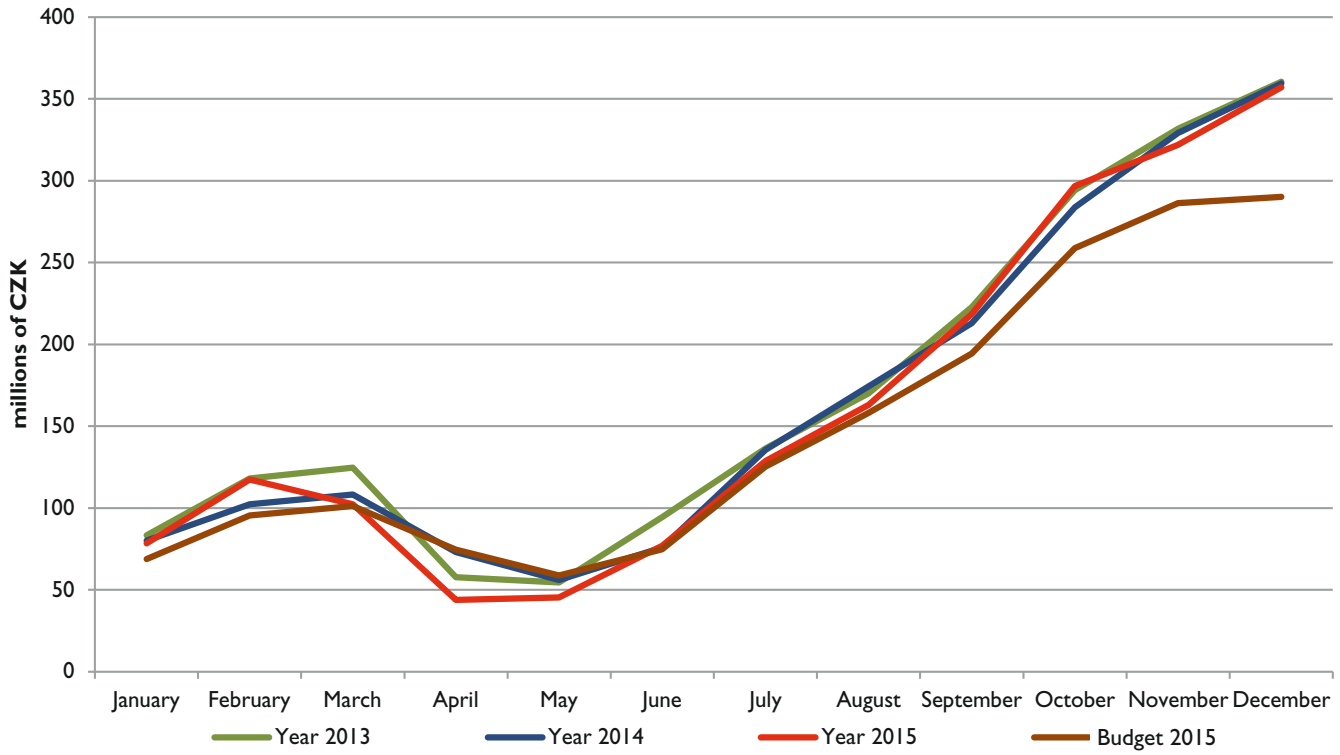
Chart 9.3.1
Development of revenues from charges for waste water in 2013–2015 in millions of CZK



Source: SEF

The collection of charges for groundwater abstractions in 2015 reached 123.1% of the budgeted revenues. For 2015, the planned budget revenues in the amount of CZK 290 million were exceeded by CZK 67 million.

Chart 9.3.2
Developement of revenues from charges for groundwater in 2013–2015 in millions of CZK



Source: SEF

National programmes

The State Environmental Fund of the Czech Republic administered in 2015 the following three programmes (according to Annexes IV and V of the MoE Directive No. 6/2010 and the MoE programme 115 270 "MoE Remedying Damage Caused by Natural Disasters") related to water management infrastructure:

Programme of Support for Municipalities Located in the Regions of National Parks (Annex IV of the MoE Directive No. 6/2010)

The aim of the programme is to compensate for losses of economic development of municipalities located in the regions of national parks. Support under the programme is provided for the implementation of measures in four sub-programmes. One of them is the sub-programme IV.2 C Waste Water Treatment, under which the project "Intensification of Waste Water Treatment Plant in Dolní Dvůr" was terminated in 2015. The approved subsidy for the project amounted to CZK 507 thousand. Under the same sub-programme, positive Decision on providing funds to the project "Renovation of the current biological waste water treatment plant in Labská Stráň". The project will be implemented in 2016 and the approved grant amounts to CZK 1.3 million. Under the sub-programme IV.4 "The Increase in Support from the SEF in Co-financing OPE Projects", 15 projects are currently administered. In 2015, funding for the "Paseky nad Jizerou – sewerage system" project in the amount of CZK 1.7 million was approved.

Programme of Support for Water Management Activities (Annex V of the MoE Directive No. 6/2010)

In accordance with the requirements of Directive No. 2000/60/EC to carry out monitoring of waters and establish a comprehensive system for the assessment of status or potential of waters and water bodies, including the implementation into a single assessment information system, 2 projects with total funding support amounting to CZK 3.7 million in sub-programme V.1.A were completed in 2015.

The Brtnický stream – revitalization flow (source: Ohře River Board, s. e.)

Revitalization of the watersourse Loděnice, Nenačovice (author: Aerodata, Ltd.)

MoE Programme 115 270 "Remedying Damage Caused by Natural Disasters"

Currently, the State Environmental Fund of the Czech Republic administers under the MoE programme "MoE Remedying Damage Caused by Natural Disasters", sub-programme 115 272 "MoE Floods 2013" 78 projects requesting funds amounting to approx. CZK 149.24 million. The projects are divided into four categories according to the types of measures that concern water management activities. The first category refers to the group "Reconstructions and Repairs of Waste Water Treatment Plants", which includes 7 applications for support amounting in total to approximately CZK 1.08 million. 22 measures relate to the category "Restoring the Natural Function of Watercourses" amounting in total to approximately CZK 14.05 million are administered under the programme. This category includes, for example, measures related to the renovation of watercourse beds or floodplains. Another group is "Decontamination of Surface Water and Groundwater Resources", which includes four applications for support amounting in total to approximately CZK 40 thousand (this mostly applies to the decontamination of wells). The last group is "Restoration of Migration Passability and Ecological Stability of the Landscape". In this group 39 measures in the total amount of CZK 134.06 million are administered. This category includes not only actions related to water management activities (for example, renewed technical structures on a pond/polder, excavation of sediments from ponds or restoration of fish passes), but also other actions that do not relate to this area (for example, remediation of landslides, rock mass, restoration of meadows).

Call No. 10/2015 "Environmentally Sensitive Renovation and Maintenance of Water Areas and Waterways"

The objective of the Call is to prevent damage caused by floods through taking measures sensitive in terms of the environment and allowing for building precautionary overfalls in small water reservoirs while taking in account interests of nature conservation. Applications were received between 28 December 2015 and 29 April 2016.

Call No. 7/2015 under the National Programme Environment

The objective of the Call is to enhance internal funds necessary for the implementation of projects supported under OPE 2014–2020, priority axis 1, specific parts 1.1 and 1.2 aimed at improving the condition of surface waters and groundwaters and improving drinkable water supply for the population. Applications are received between 13 November 2015 and 31 December 2016.

The SEF also provided CZK 1,124.4 million from national funds for co-funding SEF projects in the sector of national water management in the structure shown in Table 9.3.2.

Table 9.3.2
The structure of co-financig OPE projects in the the sector of water management in 2015

Item	CZK
Approved subsidy	26,015,378
Approved loan	15, 537,152
Subsidy paid	759,549,625
Loan paid	323,315,077

Source: SEF

9.4 Financial support from international cooperation and the European Union

Projects focused on the area of water management were also implemented under programmes of cross-border cooperation, generally referred to as Objective 3. With respect to termination of the programme period 2007–2013, implementation of all water management projects was terminated in 2015 together with period when relevant eligible costs could be claimed. Control of the projects under Objective 3 was entrusted to the Centre for Regional Development of the Czech Republic, which performed control during the whole period through a network of offices in NUTS II regions.

Under the Objective 3 programmes sheltered in 2007–2013 9 independent operative programmes: Operational Programmes of Cross-border Cooperation Czech Republic – Polish Republic, Czech Republic – Slovak Republic, Czech Republic – Austria, Czech Republic – Free State of Saxony and Czech Republic – Free State of Bavaria, Transnational Cooperation Operational Programme for Central Europe focused, the Operational Programme for Inter-regional Cooperation (programme INTERREG IVC), Espon programmes and URBACT II. These programmes supported, among others, projects that contributed to the improvement of the environment, risk prevention (natural and technological risks including the impact of climate change on water management, etc.). The implemented projects focused on the investment aspect (flood control measures) as well as on writing studies and the resulting measures.

The Programme period 2007–2013 was completed in terms of implementation and costs eligibility in 2015 (by 30 September 2015 and by 31 December 2015). In the calendar year of 2015, no new projects were approved, which applies also to water management projects.

Below are projects implemented in 2007–2013 under the operational programmes.

1. The following projects under the Operational Programme of Cross-border Cooperation between the Czech Republic and Austria in the field of environmental protection were implemented and completed:
   – "Schwarzenberg Navigation Canal – Cultural Heritage Revives" (with ERDF grant in the amount of 856.272 € for the Czech partners) was approved in November 2011 and its execution was completed,
   – "Flood control measures on the Malše River in Leopoldschlag, planning" (with no financial participation of the Czech partner) was approved in November 2012 and its execution is currently under way, "Flood control measures on the Malše River in Leopoldschlag, extension" (with no financial participation of the Czech partner) was approved in June 2013, successfully completed,
   – "Joint measures in the area of water protection on the border formed by the Dyje River" (with ERDF grant in the amount of 1,447.507 € for the Czech partner) was approved in May 2012, successfully completed in 2015.

2. Operational Programme of Cross-border Cooperation between the Czech Republic and the Free State of Bavaria supported the implementation of the following projects:
   – "Gurgling Cheb area – a river without borders" with a grant in the amount of 310.564 € (the implementation of the project was terminated in 2013),
   – "Integrated soil and water protection in the Drachensee Basin" with a grant in the amount of 229.500 € (the implementation of the project continued and was terminated in 2014),
   – "Contaminants in the environment of the Eger – the Ohře River" with a grant in the amount of 162.000 € (the implementation of the project continued and was also terminated in 2014).

3. Under the Operational Programme of Cross-border Cooperation between the Czech Republic and the Free State of Saxony, the following projects were completed in 2014:
   – "Jointly used groundwaters on the Czech-Saxonian border" – GRACE, with a grant in the amount of 991.701 €,
   – "AQUAMUNDI" focusing on education, with water as the key element, with a grant in the amount of 1,408.858 €.
   – "The research of possibilities how to minimize the contents of organic harmful substances in drinking water resources in the Krušné Mountains" with a grant in the amount of 1,224.850 €,
   – "VODAMIN" focusing on the quality of groundwater and surface water and water supply, with a grant in the amount of 3,435.975 €,
   – "The Elbe River – our shared heritage", focusing on education, with a grant in the amount of 467.118 €,
   – "Flood protection and remediation of flood damage Hrádek nad Nisou – Zittau focusing on the rehabilitation of damaged meadows along the Nisa River in the area of Trojmezí and acquisition of water level monitoring system on the Nisa River and tributaries", with a total grant in the amount of 1,219.179 €,
   – "Reconstruction of border communications and bridges after the floods in 2010" with a grant in the amount of 2,992.816 €,
   – "Clean waters in the Upper Krušné Mountains area, German-Czech project of waste water discharge with a grant in the amount of 6,630.789 €,
   – "The revitalization of peat-bogs between Hora Sv. Šebestiána and Satzung – implementation stage" with a grant in the amount of 1,194.346 €,
   – "The proposed uses of the landscape leading to sustainable improvements of water quality and erosion control measures in the transboundary Neisse River Basin", with a grant in the amount of 538.595 €,
   – "Flood control measures at Opárenský Mill", with a grant in the amount of 249.315 €,
   – "Clean waters in the Upper Krušné Mountains area – implementation of joint measures for waste water disposal in the border region" with a grant in the amount of 352.767 €.
   – "Joint solutions for original landscape management" with a total grant of 199,724.75 € from the ERDF was approved.

4. Under the Operational Programme of Cross-border Cooperation between the Czech Republic and the Polish Republic, the implementation of the following projects was completed in 2014:
   – "Protection of waters in the territory of the Sudetenland" with a grant in the amount of 2,188.066 €,
   – "Via the clean river from the Orlice Mountains to the Elbe" with a grant in the amount of 719.313 € from the ERDF,
   – "Protection of waters in the Metuje River Basin in Kudowa Zdrój and Náchod" with a grant in the amount of 883.566 €,
   – "Improvement of water supply and sewerage infrastructure in the Czech-Polish borderland" with a grant in the amount of 728.673 €.

5. Under the Operational Programme of Cross-border Cooperation between the Czech Republic and the Slovak Republic, the following projects that required vast investments were completed in 2015:
   – "Automation of exchange of crisis data in the hydrological district of the Morava River and the Dyje River Basins" with a grant in the amount of 1,288.213 €,
   – "The confluence of the Morava River and the Myjava River – joint flood control measures on both banks of the Morava River", with the ERDF grant in the amount of 819.934 €,
   – "Kopčany – Hodonín – joint flood control measures on both banks of the Morava River", with the ERDF grant in the amount of 814.606 €.

The following projects were completed in 2014:
   – "The renaturalization of the Morava River from the Radějovka River to the Myjava River", with the ERDF grant in the amount of 825.523 €,

– "We want clean water in both Slovakia and Czechia" with the ERDF grant in the amount of 214.644 €,
– "Flood control measures and early warning system Říka-Vlára-Váh Rivers, Stage II", with the ERDF support in the total amount of 338.494 € was completed,
– "Following water to the wealth of habitats in cross-border area" with the ERDF support in the total amount of 27,702.18 €,
– "Caring for springs" – a way to preserving natural wealth with the ERDF grant in the amount of 40,144.43 €.

6. The Operational Programme for Supranational Cooperation (Central Europe) supported the project CE bframe – Central European Flood Risk Assessment and Management in CENTROPE, where the ERDF contribution amounted to 599.250 €. The project implementation was completed in the first quarter of 2013.

7. Under the Operational Programme for Inter-regional Cooperation (INTERREG IVC), support was granted for the project Lake-Admin (Regional administration of lake restoration initiatives), with the ERDF support amounting to 157.250 €. The project implementation was completed on 31 December 2014.

The Rural Development Programme of the Czech Republic for the period 2014–2020 is based on the Joint Strategic plan, Partnership Agreement and other strategic documents such as the Strategic Plan for Biodiversity 2011-2020, the National Programme of Nature and Landscape Protection in the Czech Republic and others. The programme was designed in accordance with Regulation No. 1698/2005 of the European Parliament and of the Council (EC). The provision of grants is aimed at renovation, preservation and improvement of eco-systems dependent on agriculture by taking especially agroenvironmental measures, investing into competitiveness and innovating agricultural products, encouraging young people to enter the agricultural sector or landscape infrastructure.

The programme supports diversification of economic activities in the country with the aim to create new job openings and increase economic development. It also supports local development driven by communities through the LEADER method, which enhances more precise targeting of the support on the needs of a given rural area and development of the participants on local level. The horizontal priority is handing over knowledge and innovations through education activities and consultancy and cooperation in the field of agriculture and forestry.

The subsidies from the Rural Development Programme for the period 2014–2020 are co-financed from the EAFRD and from the state budget of the Czech Republic. In the following years, almost EUR 3.55 billion (approx. CZK 95 billion) will flow from the RDP in Czech agriculture.

The PRV supports, among others, Land consolidation that facilitates rational spatial arrangement of land that belongs to landowners in a given cadastral district. Land adjustment takes into consideration principles of nature and landscape conservation, it helps to recover and preserve biological diversity of landscape. Land consolidation serves for surveying the land that is subject to adjustments and actual marking of the lands in the landscape, or for designing so-called plans of joint arrangement. Implementing plans of joint property leads to accessibility of the lands concerned, while it also includes measures aimed the protection of the environment, measures aimed at preserving the landscape character, erosion control measures with the purpose of protecting land resources, flood control and water management measures and measures aimed at reducing the impact of agricultural drought.

Projects implemented as a part of land consolidation facilitate, among others, prevention of water and wind erosion, while they enhance better management with water in the landscape (harmless water drain and retention, flood control and water management measures, etc.) and they lead to an increase in the retention capacity of the landscape from the perspective of mitigating negative impacts of climate change (floods, drought).

Under land consolidation, an only recipient of grant is defined, which is the State Land Office and its branches of Regional Land Offices.

Under the RDP 2014–2020, land consolidation support follows the previous programme period of RDP 2007–2013.

Under the RDP 2007–2013, measure 1.1.4, investments in the following projects were funded:

a) survey of the land and all topographic elements and other geodetic works in order to design a proposal of land consolidation pursuant to Act No. 139/2002 Coll.
b) marking of new lands based on the approved proposal of land consolidation pursuant to Act No.139/2002 Coll.
c) marking of lands in accordance with Section 21 (a) of Act. 229/1991 Coll.
d) implementation of plans of joint arrangement of land consolidation pursuant to Act No. 139/2002 Coll.:
   - measures to make land accessible,
   - erosion control in order to protect land resources,
   - water management measures aimed at harmless drain of surface waters and protection of the land against floods,
   - measures aimed at protecting the environment and increasing ecological stabiliy of the landscape (local Territorial system of ecological stability and landscaping including subsequent care).

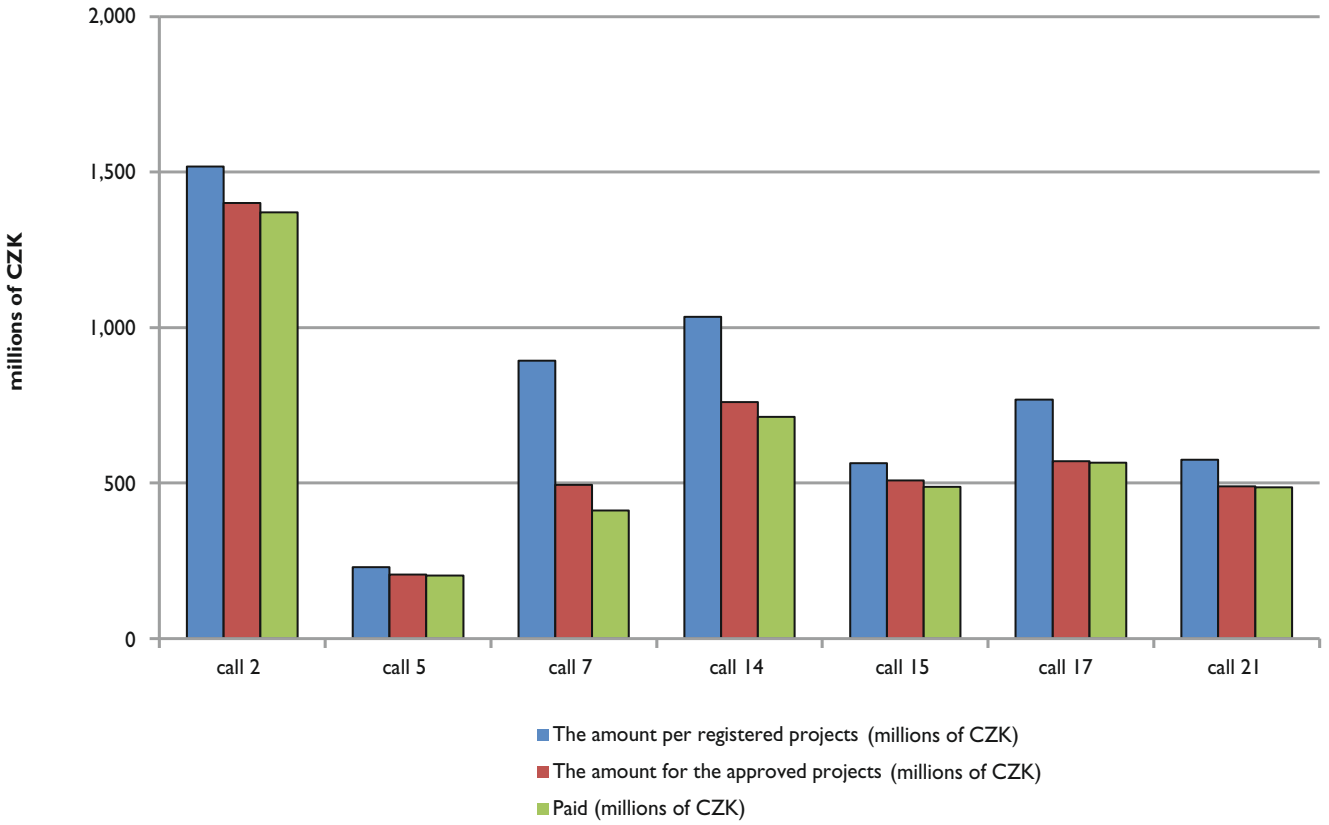
Under measure 1.1.4, Land consolidation, in the programme period 2007–2013 there were seven rounds of receiving applications for grants. Last round took place in 2014, when all the remaining funds intended for this measure were allocated.

Table 9.4.1
Status of implementation of sub-measure 1.1.4 Land consolidation as of 31 December 2015

Land consolidation	Total
Number of registered projects (pcs)	1,064
Amount claimed by registered projects (milions of CZK)	5,577.538
Number of approved applications (pcs)	866
Amount covering approved projects (milions of CZK)	4,425.097
Number of reimbursed projects (pcs)	866
Amount claimed by reimbursed projects (milions of CZK)	4,238.194
Reimbursed projects (pcs)	865
Reimbursed (millions of CZK)	4,235.204

Source: MoA

Chart 9.4.1
Overall of registered, approved and reimbursed projects of land consolidation in different calls for applications as of 31 December 2015



Source: MoA

Chart 9.4.1 shows high interest of municipalities to get support under measure 1.1.4, Land Consolidation. From 2007 to 31 December 2015, a total of 866 projects were approved amounting to CZK 4.4 billion. By 31 December 2015, 865 projects were funded in the total amount of CZK 4.2 billion, which witnesses of almost 100% use of the allocated funds for this operation in the given programme period.

Under the RDP 2014–2020, measure 4.3.1 Land Consolidation, investment in the following intentions are supported:

a) geodetic work (land survey including all topographic elements and other geodetic work done for the purpose of designing a proposal of land consolidation and marking new lands on the basis of the approved plan of land consolidation) and
b) implementation of the plan of joint arrangements (on the basis of the approved proposal of land consolidation):
   - measures aimed at making accessible agricultural and forest lands (outside urban areas),
   - erosion control measures aimed at protecting land resources, water management measures aimed at harmless draining or overflowing of surface waters and land protection against floods, increasing the retention capacity of the landscape and measures aimed at reducing the impact of agricultural drought (e.g., retention reservoirs, etc.),
   - measures aimed at reducing the impact of agricultural drought (e.g., retention reservoirs, etc.),
   - measures aimed at preservation and formation of the environment and increasing the ecological stability of landscape).

The main change, in comparison with the previous programme period, is condensation of the project intentions and the effort to focus support on the above stated measures. Another important change in this programme period is that applications are no longer received in rounds and as of 22 February 2016, a continual call for grant applications was opened. The call will remain open until funds intended to be allocated under this project for the programme period 2014–2020 amounting to EUR 130 million (approx. CZK 3.5 billion) will be used up.

Surrounding the water reservoir Landštejn (author: Petr Soukup)

Lenka Válková – Fisherman by fishing his pond – 4th class, Primary school practical, Tyršovo nábřeží 648, Rožnov pod Radhoštěm, Zlín Region

10. Legislative measures

10.1 Water Act and implementing regulations

The Water Act did not undergo any significant changes in 2015; its text was only influenced by the following legislation published in the Collection of Laws of the Czech Republic:

Act No. 39/2015 Coll. of 10 February 2015 changing Act No. 100/2001 Coll., on environmental impact assessment and on changes of some relevant acts (the Act on Environmental Impact Assessment), as amended, and other relevant acts.

The purpose of the amendment was the Transposition of Regulation 2011/92/EU of the European Parliament and of the Council. The amendment to the Water Act in the provision of Section 115 (6) and (7) stipulates that non-governmental organizations may only participate in water right permit proceedings following in the EIA process in a manner anticipated in the new provisions of Section 9 (b) and (c) of the Act on Environmental Impact Assessment. Furthermore, a new paragraph was added to the provision of Section 115: paragraph 9 enables a water authority to gather observations also in the following proceedings after assessing the impact on the invironment, which is due to maintaining uniformity of water proceedings. This act entered into force on 1 April 2015.

In the Collection of Laws of the Czech Republic, five implementing regulations to the Water Act was published in 2015:

Decree No. 46/2015 Coll. of 12 March 2015, on determining water reservoirs and watercourses on which it is disable to cruise vessels with internal combustion engines, and about the scope and terms of using surface waters to voyage.

The Decree written by the Ministry of Transport implements the provision of Section 7 (5) of the Water Act. It regulates the use of sufrface water for voyage, especially of vessels with internal combustion engines. It defines water surfaces where voayage of vessels with internal combustion engines is prohibited beyond the extent of water surfaces defined in the provision of Section 7 (5) first sentence of the Water Act. It also defines water surfaces where voyage of vessels with internal combustion engines is restricted or regulated. New legislation replaced Decree No. 241/2002 Coll., on determining water reservoirs and watercourses on which it is disable to cruise vessels with internal combustion engines, and about the scope and terms of using surface waters to voyage. It entered into force on 15 April 2015.

Decree No. 264/2015 Coll. of 6 October 2015 that changes Decree No. 5/2011 Coll., on defining hydrogeological regions and bodies of groundwater, assessment method of the status of groundwaters

The Decree responds to reasoned opinion 2013/2095 issued on 28 May 2015 by tje EC to the Czech Republic concerning incorrect transposition of Regulation 2006/118/EC of the European Parliament and of the Council of 18 December 2006 on protection of groundwaters against pollution and deterioration of their condition; in particular, it newly defines the reason for

At the confluence of Rivers Morava and Dyje (source: Morava River Board, s. e.)

Confluence of Rivers Wild and Silent Orlice at Albrechtice – panorama (source: Elbe River Board, s. e.)

application of stricter threshold values when detecting and assessing the condition of waters. There were changes to Annex No. 3 and Annex No. 5. It entered into force on 20 October 2015.

Decree No. 312/2015 Coll. of 24 November 2015 that changes Decree No. 5/2011 Coll., on plans of river boards and plans for coping with flood risks within the meaning of Decree No. 49/2014 Coll.

The amendment to Decree No. 24/2011 Coll., on plans of river boards and plans for coping with flood risks within the meaning of Decree No. 49/2014 Coll. resulted from the necessity to transpose Regulation 2013/39/EC of the European Parliament and of the Council of 12 August 2013 that changes Regulation 2000/60/EC and 2008/105/EC concerning priority substances in the field of water policy. The amendment concerned particularly the provisions of Section 12 and Annex No. 1. It entered into force on 1 December 2015.

Decree No. 313/2015 Coll. of 24 November 2015 that amends Decree No. 98/2011 Coll., on the method of status assessment of surface water bodies, methods of ecological potentional of heavily modified and artificial surface water bodies and the requirements of programmes of surface water status identification and assessment

The amendment to Decree No. 98/2011 Coll. was initiated by the duty to carry out the transposition of Regulation 2013/39/EU of the European Parliament and of the Council of 12 August 2013 that changes Regulation 2000/60/EC and 2008/105/EC concerning priority substances in the field of water policy. The amendment also takes into account the fact that some processes defined in the annexes to the Decree are addressed by individual certified methodological procedures for assessing the condition of surface waters. The decree entered into force on 1 December 2015.

Government Order No. 401/2015 Coll. of 14 December 2015, on indicators and values of acceptable pollution of surface waters and sewage waters, formalities of permits to discharge sewage waters into surface waters and sewerage systems and on sensitive areas

The proposed legislation replaces the current Government Order No. 61/2003 Coll., with the same title as the previous regulation. The proposal of the Government Order takes over, to a great extent the current legislation, and adapts it to the requirements of the current practices. Most importantly, it newly transposes Regulation 2013/39/EU of the European Parliament and of the Council that changes Regulation 2000/60/EC and 2008/105/EC concerning priority substances in the field of water policy and it defines some terms that led to confusion (e.g., industrial sewerage waers, municipal sewerage waters). The extent of changes required submitting a new government order. It entered into force on 1 January 2016.

10.2 Act on Public Water Supply and Sewerage Systems and implementing regulations

In 2014, there was no direct amendment to Act No. 274/2001 Coll., on public water supply and sewerage systems. The Act on Supply and Sewerage Systems was indirectly amended by the following amendment:

Act No. 39/2015 Coll. that changes Act No. 100/2001 Coll., on assessing impact on the environment and on change of some relevant acts (the Act on Environmental Impact Assessment), as amended and other relevant acts.

An amendment defines new competences of water authorities pursuant to Section 27 of the Act on Water and Sewerage Systems.

Decree No. 428/2001 Coll. implementing the above stated Act was not subject to any changes in 2015. With respect to postponed force of some provisions of this Decree, Annex No. 19a regulating forms C to F in line IV. entered into force on 1 September 2015.

10.3 Audits of the execution of public administration in the field of water management and water protection

Ministry of Agriculture

Auditing of the execution of the delegated powers in water management sector is carried out within the organizational structure of the Ministry of Agriculture by the Department for State Administration in the Water Management Sector and for River Basin Administration as the central water authority.

Audits of Regional Authorities are carried out pursuant to Government Resolution No. 689, on the planning, evaluation and coordination of auditing of the execution of the delegated and separate powers of local governments carried out by the central administrative authorities, regional authorities, the Capital City of Prague and municipal authorities of territorially divided statutory cities, of 11 September 2013. The plan of audits of regions and the Capital City of Prague within the set three-year auditing period, i.e. for 2014–2016 (general monthly schedule) was prepared by the Ministry of the Interior of the Czech Republic.

In 2015, in accordance with the plan, audits of the execution of the delegated powers were carried out at five Regional Authorities performing the function of the water authority (see table 10.3.1).

Table 10.3.1
Audits of the execution of state administration, carried out by the Ministry of Agrculture at Regional Authorities in 2015

Region	Audit date
Pilsen	12 February 2015
Vysočina	28 April 2015
Liberec	20 May 2015
Pardubice	18 June 2015
Moravia-Silesia	15 September 2015

Source: MoA

Surrounding the pond Zvůle (author: Petr Soukup)

Beyond the scheduled audits of regional water authorities, in the period from July to September, audits of the execution of the agenda of the water authorities of municipalities with extended powers were also carried out.

These audits examined the activities of 18 offices of municipalities with extended powers performing the function of the water authority (see Table 10.3.2).

Table 10.3.2
Audits of the execution of state administration, carried out by the Ministry of Agriculture at water authorities of municipalities with extended powers in 2015

Municipality	Audit date
Municipality Brandýs n. Labem – Stará Boleslav	27 April 2015
Municipality Kroměříž	22 July 2015
Municipality Holešov	22 July 2015
Office of Prague 13	22 July 2015
Office of Prague 7	7 August 2015
Municipality Kopřivnice	10 August 2015
Municipality Frýdlant n. Ostravicí	11 August 2015
Municipality Frenštát p. Radhoštěm	11 August 2015
Municipality Frýdek-Místek	12 August 2015
Municipality Nové Město na Moravě	12 August 2015
Municipality Žďár nad Sázavou	12 August 2015
Municipality Vlašim	13 August 2015
Municipality Světlá nad Sázavou	13 August 2015
Municipality Česká Lípa	19 August 2015
Municipality Děčín	19 August 2015
Municipality Broumov	26 August 2015
Municipality Náchod	26 August 2015
Office of Prague 9	29 August 2015

Source: MoA

The Ministry of Agriculture in carrying out audits focused mainly on implementation of Act No. 254/2001 Coll., on waters and on amendments to some acts (the Water Act), as amended, in cases in which the powers of central water authority are exercised by the Ministry of Agriculture, and regulations issued pursuant to this Act; Act No. 274/2001 Coll., on public water supply and sewerage systems and on amendments to some acts (Public Water Supply and Sewerage Act), as amended, and regulations issued pursuant to this Act; Act No. 500/2004 Coll., Code of the Administrative Procedure, as amended; and Act No. 183/2006 Coll., on Land-Use Planning and Building Code (the Building Act), as amended, and its implementing legal regulations.

In the case of Regional Authorities, audits also focused on compliance with the provisions of Section 67, Subsection 1, letters a), b), c) and e) of the Act No. 129/2000 Coll., on regions, as amended; in the case of offices of municipalities with extended powers, audits also focused on compliance with the provisions of Section 61 of Act No. 128/2000 Coll., on municipalities, as amended.

Audits also focused on the way the water authorities operate, involving their personnel, material and organizational support, especially the achieved qualifications and experience of staff.

During each audit, randomly selected documents were examined. The MoA prepares minutes of each audit, containing a description of any shortcomings found.

Based on audits carried out it can be stated that the exercise of the delegated powers of regional authorities in the field of water management is consistently on a high level. Positive as well are continuing efforts of regional water authorities to provide detailed methodological guidance for offices within their jurisdiction.

The quality of the exercise of this agenda at the level of municipal offices with extended powers often depends on the size of a particular office, where it is significantly influenced by the personnel and material support. However, also here an improving level of activity of the water authorities can be pointed out.

This finding is also confirmed by the fact that for none of the audited offices it was necessary to impose corrective measures. The identified shortcomings were mostly of a formal nature, having made the examined decisions unlawful in none of the cases.

The Ministry of Agriculture uses findings from audits towards water authorities as feedback that not only helps to deepen mutual communication at all levels of administrative hierarchy, but for the Ministry of Agriculture it is very useful to become acquainted with the regional and local water management issues.

The audit findings are then also applied in the methodological guidance for water authorities. Knowledge of the application of regulations within the competence of the Ministry of Agriculture is annually presented at a work meeting of the MoE Department of Water Management with water authorities.

Ministry of the Environment

Supervision of the execution of the delegated powers in water management sector is annually carried out within the supreme water management supervision by the Ministry of the Environment as the central water authority through the Departments for Execution of State Administration. At the regional level, the supervisory activities were carried out in accordance with the Government Resolution No. 1 181 of 18 October 2006 and in accordance with the "Audit Plan for the Regions and the City of Prague for the 2014–2016" of the Ministry of the Interior and the plan of supervisory activities of the departments for execution of state administration I–IX for 2015. At the Czech Environmental Inspection and municipalities with extended powers (water authorities) the supervisory activities were carried out by the departments for execution of state administration I–IX in accordance with the plan of supervisory activities of the Ministry of the Environment for the year 2015.

Dry reservoir Lutyňka (source: Odra River Board, s. e.)

Execution of the supreme government supervision is imposed on the ministry by the Act No. 2/1969 Coll., on the establishment of ministries and other central bodies of state administration of the Czech Republic, as amended, and Act No. 254/2001 Coll., on waters and on amendments to some acts (the Water Act), as amended.

Supervisory activities form an essential element of controlling the level of execution of state administration, the purpose of which is to supervise how the administration authorities at the lower level (regional authorities, water authorities and the Czech Environmental Inspection) execute state administration in the assigned area of water management. Of particular concern is the correct application of legal regulations, compliance with the relevant competence legal provisions and compliance with the provisions of the Act No. 500/2004 Coll., the Code of the Administrative Procedure, as amended. Audits also focus on the way the water authorities operate, qualifications and experience of staff members, organization of work and material background of departments.

The purpose of the exercise of the supreme state supervision is primarily to eliminate defects of systemic nature. In individual cases, the wrong decision may be changed by means of an extraordinary legal remedy (review of the decision in review proceedings, revision).

Table 10.3.3
Audit of the execution of state administration, carried out by the Ministry of Environment at the Regional Authorities in 2015

Region	Audit date
Pilsen	25 February – 28 April 2015
Liberec	26 February – 27 March 2015
South Bohemia	1 April – 15 May 2015
Moravia-Silesia	16 March – 17 April 2015
Hradec Králové	21 April – 22 May 2015
Central Bohemia	27 May – 4 June 2015

Source: MoE

In carrying out audits of the exercise of the delegated powers of regional authorities no major systemic shortcomings were identified in the area of water management in 2015. For that reason, it was not necessary to take measures of the fundamental (systemic) nature. Tasks resulting from special legal regulations are fulfilled and achieved. Opposition proceedings were not conducted and process penalties did not need to be imposed. Recommendations for administrative authorities were formulated in relevant protocols, other minor irregularities or administrative shortcomings were addressed and remedied during the audit, in the form of the recommendations and proposals for action.

Audits carried out at water authorities constitute a smaller part of supervisory activities of the Ministry of the Environment. More frequent and more extensive in their scope are audits carried out at the regional authorities and other bodies.

Table 10.3.4
Audit of the execution of state administration, carried out by the Ministry of the Environment at water authorities of municipalities with extended powers in 2015

Municipality	Audit date
Municipality Rumburk	11 – 15 June 2015
Municipality Kralovice	23 – 25 August 2015
Municipality Lovosice	24 – 26 November 2015
Municipality Blovice	8 December 2015 – 6 January 2016

Source: MoE

Audits of the execution of the delegated powers of water authorities did not identify shortcomings with the need to impose remedial measures. Minor errors or administrative shortcomings that did not affect the effectiveness, validity or legality of the administrative acts issued, were corrected during the audit or discussed with the officials in the course of the supreme water management supervision within the methodological assistance.

Table 10.3.5
Audit of the execution of state administration, carried out by the Ministry of the Environment in 2015 at Regional Inspectorate of the Czech Evnironmental Inspection

Regional Inspectorate of the Czech Environmental Inspection	Audit date
Havlíčkův Brod	29 October – 2 Decemeber 2015

Source: MoE

Beyond the audits carried out at the Regional Authorities, Municipal Offices and the Czech Environmental Inspection, supreme water management supervision of the waste water treatment using the root zone was carried out at Water Supply and Sewerage Company Vyškov, a.s., on 16 December 2015.

Audit of the execution of state administration under the Water Act, carried out by the Ministry of the Environment at the Czech Environmental Inspection was paid due attention. The supreme water supervision found no significant shortcomings. Despite the considerable complexity and difficulty of the agenda, the execution of state administration at the department of water protection is at an adequate level, both in terms of organization and in terms of expertise.

Based on the conclusions of the audits carried out within the supreme water supervision by the departments for the execution of state administration it can be stated that the exercise of the delegated powers in the field of water protection by regional authorities, water authorities and the Czech Environmental Inspection audited in 2015 is provided at a very good level, the decisions issued contain the particulars required by the Code of the Administrative Procedure and references to the relevant provisions of the Water Act. The MoE methodologies and guidelines are respected in the proceedings and decision-making. Positively assessed are also supervisory activities of the regional authorities and methodical guidance provided to lower-level water authorities in their administrative ward, which in turn is positively reflected in the fact that none of the audited water authorities in 2015 were imposed remedial measures.

Sofia Szentiványi – Fisheries dream – 2nd class A, 2nd Primary school Schwarzova 20, Pilsen, Pilsen Region

11. Priority tasks, programmes and key documents in water management

11.1 Planning in the field of waters

In 2015 the second phase of the process of preparation of the second cycle of river basin management planning, under which international river basin plans, national river basin plans and partial river basin plans were compiled together with international plans for coping with flood risk and plans for coping with floods risks. Within the framework of the first planning cycle, the third (final) phase – preparation and approval of plans for coping with flood risks was completed in accordance with Directive 2007/60/EC.

In terms of the planning in the field of waters, 2015 was a crucial year, as it saw the completion of preparations and comments on the update of river board plans for the second planning phase (2016–2021) under Section 24 (2) of the Water Act on the following levels:

- international river basins: international plans for the Elbe, Oder and Danube River Basins,
- parts of international river basins in the Czech Republic: national plans for the Elbe, Oder and Danube River Basins,
- partial river basins: plans for partial river basins (the Upper and Middle Elbe; the Upper Vltava River; the Berounka River; the Lower Vltava River; the Ohře River, the Lower Elbe and other tributaries of the Elbe; the Upper Oder; the Lusatian Neisse River and other tributaries of the Oder; the Morava River and tributaries of the Váh River; the Dyje River; other tributaries of the Danube).

In 2015, plans drafted by river boards and plans for coping with flood risks, compiled on the basis of preparatory works, were open for written observations from the part of water users and general public between 22 December 2014 and 22 June 2015.

National plans of river boards and plans for coping with flood risks were also assessed under Act No. 100/2001 Coll. from the perspective of the environmental impact (SEA) including public discussion and they were all approved under Section 10g of Act No. 100/2001 Coll. On 21 December, the Government of the Czech Republic approved national plans of river boards with Resulution No. 1083. Approval of the plans of river boards by the government by 22 December 2015 is a part of thematic preliminary conditions that are part of operational programmes.

Subsequently, the MoA, as the relevant administrative body pursuant to the provision of Section 25 (4) of the Water Act, issued in accordance with Section 173 (1) of Act No. 500/2004 Coll., the Code of Administrative Procedure, as amended, general measure Ref. No. 148/2016-MZE-15120 of 12 January 2016 concerning the National Plan of the Elbe River Basin, general measure Ref. No. 152/2016-MZE-15120 of 12 January 2016 concerning the National Plan of the Oder River Basin and general measure Ref. No. 154/2016-MZE-15120 of 12 January 2016 concerning the National Plan of the Danube River Basin.

International plan of river basins and international plans for coping with flood risks were compiled on the level of international committees for the protection of the Elbe, Oder and Danube protection and were approved by December 2015. Plans for partial river basins were to be approved by the relevant regions by 30 June 2016.

The current and general information about the process of planning in the field of waters, including materials and minutes from meetings of the Committee for Water Planning, is available to the general public on the website of the MoA (www.eagri.cz) with links to the MoE website and river basin administrators. Other information relating to water planning are available on the website of the interdepartmental WATER Management Information System (hereinafter referred to as the "WATER MIS") www.voda.gov.cz. For the purpose of implementing the Flood Guideline, the Flood Information System (www.povis.cz) is used as a communication platform.

Plans for coping with flood risks

Completion of the plans for coping with flood risks is a follow-up to the first two phases of the implementation of the Flood Directive and caps the six-year process.

In the first phase of preliminary assessment of flood risks (2011), areas with significant risk were defined (in total 2,966 km of watercourses), for which maps of flood danger and flood risks were made in the second phase (2013). Measure to be taken in the identified risk localities are proposed through plans for coping with flood risks, i.e. the Plan for coping with flood risks in the Elbe River Basin, the Plan for coping with flood risks in the Oder River Basin and the Plan for coping with flood risks in the Danube River Basin. Objectives defined in the plans for coping with flood risks stem from the strategic objective of Directive 2007/60/EC, which is to decrease risk of floods and increase resistance against their negative impact on human health, the environment, cultural heritage, economic activity and infrastructure. The background material for determining the objectives were maps of flood danger and flood risks indicating the degree of danger and risk connected with floods. These objectives respect and are a follow-up to objectives concerning the protection against floods included in previous planning documents. In line with the current view of flood control and Flood Directive of the EC, floods are considered to be a natural phenomenon that cannot be completely prevented. Therefore, the objectives of the plan are focused on the field of coping with flood risks. The three objectives are as follows:

1. preventing the occurrence of a new risk and reducing the extent of areas threatened by unacceptable risk,
2. reducing the degree of flood danger,
3. increasing the resistance of inhabitants, buildings, municipal infrastructure and economic activities against negative impacts of floods.

The plans contain 2 basic types of measures for meeting the objectives: general and specific. General measures are applied in all municipalities situated in areas with significant flood risk (705 municipalities in the Elbe River Basin, 216 municipalities in the Danube River Basin, 69 municipalities in the Oder River Basin). These measures serve especially the purpose of preventing risks and improving the readiness for coping with floods (e.g., creating or updating flood plans for territorial units, using the outcomes of flood mapping in territorial planning, establishing and refurbishment of precipitation and water measuring stations, local warning systems, etc.). There are in total 52 preventive measures proposed for the Elbe River Basin, 28 for the Oder River Basin and 55 for the Danube River Basin and they typically include construction of protective dams including mobile elements, dry reservoirs and implementation of nature-friendly flood control measures.

The background material for writing up the plans for coping with flood risks is – on the level of plans of the partial plan of a river basin – so-called documents of regions with significant flood risk: there are in total 187 of them for the Czech Republic and they always include one or more stretches of watercourses with significant flood risk. These documents are always a part of the relevant plan of the partial river basin to which they belong in terms of hydrology. Documents or an area with significant flood risk includes description of the area, its characteristics and – above all – lists with measures that include more detailed information about the measures proposed.

Figure 11.1.1
Areas with significant flood risk

Source: MoE

The plans are an indispensable background material for the execution of public administration, especially for territorial planning and water right permit proceedings in areas with significant flood risk.

In accordance with requirements of the Directive, drafts of plans for coping with flood risks were open for written observations as of 22 December 2014 for six months (i.e. until 22 June 2015) that could be submitted by water users and general public pursuant to the provision of Section 19 of Decree No. 24/2011 Coll., on river basin management plans and flood risk management plans, as amended.

In accordance with the Code of Administrative Procedure, a process of issuing measures of general nature was initiated in February 2015. The proposed measures of general nature for the respective plans were first discussed with the relevant bodies. Between 10 April and 22 June 2015, the measures of general nature for issuing plans for flood risk management including binding parts of the plan (i.e. objectives and measures) were published on official notice boards of the MoE and official notice boards of all municipalities whose administration district is situated in an area with significant flood risk of the relevant river basin. Observations arising from the observation proceedings under the Water Act and the Code of Administrative Procedure were considered equal and were included in both settlements.

Most of the observations received concerned specific proposed measures (either proposals to complement some of these measures or leaving them out) and consistent adherence to the legislation concerning flood protection. Until the end of July 2015, observations to the published proposed plans were addressed in a joint effort b the MoE, MoA and the River Board, s. e. All acceptable observations were taken into consideration and included in the text of plan proposals.

The settling document with an overview of observations and submitted and changes made as their consequence to the plan proposals for flood risk management, was published pursuant to Section 19 (4) of Decree No. 24/2011 Coll. on official notice boards of the MoE and MoE for 30 days, i.e. between 20 August and 19 September 2015 within 60 days after the deadline for submitting observations.

The plans for flood management risks were approved by the Government of the Czech Republic on 21 December 2015 by Resolution No. 1082. The MoE as the relevant administrative body within the meaning of the provision of Section 25 (5) of Act No. 254/2001 Coll., on waters and changes to some acts (the Water Act), as amended, issued in accordance with Section 173 (1) of Act No. 500/2004 Coll., the Code of Administrative Procedure, as amended, measure of general nature Ref. No. 90988/ENV/15 of 22 December 2015 concerning the Plan of Floor Risk Management in the Elbe River Basin, measure of general nature Ref. No. 90991/ENV/15 of 22 December 2015 concerning the Plan of Floor Risk Management in the Oder River Basin and measure of general nature Ref. No. 90992/ENV/15 of 22 December 2015 concerning the Plan of Floor Risk Management in the Danube River Basin. The measure of general nature entered into force on 19 January 2016.

By approving the Plans for Flood Risk Management by 22 December 2015, the Czech Republic met one part of thematic preliminary conditions concerning water management and risk control under the following operational programmes: The Operational Programme Environment 2014–2020 (hereinafter referred to as the "OPE 2014–2020"), Integrated Regional Programme and the RDP. The flood risk management plans will also serve as background materials for using grants from the EU funds in 2014–2020, e.g. OPE 2014–2020 (especially in the field of nature-friendly flood control measures and preventive flood control measures, or from national programmes.

The flood risk management plans were subjected to the process of strategic assessment of the impacts the implementation of the concept has on the environment (so-called SEA) in accordance with Act No. 100/2001 Coll., on environmental impact assessment and on changes of some relevant acts (the Act on Environmental Impact Assessment). The assessment process was conducted simultaneously with the process of plan preparation throughout 2015. In February 2015, conclusions of investigation proceedings were issued for the respective plans. In August and September 2015 the concepts were evaluated and in October 2015 public discussions were held. The whole process was capped by issuing approvals for the Flood risk management plan for the Elbe/Oder/Danube River Basin pursuant to Section 10g of Act No. 100/2001 Coll. of 4 December 2015.

All the documents pertaining to the flood risk management plans are available on the website of the Flood Information System POVIS (www.povis.cz).

11.2 Development plans for water supply and sewerage systems

The National Development Plan for Water Supply and Sewerage Systems in the Czech Republic, prepared pursuant to Section 29, Subsection 1, Letter c) of the Act No. 274/2001 Coll., on public water supply and sewerage systems and on amendments to certain related laws, as amended, is placed on the website of the Ministry of Agriculture.

Development plans for water supply and sewerage systems in the Czech Republic (the National Development Plan for Water Supply and Sewerage Systems, the Regional Development Plans for Water Supply and Sewerage Systems) including their updates represent a medium-term constantly updated concept in the sector of water supply and sewerage systems.

The Regional Development Plans for Water Supply and Sewerage Systems are the basis for the use of the European Community funds and national financial resources for the construction and renewal of water supply and sewerage system infrastructure. Therefore, one of the obligations of each applicant requesting the provision and use of the state financial support is to demonstrate the compliance of the submitted technical and economic solution with the valid Regional Development Plan for Water Supply and Sewerage Systems.

The National Development Plan for Water Supply and Sewerage Systems in the Czech Republic is based on a synthesis of information from the Regional Development Plans for Water Supply and Sewerage Systems, including their updates, which were prepared, discussed and approved by the councils of regional authorities. It follows up with other strategic documents and departmental policy documents and also respects the requirements resulting from the relevant regulations of the European Communities. The National Development Plan for Water Supply and Sewerage Systems in the Czech Republic also includes standpoints of the Ministry of Agriculture issued to each of the updates of the Regional Development Plans for Water Supply and Sewerage Systems.

The National Development Plan for Water Supply and Sewerage Systems in the Czech Republic also defines general objectives and main principles of government policy for ensuring long-term public interest in the field of water supply and sewerage system in the Czech Republic, i.e. sustainable use of water resources and water management while adhering to requirements for water management service – drinkable water supply, sewerage and cleaning of waste waters.

Pursuant to Section 29, Subsection 1, Letter c) of the aforementioned Act, the Ministry of Agriculture continued to issue statements for the approved and effective Development Plans for Water Supply and Sewerage Systems in the Regions of the Czech Republic,

Dry reservoir Lutyňka (source: Oder River Board, s. e.)

relating to the proposed updates of the technical solutions for drinking water supply and waste water sewerage and treatment.

In 2015, 185 statements were issued. In total for the period 2006–2015, the Ministry of Agriculture issued 4,949 statements.

The Regional Development Plans for Water Supply and Sewerage Systems are used by the Ministry of Agriculture, the Ministry of the Environment, the regional authorities, municipalities with extended powers (water authorities), municipalities, owners and operators of water supply and sewerage systems as well as by special communities and the general public.

11.3 Programmes and measures to reduce surface water pollution

Construction projects for water quality protection completed in 2015

As regards the most important projects relating to the sources of pollution produced by the municipalities with the population of more than 2,000 PE, the following waste water treatment plants were completed in 2015 (N = nitrification, DN = denitrification, BP = biological removal of phosphorus, CHP = chemical removal of phosphorus):

New municipal waste water treatment plants (31,413 PE in total): Hodějovice (4,600 PE, N, DN, CHP), Košťálov (3,600 PE, N, DN, CHP), Hostomice (3,446 PE, N, DN, CHP), Brodek u Prostějova (2,505 PE, N, DN), Lžovice (2,500 PE, N, DN, CHP), Branišovice (2,350 PE, N, DN, CHP), Tatenice (2,250 PE, N, DN, CHP), Drahanovice (2,100 PE, N, DN, CHP), Těšetice (2,050 PE, N, DN), Horní a Dolní Věstonice (2,012 PE, N, DN, CHP), Vinařice (2,000 PE, N, DN, CHP), Radnice (2,000 PE, N, DN, CHP).

Furthermore, the following waste water treatment plants were reconstructed or extended in 2015:

The existing municipal waste water treatment plants: Benešov (53,738 PE, N, DN, CHP), Třebíč (52,000 PE, N, DN, CHP), Pelhřimov (36,000 PE, N, DN, CHP), Nová Paka (14,000 PE, N, DN, CHP), Hostivice (14,000 PE, N, DN, CHP), Mohelnice (9,800 PE, N, DN, CHP), Mníšek pod Brdy (9,750 PE, N, DN, CHP), Černošice (9,108 PE, N, DN, CHP), Týniště nad Orlicí (7,500 PE, N, DN, CHP), Lidečko (6,810 PE, N, DN, CHP), Moravský Krumlov (6,180 PE, N, DN, CHP), Mnichovice (6,000 PE, N, DN, CHP), Velké Přílepy (5,500 PE, N, DN, CHP), Dolní Břežany (5,000 PE, N, DN, CHP), Městec Králové (4,500 PE, N, DN, CHP), Hovorčovice (4,500 PE, N, DN, CHP), Velké Losiny (4,000 PE, N, DN, CHP), Velký Týnec (3,800 PE, N, DN, CHP), Leština (3,770 PE, N, DN, CHP), Žabčice (3,721 PE, N, DN, CHP), Náklo (3,000 PE, N, DN, CHP), Hostěradice (2,800 PE, N, DN, CHP), Šanov (2,615 PE, N, DN, CHP), Dýšina (2,610 PE, N, DN, CHP), Březová nad Svitavou (2,582 PE, N, DN, CHP), Rakvice (2,530 PE, N, DN, CHP), Vidnava (2,500 PE, N, DN,

The Lhotka weir (source: Oder River Board, s. e.)

Water reservoir Vranov (author: Luboš Vřešťál)

CHP), Bystré (2,500 PE, N, DN, CHP), Čebín (2,485 PE, N, DN, CHP), Dambořice (2,400 PE, N, DN, CHP).

The existing industrial waste water treatment plants: Lacrum Velké Meziříčí (13,333 PE, N, DN, CHP), Krahulík – Masozávod Krahulčí (6,130 PE, N, DN, CHP).

Action Programme under the Directive of the Council 91/676/EEC (Nitrates Directive)

In 1991, Council Directive 91/676/EEC on the protection of waters against pollution caused by nitrates from agricultural sources, the Nitrates Directive, was adopted. The transfer of the Nitrates Directive was implemented into the provisions of Section 33 of the Act No. 254/2001 Coll., on waters, as amended (the Water Act), where it is imposed on the government to specify by order vulnerable zones and in these zones to regulate the use and storage of fertilizers and livestock manure, crop rotation and implementation of erosion control measures (the so-called Action Programme).

Vulnerable zones represent the areas, where the contamination of groundwaters and surface waters by nitrates has already exceeded or might exceed the set limit of nitrate concentration in amount of 50 mg/l. The list of vulnerable zones was announced by the Government Order No. 103/2003 Coll., on specification of vulnerable zones and on the use and storage of fertilizers and farmyard manure, crop rotation and implementation of erosion control measures in these zones. Vulnerable zones are subject to review, according to the requirements of the Nitrates Directive, at least every four years from their publication. The first review of vulnerable zones was carried out in 2007 and announced through the amendment to the Government Order No. 219/2007 Coll., with effect from 1 September 2007. The second review of the specification of vulnerable zones was carried out in March 2011 and announced through the Government Order No. 262/2012 Coll., on specification of vulnerable zones and action programme, with effect from 1 August 2012.

The Action Programme which is also updated every period of four years, represents mandatory methods of management in the defined vulnerable zones which are aimed at reducing the risk of nitrogen leaching into surface waters and groundwaters. Through the Government Order No. 262/2012 Coll., the so-called Action Programme 3 was promulgated. User relation-based Land Use Register brings information for farmers on measures which the farmer should comply with within the specific soil block. The Action Programme is the most effective system of measures in the implementation of the Nitrates Directive.

The basic measures of the Action Programme in the Czech Republic which is produced in compliance with Annex III to the Nitrate Directive, include:

1. Period, when the use of certain types of fertilizers and farmyard manure is prohibited.
2. The establishment of maximum nitrogen fertilization limits for the individual crops.
3. Specification of the minimum capacity of farmyard manure storage facilities for storing farmyard manure during the period when manuring is prohibited (in the Czech Republic, this is based on general legal regulations).
4. Ban on wide-row crop growing on land threatened by erosion.
5. Restrictions on the use of fertilizers on sloping land.
6. Maintaining a protection zone near surface water bodies.

The measures included in the Action Programme must guarantee that the quantity of farmyard manure together with organic and organic-mineral fertilizers applied in any farming establishment in a vulnerable zone will not exceed on average the limit of 170 kg nitrogen per hectare per year.

Government Order No. 262/2012 Coll. slightly extended vulnerable zones and, mainly based on comments raised by the European Commission, it tightened some methods of land use and management in these areas. This is particularly the extension of the period when the use of fertilizers is prohibited, the harmonization of farming on sloping land with the requirements of the standard of good agricultural and environmental condition (GAEC) and the increase in the capacity of farmyard manure storage facilities for six-month production.

In 2015, Government Order No. 117/2014 Coll. in connection with the comments of the European Commission on the implementation of the Nitrates Directive amended the Government Order

Cancer – Řečice, New Empire (author: Martin Nejezchleb)

No. 262/2012 Coll. The amendment extended the period of the ban on fertilizing in the spring, modified the capacity of farmyard manure storage facilities to five-month production, expanded the list of crops in the table of fertilization limits, imposed restrictions of fertilization on sloping grassland and modified fertilizer application under adverse soil conditions.

An amendment to Government Order No. 262/2012 Coll., on defining vulnerable areas and action programme, is currently being prepared for 2016. This amendment should take into consideration third review of the definition of areas vulnerable to nitrates.

11.4 Strategic materials

Strategy of the Ministry of Agriculture of the Czech Republic with the outlook until 2030

In the middle of 2015, preparations of the strategic document "Strategy of the Ministry of Agriculture of the Czech Republic with the outlook until 2030" that will cover most of the expert activities that are under the competences of the MoA. Therefore, this document shall also contain a water management strategy, as in the previous 15 years "water management concepts of the MoA" have always been intended for five-year periods (specifically for 2000–2004, 2004–2010 and 2010–2015). This strategic document shall be approved by the Government in 2016.

The mission of water management is to create conditions for sustainable management of limited water resources of the Czech Republic so that requirements for the use of water resources are in synergy with the requirements for water protection as well as implementation of measures aimed at decreasing the harmful effects of waters caused by hydrological extremes – floods and drought. This reflects the fact that the available water resources per capita in the Czech Republic are among the lowest in Europe.

The main strategic priority of water management of the MoA is ensuring drinkable water supply for the inhabitants, water supply for industry (especially energy sector) and agriculture, safeguarding water resources, ensuring security of hydraulic structures, mitigating the effects of extreme weather such as floods and drought and achieving a good condition of waters (National River Basin Management Plans, River Sub-Basin Management Plans).

The main strategic goals include:

- enhancing prevention against floods
- mitigating the effects of drought in connection with climate change,
- sustainable care of water resources of the Czech Republic,
- support and regulation of the water supply and sewerage systems in order to ensure water management service for the public,
- improving the condition of water ecosystems by implementing measures under the plans of river basins and Plans or partial river basins,
- improving the quality of the activity of state administration, ensuring publicly available information on water management and development of public relations.

Strategy of adjusting to climate change in the Czech Republic

The Strategy of adjusting to climate changes in the Czech Republic (hereinafter referred to as the "Adaptation Strategy of the Czech Republic") was approved by Government Resolution No. 861 of 26 October 2015. The document was written under

The Stream Srpina, Malé Březno – repair the streambed (source: Ohře River Basins, s. e.)

interdepartmental cooperation, the coordinator of the material was the MoE. The Adaptation Strategy of the Czech Republic and its content is based on the White paper of the EC "Adapting to climate change: towards European framework for action" (2009) and it is in accordance with the Adaptation strategy of the EU, while it reflects the scale and conditions of the Czech Republic. Creating and implementing adaptation plans and measures is an inseparable part of commitments adopted under United Nations Framework Convention on Climate Change (UNFCCC).

The objective of the Adaptation Strategy of the Czech Republic is to mitigate negative impact of climate change by adapting to this change in the largest extent possible, to preserve good living conditions and preserve, or improve, the economic potential for future generations.

The Adaptation Strategy of the Czech Republic identifies priority areas (sectors) where the greatest impacts of climate change are expected. These sectors are forestry, water regime in the landscape and water management, urbanized landscape, biodiversity and ecosystem services, health and hygiene, tourism, transportation, industry and power engineering, extraordinary events, protection of the population and the environment.

The strategy presents in a structure manner the risks and expected effects of climate change in these sectors, defines general principles of adaptation measures, insinuates priorities, draws attention to interdepartmental relations and linkage with mitigation measures and shows the directions and examples of suitable adaptation measures. The strategy analyses the current status quo of the legislation in the given context and proposes the legislative changes that should be made. The strategy also presents a framework assessment of financial demands of the adaptation measures proposed, the analysis of the influence on the business environment and quantification of costs in case of idleness and also an overview of the current and prospective economic tools and possibilities of their use.

The Adaptation Strategy of the Czech Republic is intended for 2015–2020 with the outlook until 2030 and it will be implemented by the National action plan of adaptation to climate change. On the basis of Government Resolution No. 861 of 26 October 2015, the MoE shall present a draft of the National action plan of adaptation to climate change to the Government by 31 December 2016. Interim fulfilment of the Adaptation strategy of the Czech Republic will be evaluated in 2019 and then every four years. At the same time, the Comprehensive study of impacts, vulnerability and risks linked to climate change in the Czech Republic was made, under which the expected impacts on different interest areas/sectors were assessed including cost analysis (of financial effects) in case of idleness and costs for adaptation measures.

The Concept of environmental safety for 2016–2020 with the outlook until 2030

In 2015, the updated Concept of environmental safety for 2016–2020 with the outlook until 2030. The objective of the Concept is to limit the risk of occurrence of critical situations (disasters) caused by the interaction of the environment with the society (particularly disasters of anthropogenic and natural origin and acts of terrorism), to reduce the effects of critical situations in case they are not prevented and increasing environmental safety. The Concept respects the relevant national and international strategic documents, in particular the NATO Strategic Concept, the EU´s Internal security strategy and activities of the United Nations, especially under the Sendai Framework for Disaster Risk Reduction 2015 - 2030. The Concept was approved by the Security Council of the Czech Republic on 18 January 2016 with Resolution No. 11.

11.5 Public administration information system WATER

Records pursuant to Section 22 of the Water Act

2015 was a year of fundamental updates of many records with respect to changes resulting from Decree No. 252/2013 Coll., on the extent of the data in records of surface waters and groundwaters and on the method of processing, storage and transmission of such data to public administration information systems. Aside from extending the records of water reservoirs by all reservoirs from categories I – III of technical and safety supervision, these records were also expanded by water reservoirs managed by Forests of the Czech Republic. Fundamental changes were also made to records of the condition of hydraulic structures. These records are now updated with respect to the development in planning concerning waters where it is one of the most key background materials.

At the same time, thorough review of the English version of the system was performed. Decree No. 252/2013 Coll., on the extent of the data in records of surface waters and groundwaters and on the method of processing, storage and transmission of such data to public administration information systems was translated into English and wording of the relevant sections was included in informative texts in the English version. All changes to records made primarily in the Czech version were reflected, too.

Changes were also made to the current information where the applications reporting conditions, flow rates, precipitations, water levels in reservoirs and quality of water in reservoirs were updated so that they can be viewed better and they use more modern methods of data transmission.

Preparation of stage II of the project

The project called "WATER MIS Development", including its funding from the budget of the MoA, was definitely approved by the meeting of the MoA management on 29 September 2015. Subsequently, discussions about the method of project implementation and possibilities of cooperation with the MoE were initiated. The project is divided in three project tasks, of which the first one is primarily aimed at updating the website and building a comprehensive map application, the second is focused on IT solutions from the perspective of infrastructure, data transport and compiling the relevant databases, while the third is focused on the solution of central register of watercourses. For each project task there is a relevant implementation team composed of representatives of all cooperating organizations. The coordination of the project is performed by the main project team that reports to the steering committee.

The completion of tender documents and commencement of tender for the first two tasks (that are closely related) is expected in 2016. In the case of the project task concerning the solution for central register of watercourses, it is expected that the preparation of relevant documentation an defining exact procedures of possible solutions will take up most of 2016.

11.6 Czech Republic´s reporting to the EU

Reporting pursuant to Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006, on the assessment and management of flood risks and on cancellation of Directive of 76/160/EEC.

Before every bathing seasons, a list pursuant to Section 6g (1)(a) of Act No. 258/2000 Coll., as amended by Act No. 151/2011 Coll. (hereinafter referred to as the "List") is compiled. This list is made by the Ministry of Health in cooperation with the MoE and the MoA. Waters used for bathing in the landscape in the Czech Republic are divided into natural swimming pools operated on surface waters used for bathing (i.e. surface water where the bathing service is offered by the operator) and surface waters where it can be expected that a large number of people will bathe in where no permanent ban on bathing or warning was issued by the relevant public health protection body (i.e. other surface waters for bathing). Before the beginning of bathing season 2015, a list of waters designated as waters for bathing for season 2015 was submitted to the EC.

The MoE in cooperation with the Ministry of Health presented to the EC a report on results of monitoring and assessing the quality of surface waters included in the List for bathing season 2015. This list was compiled in accordance with the requirements of Directive 2006/7/EC. Waters designated for bathing were classified on the basis of their quality as unsuitable, acceptable, good or excellent. The assessment was performed on the basis of the data set on quality for bathing season 2015 and the four preceding bathing season. Reports from all European countries are published every year after the results are processed on the EC website at: http://ec.europa.eu/environment/water/water-bathing/index_en.html.

The most frequent problems affecting water quality in the Czech Republic are connected with mass development of cyanobacteria which resulted in bathing season 2015 in imposing a ban on bathing at 8 sites. Out of total 154 reported waters for bathing, only three sites were classified as unsuitable under the requirements of Directive 2006/7/EC.

The project of micro-project fund – White Carpathian Region – Educational ship Jan Amos (source: Morava River Board, s. e.)

Daniela Dobešová – The captain Bohouš and his crab Kája go on a tour arround the world – 5th class, Primary school Dohalice, Hradec Králové Region

12. International relations

International cooperation of the Czech Republic in the field of water protection is based on the principles arising from the UN/ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, which the Czech Republic is a party to.

The roots of the involvement of the Czech Republic in international cooperation in the protection of waters date back to 1928, when the Joint Technical Commission was established between former Czechoslovakia and Austria. This commission in the period of its action dealt with technical issues in transboundary stretches of the Danube River, the Dyje River and the Morava River and also watercourses in the Malše River and the Lužnice River Basins.

Today, the Czech Republic is a party to nine international treaties in the field of water protection. This international cooperation can be divided into the following areas:

1. cooperation within the UN/ECE;
2. cooperation in the area of international river basins of the Danube, the Elbe and the Oder;
3. cooperation of the Czech Republic with the neighbouring states in the field of water management on transboundary watercourses.

12.1 Cooperation within the UN/ECE

The Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) is intended to strengthen national measures for the protection and ecologically sound management of transboundary surface waters and groundwaters. The Convention obliges Parties to prevent, control and reduce transboundary impact, use transboundary waters in a reasonable and balanced way and ensure their sustainable management.

UNITED NATIONS
ECONOMIC COMMISSION FOR EUROPE

The basic principle is bilateral cooperation of neighbouring states in the field of water management, based on concluded international agreements, treaties and conventions. Emphasis is laid on mutual exchange of information, joint research and development (for example, through bilateral and multilateral projects, international commissions, etc.), improving warning and alarm systems, as well as access to information by the public.

The pond Vřešťov (source: Elbe River Board, s. e.)

The Convention on the Protection and Use of Transboundary Watercourses and International Lakes

The UN/ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (The Convention) entered into force on 6 October 1996. Czech Republic is a party to the Convention from 10 September 2000. Representatives of the Czech Republic participate in activities relating to the fields of integrated management of water resources and water ecosystems, protection of waters against accidental pollution from industrial sources, support for international cooperation on transboundary watercourses and in commissions for international river basins. Cooperation under the Convention also focuses on the relation between water quality and human health. The supreme body of the Convention is the Meeting of the Parties, held once every three years. In 17–20 November 2015, 7th Meeting of the Parties took place in Budapest.

During the Meeting of the Parties, the advancement made when implementing the Convention was evaluated and the future operation programme for 2016-2018, under which experts are to address a wide range of topics, including: support for joining and implementing the Convention in states outside the UN/ECE was discussed; assessment of the contributions of transboundary cooperation in the field of waters; support of adjustment to climate change in the transboundary context; improvement of water administration through national policies.

The Meeting of the Parties also agreed to introduce pilot submission of reports on the course of implementation of the Convention in the member states, so-called reporting. The Czech Republic participated in negotiations where the proposal of the relevant form the member states need to fill in by 30 June 2017 was discussed.

The current topic is so-called global opening of the Convention. The basic precondition so that states outside the UN/ECE could access the Convention is the change to Articles 25 and 26 of the Convention. The Czech Republic accepted these updated articles of the Convention on 29 January 2008. In 2015, all member states ratified the change to Articles 25 and 26 of the Convention.

Protocol on Water and Health

Within the UN/ECE Convention, in cooperation with the World Health Organization (WHO) a convention document was produced with focus on the connection between water and human health – the Protocol on Water and Health. Although the Protocol entered into force in 2005, the Czech Republic has been a party to the Protocol since 2001. The Czech Republic set national targets to the Protocol already in 2008. Update of these targets was approved on 1 June 2013. The reason for this update was that some targets have already been met or their achieving in the future is ensured by legislation. The Commission for Health and the Environment authorised a permanent working team composed of representatives from the Ministry of Health, MoE, MoA and State Health Institute to compile a proposal of national objectives and to supervise their implementation.

The forthcoming meeting of the Parties to the Convention will be held in 2016 in Switzerland. In the same year, the Czech Republic will be sending a regular report on the advancement made in the implementation of the Protocol.

In more detail, the information on the UN/ECE Convention and the Protocol on Water and Health is available on the website www.unece.org/env/water.

12.2 International cooperation in the integrated Elbe, Danube and Oder River Basins

Modern water protection principles, based on the hydrological basins of large transboundary rivers, started to be applied in the Czech Republic in 1990 through launching cooperation in protection of the Elbe according to the Agreement on the International Commission for Protection of the Elbe. At that time, also the Agreement on the International Commission for Protection of the Oder River against Pollution started to be prepared, later followed by a preparation of the Convention on Cooperation for Protection and Sustainable Use of the Danube River.

International cooperation in protection of the main river basins in the Czech Republic primarily focuses, through international commissions for protection of the Elbe, the Danube River and the Oder River, on the following:

- reducing the pollutant load on the Elbe, the Danube River and the Oder River,
- striving to achieve an ecosystem that is as close as possible to natural condition with a healthy diversity of species,
- allowing the use of water, especially the provision of drinking water from bank infiltration and the agricultural use of water and sediments,
- reducing pollution in the North Sea from the Elbe River Basin, in the Black Sea from the Danube River Basin and in the Baltic Sea from the Oder River Basin,
- flood control,
- coordinated implementation of the Water Framework Directive (2000/60/EC) of the European Parliament and of the Council, establishing a framework for Community action in the field of water policy in integrated river basins.

Agreement on the International Commission for Protection of the Elbe

The Elbe River Basin is shared by four states: the predominant part is situated in Germany (65.5%) and the Czech Republic (33.7%), very small part in Austria (0.6%) and Poland (0.2%). In order to improve the status of surface waters, the Agreement on the International Commission for Protection of the Elbe was signed on 8 October 1990. This Agreement entered into force on 14 September 1992. The Protocol to the Agreement on the International Commission for Protection of the Elbe, through which the Commission acquired legal subjectivity, came into effect on 13 August 1993. International cooperation at the level of the International Commission for Protection of the Elbe (ICPE) can be considered the most important board of the Czech-German cooperation in the field of water protection in the Elbe River Basin. The cooperation focuses on reducing the pollution of the Elbe and its tributaries, improving the status of water-related ecosystems, the programmes of water quality measuring and monitoring, the prevention of accidental pollution and especially on the coordinated approach to meeting the requirements of the Water Framework Directive (2000/60/EC) and improving flood control measures through the coordinated approach to meeting the requirements of the EC Directive on the assessment and management of flood risks (2007/60/EC).

The International Commission for Protection of the Elbe discussed at its 28th session (on 7 October 2015 in Dresden), among others, the final version of the International Elbe River Basin District Management Plan (part A) and of the International Flood Risk Management Plan in the Elbe River Basin District (level A). On 1 December 2015, these versions were approved in writing and in December 2015 they were published on the ICPE website.

ICPE initiated work on the proposal of procedures for presenting reports on implementing "the ICPE concept for management of sediments. Proposals of good practice for management of sediments in the Elbe River Basinin order to achieve supra-regional operational objectives".

After a discussion on the topic "drought", especially with regard to the impact of the exceptionally dry summer of 2015 in the Elbe River Basin, the ICPE concluded that this issue should be addressed in a greater detail in the future. Therefore, establishing an ad hoc group of experts was suggested. At the same time, the decision to evaluate hydrological drought in the Elbe River Basin in 2015 was taken.

The ICPE also took note of information on the completion of a stable emergency profile in the transboundary section of the Elbe and thanked the Elbe River Board, state enterprise, for its implementation. is also significantly involved in organizing the Magdeburg Workshop on protection of waters, which is held every two years, alternately in the Czech Republic and Germany, and is the most important international expert and scientific event in the field of water protection in the Elbe River Basin. The 16th meeting of the Magdeburg Workshop took place between 18 and 19 September 2014 in Špindlerův Mlýn, Czech Republic. Preparations of the following 17th meeting of the Magdeburg Workshop on protection of waters held in October 2016 in Dresden, were initiated. Detailed information about the activity of the ICPE can be seen at www.ikse-mkol.org.

Convention on Cooperation for Protection and Sustainable Use of the Danube River

In terms of the area covered, the Danube River Basin belongs to the most significant river basins in Europe and is shared by 19 European states. The Danube River Basin takes an area of 801,463 km^2, the Danube River itself reaches a length of 2,857 km and after the Volga River it is the second longest river in Europe. In order to reach coordinated approach to the protection of watercourses in the Danube River Basin, the Convention on Cooperation for Protection and Sustainable Use of the Danube River was signed on 29 June 1994. This Convention entered into force on 22 October 1998. The Convention currently has 15 Parties, ranking it on the position of the most significant structure built to protect the particular river basin. The body to coordinate the implementation of this Convention is the International Commission for Protection of the Danube River (ICPDR).

Members of the ICPDR expert groups, in which the Czech Republic has representatives from the Ministry of the Environment, the Ministry of Agriculture, the Czech Hydrometeorological Institute, the Czech Environmental Inspection, Morava River Board, s. e., and T. G. Masaryk Water Management Research Institute, public research institution, were involved mainly in drafting an update of the International Danube River Basin Management Plan. Update of the International Danube River Basin Management Plan and the Flood Risk Management Plan in the Danube River Basin were approved on 1 December 2015 by the heads of delegations from ICPDR and EU members states. Two meetings at the level of heads of delegations of the Parties were held in 2015. The first of them,

the 13th meeting of the Steering Group took place on 19–20 June 2015 in Zagreb. The second meeting was the 17th plenary session of the International Commission for Protection of the Danube River, which took place on 9–10 December 2014 in Vienna. Petr J. Kalaš, the chief-consultant of the Minister of the Environment, who became the ICPDR President in 2016, held a speech and introduced priorities of Czech presidency of the ICPDR, which are support of the implementation of both international plans approved, promoting the current cooperation in water management in the Danube River Basin and the issue of floods and drought.

More detailed information on the activities of the International Commission for Protection of the Danube River is available on the website www.icpdr.org.

Agreement on the International Commission for Protection of the Oder River against Pollution

International Commission for Protection of the Oder River against Pollution is another important commission established to protect waters in the basin, whose area is shared by more than one country.

International Commission for Protection of the Oder River against Pollution was established by the international Agreement on the International Commission for Protection of the Oder River against Pollution, which was concluded by the Government of the Czech Republic, the Government of the Republic of Poland, the Government of the Federal Republic of Germany and the European Community on 11 April 1996. The Agreement entered into force after ratification on 26 April 1999.

The activity of the Commission is focused especially on international coordination of meeting the requirements of the Water Framework Directive (2000/60/EC), flood protection and prevention of water pollution. The work of the Commission is carried out in working groups focused mainly on flood protection, accidental pollution, legal issues, monitoring and data management.

The work performed in 2015 was evaluated at the 18th plenary session of the International Commission for Protection of the Oder River against Pollution (ICPO), which took place from 24 to 25 November 2015 in Wroclaw. This meeting approved work plans of the Steering Working Group and its subgroups for 2016 and the Flood Risk Management Plan in the International Oder River Basin District aimed at limiting flood risk and reducing consequences of floods in member states. The Emergency plan fo the Oder (the purpose of this plan is to provide a pragmatic and informative overview of the most important measures taken in order to prevent occurrence of serious accidents and coping with them, thus limiting the risk of accident occurrence to the minimum) was approved. The updated version of the International Oder River Basin District Management Plan was approved by the heads of delegations in written proceedings on 16 December 2015.

In 25–26 November 2015, a conference on "Introducing the general regulation on water policy and flood regulation in the international area of the Oder River Basin" was held in Wroclaw. Proposals of the International Oder River Basin District Management Plan and the Flood Risk Management Plan in the International Oder River Basin were presented together with the specific concept of these plans and question concerning national programmes of measures, cross-border cooperation in the field of flood control and projects that are an example of the international cooperation of the ICPOR.

Detailed information on the activities of the International Commission for Protection of the Oder River against Pollution is available on the website www.mkoo.pl.

12.3 International cooperation on transboundary waters

The total length of the state border of the Czech Republic with neighbouring states is 2,290 km, of which approximately a third is known as the "wet line", which means that 740 km of the state border are constituted by watercourses and water bodies.

Transboundary waters are not only watercourses or water bodies that are crossed by the state border. Transboundary waters are also considered watercourses which criss-cross the state border and surface waters and groundwaters where the measures implemented on the territory of one party would substantially affect water management conditions on the territory of the other party. To avoid potential disputes with neighbouring states, the Czech Republic entered into international agreements with all neighhbouring countries. Through these agreements, or through the relevant commissions for transboundary waters, the following issues are addressed at the level of bilateral cooperation: regulation and maintenance of transboundary watercourses including construction and operation of structures on these watercourses, water supply and amelioration of border reaching territories, the protection of transboundary waters against pollution (including the respective monitoring, joint monitoring of the quality of transboundary waters, exchange of data and organization of warning and alert service in case of emergency), hydrology and flood warning service (including monitoring, joint measurements, exchange of data and organization of warning and alert service in case of emergency), water management proceedings regarding transboundary waters, the protection of aquatic and littoral habitats (in the Bavarian part of the state border, for example, protection of freshwater pearl mussel), the course of the state border on transboundary watercourses, etc.

Agreement between the Czech Republic and the Federal Republic of Germany on Cooperation on Transboundary Waters in the Field of Water Management

The total length of the state border between the Czech Republic and the Federal Republic of Germany is 811 km. Of this length, 290 km are constituted by watercourses or water bodies. Cooperation in the field of water management is regulated by the "Agreement between the Czech Republic and the Federal Republic of Germany on Cooperation on Transboundary Waters in the Field of Water Management", which was signed on 12 December 1995 and became effective on 25 October 1997. The fulfilment of the Agreement with the Federal Republic of Germany takes places through the Czech-German Commission for Transboundary Waters.

With regard to the territorial division of the Federal Republic of Germany, the cooperation takes place at the first level through the Standing Committee Bavaria and the Standing Committee Saxony. Collectively, the cooperation is roofed by the Czech-German Commission for Transboundary Waters.

In 2015, the following meetings took place:

- 17th session of the Standing Committee Bavaria (8–10 April 2015, České Budějovice, the Czech Republic),
- 17th session of the Standing Committee Saxony (29 June–1 July 2015, Eibenstock, Germany),
- 18th session of the Commission (20–21 October 2015, Bad Elster, Germany).

The key points that were discussed during the above mentioned meetings include, for example, the implementation of the Water

Framework Directive (2000/60/EC) and Directive on Flood Risk Assessment and Management (2007/60/EC) in transboundary waters, the issues of increased mercury concentrations in suspended solids and sediments in the borderline stretch of the Reslava (Röslau) stream that are subsequently deposited in the Skalka water reservoir and joint cross-border projects aimed at improving the quality and quantity of surface waters and protection of freshwater pearl mussel and blunt mussel (*Unio crassus*) in transboundary waters and their catchment areas. Furthermore, warning systems for notification in the events of pollution of transboundary watercourses between the Czech Republic and the Federal Republic of Germany and their updating were discussed. As for the intention to implement an emergency profile on the Elbe in Hřensko, it was announced that its construction was completed on 21 August 2015. The results of these meeting are included in the "Protocol on the 18th meeting of the Czech-German Commission for Transboundary Waters", which was submitted to heads of the departments concerned for their standpoint and subsequently approved by the Minister of the Environment.

The next 19th session of the Commission will take place on 24–25 October 2016 in the Czech Republic.

Agreement between the Czechoslovak Socialist Republic and the Republic of Austria on Regulation of Water Management Issues on Transboundary Waters

The total length of the state border between the Czech Republic and the Republic of Austria is 466 km, of which 173 km (approx. 37%) of the state border are constituted by watercourses and water bodies. The cooperation on transboundary waters with Austria is governed by the Agreement between the Czechoslovak Socialist Republic and the Republic of Austria on Regulation of Water Management Issues on Transboundary Waters of 7 December 1967 and effective from 18 March 1970. This agreement is implemented through the Czech-Austrian Commission for Transboundary Waters, which involves the Sub-commission I and Sub-commission II.

The 23nd session of the Czech-Austrian Commission for Transboundary Waters took place on 26–27 May 2015 in Vienna and a regular meeting of the representatives of the Governments for the purpose of mutual informing about current issues in the field of water management was held on 9–10 December 2015. In addition to issues of maintenance of transboundary watercourses, their quality monitoring and joint monitoring, the main issues included the impacts on the Dyje River caused by the Austrian chemical plant in Pernhofen.

Regarding the impacts on the Dyje River caused by the Austrian chemical plant in Pernhofen, the final report of the Dyje River working team that dealt with this issue was presented. It was also observed that despite continuing disagreement of the Czech part, water permit on discharge of waste waters was issued for the Austrian chemical plant in Pernhofen that enters in force as of 2016 in the proposed extent. Czech and Austrian parties have agreed that Jungbunzlauer Company will continue to maintain a regular communication process with the mayors of neighbouring municipalities.

The result of the meeting of the Commission is included in the mutually agreed and signed Protocol on the 23rd Meeting of the Czech-Austrian Commission for Transboundary Waters, which was subjected to interdepartmental discussion and approved by the Minister of the Environment.

The next 24th session of the Commission will take place on 24–25 May 2016 in the Czech Republic.

Agreement between the Government of the Czech Republic and the Government of the Slovak Republic on Cooperation on Transboundary Waters

The total length of the state border between the Czech Republic and the Slovak Republic is 252 km. Of that, watercourses and water areas constitute 71 km. Cooperation of both states in the field of water management is governed by the Agreement between the Government of the Czech Republic and the Government of the Slovak Republic on Cooperation on Transboundary Waters, which was signed and became effective on 16 December 1999. This agreement is implemented through the Czech-Slovak Commission for Transboundary Waters, which for its activities established four working groups focusing on technical issues, hydrology, water protection and the Water Framework Directive (2000/60/EC).

The 15th session of the Commission took place on 7–9 July 2015 in Bratislava, Slovakia.

Within the framework of the Czech-Slovak cooperation on transboundary waters, mainly discussed are joint cross-border projects aimed at improving flood protection, in terms of construction (project "Joint Flood Control Measures on Both Banks of the Morava River"), and in terms of technical support for improving the exchange of current data (project "Automation of the Exchange of Crisis Data in the Hydrological Catchment Area of the Morava River and the Dyje River").

The project "Joint Flood Control Measures on Both Banks of the Morava River" is divided into three project parts, funded under the programme of the European Territorial Cooperation between the Slovak Republic and the Czech Republic 2007–2013. The project comprises a study part and a realization part. In particular, it includes the study of revitalization measures, the levelling of left-bank dike of the Morava River between border km 48.20 and 49.00 and levelling of the vertical alignment of the dike between the road bridge and weir in Hodonín. Both parties inform each other about the state of progress of the work and potential cross-border impacts.

The aim of the project "Automation of the Exchange of Crisis Data in the Hydrological Catchment Area of the Morava River and the Dyje River" is to streamline, expand and link existing systems of hydrological data transmission in border catchment areas of the Morava River and the Dyje River, using the website for transmission of current important data for the relevant institutions. The implementation of the project was terminated on 28 February 2015. On 5 February 2014 the final conference was held in Skalica where both partners presented their results.

Other discussed topics of the Czech-Slovak cooperation are included in the Protocol on the 15th session of the Czech-Slovak Commission for Transboundary Waters, which was subjected to interdepartmental discussion and subsequently approved by the Minister of the Environment.

Next 16th session of the Commission will take place on 3–5 May 2016 in Prague, Czech Republic.

Convention between the Government of the Czechoslovak Republic and the Government of the People´s Republic of Poland on Water Management on Transboundary Waters

The length of the state border between the Czech Republic and Poland is 762 km, of that approximately 220 km are constituted by watercourses and water areas. Cooperation between both countries is regulated by the Convention between the Government of the Czechoslovak Republic and the Government of the People's Republic of Poland on Water Management on Transboundary

Waters, which was signed on 21 March 1958 and became effective on 7 August 1958. The Convention is implemented through meetings of the representatives of the governments of the Czech Republic and the Republic of Poland for cooperation in the field of water management on transboundary waters. Within the framework of the Czech-Polish cooperation there are established five standing working groups focused on investment plans, hydrology, hydrogeology, flood protection, regulation of watercourses, the protection of waters against pollution and the Water Framework Directive (2000/60/EC).

The 17th meeting of government representatives took place on 23–25 September 2015 in Lipová-lázně, Czech Republic.

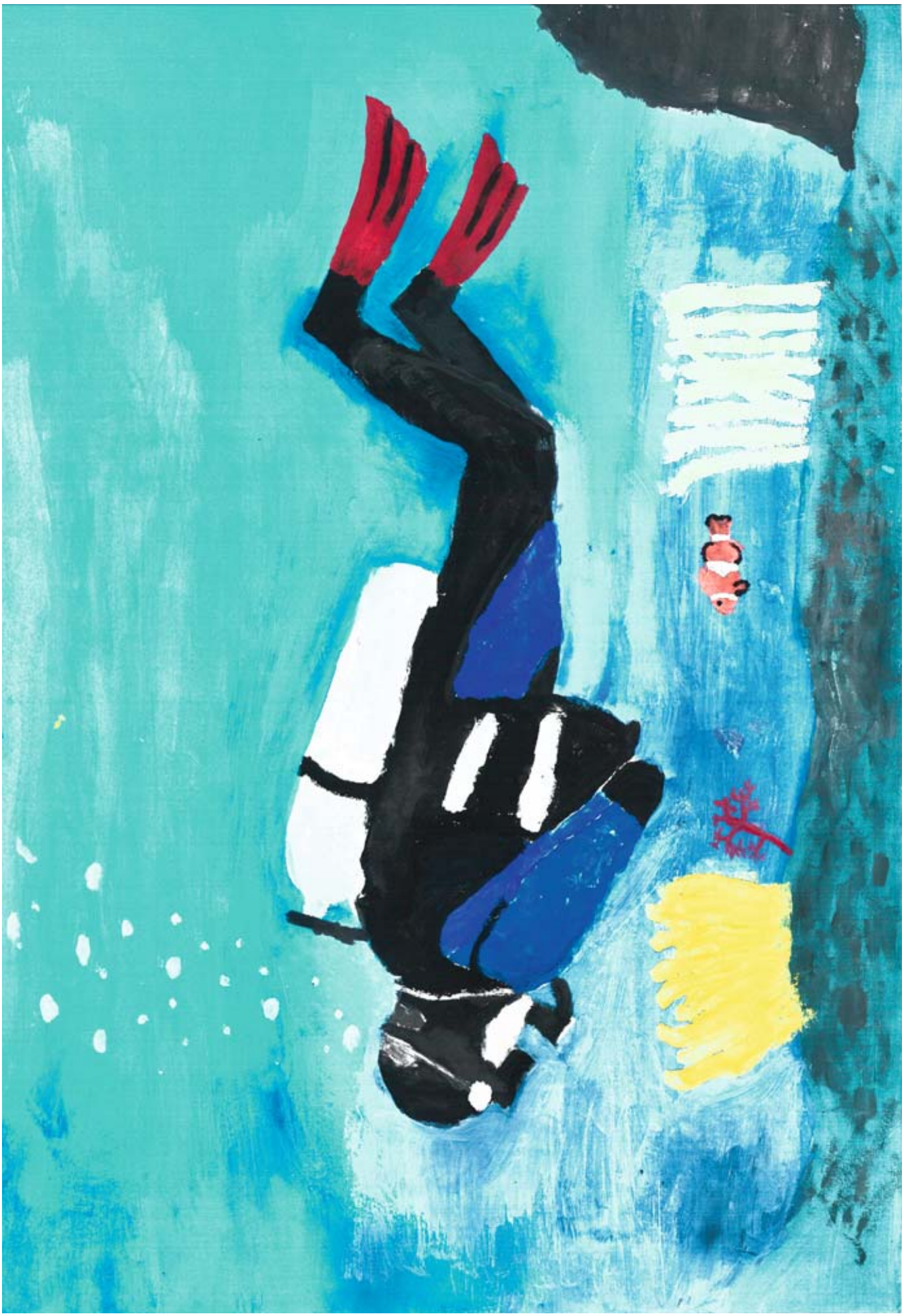
In terms of cooperation on transboundary waters with Poland, special attention was paid to the negotiation of a New Agreement between the Government of the Czech Republic and the Government of the Republic of Poland on Cooperation in Water Management on Transboundary Waters. Negotiation on the Agreement was initiated in 2002, the procedure was revived in 2009, when at the 11th meeting of representatives of the governments for transboundary waters it was stated that both parties would take national action in accordance with relevant national legislation, to be followed by international negotiations. In February 2013, the Polish party informed the Czech party of having accepted the Czech comments. In addition to the acceptance of these comments, the Polish party in April 2014 sent to the Czech party the comments of the Legislative Council of the Republic of Poland and the legal department of the Ministry of the Environment of the Republic of Poland. These comments were settled in the presence of Czech and Polish representatives at the beginning of June in Prague. On the Czech part, the text of the Agreement was submitted to the Ministry of the Environment in October 2014 and then to the Government of the Czech Republic for final approval, which was signed on 12 November 2014. The Polish part also continued to carry out work leading to the acceptance of the text of the Agreement by the Government of the Republic of Poland and its subsequent signature. The Agreement was signed on 20 April 2015 on the occasion of Czech-Polish intergovernmental consultation in the presence of the Ministers of the Environment of the Czech Republic and the Republic of Poland. The Agreement entered into force on 5 October 2015.

Under the Czech-Polish cooperation in transboundary waters, the pivotal topic is currently the issue of impact of the Turów brown-coal mine on Czech landscape. In order to reduce negative impacts of the Turów mine, the Czech Republic initiates the definition of a jointly administered water body of groundwaters. The Czech Republic also pressures Poland to submit hydrogeological and geological data that are necessary for comprehensive assessment of negative impact on hydrogeological, hydrological and quality parameters of groundwaters and surface waters in the adjacent territory of the Czech Republic affected by the Turów mine.

Other discussed topics of the Czech-Polish cooperation on transboundary waters are included in the Protocol on the 17th meeting of representatives of the Government of the Czech Republic and the Government of the Republic of Poland for cooperation in the field of water management on transboundary waters, which was subjected to interdepartmental discussion and subsequently approved by the Minister of the Environment.

Next 18th meeting of government representatives will take place on 21–23 September 2016 in the Republic of Poland.

Signing of the New Agreement between the Government of the Czech Republic and the Government of the Republic of Poland on Cooperation in Water Management on Transboundary Waters (source: MoE)



Ondřej Sedláček – Rescue diver – 4th class C, Primary school Pod školou 447, Černošice, Central Bohemian Region

13. Research and development

13.1 Research and development in the competence of the Ministry of Agriculture

In 2015, the Ministry of Agriculture provided special-purpose and institutional funding to address research and development projects and long-term conceptual development in the field of water management in the amount of CZK 39 million.

In 2015, the funds to support water management R&D projects amounted in total to CZK 30,011 thousand. The R&D projects launched in 2012 were funded by the amount of CZK 17,568 thousand, the R&D projects launched in 2013 were granted support amounting to CZK 3,448 thousand and the R&D projects launched in 2015 were granted support amounting to CZK 8,995 thousand. R&D projects are primarily aimed at soil and water protection in sustainable development of the agricultural sector, landscaping, revitalization and protection of cultural landscape, forests and water bodies, rationalization of water management and addressing the impacts of climate change.

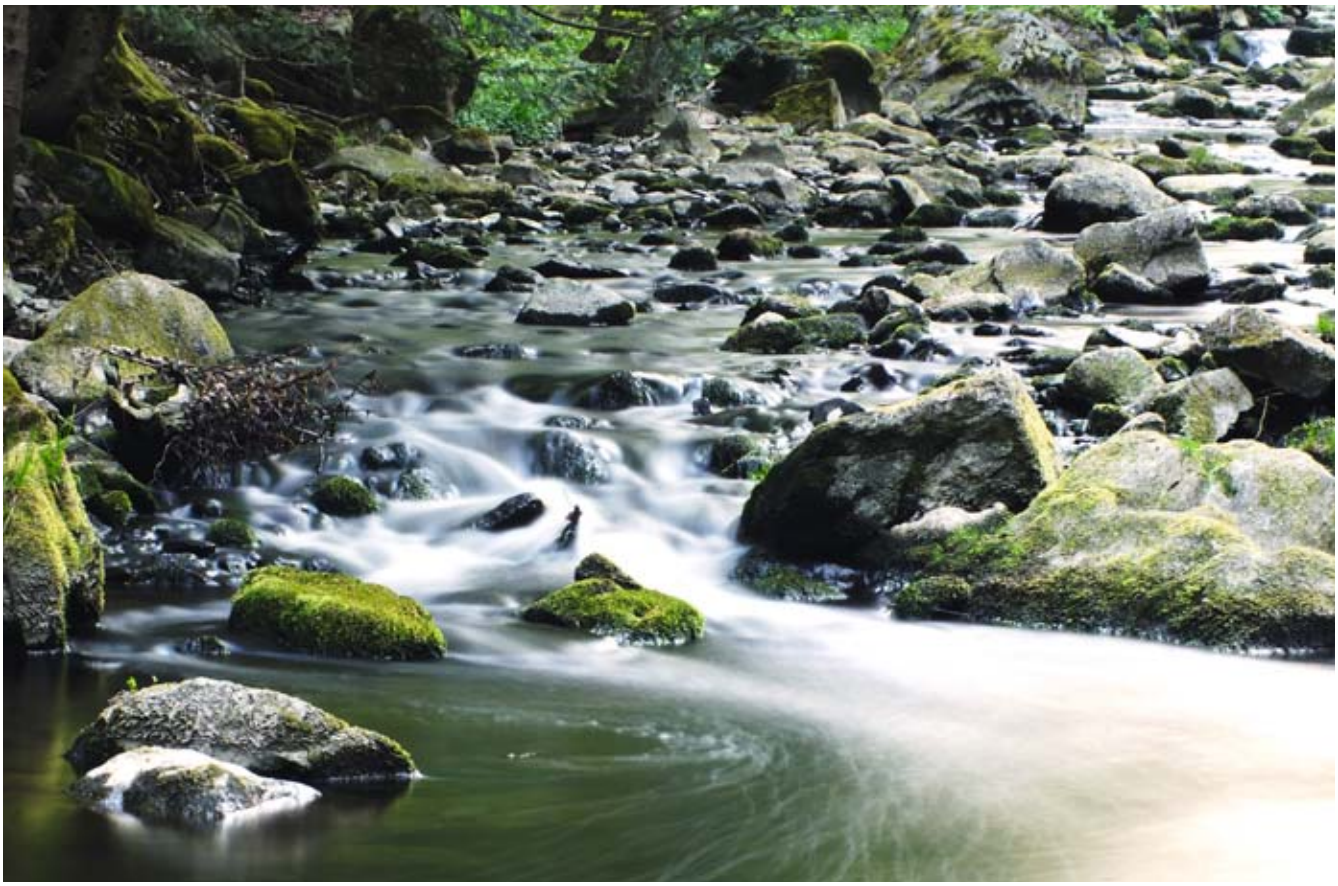
An overview of the addressed R&D projects is shown in a summarized form in Table 13.1.

Water management R&D projects implemented in 2015 resulted from public tenders called under the research programme of the Ministry of Agriculture, namely the Complex Sustainable Systems in Agriculture 2012–2018. Under sub-programme II of the programme Complex Sustainable Systems in Agriculture 2012–2018 called Sustainable Development of Forestry and Water Management and Other Areas of Agriculture, projects concerning forestry and water management and soil protection are implemented. The objectives of this programme include:

- Creating systems for optimisation of water and original resources management over the long-term including their balance in the soil-plan-atmosphere system, restricting negative impacts of climate change on agricultural ecosystems,
- Creating tools for supporting systems of water protection against pollution caused by agricultural production together with the quantification of the influence of various soil management systems, classification of area sources of water pollution in river basins and their impact on eutrophication,
- Defining the possibilities of increasing retention and accumulation of surface waters and groundwaters in river basins on the basis of generating a fast outflow constituent of surface waters and groundwaters.

In 2015, the Research Institute for Soil and Water Reclamation, public research institution was granted institutional financial support in the amount of CZK 9,233 thousand for long-term conceptual development called Integrated Protection of Soil, Water and Landscape.

Publicly accessible data on R&D projects and granted institutional support for long-term conceptual development are available on the website of the Council for Research, Development and Innovation at www.vyzkum.cz in the section Information System R&D&I (the Central Register of R&D projects, Central Register of Activities). The information on the results obtained from research activities is available on the same website in the Information Register of R&D results.



The Bělá stream under the water reservoir Boskovice (author: Vladimír Tichý)

Table 13. 1.
Research and development projetcs in the field of water management financed from the budget chapter of the Ministry of Agriculture in 2015

Project No.	Project name	Date from – to	Coordinator	Funds (thousands of CZK)
QJ1220007	Possibilities of the capture of reactive nitrogen from agriculture in the most vulnerable zone in terms of water management	1 April 2012 31 December 2016	Mendel University in Brno	1,826
QJ1220029	The planting and maintenance of pond dam vegetation with regard to their use	1 April 2012 31 December 2016	Mendel University in Brno	2,197
QJ1220033	Optimization of water regime on the Morava River floodplain model	1 April 2012 31 December 2016	Mendel University in Brno	2,048
QJ1220050	Strengthening the infi ltration processes through regulating water runoff from small river basins	1 April 2012 31 December 2016	Research Institute for Soil and Water Reclamation, public research institution	3,493
QJ1220052	The use of remote sensing for the identifi cation and defi nition of the functions of drainage systems	1 April 2012 31 December 2016	Research Institute for Soil and Water Reclamation, public research institution	2,034
QJ1220218	The development of eff ective measures to eliminate the impact of invasion of Chalara fraxinea in forest nurseries and related aspects of forestry and water management	1 April 2012 31 December 2016	Silva Tarouc y Research Institute for Landscape and Ornamental Gardening, public research institution	2,106
QJ1220233	The assessment of the area in the former fi shpond systems (water bodies) in order to strengthen sustainable management of water and land resources in the Czech Republic	1 April 2012 31 December 2015	Palacký University in Olomouc	1,664
QJ1230319	Water regime of soils on sloping agricultural land	1 April 2012 31 December 2015	Czech Agricultural University in Prague	2,200
QJ1320122	Optimization of management of afforestation of agricultural land in relation to improving the retention potential of the landscape	1 January 2013 31 December 2017	Research Institute for Soil and Water Reclamation, public research institution	1,821
QJ1320213	Innovation of farming systems in the environment of Quaternary sediments, their verifi cation and application in water protection zones	1 January 2013 31 December 2017	The Crop Research Institute, public research institution	1,627
QJ1520026	Optimization of agricultural land use in terms of infiltration and retention support with impacts on drought an flood prediction in conditions of the Czech Republic	1 April 2015 31 December 2018	Research Institute for Soil and Water Reclamation, public research institution	1,759
QJ1520265	Influence of the variability of short term precipitation and following discharge in small catchmenst in the Czech Republic on water management in landscape.	1 April 2015 31 December 2017	Czech Technical University in Prague	2,648
QJ1520267	Management system of monitoring and water management infrastructure maintenance.	1 April 2015 31 March 2018	VARS BRNO a.s.	1,458
QJ1520318	Securing availability of water resources in selected areas of Karlovarský region	1 April 2015 31 December 2018	T. G. Masaryk Water Management Research Institute, public research institution	1,176
QJ1520322	Procedures to compile and approve water footprint in accordance with international strandards	1 April 2015 31 December 2017	T. G. Masaryk Water Management Research Institute, public research institution	1,954
Total				**30,011**

Source: MoA

13.2 Research and development within the scope of the Ministry of the Environment

The Ministry of the Environment does not have the possibility to provide special-purpose and institutional grants for the implementation of research and development projects, which is why it uses the possibility to fund the necessary projects under the current programmes (e.g. the Technology Agency of the Czech Republic). In 2015, the following outcomes were completed or certified.

Methodology of retrospective bioindication of episodes of watercourse dry up on the basis of macrozoobenthos analysis

The research was supported by the Technology Agency of the Czech Republic (hereinafter referred to as the "TA CR") – (TA02020395). The project focused on drying up of water courses. Therefore, it responds to the problem current drought and lack of water that, due to the climate change, affects also the Central Europe, a territory where it was not common in the past. The project deals especially with biological indication of drying up of watercourses and mapping the areas in the Czech Republic that are threatened by partial or complete drying up of the river bed. Outcomes of the project allow for identifying the river basins and watercourse stretches that have been or could become affected by drying up and thus for minimising the damage caused by negative impacts of climate change.

More detailed information is available at http://www.sucho.eu.

Environmental risks concerning the operation of small hydroelectric power plants in relation to the down-stream migration of fish and corrective solutions

The research was supported by the TA CR (TB010MZP065). A methodical publication sums up findings concerning the environmental impacts of hydropower on water biota, describes the current development of hydropower in the Czech Republic, presents environmental risks linked to the operation of small hydroelectric power plants, identifies signal (model) species of fish that are affected by hydropower including problems of legislative nature. Big emphasis is laid on corrective measures that also include pilot results of the project implemented under a case study of turbine mortality and migration behaviour of the common eel. The methods are conceived as basic methodological and conceptual framework for the assessment of environmental risks resulting from small hydroelectric power plants and their solution.

Morning dew, the Upper Bečva River (author: Eva Holásková)

Methods for assessment of the ecological potential and strongly affected and artificial water bodies – the lake category

The research was supported by the State Environmental Fund SEF (05611212). The methods describe an inexistent (so far) procedure of water body assessment for the purpose of planning in the field of waters. The basic contribution of these methods is the derivation of good ecologic potential of a water reservoir in all assessed components, i.e. the structure of plankton and fish stock, the presence of submerged macrovegetation and characteristics of water environment such as pH value, oxygen saturation, phosphorus concentration at inflows to reservoirs and others. The methodology was certified on 8 January 2015. The methodology for assessment of fish component was intercalibrated on 30 June 2015.

Determining parameters for the design of soakage facilities for rainfall waters

The research was supported by the TA CR (TA02020386). The methodological manual describes the process of research and design of facilities for soakage of rainfall waters. It also presents a new reliable approach to the evaluation of soakage tests and to the design of retention capacity of a soakage facility that results in a safe design of soakage facilities. Its annexes describe processes and background materials necessary for evaluation of geological research for soakage. These new procedures were proven in research work and published at forums in the Czech Republic as well as abroad. The methods were certified on 27 October 2015.

Geographic information systems intended for the support of dealing with critical situation and their connection with automatic reporting systems

The research was supported by the Ministry of the Interior – Security Research Programme of the Czech Republic 2010–2015 (VG20132015127). The certified outcome is a map of real estate property endangered 1 (depth grid) and 2 (speed grid) – the area of the confluence of the Berounka River and the Litavka River. Specialised maps with expert contents show the potential risk for each real estate property within the flood area in the calculation of a flood event (i.e. a specific flow rate of flood in the given watercourse). The purpose of the specialised maps with expert content is the identification of endangered estate properties/ population and possible ways of warning people through mass information media that enable informing large populations about a imminent danger (in this case a flood of a certain flow rate). The main purpose of preparing the data set of depth and speed grids for the scenarios monitored is its connection to automatic communication systems of the town of Beroun. Under the project, flood flow rates were modelled at the confluence of the Berounka River and the Litavka River (cadastral territory of Beroun) ranging between 270 m^3/s and 1965 m^3/s, i.e. flow rates defined for the confluence of watercourses in accordance with the methods of the MoE and also for predefined combinations of N-year flow rates. The specialised maps with expert content were certified on 18 December 2015.

Draft of the Concept for dealing with critical situations caused by drought and lack of water in the Czech Republic

The research was supported by the Ministry of the Interior – Security Research Programme of the Czech Republic 2010–2015 (VG20102014038). The outcome led to creating two certified methodologies.

Methodology for determining limit values of hydrological drought indicators

The methodology is focused on the evaluation of hydrological drought at resources of surface water and groundwaters. It contains an overview of variables used and period of their occurrence, indicator and their limit values used for the evaluation of these variables and the resulting danger due to lack of water. It also contains recommendations concerning suitable theoretic distribution functions and a simplified version of indicators that can be used for empiric functions. It processes can also be used for the characterization of an extremity of other metric data with symmetric and asymmetric division. The methodology is the first document on processes for determining drought indicators at a water resource that was designed for the conditions in the Czech Republic. Furthermore, it includes partial processes that are known and used in practice (percentage of the standard value, minimum residual flow rate, minimum level of groundwaters). Recommendations concerning the procedures of data processing were tested when implementing a project. The methodology was certified on 16 February 2015.

Methods for compiling a hierarchy of measures for stages of drought threat

The methodology is a set of activities and measures proposed for the stages of drought threat (normal situation, vigilance, emergency) resulting in preventing the critical situation caused by the occurrence of drought and lack of water in resources. The methodology complements the current legislative procedures and recommends how to proceed in matters that are not regulated by the law. The methodology is primarily intended for bodies that are public administrators (especially on the level of regions), river board management and other entities involved in the planning process in the field of waters and critical management, for which it should be the basis for activities aimed at preventing a critical situation caused by the occurrence of drought connected with lack of water in resources and also in decision making about the implementation of long-term measures intended to strengthen the system resistance against negative impacts of hydrological drought. The methodology was certified on 3 November 2015.

The research of intensification of rural and small waste water treatment plan by non-investment means

The research was supported by the TA CR (TA01021419). The research led to creating two certified methodologies.

Methodological approach to verifying the influence of biotechnological preparations on the functioning of a waster water treatment plan

The objective of the methodology is to define processes and recommendations for monitoring and evaluations whether application of biotechnological preparations intended to improve outflow parameters or achieving such a level of sewage treatment that will allows for more suitable operation of a waste water treatment plan and whether it served its purpose and did not have any negative effect on sewerage treatment. The basic grounds for assessing the suitability of the application of biotechnological preparations (depending on the type of the waste water treatment plan) are the results of comparing different chemical, microbiological and hydrobiological parameters determined when monitoring the operation of waste water treatment plants. The assessment has to take into consideration the conclusiveness and unambiguousness of the results achieve. The methodology was certified on 5 February 2015.

The methodology of the application of biotechnological preparations SEKOL® in order to achieve optimum results when applied at small waste water treatment plants

The methodology describes processes in the application of biotechnological preparations of the SEKOL® product line in various types of waster water treatment plants and summarizes the effects the application of these preparations had on the quality of sewerage water treatment. In each waste water treatment plant there can be a decrease of the sewerage treatment efficiency, which manifests in various specific features such as bad smell, biological foaming in activation reservoirs, poor quality of the activated sludge, increased concentrations of COD_{Cr}, BOD_5, NL, nitrogen or phosphorous at the outflow, etc. These negative effects can be removed or mitigated by applying biotechnological preparations. Furthermore, the methodology also defines processes for establishing the quantity and frequency of dosage for these preparations. It also summarizes results of the application at various types of actual waste water treatment plants. The methodology was certified on 5 February 2015.

Options of rainfall water soakage in urbanized areas of the Czech Republic

The research was supported by the Technical assistance of the OPE. The outcome was the methodology with the research of rainfall water management in urbanized areas (justification of the need of the construction, general conditions of the implementation, etc.), analysis of solving this issue in urbanized areas of the Czech Republic and abroad (with similar entry conditions as the Czech Republic), including practical experience with implemented projects and a spatial analysis of territories suitable for the rainfall water soakage management where the suitable areas in town and municipalities with appropriate infiltration will be performed with respect to the geology of the given territory, subsoil permeability, vicinity of the recipient, etc., in relation to the current legislation. The methodology also contains cost analysis of the proposed types of measures. An individual output was a map of the potential of the territory of the Czech Republic for the infiltration of rainfall waters into the rock environment.

The analysis of effective use of small hydroelectric power plants from the perspective of natural potential of watercourses as the source of energy

The research was supported under the BETA programme with grants from the TA CR in 2013 to 2015. The author of the project was the Sdružení VRV + SHDP represented by Vodohospodářský rozvoj a výstavba a.s., the expert guarantor of the project was the Department of Water Protection of the MoE. The outputs are the methodology "Principles of designing small hydroelectric power plants on small, medium-sized and big watercourses with respect to maintaining the ecological balance of the water course and minimum residual flow rates, including the assessment of economic efficiency", the database of transversals obstacles in water courses with existing or unused hydropower potential and a map showing the current state of using the hydropower potential of small hydroelectric power plants and the available potential of watercourses. The methodology sums up the general processes of the design and operation of small hydroelectric power plants in the Czech Republic and takes into consideration the potential of unused localities. The influence of small hydroelectric power plants is addressed in a greater detailed by the process proposed to be included in the Government Resolution for assessing minimum residual flow rates. The methodology is primarily intended for new investors and persons interested in building and operating a small hydroelectric power plant. It can also serve as background material for the work of water management authorities.

Table 13.2.1
Research and development projects in the field of water management financed form the budget chapter of the Ministry of Environment in 2015

Project No.	Project name	Date from – to	Coordinator	Funds (thousands of CZK)
TA02020395	Drying of rivers in period of climatic change: risk prediction and biological indication of drying periods as a new method for water and landscape management (BIODRAUGHT)	February 2013 23 July 2015	T. G. Masaryk Water Management Research Institute, public research institution	9,198
TB010MZP065	Analysis and solution to environmental risk of small hydroelectric power plants operation in relation to water organisms	February 2013 23 July 2015	T. G. Masaryk Water Management Research Institute, public research institution	2,223
05611212 *)	Methodology for assessment of ecological potential of heavily modified and artificial water bodies – category lake	September 2012 30 March 2014	Biology Centre CAS, public research institution	2,940
TA02020386	Use of methods of infiltration and their evaluation following a comparison of results with laboratory tests on different types of soil and model for proposing infiltration tanks	January 2012 31 December 2015	Brno University of Technology, Faculty of Civil Engineering, Institute of Water Structures	9,578
VG20132015127	GeoFigureick information systems supporting management of critical situations and their interconnection to automatic notification systems	April 2013 31 December 2015	Czech Agricultural University in Prague, Research Institute for Soil and Water Reclamation, public research institution, public research institution, DHI a.s.	6,386
VG20102014038 *)	Proposal for conceptual solution to crisis caused by draught and lack of water in the territory of the Czech Republic	October 2010 31 December 2014	T. G. Masaryk Water Management Research Institute, public research institution	15,501
TA01021419 *)	Research on intensification of small waste water treatment plants with the use of non-investment financial resources	January 2010 31 December 2014	T. G. Masaryk Water Management Research Institute, public research institution	9,313
designation	Options for rainfall infiltration in urban areas in the Czech Republic	27 April 2015 30 September 2015	GEOtest, a.s., Sweco Hydroprojekt a.s.	336
TB010MZP066	Analysis of effective use of small hydroelectric power plants in terms of natural potential of watercourses as source of energy	2013 2015	VRV SHDP	1,272
Total				**56,747**

Source: MoE, from www.isvav.cz
*Note: *) Project was certificate in 2015*

Other research and development projects were implemented either fully or partially by the T. G. Masaryk Water Management Research Institute, public research institution.

Drying up of watercourses in the period of climate change: risk prediction and biological indication of dry up episodes as new methods for water management and landscape conservation

The objective of the project was to create a Map of risk of drying up of minor watercourses in the Czech Republic on the basis of the model based on abiotic data that will be verified by biotic data. The second main output was the certified Methodology of retrospective bioindication of episodes of watercourse dry up on the basis of macrozoobenthos analysis that includes metrics quantifying the frequency and extent of watercourse drying up. The output will allow for identifying the most risky areas of watercourse drying up and directing protective measures effectively to them,

while their success can be evaluated through the methodology. Both main objectives of the target were completed in 2015 and they will be implemented in practice. The final version of maps is published in GIS layers at http://heis.vuv.cz/.

Strategy of protection against negative effects of floods and erosion through nature-friendly measures in the Czech Republic

This comprehensive project supported by the OPE is of infrastructural nature and is intended for universal long-term use that will fundamentally allow for the evaluation of the society-wide benefit and financial and factual parameters of projects filed by applicants to grant programmes on the nationwide scale. The outputs of the project are a significant contribution to forming a coherent strategy of the MoE concerning the issues of flood protection, general pollution, water erosion and water regime recovery. The outputs are available online at www.vodavkrajine.cz.

All-embracing planning, monitoring, informative and educative tools for territory adaptation to impacts of climate change with main focus on agriculture and forestry in the landscape

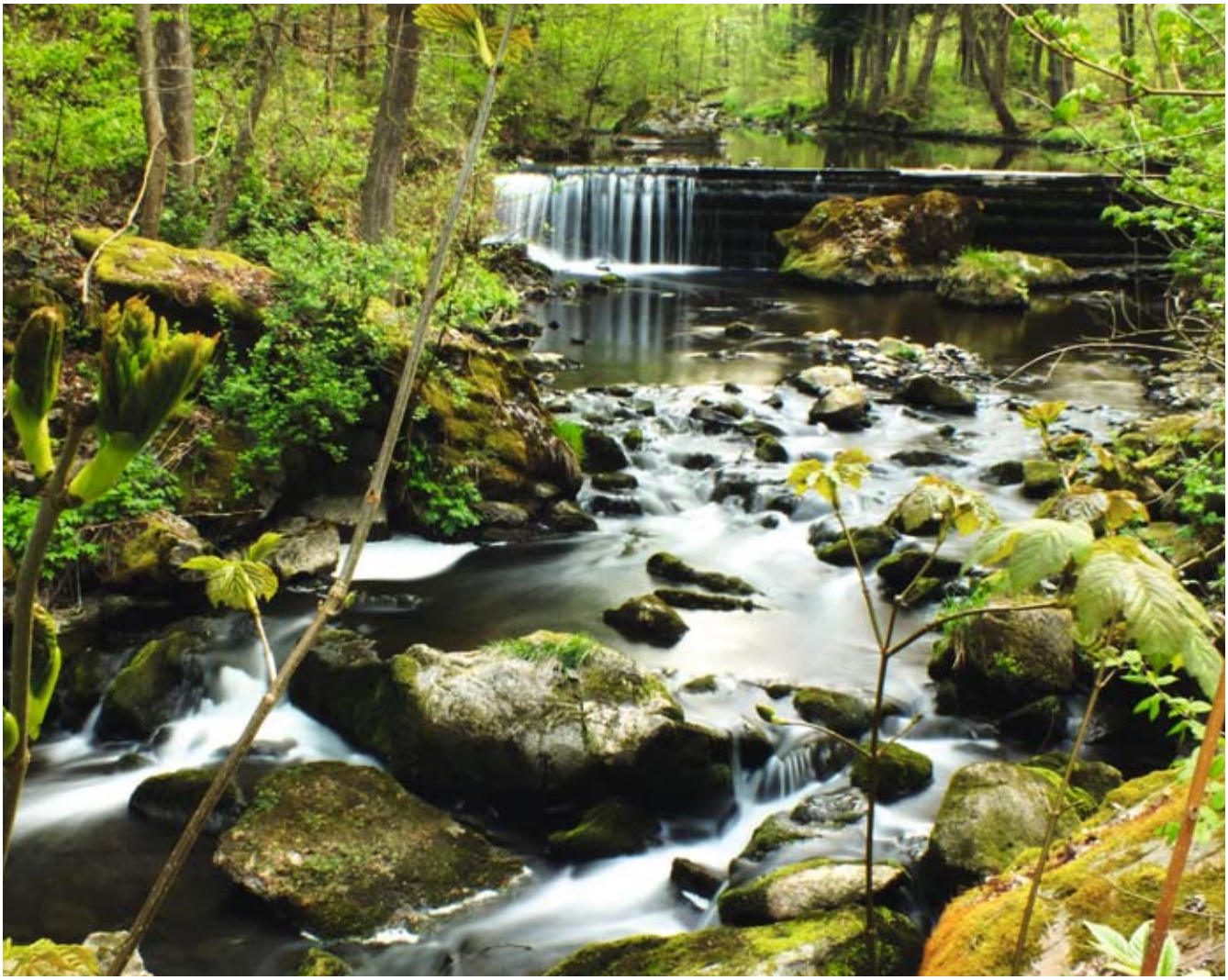
This multidisciplinary project is focused on mitigating the negative impacts of climate changes, especially extreme phenomena, i.e. drought and local torrential precipitation in the South Moravian Region (hereinafter referred to as the "SMR"), as this region can be considered – on the grounds of the climatic data and anticipated scenarios available – the most threatened, especially by drought, of all Czech regions. The main focus of the project is on agriculture and forestry, as it covers 90% of the area of the SMR, where a decrease in natural land capability and subsequent fall in the crop and wood production can be expected due to climate change. The outputs of the projects are aimed at a set of various types of adaptation measures that can be used to eliminate or decrease negative impacts of possible climate change.

Uncertainties in Water Footprint and a new method of working with climatic model predictions

The project investigates water footprint in the Czech Republic. It deals with diffusion pollution during various flow situations (floods and drought), it compares pollution in agriculture with pollution from small sites. It also focuses on the efficiency of waste water treatment plants, effects on the quality of waters discharged from waste water treatment plants and variability of the inflow and outflow. A new method of working with climatic model predictions was programmed according to Prudhomme et al. (2010) using data from the Skalka River Basin.

Research of the impact of the Temelín Nuclear Power Plant accident on the water contamination in the Vltava River and the Elbe River to the border profile Elbe Hřensko

The migration of tritium was monitored in the longitudinal profile of the Vltava River and the Elbe River using tritium discharged in common operation of the power plant as a trace and the time of its



The Bělá River (author: Vladimír Tichý)

Novořecké sinuses – flood recovery (author: Hana Žáčková)

translation depending on the water flow rate. Partition coefficients of radionuclides were determined for water, river sediments and undissolved substances in laboratories. The proposed method of determining partition coefficients of radioactive substances in water and river-bed sediments and dissolved substances was approved as a certified methodology of the MoE after having been discussed with experts.

Determining the amount of illegal drugs and their metabolites in municipal waste waters – a new tool for complementing data on drug consumption in the Czech Republic

The objective of the DRAGON project, which is a part of the Safety Research Programme of the Czech Republic, is to apply in the Czech Republic epidemiology of waste waters and prepare a methodical approach for estimating the amount of drugs used by monitoring the content of drugs and their metabolites. In comparison with traditional methods, the methods of "sewage epidemiology" are less demanding in terms of finances, anonymous and can be performed almost in real time. The methodology was certified by the Czech Environment Management Centre (Certificate No. 10/2015).

Research of detection methods and determining radioactive contamination

The objective of the task was to develop a fast method for determining the total volume beta activity and sampling strategy in case of nuclear accident. The method was processed and published as CSN 75 7613.

Increasing the efficiency of using surface waters by enhancing economic tools under the current allocation mechanisms

The project focuses on free registration of admissible consumption of surface waters which, as water becomes increasingly more precious, results in inefficient allocation of this resource. For consumers it becomes a right of reserving the maximum amount, for the supplier (state administration) it is a burden due to its excessive costs. The project proposes imposing charges on permits as a new economic tool with the option of transferring the right between consumers in order to increase the efficiency of water administration. The methodology and software are intended for entities in the field of water policy in the Czech Republic to assess ex-ante impacts of changes to fee policies. The software is available on the website of the project at: http://www.ireas.cz/cz/zamereni/33-zivotni-prostredi/projekty/131-vek.

Low-rate biological final sedimentation ponds

The project is focused on investigating the possibility of final treatment of roughly cleaned waster waters from aeration waste water treatment plants in low-rate biological ponds of new construction. The project is based on the prototype design of the Zbytiny waste water treatment plant for 500 PE. The objective of the projects is to quantify the processes that occur in sedimentation ponds under differing conditions and their optimisation. At the same time, attention is also paid to the possibility to use sedimentation ponds when using a residential waste water treatment plant. The output of the project is a utility model and a prototype that was included in product line of a cooperating company.

Identification of significant territories with culturally-historic values endangered by natural and anthropogenic influence

The objective is to evaluate – using a uniform procedure for the Czech Republic – the extent of possible damage of selected categories of historic monuments (national cultural monuments and national cultural heritage monuments) and protected areas (municipal conservation areas, rural conservation areas, archaeological conservation areas and other conservation areas) that could be caused by significant natural, industrial and agricultural risks. An individual output of the project is a methodology describing how selected possible threats to monuments should be assessed, what background materials should be used with priority and what procedures should be followed. The methodology can

be used repeatedly for (updated) evaluation of monuments and applying it will allow for comparing the rate of risk in time and space. Most outputs are accessible for the expert as well as lay public on the website of the T. G. Masaryk Water Management Research Institute and it will also be available on the web pages of the National Monument Institute and the Ministry of Culture. An implementation plan of the project was approved: this plan is going to facilitate spreading of information on a wide scale and making use of the procedures developed in practice in the following three years.

Water recreation – bathing in natural swimming pools and other surface waters

The objective of the project is the reassessment of the current list of natural swimming pools and surface waters intended for bathing through a methodological manual of the Chief Hygiene Officer on the identification of new bathing waters and a specialised set of maps that will serve as background material for the aforementioned methodological manual. The output "Set of maps of bathing sites" included a map viewer and a set of thematic maps that serve as a support for the methodological manual of the Chief Hygiene Officer for decision making concerning the declaration or cancellation of bathing waters.

The development of technologies for cleaning rainfall washings from roads and other paved surfaces

The objective of the project is to design, implement and test in a three-stage pilot facility a comprehensive water cleaning technology intended for outwash waters from the traffic infrastructure and paved surfaces in industrial compounds and complement the necessary background materials required for setting the size of the facility of this type. A partial objective of the project is to develop a halophilic biopreparation for microbial degradation of oil substances and fuel residues. The biopreparation will be used for eliminating negative impacts that are a burden to outwash waters and subsequently to the environment in the swamp system of waste water treatment system. Another partial objective is the design and implementation of a project concerning the construction of a drain facility including the relevant dimensions.

Erosion washing – increased risk of danger to the public and water quality in connection with the expected climate change

The main objective of the project is to design conceptual procedures and develop technical tools for evaluating a territory with respect to how it is threatened by the possible impact of an increased erosion washing linked with the expected climate change on the population, residential structure as well as resources of surface waters or significant recreational sites

Optimisation of wood mass structure for restoration and nature-friendly adjustments to watercourses

The objective of the project is the development of new technical solution and methodical procedures concerning safe and effective application of wood mass in restoration and nature-friendly adjustments of watercourses. The project also addresses the method of handling "river timber" in river beds and researches how it influences aquatic animals.

Water reservoir Sedlice – reconstruction of the crown and the upstream face of the dam (author: Jiří Kahánek)

Table 13.2.2
Other research and development projects in the field of water management financed and solved or co-solved by T. G. Masaryk Water Management Research Institute, public research institution

Project No.	Project name	Date from – to	Coordinator	Funds (thousands of CZK)
2814	Drying up of streams in a period of climate change: predicting the risk and biological indication as new methods for water management and landscape maintenance	2012–2015	TA CR	1,592
4700	Strategy of defence against negative impacts of floods and erosion by green measures in the Czech Republic	2014–2015	SEF	187,940
8505	Complex planning, monitoring, information and educational tools for area adaptation to impacts of climatic change with main regard to agricultural and forestry management in countryside	2015–2016	NF – MoE – VUT	1,944
2609	Uncertainities in Water Footprint and new way of working with predictions of climatic models	2014–2015	Ministry of Education, Youth and Sports of the Czech Republic	500
2705	Research of impact of Atomic power station Temelín accident on contamination of water environment of the Vltava River and the Labe River down to Labe Hřensko profile	2012–2015	Ministry of the Interior of the Czech Republic	2,280
2707	Assessment of the volume of illegal drugs and their metabolits in communal waste waters – new tool to add data on drug use in the Czech Republic	2012–2015	Ministry of the Interior of the Czech Republic	3,378
9453	Research of methods for detection and determination of radioactive contamination	2012–2015	SÚRO	347
2896	Increase of effectivity of the use of surface waters by strengthening of economic tools within existing allocation mechanisms	2014–2015	IREAS – TA CR OMEGA	576
2812	Low-burdened biological ponds	2012–2015	TA CR	1,135
2990	Identification of significant areas with cultural – historical values endangered by natural and anthropogenic impacts	2012–2015	Ministry of Culture of the Czech Republic	2,690
2818	Development of technologies for treatment of runoff water from roads and other hard surfaces	2013–2015	DEKONTA – TA CR	1,520
2708	Erosion runoff – increased risk of hazard to inhabitants and water quality in relation to expected climate change	2012–2015	Ministry of the Interior of the Czech Republic	1,962
2816	Optimization of structures of wood mass for restoration and near natural river modifications	2012–2015	TA CR ALFA	702
2891	Water recreation – bathing in natural bathing waters and other surface waters	2014–2015	State Health Institute – TA CR OMEGA	615
Total				**207,181**

Source: VUV TGM

Barbora Švarcová – Sea fishing – 5th class B, Primary school Komenského 30, Nové Hrady, South Bohemian Region

14. Implementation of programmes of measures adopted by river basin management plans in 2009

The provision of Section 26, Subsection 7 of the Water Act No. 254/2001 Coll. requires the Ministry of Agriculture in cooperation with the Ministry of the Environment and the regional authorities to submit to the Government every three years a summary report on the implementation of the programme of measures and the status of surface waters and groundwaters and water management in river basin districts. The programme of measures is intended to help respond to the pressures identified and achieve good status of the river basin or water body. Monitoring and assessment of the effectiveness of the measures is a source of important information needed to interlink the successive water management planning cycles.

This report is a follow-up to the previous report of 2012 which described the initial influences, condition of water bodies and measures to be taken in the first planning cycle (for 2009–2015) and the advancement made when implementing the measures in 2009–2012.

The objective of presenting this report is to extend this information by describing the advancement made when implementing the measures in the following period of 2013–2015. During this period, River Basin District Management Plans were prepared and later approved for the second planning period (2016–2021). Information relevant for the second planning period will be presented in the following report for 2018.

14.1 Description of the adopted river basin management plans

In 2000, through Water Framework Directive (2000/60/EC) of the European Parliament and of the Council establishing a framework for Community action in the field of water policy, the European Union defined new ambitious targets for the protection and rehabilitation of aquatic ecosystems to serve as a basis for long-term and sustainable water use by people, businesses and nature. The requirements of this Directive were incorporated into the Act No. 254/2001 Coll., on waters and on amendments to some acts (the Water Act), as amended, and as the main tool for the implementation of the Water Framework Directive a river basin management plan and the relevant programme of measures proposed by the river basin management plan were established. The programme of measures was prepared by the end of 2009 for each river basin district. The responsibility for water management planning process shall be borne by the Ministry of Agriculture and the Ministry of the Environment.

River Basin management plans are made for six-year periods on 2009, 2015 and 2021, with objectives defined until 2015, 2021 and 2027 respectively. If an objective cannot be achieved within the predefined period, it is necessary to embody in river basin management plans for selected water bodies special objectives or less strict objectives, or apply an exception.

River Basin management plans for the first planning stage include all measures that were to be adopted in the relevant river basins to achieve good status of all water bodies by 2015 in terms of the environmental objectives of Directive 2000/60/EC of the European Parliament and of the Council defining the framework of the activity of the Community in the field of water policy (hereinafter referred to as the Water Framework Directive). Beyond the requirements of the Water Framework Directive, the Water Act also defined objectives for the first and second planning stage in the area of protection against floods and objectives for sustainable use of water resources, especially for the purposes of drinking water supply. As part of water management planning process, the following documents were prepared and approved by the end of 2009:

- Main River Basin Management Plan of the Czech Republic, which represents a long-term concept and strategy in the area of protection and use of waters and protection against floods and drought. It integrates the aims and objectives of departmental policies of the central water authorities in sharing competencies in accordance with the provision of Section 108 of the Water Act, and it especially follows up with the Concept of Water Management Policy of the Ministry of Agriculture for the period after the accession to the EU for the years 2004–2010 and the National Environmental Policy 2004–2010. Main River Basin Management Plan was approved by Government Resolution No. 562 of 23 May 2007, and its binding parts were published in Government Directive No. 262/2007 Coll. In response to observations of the European Commission (so-called infringement) concerning the implementation of the Water Framework Directive, a new structure of processing river basin management plans for the second planning period was defined by changes to the legislation (amendment to the Water Act No. 150/2010 Coll.): in the second planning period the Main River Basin Management Plan of the Czech Republic was replaced with National Management Plans of the Elbe, Oder and Danube River Basins. (The binding part of the Plan of Main River Boards of the Czech Republic was cancelled on 1 May 2016 with Government Directive No. 99/2016 Coll.)
- Eight river basin district management plans (the Upper and the Middle Elbe River Basin, the Upper Vltava River Basin, the Berounka River Basin, the Lower Vltava River Basin, the Ohře River and the Lower Elbe River Basin, the Oder River Basin, the Morava River Basin and the Dyje River Basin), which are policy documents that summarized information on the current status of water bodies in river basin districts and set specific objectives aimed at achieving their good status, preventing deterioration of the status of aquatic environment, support for sustainable water use, reducing the effects of extreme flow conditions (floods and droughts) and propose measures to ensure the achievement of these objectives by 2015. The relevant river basin district management plans were approved by the end of 2009 by the councils of individual regions. As of 1 January 2011, Decree No. 292/2010 Coll., on river basin districts, was cancelled and replaced with Decree No. 393/2010 Coll., on river basin districts. For this reason, eight river basin district management plans were replaced with ten river sub-basin management plans in the second planning period.
- International Elbe, Oder and Danube River Basin District Management Plans were prepared in accordance with Article 13 of Water Framework Directive, on the basis of which Member States sharing the relevant international

river basin ensured the preparation of a single international river basin management plan. The plans were prepared by the International Commission for Protection of the Elbe, International Commission for Protection of the Oder against Pollution and International Commission for Protection of the Danube River. Within these international commissions, the Czech Republic actively participated in the preparation of the relevant international river basin management plans through its experts. International river basin district management plans were updated on 22 December 2015.

The adopted River Basin Management Plans, including regulations through which their binding parts were promulgated, and information from the process of compiling these plans are made available to the public on the website of the Ministry of Agriculture (www.eagri.cz in the section Water → Water Management Planning → River Basin Management Plans for the 1st period) and on the website of the Ministry of the Environment (www.mzp.cz in the section Water → Water Management Planning).

14.2 Report to the European Commission on river basin management plans

Among other requirements of the Water Framework Directive, Member States are also required to submit to the European Commission the mandatory reports, the so-called reporting. These reports are then evaluated by the Commission and summarized to produce the so-called implementation reports, in which you can find summary information on the progress made in individual Member States, but also specifically addressed recommendations for the countries to improve the implementation of the identified requirements.

In the system of the submitted reports probably the most important and the most comprehensively prepared document for the first planning period are River Basin Management Plans, which were forwarded by the Czech Republic to the European Commission in 2010. An important part of these plans are the above mentioned programmes of measures. A report describing the progress made in the implementation of the planned programme of measures was written in 2012 in accordance with Section 15 (3) of the Water Framework Directive.

14.3 Implementation of the programme of measures adopted by the Main River Basin Management Plan of the Czech Republic

Main River Basin Management Plan of the Czech Republic was approved by Government Resolution No. 562 of 23 May 2007 and its binding parts were promulgated by the Government Order No. 262/2007 Coll. (this Order was cancelled on 1 May 2016 with Government Order No. 99/2016 Coll.) It integrates the aims and objectives of departmental policies of the central water authorities, especially the Concept of Water Management Policy of the Ministry of Agriculture for the period after the accession to the EU for the years 2004–2010 and the National Environmental Policy 2004–2010, and became the basic document for the preparation of the river basin district management plans.

The binding part of the Main River Basin Management Plan of the Czech Republic contains general objectives and framework measures for individual areas of public interest:

- protection of water as the environmental compartment,
- protection against floods and other harmful effects of water,
- sustainable use of water resources and water management to meet the requirements for water services, especially drinking water supply.

Below is a list of measures proposed in the Main River Basin Management Plan where there was advancement in their implementation between 2013 and 2015. Their headings are based on the numbering of measures of the Main River Basin Management Plan and with respect to the above stated, the numeral series do not have to be unnecessary in direct succession. The introductory text has been completely adopted from the Main River Basin Management Plan, whereas the information on implementing the measures is highlighted in italics.

1.2 Measures in protection of water as the environmental

1.2.1

From 2007 on, to launch operation of the system for monitoring and detecting water status so that all significant anthropogenic pressures in terms of both the chemical and the ecological status of water, including monitoring of hydromorphological status are included, while providing the necessary documents for assessing the status of water bodies and for drafting river basin district management plans and providing data to evaluate the effectiveness of implementation of the programmes of measures.

On 31 January 2013, the General Monitoring Programme, available on the website of the MoE at http://www.mzp.cz/cz/ramcovy_program_monitoringu was approved.

1.2.2

Based on the evaluation of monitoring results, status assessment of water bodies, expert assessment of the options for improving the status of water bodies, and development plans for water supply and sewerage systems for the regions to identify projects in the river basin district management plans and evaluate the effect of:

a) missing urban waste water treatment plants and sewerage systems in agglomerations with the population of more than 2,000 PE,
b) rehabilitation or intensification of urban waste water treatment plants to improve waste water treatment technologies in agglomerations with the population of more than 2,000 PE,
c) missing adequate waste water treatment in municipalities with the population of less than 2,000 PE, where there is a functional public sewerage system with operation permit,
d) missing adequate waste water treatment in municipalities with the population of less than 2,000 PE, where the impact of municipal pollution is a significant factor affecting the status of the water body.

For individual projects in agglomerations with the population of more than 2,000 PE included in the current list which was approved by the Government within the Updated Strategy of Funding the Implementation of the Council Directive 91/271/EEC concerning urban waste water treatment as well as for relevant specific projects in agglomerations with the population of less than

2,000 PE to prepare in the river basin district management plans time schedules of implementation for projects unfinished in 2008, including details of funding. For this purpose to use supporting financial resources under the national programmes and the EU funds, in particular the Operational Programme Environment, and follow the deadline of 31 December 2010, which shall mean the compliance with the EU requirement concerning urban waste water treatment in accordance with the Treaty of Accession to the EU between the Czech Republic and the European Communities.

Each of the river basin district management plans included lists of specific measures to meet the requirements of the Council Directive 91/271/EEC. The state of their implementation in 2010 was reported to the European Commission on 30 March 2012 under the regular reporting pursuant to Article 15 of the Council Directive 91/271/EEC. An implementation exception was agreed for several agglomerations. By 2015, all of these measures were completed, with the exception of Prague where the implementation has been started.

1.2.4

Update development plans for water supply and sewerage systems for the regions, if evaluations of water monitoring or other data indicate that the objectives of water protection by implementing the programme of measures are not likely to be achieved for the relevant body of water.

In 2015, the Government of the Czech Republic approved Resolution No. 620 of 29 July 2015 concerning the preparation of implementing measures aimed at mitigating the negative effects of drought and lack of water that defines the requirement to perform a review of interconnecting water supply systems (as a part of water supply and sewerage system development) with the purpose of optimising the distribution of drinkable water in the periods of drought and lack of water with respect to the anticipated demand for water, including a review of the current drinkable water supply reserve.

1.10

Strive to complete the establishment of protection zones to protect the yield, quality and health safety of major water resources in use.

Protective zones of water resources are to be completely updated and verified by the end of 2017.

2.3 Measures to protect against floods and other harmful effects of waters

2.3.1

For effective proposals for preventive flood control measures to seek a suitable combination of measures in the landscape, which will improve the natural retardation of water in the area, with technical measures influencing flood flows. In designing flood control measures to build on hydromorphological mapping of the river network, on conceptual studies of runoff conditions and studies of flood control measures in integrated river basins, including analyses of the factors influencing erosion and runoff conditions, with indications of areas and lands that are sources of erosion and surface runoff, as well as analyses of various options of flood protection designs, including cost-benefit analysis and risk analysis.

The task was further developed under the Concept of Addressing the Issues of Flood Protection in the Czech Republic Using Technical and Nature Friendly Measures, adopted by the Government Order No. 799 of 10 November 2010, into subtasks for use to prepare flood risk management plans by the end of 2015. Information on fulfilment of the Concept tasks will be submitted to the Government of the Czech Republic by the end of 2013.

In 2015, the "Strategy of protection against negative effects of floods and erision through nature-friendly measures in the Czech Republic" project, supported by the OPE 2007–2013 programme was completed. This programme analysed the current status of the landscape with subsequent proposal of a set of nature-friendly measures to be taken on watercourses and in river boards. The outputs of the project were presented at regional seminars in September and October 2015 and they are available at www.vodavkrajine.cz.

2.3.3

By the end of 2007, under the responsibility of the Ministry of Agriculture and Ministry of the Environment to define, on the basis of the conceptual studies, a proposal of specific measures in each of the priority areas.

These measures should be targeted in accordance with the objectives of the Operational Programme Environment for the period 2007–2013, the Rural Development Programme for the period 2007–2013 and the programme Flood Prevention II for the period 2007–2012. After a positive assessment to reflect these measures into the river basin district management plans, to reflect them into land use plans and start preparations for investment.

In the programme Support for Flood Prevention II, until 2015, the following projects were completed or are being completed or their preparation was abandoned in the identified priority areas:

The complex of flood control measures on the Lužnice River and the Nežárka River – eight measures (Reconstruction of the Novořecká Dike km 3, 52 – 6, 25, Distribution Structure of the Novořecké Weirs, Flood Control Measures in Soběslav, in Veselí nad Lužnicí, in Planá nad Lužnicí, in Dráchov and in Bechyně – Zářečí, flood control measure for the City of Tábor) – implementation completed.

The complex of flood control measures in the lower Vltava River Basin in the segment between Štěchovice and Mělník – six measures, of that five to protect the Capital of Prague in the areas of Zbraslav – Radotín and Troja and the municipality of Veltrusy – implementation completed.

The complex of flood control measures in the area of the middle Elbe in the segment between Kolín and Mělník – five measures in Turnov, Mnichovo Hradiště, Benátky nad Jizerou, Poděbrady and Mělník – implementation was completed at the following sites: Poděbrady, Mnichovo Hradiště and Benátky nad Jizerou, building permit issued for Turnov, documents for land planning procedure for Mělník are currently being processed.

Flood control measures in the Dědina stream valley – documents for land planning procedure are being processed (design using water reservoir or polder Mělčany).

The complex of flood control measures in the area of the lower Elbe in the segment Štětí – Křešice – Hřensko. Six measures to protect Štětí, Křešice, the Lovosice area, Ústí nad Elbem (Střekov and the town centre on the left bank of the Elbe) and Děčín – implementation completed.

Protection of Česká Lípa and municipalities in the flood area of the Ploučnice River, including flood control measures in the Svitávka River Basin – reconstruction of the Ploučnice River channel in Lázně Kundratice – implementation completed.

The complex of flood control measures and protection of municipalities in the area of confluence of the Ohře River and the Elbe – two measures to protect the towns of Bohušovice nad Ohří and Terezín – implementation completed.

Flood control measures to protect municipalities on the upper Opava River – preparation of the complex of measures to protect against floods in the upper Opava River Basin in the variant of a smaller water reservoir of Nové Heřminovy using nature-friendly measures in accordance with the Czech Republic Government Resolution No. 444 of 21 April 2008 and No. 119 of 16 February 2011 and No. 251 of 16 April 2016 – the Oder River Board, state enterprise, as the investor of the whole set of measures is in charge of project documents for land planning decision concerning building of the Nové Heřminovy water reservoir including all other relevant measures such as rediking of the Opava River upstream to Nové Heřminovy, connecting the water reservoir to road network, service roads and sewerage system – all of this under the documents for land planning decision. An engineering geological research is being carried out for all the above mentioned buildings, with most detailed focus on the area under the dam. Project documents for river modifications on the Opava River with the Opavice River from Zátor to Brantice, including the town of Krnov upstream of the confluence of the Opava River as well as downstream of the confluence is currently being processed. These river modification include revitalization and humanization measures. Construction process of the left bank protection dam downstream of Krnov in Poland is currently underway. Five dry reservoirs are being prepared and built, while documents for land planning decision is being prepared, building permits were issued for Loděnice and Jelení and two reservoirs in Lichnov are under construction. Pluviometer and limnigraphic stations were built in the Upper Opava River Basin. The investor has contractually secured 98% of the lands that are to be below the future Nové Heřminovy water reservoir and dam. All land planning documents for the Upper Opava River were updated and the intended measures were incorporated for all the municipalities, except for Nové Heřminovy, which is due to its persisting unwillingness to cooperate. Measures taken in the Upper Opava River were reflected in the Zone Development Policy of the Czech Republic as well as in Zone Development Policy of the Moravian-Silesian Region. Road and Motorway Directorate of the Czech Republic is preparing in coordination with the Oder River Board, s. e., documents for land planning decision for relocation of road I/45 in Zátor and Nové Heřminovy.

Flood control measures in the Liberec-Jablonec agglomeration – the Lusatian Neisse River, Jablonec nad Nisou – flood control measures through the Mšeno hydraulic structure – implementation completed.

Flood control measures in the area of Olomouc – measures to increase the river channel capacity, stage II A – implementation completed and stage II B – detailed project documentation, application for grant for a building under Flood Protection III was processed.

Flood control measures in the area of Litovel – study of runoff conditions Litovelské Pomoraví, measures for the Třebůvka stream, Moravičany – damming and the Morava River – Mitrovice, protective dikes – implementation completed.

Flood control measures in the area of Uherské Hradiště and Staré Město – measures on the right bank of the Morava River in Napajedla, increasing the river channel capacity stage I for the Morava River – Staré Město, Uherské Hradiště – implementation completed.

The complex of flood control measures on the lower Bečva River and the confluence with the Morava River – Flood Control Dike Juřinka II, Pobečví – study of runoff conditions in preparation of flood control measures in the Bečva River Basin, using technical and nature-friendly measures, including dry polder Teplice, in accordance with the Government Resolution No. 259 of 13 April 2011 – according to a study, the preparation and/or implementation of the partial measures proposed under Flood Protection III is underway.

Reconstruction of dry reservoirs (polders) and controlled inundations downstream of the Nové Mlýny hydraulic structure – the following flood control measures were completed, are under way or their preparation is under way: the Kurdějovský stream – increase in the stream channel capacity – completed under Flood Protection II; Feasibility study of nature-friendly flood control measures in the Dyje River and the Kyjovka River Basins – its preparation was funded from the Operational Programme Environment (part is addressed also by Flood Protection in the following priority area "Improving retention at the confluence of the Morava River and the Dyje River"); Břeclav – flood protection – stage I (linear diking) – before the commencement of implementation under Flood Protection III; Bulhary – stabilization of the slope above the Dyje River, regulation of the Dyje River – failed to meet the conditions of Flood Protection II, work funded by other sources; Protection of the Lednice Castle Park – failed to meet the conditions of Flood Protection II, currently the National Heritage Institute prepares measures to protect against damage caused by European beaver, which also address flood protection from other sources.

Improving retention at the confluence of the Morava River and the Dyje River – the following flood control measures were completed, are under way or their preparation is under way: Flood protection for the municipality of Prušánky (two polders upstream of the Lučnice watercourse), carried out within land consolidation; Feasibility study of nature-friendly flood control measures in the Dyje River and the Kyjovka River Basins – its preparation is funded from the Operational Programme Environment (part is addressed also by Flood Protection in the previous priority area "Reconstruction of dry reservoirs (polders) and controlled inundations downstream of the Nové Mlýny hydraulic structure"); Flood protection for the town of Lanžhot – stage II (negotiations with the town are being currently held, implementation using either funds from the OPE or Flood Protection III is being considered).

Controlled inundations in the area of Kroměříž – in this priority area the following flood control measures were completed or their preparation is under way: Increasing the Mlýnský náhon stream channel capacity in the municipality of Vlkoš, completed (the project taken over from the Agricultural Water Management Administration); Hruška polder on the Žlebůvka stream – implementation has been abandoned for the time being; The Bečva River in Troubky – protective dikes – a concept has been approved and documents for land planning decision is being updated: this will be followed by the relevant transfer of rights.

Controlled inundations in the area of the Mohelnice Furrow – the preparation of the following flood control measures is under way: the Morava River in Dolní Bohdíkov – protective dikes – implementation has been abandoned due to the disagreement of owners; the Merta stream, polder Sobotín – preparation cannot be carried on without simultaneously preparing polders in the area of Velké Losiny; the Desná River, polder Velké Losiny – due to the opposition of the territorial autonomy, preparation works cannot be currently carried on.

2.3.9

Further develop, improve and modernize the equipment of information systems in the field of flood prediction and warning services at the national, regional and local levels. To do this, make use of the financial support under the Operational Programme Environment.

Department of Water Protection of the Ministry of the Environment updated the Guidance Document to ensure flood prediction and warning services before the assessed period (Bulletin of the Ministry of the Environment 12/2011). In 2013 to 2015 (under six Calls), grants from the Operational Programme Environment supported 271 projects

of local warning systems and reporting systems, where the condition for the granting of support was also the preparation of digital flood management plans and the availability of current information on water conditions or rainfall.

14.4. Implementation of the programme of measures adopted by the River Basin District Management Plans

The base for the River Basin District Management Plans there became results of the analysis of general and water management characteristics (hereinafter referred to as "the characterization of the River Basin District"), which was completed in 2004 within the framework of the so-called "Preparatory Work". A key step in the characterization was the designation of the basic units of the river basin district management, the water bodies. Standing surface water bodies, running surface water bodies and groundwater bodies were designated. All water bodies were then assessed in terms of the impact of human activity on the status of water. The outcome was a list of risk posing water bodies that due to the impact of human activity will likely fail to meet by 2015 the limits for good water status.

For the significant water uses, within the framework of the economic analysis, socio-economic data was collected and return on costs of water services provided in the relevant water basin district was evaluated.

In 2005–2007, additional data was collected and especially the characterization was refined. In 2006, the programme of operational monitoring focused on monitoring parameters to assess the status of water bodies was prepared.

The preparatory work was terminated by compiling a Preliminary Overview of Significant Water Management Issues, which along with risk assessment and status assessment of water bodies became a basis for the draft of the River Basin District Management Plan with the programme of measures, whose aim is to achieve good status of the river basin or water body.

River Basin District Management Plans were prepared in accordance with the then applicable Decree No. 142/2005 Coll., on water management planning and have 6 parts.

- **Description of the River Basin District (part A)** describes the designated river basin district and its characteristics and provides contact points and procedures for obtaining basic information on the stages of preparing the Plan.
- **Water use and its impact on water status (part B)** describes the current water uses, assesses the impact of such uses on water status and provides a list of risk posing water bodies. In addition, part B defines the requirements for water uses and proposes measures to meet these requirements.
- **Status and protection of water bodies (part C)** includes the description and results of status assessment of water bodies and protected areas, indicators and their limits that were used for the assessment, draft of the Programme of Measures and the final lists of water bodies that are likely to achieve good status and water bodies with expected extension of deadlines for achieving the objectives. Part C includes assessment lists of water bodies (presenting the results of status assessment, the proposed measures and estimated impact of the measures) for surface water bodies and groundwater bodies. A key part of this chapter is represented by lists of measures (including a description of each measure).

Repairing of the locks Velký Osek (source: Elbe River Board, s. e.)

- **Flood protection and landscape water regime (part D)** describes the objectives of protection against the negative effects of extreme hydrological situations and for improving the landscape water regime, including the proposed measures. It contains lists of measures.
- **Estimation of the impact of the measures on water status (part E)** deals with estimating the impact of the measures proposed to achieve the objectives.
- **Economic analysis (part F)** defines the economic importance of water use in the river basin district and predicts the trend of volume, prices and costs related to water services. Furthermore, cost-effectiveness of the measures is assessed.

The following part presents, for the purpose of this Report, an overview of the state of implementation of the measures proposed on 31 December 2015 together with the costs expended on their implementation.

14.4.1 Key information from each River Basin District Management Plan

Key information from the River Basin District Management Plans is presented in eight separate sub-chapters – in information sheets for all River Basin District Management Plans. For better understanding of this chapter of the Report, we present explanatory texts for different types of measures and the degree of their implementation below:

The proposed measures

For water bodies that at the time of preparing the River Basin District Management Plans failed to achieve good status, there has been prepared the Programme of Measures, representing the integral part of the River Basin Management Plans. Measures that were not implemented for various reasons in 2010–2012, were postponed to 2012–2015. Requirements relating to the Programme of Measures are specified in amendment to the Water Act and Decree No. 24/2011 Coll., on river basin management plans and flood risk management plans. The Programme of Measures is designed either as a set of specific measures for each of the river basin districts or as general legislative or other tools to cover all river basin districts. Two categories of measures are distinguished:

- basic measures
- additional measures.

The basic measures include:

- measures to meet the set objectives of water protection
- measures to meet the requirements of environmental legal regulations of the EC (Chapter C.4.1)
- measures applied to waters used or to be used for the abstraction of water intended for human consumption (Chapter C.4.2)
- measures resulting from the water balance of perspective quantities and quality of surface waters and groundwaters (Chapter C.4.3)
- measures to regulate water abstractions and impoundments, including the justification for any exemptions (Chapter C.4.4)
- measures to prevent direct discharges into groundwaters, indicating the cases of permitted discharges (Chapter C.4.5)
- measures to reduce the discharges of pollutants from point sources and other activities impacting the status of waters (Chapter C.4.6)
- measures to reduce or stop the entry of especially hazardous substances into water (Chapter C.4.7)
- measures to prevent and reduce the impact of accidental pollution (Chapter C.4.8)
- measures for water bodies, which are unlikely to achieve the objectives of protection of water as the environmental compartment (Chapter C.4.9)
- additional measures necessary to meet the adopted objectives of protection of waters as the environmental compartment (Chapter C.4.10)
- measures relating to the application of the "polluter-pays" principle (Chapter C.4.12)
- measures to ensure adequate hydromorphological status of water bodies, allowing for achieving the required ecological status or good ecological potential (Chapter C.4.13)
- measures to regulate pollution from diffuse sources (Chapter C.4.14).

Additional measures are proposed in the case that the basic measures will not be sufficient to achieve good water status. They include mainly legislative, administrative and economic instruments, codes of good practice, concluded environmental agreements, emission controls and water abstraction controls, revitalization projects, etc.

Measures included in the Programme of Measures of the River Basin District Management Plans are divided into three categories:

- **A type measure** is a measure, for which there is known the location in which the measure is to be implemented and is specified in predetermined units (for example, for measure such as the revitalization of watercourses there is known the length of the watercourse to be revitalized, etc.). Implementation plan, expected costs and funding strategy are specified for A type measures. Examples of such measures include the construction or intensification of waste water treatment plants, revitalization of the watercourse, elimination of migration barriers on the watercourse, remediation of old contaminated sites, etc.
- **B type measure** is proposed in the event that the body of water in which the problem occurs is known, but the specific location for the implementation of the measure is not known. Examples of such measures include proper technological practices or principles of sound management, such as measures to protect waters against pollution caused by nitrates from agricultural sources, etc.
- **C type measure** is applied in the entire river basin district area and includes approved legislative procedures for protection of water bodies (for example, measures to prevent and mitigate the impact of accidental pollution).

Status of implementation of measures

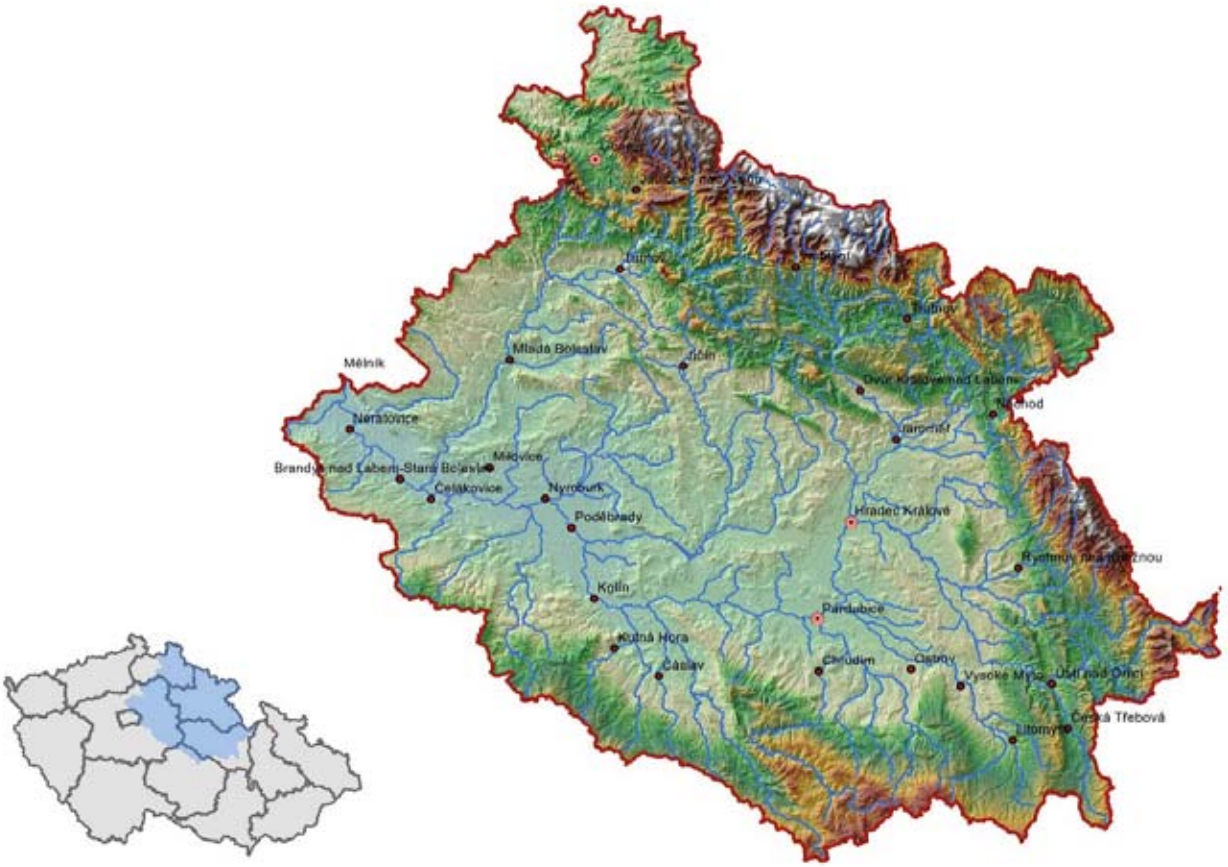
Summary charts showing the status of implementation of measures were prepared on the basis of collected data on the status of implementation and the costs of specific measures in river basin district as of 31 December 2012. For the purposes of this report, the status of implementation and quantification of costs is presented only for A type measures. For B type and C type measures, which are measures of a general nature, only their proposed number in the River Basin District Management Plans is presented. These measures were continuously implemented, however, not all were completed in the first planning cycle.

In case that the current status of implementation of the measure could not be identified or the costs of this measure could not be quantified (for example, if the investor was a private company, which refused to provide this information), this fact is referred to by a note indicating the number of measures in question.

14.4.1.1 The Upper and Middle Elbe River Basin District Management Plan

Characterization of the River Basin District

Figure 14.4.1.1.1
Overview map of the Upper and Middle Elbe River Basin District



The most important watercourse of the backbone river network in the Upper and Middle Elbe River Basin District is the Elbe, which springs at Labská louka in the Krkonoše Mountains (Giant Mountains) at an altitude of 1,386 m a. s. l. Downstream of Vrchlabí the Elbe leaves the mountain region and flows through the foothills of the Krkonoše Mountains (Giant Mountains). In Jaroměř the Elbe receives left-hand tributaries, the Úpa River and the Metuje River, and downstream of Jaroměř the Elbe valley markedly widens and the river flows through the wide Elbe lowlands. In the stretch between Jaroměř and Mělník, the Elbe is joined by two major left-hand tributaries, the Orlice River in Hradec Králové and the Chrudimka River in Pardubice and near Brandýs nad Elbem – Stará Boleslav the Elbe is joined by the right-hand tributary, the Jizera River. In this river basin district there are 16 significant permanently operated water reservoirs, used for different purposes (water supply, flood protection, energy generation, recreation, etc.).

The Upper and Middle Elbe River Basin District covers an area of 14,735 km^2 and lies at an altitude of between 157 and 1,602 m a. s. l. This area is administered by the Hradec Králové, Pardubice, Liberec and Central Bohemian Regions, marginal parts reach also the Vysočina Region and the City of Prague. In the Upper and Middle Elbe, there are approximately 2.24 million of people living in 1,354 municipalities. The average population density is 155 people per km^2.

The highest mountains in the Upper and Middle Elbe River Basin District are the Krkonoše Mountains, which are westwards followed by the Jizera Mountains. The third highest mountain range in this area is the Orlice Mountains. The ridges of these mountains form the European divide separating the drainage areas of the Baltic Sea and the North Sea. The Upper and Middle Elbe River Basin District includes the Krkonoše National Park and fully or partly also eight Protected Landscape Areas and 21 Nature Parks.

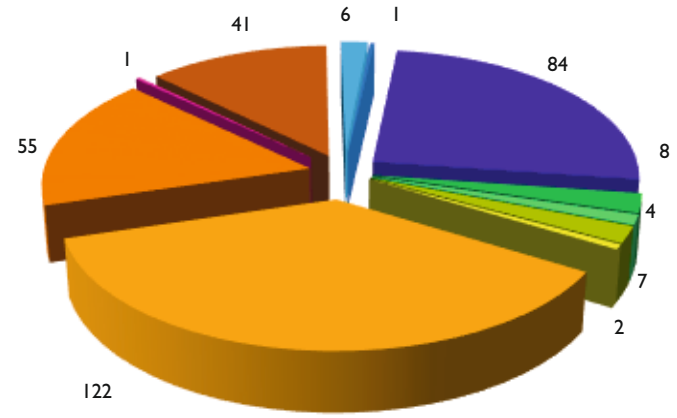
Industrial production in the Upper and Middle Elbe River Basin District is concentrated in the line of towns Náchod – Hradec Králové – Pardubice – Chrudim, along the Middle Elbe as far as Mělník, in the agglomeration of Liberec – Jablonec nad Nisou, in Jičín, Kolín and Mladá Boleslav. In particular, the chemical, engineering, automobile, glass and textile industries are concerned.

Status of implementation of measures

Under Chapter C.4.13 Measures to ensure adequate hydromorphological status of the water body, allowing for achieving the required ecological status or good ecological potential, 7 measures in the total amount of CZK 37.3 million were completed. Out of the remaining measures, 25 are in progress or in the stage of project preparation. 25 measures have not been implemented yet, mostly because of complicated property relations or insufficient financial coverage of the measures. In some cases, the reason for implementation of the measure no longer exists. Under Chapter C.4.6 Measures to reduce the discharges of pollutants from point sources and other activities impacting water status, 53 measures in the total amount of CZK 6,311.3 million were completed. The remaining measures are in progress and 10 of the measures have not been launched, the reason being mostly insufficient funding. The responsibility for the measures under Chapter C.4.6 is in most cases borne by operators and owners of sewerage systems. Under Chapter C.4.7 Measures to reduce or stop the entry of especially hazardous substances to water,

11 measures in the amount of CZK 943.2 million were completed. The remaining measures are in progress or have not been launched. These are exclusively measures from the category of old ecological burdens, whose registry is available in the database of the registration system of contaminated areas. Updated and relevant information about a rather vast amount of old ecological burdens is not available. Review of the old ecological burden registry is planned for 2016. Under Chapter D, Measures to protect against floods, 5 measures in the total amount of CZK 107.6 million were completed. 27 measures are in progress and 10 have not been launched, mostly because of complicated property relations. Most of the projects are implemented by river basin administrators with financial support granted from the EU Funds, national sources of financial support (co-financing of the Operational Programme Environment), Programmes of the state budget of the Czech Republic (MoA and MoE) and own and other sources.

Chart 14.4.1.1.1
Number of measures proposed in the River Basin District Management Plan by the measure types



- Additional measures necessary to meet the adopted objectives of protection of waters as the environmental compartment (Chapter C.4.10)
- Measures relating to the application of the „polluter-pays" principle (Chapter C.4.12)
- Measures to ensure adequate hydromorphological conditions of water bodies (Chapter C.4.13)
- Measures to regulate pollution from diffuse sources (Chapter C.4.14)
- Measures applied to waters used or to be used for the abstraction of water intended for human consumption (Chapter C.4.2)
- Measures to regulate water abstractions and impoundments (Chapter C.4.4)
- Measures to prevent direct discharges into groundwaters, indicating the cases of permitted discharges (Chapter C.4.5)
- Measures to reduce the discharges of pollutants from point sources (Chapter C.4.6)
- Measures to reduce or stop the entry of especially hazardous substances to water (Chapter C.4.7)
- Measures to prevent and reduce the impact of accidental pollution (Chapter C.4.8)
- Measures to protect against floods (Chapter D)

Table 14.4.1.1.1
Status of implementation of measures

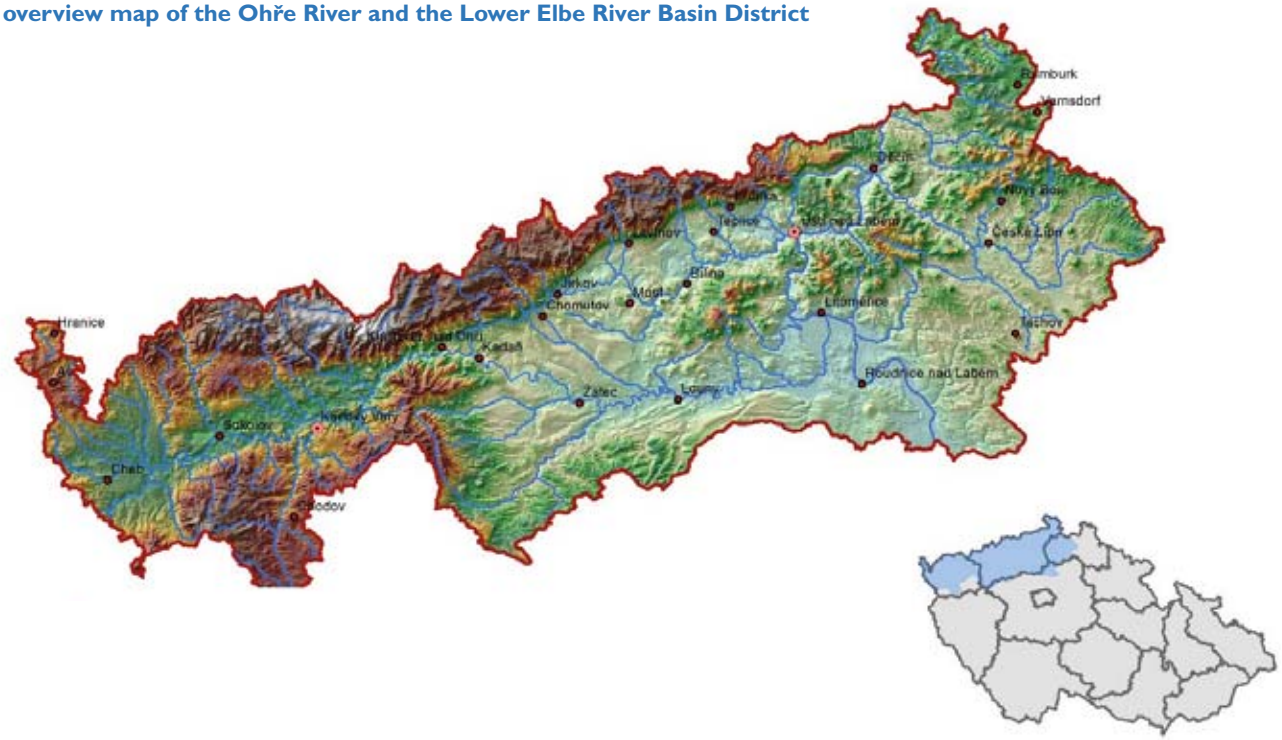
RBDMP chapter	A type measures							B type measures	C type measures
	Number in RBDMP	Of which implemented (2009–2012)	Of which implemented (2012–2015)	Costs (milions of CZK)	Of which in progress	Planned costs (millions of CZK)	Of which not implemented	Number in RBDMP	Number in RBDMP
C.4.10	0	0	0	0	0	0	0	1	5
C.4.12	0	0	0	0	0	0	0	0	1
C.4.13	71	14	7	37.3	25	304.5	25	12	1
C.4.14	0	0	0	0	0	0	0	8	0
C.4.2	2	0	0	0	2	45	0	2	0
C.4.4	0	0	0	0	0	0	0	7	0
C.4.5	0	0	0	0	0	0	0	0	2
C.4.6[1)]	120	30	53	6,311.3	27	1,889.9	10	2	0
C.4.7[2)]	53	15	11	943.2	12	6,020.8	3	2	0
C.4.8	0	0	0	0	0	0	0	0	1
D	41	22	5	107.6	2	476.8	12	0	0
Measures in total	**287**	**81**	**76**	**7,399.4**	**68**	**8,737.0**	**50**	**34**	**10**

Source: River Boards, s. e., MoA, SEF
Note: [1)] *Costs was not possible to define for fourteen implemented or measures in process.*
[2)] *State was not possible to figure for twelve measures, costs was not possible to define for fourteen measures.*

14.4.1.2. The Ohře River and the Lower Elbe River Basin District Management Plan

Characterization of the River Basin District

Figure 14.4.1.2.1.
An overview map of the Ohře River and the Lower Elbe River Basin District



The territory of the Ohře River and the Lower Elbe River Basin District is situated in the northwest part of the Czech Republic. Its total area is 9,518.9 km^2. It covers the Elbe River Basin downstream of the confluence with the Vltava River as far as the state border with Germany (including marginal river basins of the Elbe tributaries in Germany) and the Mandau River Basin. The entire western and northern boundary of the area is identical with the state border.

The Ohře River and the Lower Elbe River Basin District reaches a total of five regions, namely the Ústí nad Labem, Karlovy Vary, Liberec, Central Bohemian and Pilsen Regions and the administrative territories of 33 municipalities with extended authority. In the Ohře River and Lower Elbe River Basins there are approximately 1.3 million of people living in 613 municipalities. The average population density is 139 people per km^2.

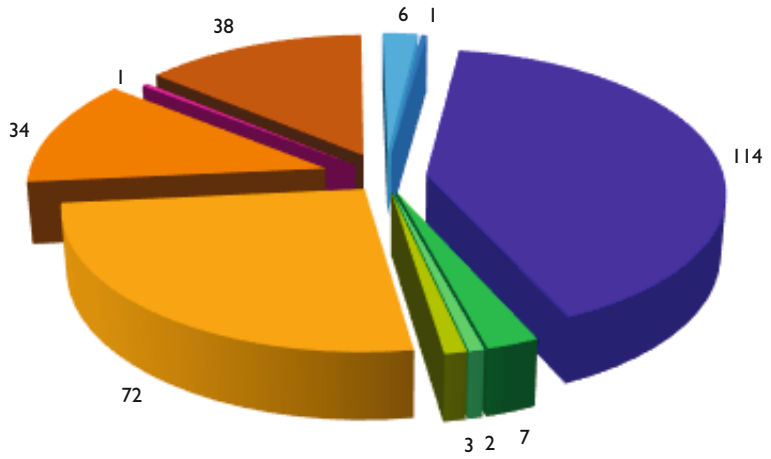
Backbone watercourse in the River Basin District is the Lower Elbe from the confluence with the Vltava River as far as the state border of the Czech Republic. The largest left-hand tributaries of the Elbe are the Ohře River and the Bílina River, draining most of the Krušné Mountains system. The Ohře River, the second most important watercourse in the River Basin District, flows to the territory of the Czech Republic from the west from the Federal Republic of Germany, further generally trending northeastwards as far as Litoměřice, where it empties into the Elbe. The Ohře River Basin covers an area of 5,613.7 km^2. The most significant right-hand tributaries of the Elbe are the Ploučnice River and the Kamenice River, draining waters from as far as the Lusatian Mountains, the other tributaries are mostly shorter watercourses from the Bohemian table. In the Ohře River and the Lower Elbe River Basin District there are a number of water reservoirs, of which the Nechranice water reservoir on the Ohře River has the largest volume.

For the protection of habitats and species a total of 133 areas were identified. Of that, 58 areas represent sites of European importance and 75 areas are selected small-scale specially protected areas. There are two water-related bird protection areas. In addition, five Protected Landscape Areas and a National Park are situated in the River Basin District.

Status of implementation of measures

Under Chapter C.4.13 Measures to ensure adequate hydromorphological status of water bodies, allowing for achieving the required ecological status or good ecological potential, 26 measures in the total amount of CZK 177.2 million were completed. The remaining measures are in progress, mostly because of complicated property relations or financial coverage of the measures. Under Chapter C.4.6 Measures to reduce the discharges of pollutants from point sources and other activities impacting water status, 30 measures in the total amount of CZK 913 million were completed. The remaining measures are in progress and 4 measures have not been launched. The responsibility for the measures under Chapter C.4.6 is in most cases borne by operators and owners of sewerage systems. Under Chapter C.4.7 Measures to reduce or stop the entry of especially hazardous substances to water, 2 measures in the amount of CZK 17.4 million were completed. The remaining measures are in progress and two have not been launched. These are exclusively measures from the category of old ecological burdens, whose registry is available in the database of the registration system of contaminated areas. Updated and relevant information about a rather vast amount of old ecological burdens is not available. Review of the old ecological burden registry is planned for 2016. Under Chapter D, Measures to protect against floods, 5 measures in the total amount of CZK 215.9 million were completed. Other two measures are in progress and 7 measures have not been launched, mostly because of complicated property relations. Most of the projects are implemented by river basin administrators with financial support granted from the EU Funds, national sources of financial support (co-financing of the Operational Programme Environment), Programmes of the state budget of the Czech Republic (MoA and MoE) and own and other sources.

Chart 14.4.1.2.1
Number of measures proposed in the River Basin District Management Plan by the measure types



- Additional measures necessary to meet the adopted objectives of protection of waters as the environmental compartment (Chapter C.4.10)
- Measures relating to the application of the „polluter-pays" principle (Chapter C.4.12)
- Measures to ensure adequate hydromorphological conditions of water bodies (Chapter C.4.13)
- Measures to regulate pollution from diffuse sources (Chapter C.4.14)
- Measures applied to waters used or to be used for the abstraction of water intended for human consumption (Chapter C.4.2)
- Measures to regulate water abstractions and impoundments (Chapter C.4.4)
- Measures to reduce the discharges of pollutants from point sources (Chapter C.4.6)
- Measures to reduce or stop the entry of especially hazardous substances to water (Chapter C.4.7)
- Measures to prevent and reduce the impact of accidental pollution (Chapter C.4.8)
- Measures to protect against floods (Chapter D)

Table 14.4.1.2.1
Status of implementation of measures

RBDMP chapter	A type measures							B type measures	C type measures
	Number in RBDMP	Of which implemented (2009–2012)	Of which implemented (2012–2015)	Costs (millions of CZK)	Of which in progress	Planned costs (millions of CZK)	Of which not implemented	Number in RBDMP	Number in RBDMP
C.4.10	0	0	0	0	0	0	0	1	5
C.4.12	0	0	0	0	0	0	0	0	1
C.4.13[1)]	110	12	26	177.2	42	31.4	20	4	0
C.4.14	0	0	0	0	0	0	0	7	0
C.4.2	0	0	0	0	0	0	0	2	0
C.4.4	0	0	0	0	0	0	0	3	0
C.4.5	0	0	0	0	0	0	0	0	0
C.4.6[2)]	70	30	5	913	14	424.4	4	2	0
C.4.7[3)]	32	7	2	17.4	13	2,041.9	10	2	0
C.4.8	0	0	0	0	0	0	0	0	1
D[4)]	30	9	5	215.9	2	7.02	7	0	
Measures in total	**242**	**58**	**38**	**1,323.5**	**71**	**2,504.7**	**41**	**21**	**7**

Note.: [1)] *C.4.13, source: Ohře River Board, s. e. Costs could not be quantified for six implemented measures and for sixteen measures in progress, the status could not be given for ten measures.*

[2)] *C.4.6, source: Ohře River Board, s. e., SEF, MoA. Status could not be given for seventeen measures, costs could not be quantified for one implemented measure, costs could not be quantified for twelve measures in progress.*

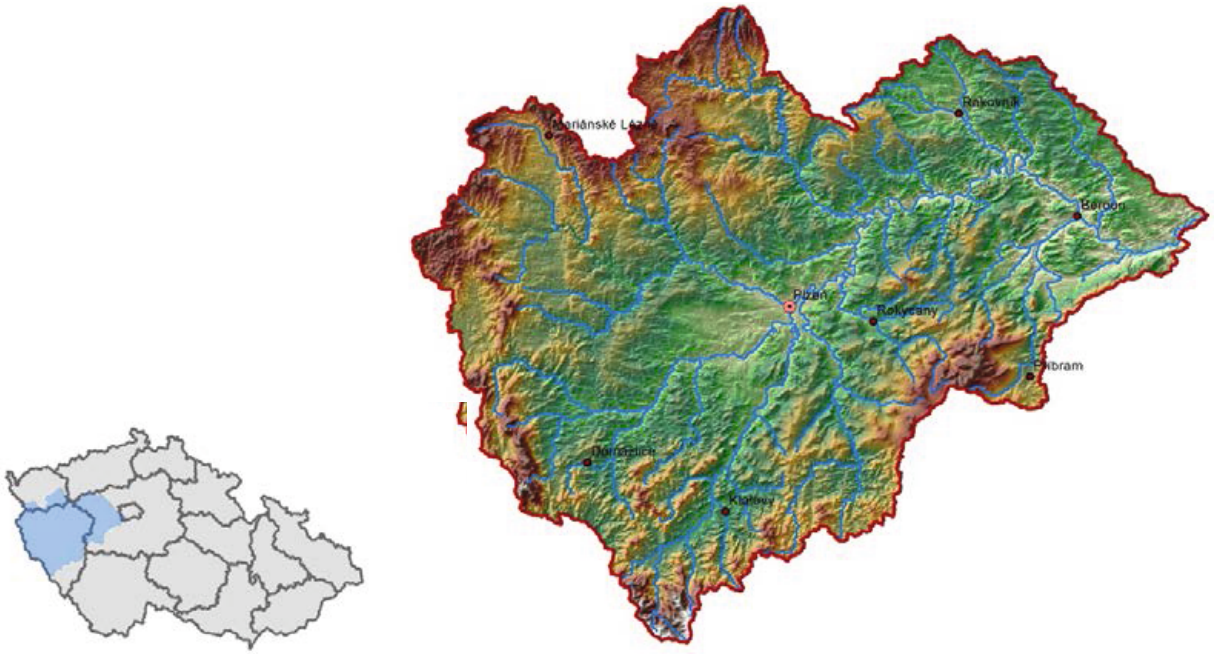
[3)] *C.4.7, source: Ohře River Board, s. e., Registration system of contaminated areas. Costs could not be quantified for one implemented measure.*

[4)] *D, source: Ohře River Board, s. e. Costs could not be quantified for three implemented, costs could not be quantified for one measure in progress.*

14.4.1.3 The Berounka River Basin District Management Plan

Characterization of the River Basin District

Figure 14.4.1.3.1
An overview map of the Berounka River Basin District



The Berounka River Basin District is situated in the western part of Bohemia. The major part (approx. 95%) falls into the main Elbe River Basin. A smaller part (approx. 5%) along the state border with the Federal Republic of Germany falls into the main Danube River Basin.

The Berounka River Basin District covers an area of 9,270.6 km^2. The backbone watercourses in the upper part of the Berounka River Basin District are the Mže River, the Radbuza River, the Úhlava River and the Úslava River, the backbone watercourse in the lower part of the river basin is the Berounka River, whose major tributaries are the Střela River, the Klabava River and the Litavka River.

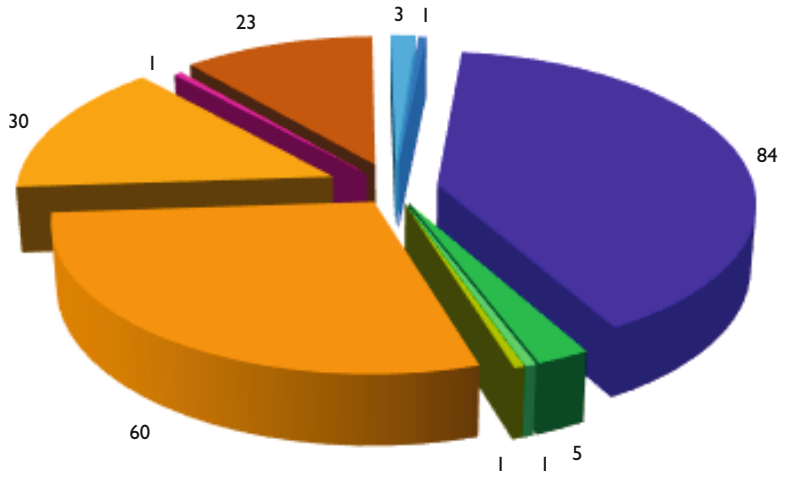
The predominant part of the Berounka River Basin District is situated in the Pilsen Region, the eastern part lies in the Central Bohemian Region and reaches the territory of the City of Prague, the northern margin extends to the Karlovy Vary Region. The Berounka River Basin District only insignificantly touches the Ústí nad Labem Region.

Status of implementation of measures

Under Chapter C.4.13 Measures to ensure adequate hydromorphological status of the water body, allowing for achieving the required ecological status or good ecological potential, 4 measures in the total amount of CZK 66.5 million were completed. The remaining measures are in progress, mostly because of complicated property relations or financial coverage of the measures. Under Chapter C.4.6 Measures to reduce the discharges of pollutants from point sources and other activities impacting water status, 16 measures in the total amount of CZK 1,404.1 million were completed. The remaining measures are in progress and 5 measures have not been launched. The responsibility for the measures under Chapter C.4.6 is in most cases borne by operators and owners of sewerage systems. Under Chapter C.4.7 Measures to reduce or stop the entry of especially hazardous substances to water, 4 measures in the amount of CZK 601.9 million were completed. The remaining measures are in progress or have not been launched. These are exclusively measures from the category of old ecological burdens, whose registry is available in the database of the registration system of contaminated areas. Updated and relevant information about a rather vast amount of old ecological burdens is not available. Review of the old ecological burden registry is planned for 2016. Under Chapter D, Measures to protect against floods, 9 measures in the total amount of CZK 650 million were completed. No measures are in progress and in the case of some measures that have not been launched, the reason for their implementation has ceased to exist. Most of the projects are implemented by river basin administrators with financial support granted from the EU Funds, national sources of financial support (co-financing of the Operational Programme Environment), Programmes of the state budget of the Czech Republic (MoA and MoE) and own and other sources.

Fish crossing Svitávka (source: Ohře River Board, s. e.)

Chart 14.4.1.3.1
Number of measures proposed in the River Basin District Management Plan by the measure types



- Additional measures necessary to meet the adopted objectives of protection of waters as the environmental compartment (Chapter C.4.10)
- Measures relating to the application of the „polluter-pays" principle (Chapter C.4.12)
- Measures to ensure adequate hydromorphological conditions of water bodies (Chapter C.4.13)
- Measures to regulate pollution from diffuse sources (Chapter C.4.14)
- Measures applied to waters used or to be used for the abstraction of water intended for human consumption (Chapter C.4.2)
- Measures to regulate water abstractions and impoundments (Chapter C.4.4)
- Measures to reduce the discharges of pollutants from point sources (Chapter C.4.6)
- Measures to reduce or stop the entry of especially hazardous substances to water (Chapter C.4.7)
- Measures to prevent and reduce the impact of accidental pollution (Chapter C.4.8)
- Measures to protect against floods (Chapter D)

Table 14.4.1.3.1
Status of implementation of measures

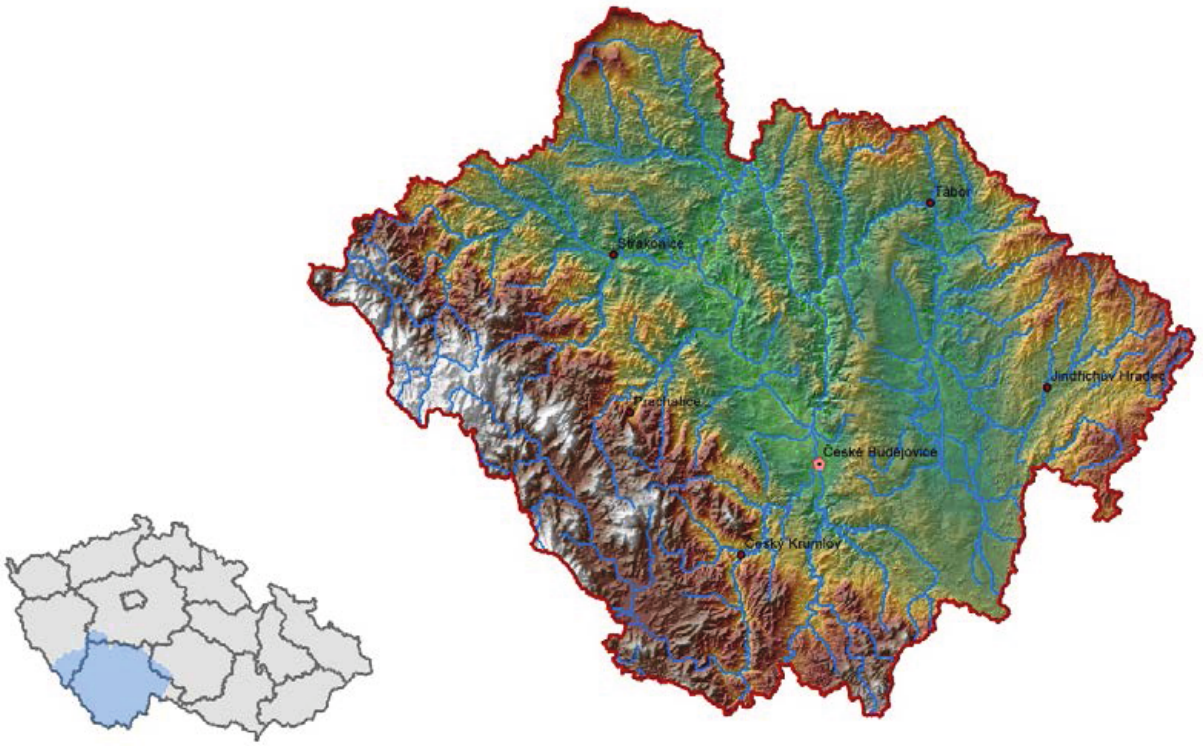
RBDMP chapter	A type measures							B type measures	C type measures
	Number in RBDMP	Of which implemented (2009–2012)	Of which implemented (2012–2015)	Costs (millions of CZK)	Of which in progress	Planned costs (millions of CZK)	Of which not implemented	Number in RBDMP	Number in RBDMP
C.4.10	0	0	0	0	0	0	0	0	3
C.4.12	0	0	0	0	0	0	0	0	1
C.4.13[1)]	83	6	4	66.5	7	0	63	1	0
C.4.14	0	0	0	0	0	0	0	5	0
C.4.2	0	0	0	0	0	0	0	0	0
C.4.4	0	0	0	0	0	0	0	1	0
C.4.5	0	0	0	0	0	0	0	0	1
C.4.6[2)]	59	21	16	1,404.1	5	143.6	5	1	0
C.4.7[3)]	28	0	4	601.9	4	29	20	2	0
C.4.8	0	0	0	0	0	0	0	0	1
D	23	7	9	650	0	0	7	0	0
Measures in total	**193**	**34**	**33**	**2,722.5**	**16**	**172.6**	**95**	**10**	**6**

Note: [1)] C.4.13, source: Vltava River Board, s. e. Costs could not be quantified for any measures in progress and status could not be given for three measures.
[2)] C.4.6, source: SEF, MoA. Status could not be given for twelve measures.
[3)] C.4.7, source: Registration system of contaminated areas. Costs could not be quantified for two implemented measures and three measures in progress.

14.4.1.4 The Upper Vltava River Basin District Management Plan

Characterization of the River Basin District

Figure 14.4.1.4.1
Overview map of the Upper Vltava River Basin District



The Upper Vltava River Basin District is situated in the south of Bohemia. The major part (approx. 99%) falls into the main Elbe River Basin. A smaller part (approx. 1%) along the state border with the Federal Republic of Germany and Austria falls into the Danube River Basin. The Upper Vltava River Basin District covers an area of 11,058.6 km^2. The backbone watercourse is the Vltava River, its most significant tributaries are the Malše River, the Lužnice River, the Otava River and the Lomnice River. The major part of the Upper Vltava River Basin District is located in the South Bohemian Region, the eastern part lies in the Vysočina Region, the western part in the Pilsen Region and the northern part in the Central Bohemian Region.

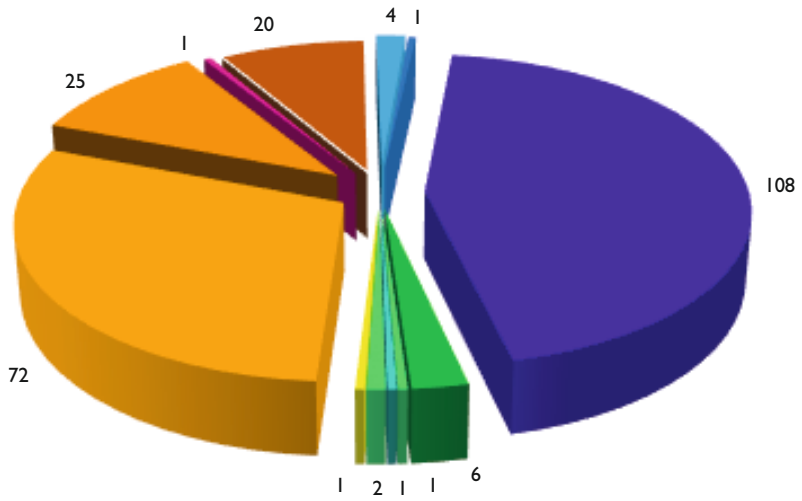
The Upper Vltava River Basin District has a population of approx. 682 thousand and population density is 62 inhabitants per km^2. The centre of economic activity is in the South Bohemian Region. The Upper Vltava River Basin District has a rural character with developed fishpond management and forestry. Developed as well is manufacturing industry. Important natural resources include extensive coniferous forests, namely spruce and pine forests. The biggest mineral resources include deposits of sand and gravel sand, brick clay, stone and glass sands. In agriculture, dominant is cereals, oil bearing crops, forage crops and potato growing, followed by cattle and pig breeding. The total area of ponds used for fish farming is approx. 25,000 hectares. Also important is waterfowl breeding.

In the Upper Vltava River Basin District, the Šumava National Park and 3 Protected Landscape Areas, namely Třeboň area, Blanský Forest and the Šumava Mountains are located. System Natura 2000 includes four bird conservation areas and 76 sites listed in the national list of sites of Community importance.

Status of implementation of measures

Under Chapter C.4.13 Measures to ensure adequate hydromorphological status of the water body, allowing for achieving the required ecological status or good ecological potential, no measures has been completed. Three measures are in progress, 92 measures was not implemented, mostly because of complicated property relations or financial coverage of the measures or insufficient funding. Under Chapter C.4.6 Measures to reduce the discharges of pollutants from point sources and other activities impacting water status, 14 measures in the total amount of CZK 218.4 million were completed. 4 measures are in progress and 11 measures have not been launched. The responsibility for the measures under Chapter C.4.6 is in most cases borne by operators and owners of sewerage systems. Under Chapter C.4.7 Measures to reduce or stop the entry of especially hazardous substances to water, 3 measures in the amount of CZK 13.6 million were completed. The remaining measures are in progress and two have not been launched. These are exclusively measures from the category of old ecological burdens, whose registry is available in the database of the registration system of contaminated areas. Updated and relevant information about a rather vast amount of old ecological burdens is not available. Review of the old ecological burden registry is planned for 2016. In the case of some measures, the reason for their implementation may cease to exist after information is specified in more detail. Under Chapter D, Measures to protect against floods, 8 measures in the total amount of CZK 448.2 million were completed. Another one is in progress and 4 measures have not been launched, mostly because of complicated property relations. Most of the projects are implemented by river basin administrators with financial support granted from the EU Funds, national sources of financial support (co-financing of the Operational Programme Environment), Programmes of the state budget of the Czech Republic (MoA and MoE) and own and other sources.

Chart 14.4.1.4.1
Number of measures proposed in the River Basin District Management Plan by the measure types



- Additional measures necessary to meet the adopted objectives of protection of waters as the environmental compartment (Chapter C.4.10)
- Measures relating to the application of the „polluter-pays" principle (Chapter C.4.12)
- Measures to ensure adequate hydromorphological conditions of water bodies (Chapter C.4.13)
- Measures to regulate pollution from diffuse sources (Chapter C.4.14)
- Measures applied to waters used or to be used for the abstraction of water intended for human consumption (Chapter C.4.2)
- Measures resulting from the water balance of a prospective state the quantity and quality of surface and groundwater (Chapter C.4.3)
- Measures to regulate water abstractions and impoundments (Chapter C.4.4)
- Measures to prevent direct discharges into groundwaters, indicating the cases of permitted discharges (Chapter C.4.5)
- Measures to reduce the discharges of pollutants from point sources (Chapter C.4.6)
- Measures to reduce or stop the entry of especially hazardous substances to water (Chapter C.4.7)
- Measures to prevent and reduce the impact of accidental pollution (Chapter C.4.8)
- Measures to protect against floods (Chapter D)

Table 14.4.1.4.1
Status of implementation of measures

RBDMP chapter	A type measures							B type measures	C type measures
	Number in RBDMP	Of which implemented (2009–2012)	Of which implemented (2012–2015)	Costs (millions of CZK)	Of which in progress	Planned costs (millions of CZK)	Of which not implemented	Number in RBDMP	Number in RBDMP
C.4.10	0	0	0	0	0	0	0	1	3
C.4.12	0	0	0	0	0	0	0	0	1
C.4.13[1)]	107	3	0	0	3	15.7	92	1	0
C.4.14	0	0	0	0	0	0	0	6	0
C.4.2	0	0	0	0	0	0	0	0	1
C.4.4	0	0	0	0	0	0	0	2	0
C.4.5	0	0	0	0	0	0	0	0	1
C.4.6[2)]	70	27	14	218.4	3	202	10	2	0
C.4.7[3)]	23	5	3	13.6	3	37	6	2	0
C.4.8	0	0	0	0	0	0	8	0	1
D	20	7	8	448.2	1	4.95	4	0	0
Measures in total	**220**	**42**	**25**	**680.2**	**10**	**259.65**	**120**	**14**	**7**

Note: [1)] *C.4.13, source: Vltava River Board, s. e. Status could not be given for nine measures, costs could not be quantified for one measure in progress.*
[2)] *C.4.6, source: SEF, MoA. Status could not be given for sixteen measures, costs could not be quantified for one implemented measure.*
[3)] *C.4.7, source: Registration system of contaminated areas. Status could not be given for six measures, costs could not be quantified for one implemented measure and two measures in progress.*

14.4.1.5 The Lower Vltava River Basin District Management Plan

Characterization of the River Basin District

Figure 14.4.1.5.1
Overview map of the Lower Vltava River Basin District

The Lower Vltava River Basin District is situated mostly in the hilly country of central Bohemia and its lower part changes to a flat territory between the Vltava River and the Elbe. The Lower Vltava River Basin District belongs to the main Elbe River Basin. The Lower Vltava River Basin District covers an area of 7,249.1 km^2. The backbone watercourse is the Vltava River, its major tributaries are the Sázava River, the Mastník stream, the Kocába River, the Rokytka stream and the Bakovský stream. Major tributaries of the Sázava River are the Želivka River and the Blanice River. The lower part of the River Basin District is significantly influenced by the Berounka River, the backbone watercourse in the Berounka River Basin District, which empties into the Vltava River upstream of Prague. The predominant part of the Lower Vltava River Basin District lies in the Central Bohemian Region and a significant part lies in the Vysočina Region. The River Basin District also reaches the territory of the City of Prague and the Ústí nad Elbem Region.

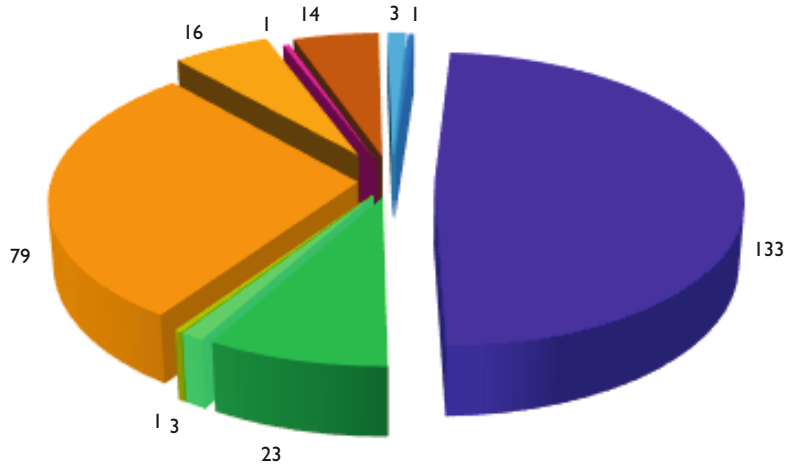
The Lower Vltava River Basin District has a population of 1,891 thousand and population density is 260 inhabitants per km^2. In terms of economic activity, entirely dominant is the City of Prague. Significant is especially the sector of services (public administration, commerce, health care, education, etc.). The upper part of the Sázava River Basin is an important potato growing area, the lower part is dominated by wheat, barley and rape growing. The surroundings of Prague are dominated by suburban agriculture – floriculture, vegetables and fruit growing. To the north of Prague, also wheat, barley and sugar-beet are grown.

In the Lower Vltava River Basin District, two Protected Landscape Areas (Blaník and Žďár Peaks) are situated. Under System Natura 2000 there is no bird conservation area (the Otava and Vltava River valley) and 51 sites are listed in the national list of sites of Community importance.

Status of implementation of measures

Under Chapter C.4.13 Measures to ensure adequate hydromorphological status of the water body, allowing for achieving the required ecological status or good ecological potential, 10 measures in the total amount of CZK 63.9 million were completed. The remaining measures are in progress, mostly because of complicated property relations or financial coverage of the measures. Under Chapter C.4.6 Measures to reduce the discharges of pollutants from point sources and other activities impacting water status, 15 measures in the total amount of CZK 1,144,2 million were completed. The remaining measures are in progress and 10% of the measures have not been launched. The responsibility for the measures under Chapter C.4.6 is in most cases borne by operators and owners of sewerage systems and the Elbe River Board, state enterprise so has not a direct influence on the implementation. Under Chapter C.4.7 Measures to reduce or stop the entry of especially hazardous substances to water, 3 measures in the amount of CZK 36 million were completed. The remaining measures are in progress and two have not been launched. These are exclusively measures from the category of old ecological burdens, whose registry is available in the database of the registration system of contaminated areas. Updated and relevant information about a rather vast amount of old ecological burdens is not available. Review of the old ecological burden registry is planned for 2016. In the case of some measures, the reason for their implementation may cease to exist after information is specified in more detail. Under Chapter D, Measures to protect against floods, three measures in the total amount of CZK 127.1 million were completed. Seven measures have not been launched, mostly because of complicated property relations. Most of the projects are implemented by river basin administrators with financial support granted from the EU Funds, national sources of financial support (co-financing of the Operational Programme Environment), Programmes of the state budget of the Czech Republic (MoA and MoE) and own and other sources.

Chart 14.4.1.5.1
Number of measures proposed in the River Basin District Management Plan by the measure types



- Additional measures necessary to meet the adopted objectives of protection of waters as the environmental compartment (Chapter C.4.10)
- Measures relating to the application of the „polluter-pays" principle (Chapter C.4.12)
- Measures to ensure adequate hydromorphological conditions of water bodies (Chapter C.4.13)
- Measures to regulate pollution from diffuse sources (Chapter C.4.14)
- Measures applied to waters used or to be used for the abstraction of water intended for human consumption (Chapter C.4.2)
- Measures to regulate water abstractions and impoundments (Chapter C.4.4)
- Measures to reduce the discharges of pollutants from point sources (Chapter C.4.6)
- Measures to reduce or stop the entry of especially hazardous substances to water (Chapter C.4.7)
- Measures to prevent and reduce the impact of accidental pollution (Chapter C.4.8)
- Measures to protect against floods (Chapter D)

Table 14.4.1.5.1
Status of implementation of measures

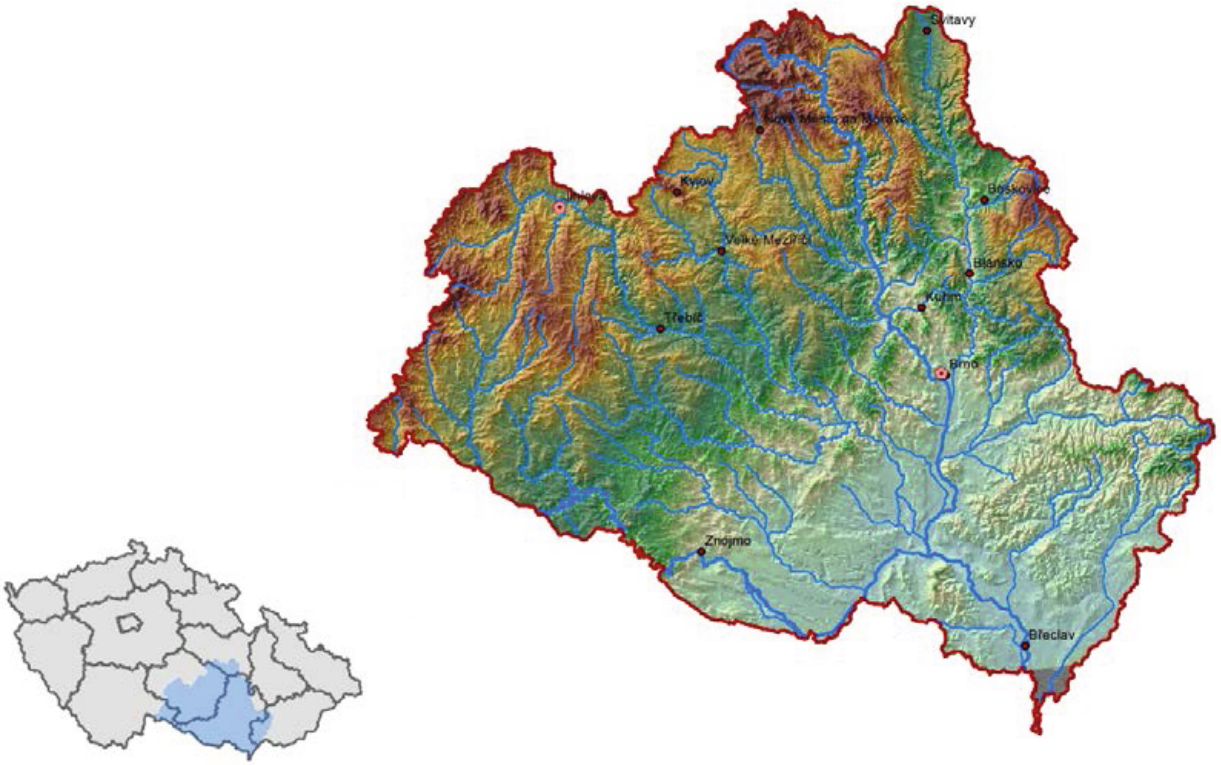
RBDMP chapter	A type measures							B type measures	C type measures
	Number in RBDMP	Of which implemented (2009–2012)	Of which implemented (2012–2015)	Costs (millions of CZK)	Of which in progress	Planned costs (millions of CZK)	Of which not implemented	Number in RBDMP	Number in RBDMP
C.4.10	0	0	0	0	0	0	0	0	3
C.4.12	0	0	0	0	0	0	0	0	1
C.4.13[1)]	133	5	10	63.9	7	3.5	111	0	0
C.4.14	0	0	0	0	0	0	0	23	0
C.4.2	0	0	0	0	0	0	0	0	0
C.4.4	0	0	0	0	0	0	0	0	3
C.4.5	0	0	0	0	0	0	0	0	1
C.4.6[2)]	69	22	15	1,144.2	5	1.76	6	10	0
C.4.7[3)]	14	6	3	36	1	509.5	3	2	0
C.4.8	0	0	0	0	0	0	0	0	1
D	14	4	3	127.1	0	0	7	0	0
Measures in total	**230**	**37**	**31**	**1,371.2**	**13**	**514.7**	**127**	**35**	**9**

Note.: [1)] *C.4.13, source:Vltava River Board, s. e. Status could not be given for nine measures, costs could not be quantified for one measure in progress.*
[2)] *C.4.6, source: SEF, MoA. Status could not be given for sixteen measures, costs could not be quantified for one implemented measure.*
[3)] *C.4.7, source: Registration system of contaminated areas. Status could not be given for six measures, costs could not be quantified for one implemented and two measures in progress.*

14.4.1.6 The Dyje River Basin District Management Plan

Characterization of the River Basin District

Figure 14.4.1.6.1
Overview map of the Dyje River Basin District



The Dyje River Basin District is the second largest of the eight river basin districts in the Czech Republic. It is fan-shaped and shows no big differences in altitudes. Its highest altitudes are situated in the Bohemian-Moravian Highlands, the highest peak is situated at the western boundary of the river basin district at the main watershed divide between the Danube River and the Elbe (the highest peak is Javořice at 837 m a. s. l.). At the point of the Dyje River flowing into the Morava River, the terrain reaches altitude of approximately 150 m a. s. l., the biggest vertical difference so reaches about 700 m.

The main watercourse in the Dyje River Basin District is the Dyje River. In terms of hydrology, the Dyje River Basin District belongs to the Black Sea drainage area, water is drained via the Dyje River into the Morava River and farther to the Danube River. The main headwater area is the eastern and southern part of the Bohemian-Moravian Highlands and the western part of the Drahany Highlands. Other major rivers in the Dyje River Basin District include, for example, the Svratka River, the Jihlava River, the Svitava River, the Oslava River, the Moravská Dyje River, the Litava River, the Rokytná River, the Želetavka River and the Jevišovka River.

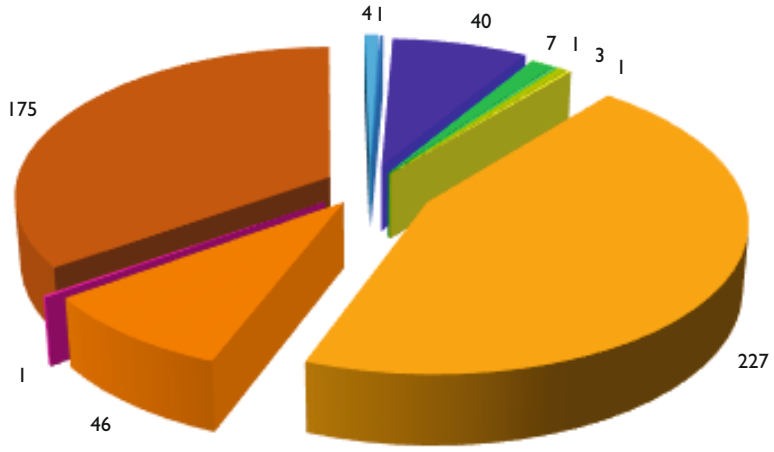
The Dyje River Basin District reaches in the Czech Republic a total of six regions, namely the South Moravian, South Bohemian, Pardubice, Zlín, Olomouc and Vysočina Regions. The Dyje River Basin District has a population of 1.43 million and population density is 128 inhabitants per km^2.

The Dyje River Basin District includes all types of protected nature and landscape areas from System Natura 2000 to Specially Protected Areas and other protected areas listed in the Register of Protected Areas.

Status of implementation of measures

Under Chapter C.4.13 Measures to ensure adequate hydromorphological status of water bodies, allowing for achieving the required ecological status or good ecological potential, 2 measures in the total amount of CZK 6.2 million were completed. The remaining measures are in progress or have been abandoned mostly because of complicated property relations or financial coverage of the measures. Under Chapter C.4.6 Measures to reduce the discharges of pollutants from point sources and other activities impacting water status, 67 measures in the total amount of CZK 5,819.1 million were completed. The remaining measures are in progress and 41 measures have not been launched. The responsibility for the measures under Chapter C.4.6 is in most cases borne by operators and owners of sewerage systems. Under Chapter C.4.7 Measures to reduce or stop the entry of especially hazardous substances to water, approximately 6 measures in the amount of CZK 28 million were completed. The remaining measures are in progress or have not been launched. These are exclusively measures from the category of old ecological burdens, whose registry is available in the database of the registration system of contaminated areas. Updated and relevant information about a rather vast amount of old ecological burdens is not available. Review of the old ecological burden registry is planned for 2016. In the case of some measures, the reason for their implementation may cease to exist after information is specified in more detail. Under Chapter D, Measures to protect against floods, 4 measures in the total amount of CZK 31.4 million were completed. Nine measures are in progress and 22 have not been launched, mostly because of complicated property relations. Most of the projects are implemented by river basin administrators with financial support granted from the EU Funds, national sources of financial support (co-financing of the Operational Programme Environment), Programmes of the state budget of the Czech Republic (MoA and MoE) and own and other sources.

Chart 14.4.1.6.1
Number of measures proposed in the River Basin District Management Plan by the measure types



- Additional measures necessary to meet the adopted objectives of protection of waters as the environmental compartment (Chapter C.4.10)
- Measures relating to the application of the „polluter-pays" principle (Chapter C.4.12)
- Measures to ensure adequate hydromorphological conditions of water bodies (Chapter C.4.13)
- Measures to regulate pollution from diffuse sources (Chapter C.4.14)
- Measures applied to waters used or to be used for the abstraction of water intended for human consumption (Chapter C.4.2)
- Measures to regulate water abstractions and impoundments (Chapter C.4.4)
- Measures to prevent direct discharges into groundwaters, indicating the cases of permitted discharges (Chapter C.4.5)
- Measures to reduce the discharges of pollutants from point sources (Chapter C.4.6)
- Measures to reduce or stop the entry of especially hazardous substances to water (Chapter C.4.7)
- Measures to prevent and reduce the impact of accidental pollution (Chapter C.4.8)
- Measures to protect against floods (Chapter D)

Table 14.4.1.6.1
Status of implementation of measures

RBDMP chapter	A type measures							B type measures	C type measures
	Number in RBDMP	Of which implemented (2009–2012)	Of which implemented (2012–2015)	Costs (millions of CZK)	Of which in progress	Planned costs (millions of CZK)	Of which not implemented	Number in RBDMP	Number in RBDMP
C.4.10	0	0	0	0	0	0	0	0	4
C.4.12	0	0	0	0	0	0	0	0	1
C.4.13[1)]	39	9	2	6.2	14	24.8	14	1	0
C.4.14	0	0	0	0	0	0	0	7	0
C.4.2	0	0	0	0	0	0	0	1	0
C.4.4	0	0	0	0	0	0	0	3	0
C.4.5	0	0	0	0	0	0	0	0	1
C.4.6[2)]	225	48	67	5,819.1	69	8,757.3	41	2	0
C.4.7[3)]	42	12	6	28	14	964.9	7	4	0
C.4.8	0	0	0	0	0	0	0	0	1
D[4)]	58	23	4	31.4	9	7.8	22	0	0
Measures in total	**364**	**92**	**79**	**5,884.7**	**106**	**9,754.8**	**84**	**18**	**7**

Note.: [1)] *C.4.13, source: Morava River Board, s. e. Costs could not be quantified for seven measures in progress.*
[2)] *C.4.6, source: Morava River Board, s. e. Costs could not be quantified for one implemented measures.*
[3)] *C.4.7, source: Morava River Board, s. e. Status could not be given for three measures, costs could not be quantified for two implemented and eight measures in progress.*
[4)] *D, source: Morava River Board, s. e. Costs could not be quantified for four measures in progress.*

14.4.1.7 The Morava River Basin District Management Plan

Characterization of the River Basin District

Figure 14.4.1.7.1
Overview map of the Morava River Basin District

The Morava River Basin District is, as to size, the fourth largest of the eight river basin districts in the Czech Republic. It is elongated in a north – south direction with a marked projection towards the east, which is formed by the Bečva River Basin. The Morava River Basin District shows relatively big differences in altitudes. This is due to the upper course of the Morava River being located below the southern slopes of the Hrubý Jeseník Mountains and the headwater area of the Bečva River in the Beskydy Mountains. In the area of the northeastern watershed contour, which is also the main European watershed divide between the Danube River and the Oder River, the peaks in the area of the Hrubý Jeseník Mountains reach altitudes of about 1,490 m a. s. l. (Praděd 1,492 m a. s. l.) and in the area of the Beskydy Mountains about 1,250 m a. s. l. (Kněhyně 1,257 m a. s. l. – the peak belongs to the Oder River Basin District). In the Morava River profile near Lanžhot the terrain reaches an altitude of only about 150 m a. s. l. The biggest vertical difference so exceeds 1,300 m.

In terms of hydrology, the Morava River Basin Distict belongs to the Black Sea drainage area, water is drained via the Morava River to the Danube River. The main headwater area are mountains in the northeastern part of the river basin – the Jeseníky Mountains, the Beskydy Mountains and the Bílé Karpaty Mountains (the White Carpathians). The main watercourse in the Morava River Basin District is the Morava River. Other major watercourses in the Morava River Basin District include the Olšava River, the Haná River, the Bečva River, the Romže and the Valová River, the Bystřice River, the Oskava River, the Moravská Sázava River and the Desná River.

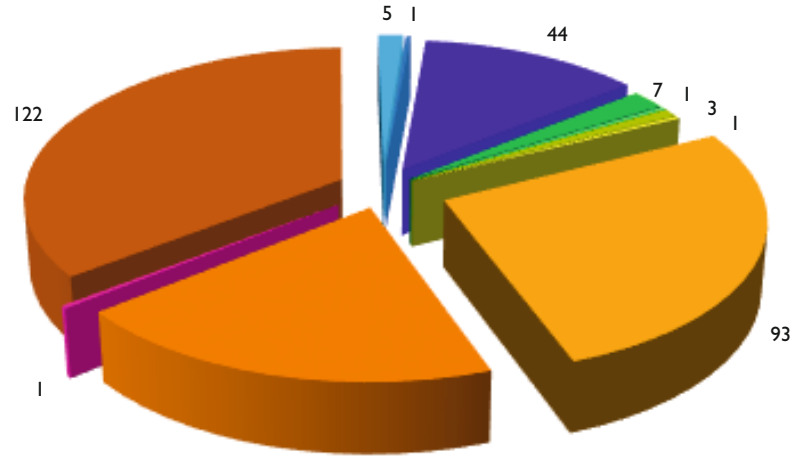
The Morava River Basin District reaches in the Czech Republic five regions – Olomouc, Zlín, South Bohemian, Pardubice and Moravian-Silesian Regions. The Morava River Basin District on the territory of the Czech Republic has a population of 1.34 million and population density is 134 inhabitants per km^2.

The Morava River Basin District includes all types of protected nature and landscape areas from System Natura 2000 to Specially Protected Areas and other protected areas listed in the Register of Protected Areas.

Status of implementation of measures

Under Chapter C.4.13 Measures to ensure adequate hydromorphological status of the water body, allowing for achieving the required ecological status or good ecological potential, 3 measures in the total amount of CZK 12.9 million were completed. The remaining measures are in progress, mostly because of complicated property relations or financial coverage of the measures. Under Chapter C.4.6 Measures to reduce the discharges of pollutants from point sources and other activities impacting water status, 26 measures in the total amount of CZK 1,897.7 million were completed. The remaining measures are in progress and 3 measures have not been launched. The responsibility for the measures under Chapter C.4.6 is in most cases borne by operators and owners of sewerage systems and the Morava River Board, state enterprise, does not have a direct influence on the implementation. Under Chapter C.4.7 Measures to reduce or stop the entry of especially hazardous substances to water, 11 measures in the amount of CZK 250.7 million were completed. The remaining measures are in progress and two have not been launched. These are exclusively measures from the category of old ecological burdens, whose registry is available in the database of the registration system of contaminated areas. Updated and relevant information about a rather vast amount of old ecological burdens is not available. Review of the old ecological burden registry is planned for 2016. In the case of some measures, the reason for their implementation may cease to exist after information is specified in more detail. Under Chapter D, Measures to protect against floods, 10 measures in the total amount of CZK 546.8 million were completed. Fifteen measures are in progress and 19 have not been launched, mostly because of complicated property relations. Most of the projects are implemented by river basin administrators with financial support granted from the EU Funds, national sources of financial support (co-financing of the Operational Programme Environment), Programmes of the state budget of the Czech Republic (MoA and MoE) and own and other sources.

Chart 14.4.1.7.1
Number of measures proposed in the River Basin District Management Plan by the measure types



- Additional measures necessary to meet the adopted objectives of protection of waters as the environmental compartment (Chapter C.4.10)
- Measures relating to the application of the „polluter-pays" principle (Chapter C.4.12)
- Measures to ensure adequate hydromorphological conditions of water bodies (Chapter C.4.13)
- Measures to regulate pollution from diffuse sources (Chapter C.4.14)
- Measures applied to waters used or to be used for the abstraction of water intended for human consumption (Chapter C.4.2)
- Measures to regulate water abstractions and impoundments (Chapter C.4.4)
- Measures to prevent direct discharges into groundwaters, indicating the cases of permitted discharges (Chapter C.4.5)
- Measures to reduce the discharges of pollutants from point sources (Chapter C.4.6)
- Measures to reduce or stop the entry of especially hazardous substances to water (Chapter C.4.7)
- Measures to prevent and reduce the impact of accidental pollution (Chapter C.4.8)
- Measures to protect against floods (Chapter D)

Table 14.4.1.7.1
Status of implementation of measures

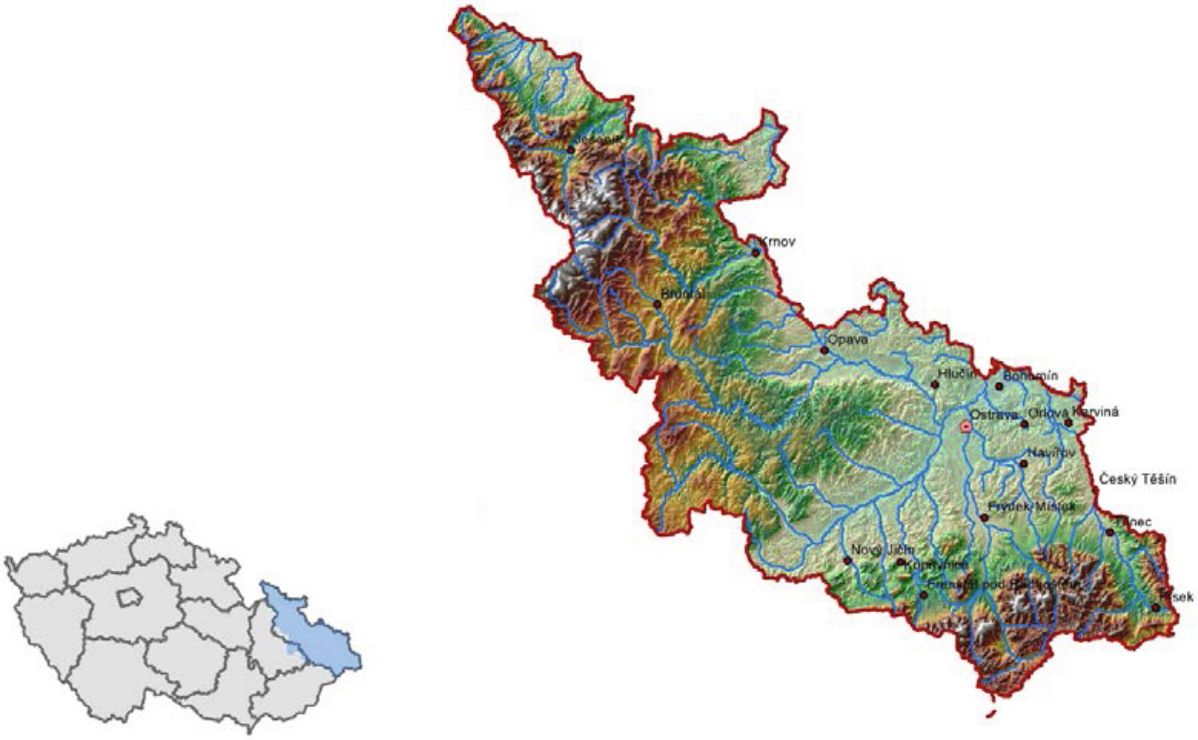
RBDMP chapter	A type measures							B type measures	C type measures
	Number in RBDMP	Of which implemented (2009–2012)	Of which implemented (2012–2015)	Costs (millions of CZK)	Of which in progress	Planned costs (millions of CZK)	Of which not implemented	Number in RBDMP	Number in RBDMP
C.4.10	0	0	0	0	0	0	0	0	5
C.4.12	0	0	0	0	0	0	0	0	1
C.4.13[1)]	43	2	3	12.9	23	23.1	15	1	0
C.4.14	0	0	0	0	0	0	0	7	0
C.4.2	0	0	0	0	0	0	0	1	0
C.4.4	0	0	0	0	0	0	0	3	0
C.4.5	0	0	0	0	0	0	0	0	1
C.4.6[2)]	91	29	26	1,897.7	33	3,030.8	3	1	0
C.4.7[3)]	63	5	11	250.7	17	486.2	25	2	1
C.4.8	0	0	0	0	0	0	0	0	1
D[4)]	59	15	10	546.8	15	145.7	19	8	3
Measures in total	**256**	**51**	**50**	**2,708.1**	**88**	**3,685.8**	**62**	**23**	**12**

Note.: [1)] *C.4.13, source: Morava River Board, s. e. Costs could not be quantified for fourteen measures in progress.*
[2)] *C.4.6, source: Morava River Board, s. e. Costs could not be quantified for one implemented and one measures in progress.*
[3)] *C.4.7, source: Morava River Board, s. e., Registration system of contaminated areas. Status could not be given for five measures, costs could not be quantified for ten measures in progress.*
[4)] *D, source: Morava River Board, s. e. Costs could not be quantified for four implemented and eight measures in progress.*

14.4.1.8 The Oder River Basin District Management Plan

Characterization of the River Basin District

Figure 14.4.1.8.1
Overview map of the Oder River Basin District



The basic structure of the Oder River Basin District is formed by a fan of the major watercourses, namely, the Oder River, the Opava River, the Ostravice River and the Olše River, which flow together to the centre of the Ostrava Basin. The so-called peripheral tributaries of the Oder River are those emptying into it on the territory of the Polish Republic mainly via the Eastern Neisse River. The Oder River Basin District covering an area of 6,252 km^2 belongs to those more exposed within the Czech Republic, which is due to natural conditions as well as its civilization load. Geographically, the Oder River Basin District is built up by mountain ranges of the Hrubý Jeseník Mountains and the Beskydy Mountains and by opening up to the north to the Silesian Lowland. The Oder River springs in the Odry Peaks (634 m a. s. l.) and leaves the territory of the Czech Republic in the area of Bohumín (190 m a. s. l.). On the southwestern watershed contour, the Oder River Basin District is adjacent to the Danube River Basin.

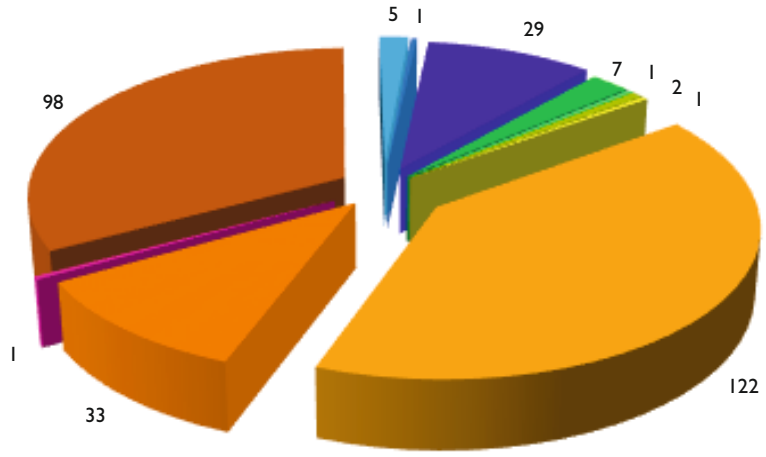
Upstream of the confluence of the Oder River with the Olše River, i.e. close to a place from where the waters from the river basin district leave the territory of the Czech Republic, the Oder River shows the long-term average flow of 49 m^3.s^{-1}, the average flow downstream of the Olše River reaches 63 m^3.s^{-1}. The entire river basin district annually receives over 5.1 billion m^3 of precipitation, the annual precipitation amount, relative to the average surface area, reaches about 820 mm, of which approximately 300 mm run off. The highest annual precipitation amounts are recorded in the area of the Beskydy Mountains (Lysá hora – 1,390 mm/year).

Forests cover 38.5% of the area of the Oder River Basin District, which is above the national average and among the highest in the Czech Republic. The Oder River Basin District has a population of almost 1.3 million, the average population density is 204 inhabitants per km^2, which is also more than the national average (130 inhabitants/km^2).

Status of implementation of measures

Under Chapter C.4.13 Measures to ensure adequate hydromorphological status of the water body, allowing for achieving the required ecological status or good ecological potential, 10 measures in the total amount of CZK 1,647.7 million were completed. The remaining measures are in progress, mostly because of complicated property relations or financial coverage of the measures. Under Chapter C.4.6 Measures to reduce the discharges of pollutants from point sources and other activities impacting water status, 15 measures in the total amount of CZK 2,097.7 million were completed. The remaining measures are in progress and 2 measures have not been launched. The responsibility for the measures under Chapter C.4.6 is in most cases borne by operators and owners of sewerage systems. Under Chapter C.4.7 Measures to reduce or stop the entry of especially hazardous substances to water, 2 measures in the amount of CZK 377.4 million were completed. The remaining measures are in progress or have not been launched. These are exclusively measures from the category of old ecological burdens, whose registry is available in the database of the registration system of contaminated areas. Updated and relevant information about a rather vast amount of old ecological burdens is not available. Review of the old ecological burden registry is planned for 2016. In the case of some measures, the reason for their implementation may cease to exist after information is specified in more detail. Under Chapter D, Measures to protect against floods, 17 measures in the total amount of CZK 544 million were completed. Other 32 measures are in progress and 8 have not been launched, mostly because of complicated property relations. Most of the projects are implemented by river basin administrators with financial support granted from the EU Funds, national sources of financial support (co-financing of the Operational Programme Environment), Programmes of the state budget of the Czech Republic (MoA and MoE) and own and other sources.

Chart 14.4.1.8.1
Number of measures proposed in the River Basin District Management Plan by the measure types



- Additional measures necessary to meet the adopted objectives of protection of waters as the environmental compartment (Chapter C.4.10)
- Measures relating to the application of the „polluter-pays" principle (Chapter C.4.12)
- Measures to ensure adequate hydromorphological conditions of water bodies (Chapter C.4.13)
- Measures to regulate pollution from diffuse sources (Chapter C.4.14)
- Measures applied to waters used or to be used for the abstraction of water intended for human consumption (Chapter C.4.2)
- Measures to regulate water abstractions and impoundments (Chapter C.4.4)
- Measures to prevent direct discharges into groundwaters, indicating the cases of permitted discharges (Chapter C.4.5)
- Measures to reduce the discharges of pollutants from point sources (Chapter C.4.6)
- Measures to reduce or stop the entry of especially hazardous substances to water (Chapter C.4.7)
- Measures to prevent and reduce the impact of accidental pollution (Chapter C.4.8)
- Measures to protect against floods (Chapter D)

Table 14.4.1.8.1
Status of implementation of measures

RBDMP chapter	A type measures							B type measures	C type measures
	Number in RBDMP	Of which implemented (2009–2012)	Of which implemented (2012–2015)	Costs (millions of CZK)	Of which in progress	Planned costs (millions of CZK)	Of which not implemented	Number in RBDMP	Number in RBDMP
C.4.10	0	0	0	0	0	0	0	0	5
C.4.12	0	0	0	0	0	0	0	0	1
C.4.13[1)]	29	2	10	164.7	15	215	2	0	0
C.4.14	0	0	0	0	0	0	0	7	0
C.4.2	0	0	0	0	0	0	0	1	0
C.4.4	0	0	0	0	0	0	0	2	0
C.4.5	0	0	0	0	0	0	0	0	1
C.4.6[2)]	119	54	15	2,097.7	48	6,237.7	2	2	1
C.4.7[3)]	32	6	2	377.4	18	629.1	6	1	0
C.4.8	0	0	0	0	0	0	0	1	0
D[4)]	97	40	17	544	32	8,428.5	8	0	0
Measures in total	**277**	**102**	**44**	**3,183.8**	**113**	**15,510.3**	**18**	**14**	**8**

Note.: [1)] *C.4.13, source: Oder River Board, s. e.*
[2)] *C.4.6, source: Oder River Board, s. e.*
[3)] *C.4.7, source: Oder River Board, s. e., Registration system of contaminated areas. Costs could not be quantified for one implemented and thirteen measures in progress.*
[4)] *D, source: Oder River Board, s. e.*

Interesting numbers (as of 31 December 2015)

- Basic hydrological network: 100,801 thousand km of watercourses (according to the Central Registry of Watercourses)
- Purchase value of non-current tangible assets related to watercourses: CZK 51.75 billion (year-on-year increase by CZK 0.63 billion)
- Income increase of the River Boards, s. e., by CZK 34 million (mainly from payments for surface water consumption and electric power generation
- Average price for 1 m^3 of surface water – CZK 4.34 (year-over-year increase by 2.1%)
- Income for small hydroelectric power plants owned by River Boards, s. e.: CZK 607.7 million (year-over-year increase by CZK 64 million)
- Investments of River Boards, s. e.: CZK 1.42 billion, of which CZK 928.3 million (65%) of internal funds
- Land consolidation: CZK 1,478.5 million, of which CZK 121.6 million for water management measures
- Population supplied with drinkable water: 9.93 million (94.2%) – most in Prague and the Karlovy Vary Region (100%), least in the Pilsen Region (83.9%) and the Central Bohemian Region (84.6%)
- Water consumption (invoiced to households): 87.9 l/person/day (year-over-year increase by 0.6 l/person/day
- Population connected to sewerage system: 8.88 million (84.2%) – most in Prague (98.9%) and the Karlovy Vary Region (96.2%), least in the Central Bohemian Region (70.5%) and the Liberec Region (68.9%)
- 1,621.4 million m^3 of waste waters and mine waters discharged into watercourses (year-over-year decrease by 6.6%)
- Total length of the water supply system: 77,146 km (extended by 198 km)
- Total length of the sewerage system: 45,884 km (extended by 627 km)
- Number of waste water treatment plants: 2,495 (increased by 50)
- Water rate: average price: CZK 35.60 per m^3, highest in the Ústí nad Labem Region (CZK 42.50 per m^3), lowest in the Pardubice Region (CZK 31.00 per m^3)
- Sewerage charge: average price: CZK 30.70 per m^3, highest in the Liberec Region (CZK 40.40 per m^3), lowest in the Vysočina Region (CZK 24.60 per m^3)
- Production of market fish: 20,200 t (19,570 t from ponds)
- Operational Programme Fisheries 2007–2013: 294 projects (CZK 208.3 million)
- Grant programmes for the field of water supply and sewerage systems:
  - 65 projects focused on water supply systems (CZK 341,5 million),
  - 74 projects focused on sewerage systems (CZK 510.4 million),
  - 25 projects focused on remedying flood damage (CZK 293,1 million),
  - subsidised loans: subsidies for interests (99 loans amounting to CZK 25.1 million)
- Grant programmes for flood control: 24 projects (CZK 55 million)
- Grant programme for remedying flood damage: 178 projects (CZK 282.6 million)
- Grant programme focused on minor watercourse management: 120 projects (CZK 43.0 million)
- Grant programme aimed at recultivation and reconstruction of ponds and water reservoirs: 11 projects (CZK 52.4 million)
- Grants for irrigation: 50 projects (CZK 44 million)
- Research and development in water management:
  - 15 projects (CZK 39 million) – MoA
  - 9 projects (CZK 56.7 million) – MoE
  - 14 projects (CZK 207.2 million) – VUV TGM
- National River Basin Management Plans – approved by the Government of the Czech Republic in Resolution of 21 December 2015
- Flood risk management plans – approved by the Government of the Czech Republic in Resolution of 21 December 2015

The Lužnice River, Bechyně, river km 10.550 (author: Michal Zoubek)

List of acronyms in the text

BOD_5	biochemical five-day oxygen demand
CEB	Council of Europe Development Bank
CEI	Czech Environmental Inspection
CF	Cohesion Fund
CHMI	Czech Hydrometeorolgical Institute
CHP	chemical removal of phosphorus
COD_{Cr}	chemical oxygen demand
CSN	Czech State Standard
CSO	Czech Statistical Office
DN	denitrification
EAFRD	European Agricultural Fund for Rural Development
EC	European Commission
EIB	European Investment Bank
ERDF	European Regional Development Fund
EU	European Union
FAD	flood activity degree
GAEC	Good Agricultural and Environmental Condition
ISPA	Instrumentfor Structural Policies for Pre-Accession
MoA	Ministry of Agriculture of the Czech Republic
MoH	Ministry of Health of the Czech Republic
MoE	Ministry of the Environment of the Czech Republic
N	nitrification
N_{inorg}	inorganic nitrogen
EQS	Environmental Quality Standards
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne (sectoral classification of economic activities according to Eurostat)
OPE	Operational Programme Environment
PE	population equivalent
PAH	polyaromatic hydrocarbons
Q_a	annual average flow
Q_m	monthly average flow
R&D	research and development
R&D&I	research, development and innovation
RBDMP	River Basin District Management Plans
s. e.	state enterprise
SEF	State Environmental Fund of the Czech Republic
TA CR	Technology Agency of the Czech Republic
VAT	value added
VUV TGM	T. G. Masaryk Water Management Research Institute, public research institution
W&S Committee	Committee for Coordinating Regulation in the Water Supply and Sewerage System Industry of the Czech Republic
WWTP	waste water treatment plan

Important contacts in water management

Ministry of Agriculture of the Czech Republic
Těšnov 65/17, Prague 1, 110 00, www.eagri.cz
Ministry of the Environment of the Czech Republic
Vršovická 1442/65, Prague 10, 100 10, www.mzp.cz
Elbe River Board, state enterprise
Víta Nejedlého 951/8, Hradec Králové, 500 03, www.pla.cz
Vltava River Board, state enterprise
Holečkova 106/8, Prague 5, 150 24, www.pvl.cz
Ohře River Board, state enterprise
Bezručova 4219, Chomutov, 430 03, www.poh.cz
Oder River Board, state enterprise
Varenská 3101/49, Ostrava, Moravská Ostrava, 701 26, www.pod.cz

Morava River Board, state enterprise
Dřevařská 932/11, Brno, 601 75, www.pmo.cz
Forests of the Czech Republic, state enterprise
Přemyslova 1106/19, Hradec Králové, 501 68, www.lesycr.cz
Czech Hydrometeorological Institute
Na Šabatce 2050/17, Prague 412 – Komořany, 143 06, www.chmi.cz
T. G. Masaryk Water Management Research Institute, public research institution
Podbabská 2582/30, Prague 6, 160 00, www.vuv.cz
State Land Office
Husinecká 1042/11a, Prague 3 – Žižkov, 130 00, www.spucr.cz
Research Institute for Amelioration and Soil Protection, public research institution
Žabovřeská 250, Prague 5 – Zbraslav, 156 27, www.vumop.cz

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