

Report on Water Management in the Czech Republic in 2023

CONTENTS

| I. | HYDROLOGICAL BALANCE | 7 |
|-----|---|----|
| 1.1 | Temperature and precipitation | 7 |
| 1.2 | Runoff | 11 |
| 1.3 | Groundwater regime | 15 |
| | | |
| 2. | HYDROLOGICAL EXTREMES | 27 |
| 2.1 | Flood situations | 27 |
| 2.2 | Remedying flood damage | 28 |
| 2.3 | Drought situation | 28 |
| 2.4 | Interdepartmental commission WATER-DROUGHT | 31 |
| | | |
| 3. | QUALITY OF SURFACE WATERS AND GROUNDWATERS | 33 |
| 3.1 | Surface water quality | 33 |
| 3.2 | Groundwater quality | 51 |
| | | |
| 4. | WATER MANAGEMENT | 53 |
| 4.1 | Surface water abstractions | 53 |
| 4.2 | Groundwater abstractions | 55 |
| 4.3 | Wastewater discharge | 57 |
| 4.4 | Overall comparison of water management | 58 |
| | | |
| 5. | SOURCES OF POLLUTION | 61 |
| 5.1 | Point sources of pollution | 61 |
| 5.2 | Area sources of pollution | 63 |
| 5.3 | Accidental pollution | 65 |
| | | |
| 6. | WATERCOURSE MANAGEMENT | 67 |
| 6.1 | Professional management of watercourses | 67 |
| 6.2 | River Boards, state enterprises | 68 |
| 6.3 | Forests of the Czech Republic, s.e. | 78 |
| | | |
| 7. | LAND CONSOLIDATION AND LAND AMELIORATION STRUCTURES | 83 |
| | | |
| 8. | WATERWAYS | 87 |
| | | |
| 9. | WATER SUPPLY AND SEWERAGE FOR PUBLIC USE | 89 |
| 9.1 | Drinking water supply | 89 |
| 9.2 | Discharge and treatment of municipal wastewaters | 91 |

| 9.3 | Development of water and sewerage prices | 93 |
|------|---|-------|
| 9.4 | Regulation of the water supply and sewerage sector | 94 |
| | | |
| 10. | FISHING AND FISH FARMING | 97 |
| | | |
| 11. | FINANCIAL SUPPORT FOR WATER MANAGEMENT | 101 |
| 11.1 | Financial support from national and transnational programmes | 101 |
| | 11.1.1 Financial support provided by the Ministry of Agriculture | 102 |
| | 11.1.2 Financial support from the Ministry of the Environment | 111 |
| | 11.1.3 Financial support of the Ministry of Transport | 118 |
| 11.2 | Financial support from foreign cooperation and the EU | 121 |
| | | |
| 12. | LEGISLATIVE MEASURES | 129 |
| 12.1 | Water Act and implementing regulations | 129 |
| 12.2 | Act on water supply and sewerage | 129 |
| 12.3 | Supervision of state administration in the field of water management | 130 |
| | | |
| 13. | PRIORITY TASKS, PROGRAMMES AND KEY DOCUMENTS IN WATER MANAGEMENT | 133 |
| 13.1 | Water planning | 133 |
| 13.2 | Water supply and sewerage development plans | 134 |
| 13.3 | Programmes and measures aimed at reducing surface water pollution | 135 |
| 13.4 | Reporting of the Czech Republic to the European Union | 137 |
| | | |
| 14. | INTERNATIONAL RELATIONS | 139 |
| 14.1 | Cooperation within the UNECE | 139 |
| 14.2 | International cooperation of the Czech Republic in the Elbe, Danube and Oder River Basins | 140 |
| 14.3 | International cooperation of the Czech Republic on transboundary waters | 141 |
| | | |
| 15. | WATER RESEARCH AND DEVELOPMENT | 145 |
| 15.1 | Research and development within the competence of the Ministry of Agriculture | 145 |
| 15.2 | Research and development within the competence of the Ministry of the Environment | 147 |
| 15.3 | Research and development within the competence of the Ministry of Education, Youth and Sports | 147 |
| 15.4 | Research and development within the competence of the Technology Agency of the Czech Republic | 149 |
| | | 150 |
| | Selected interesting data for 2023 | 152 |
| | | . = c |
| | Acronyms | 153 |
| | | |
| | Important contacts in water management | 155 |

Dear readers.

The yearbook "Report on Water Management in the Czech Republic", known as the Blue Report, is an essential water management material published by the Ministry of Agriculture annually since 1997. This report is traditionally prepared in cooperation with the Ministry of the Environment. Its main objective is to provide the reader with an overview of water-related activities in 2023, trends and changes achieved, current water management situation, use of water resources and water supply. This publication also provides information on current hydrological extremes, recent developments in water supply and sewerage systems, and financial support provided. Legislative and strategic documents as well as international cooperation are also key areas.

Our planet is increasingly affected by climate change. This report describes the situation in 2023, which was a strongly above-average year in terms of temperatures; the average annual air temperature of 9.7° C, (1.4° C above the 1991-2020 average) made it the warmest year since 1961. Hydrologically, it was mostly average, its average annual precipitation of 732 mm representing 107% of the 1991-2020 average.



The Ministry of Agriculture is one of the central water administration authorities and is the founder of five River Basins, state-owned enterprises, and the Forests of the Czech Republic, s.e. Therefore, the Blue Report also informs about the activities of these companies in 2023 and compares them with previous years. As you will find, these state enterprises manage 94.4% of the total length of watercourses in the Czech Republic.

In the chapter on water supply and sewerage, you will learn that in 2023 more than 10 million inhabitants (94.5%) were supplied with water from water supply systems and more than 9 million (86.7%) were connected to sewerage systems. The length of the water supply network has increased to almost 81,000 km and the sewerage network to 52,000 km. The number of wastewater treatment plants rose by 44 to 2,959. Interestingly, water consumption decreased by 2.7 I/person/day year-on-year to a total of 86.7 I/person/day. This is a very low water consumption when compared to other developed countries.

Water management is supported by national and transnational subsidy programmes of the Ministry of Agriculture, Ministry of the Environment and Ministry of Transport. The total amount of state subsidies for water management exceeded CZK 11 billion in 2023, with the Ministry of Agriculture providing approximately one third of the amount (CZK 3.5 billion), which was used mainly to support water supply and sewerage systems, flood protection, maintenance of watercourses and reservoirs, and measures aimed at mitigating negative impacts of drought and water scarcity.

Furthermore, the Blue Report pays great attention to land consolidation, where the State Land Office spent CZK 358 million from its own resources on water management measures and CZK 116.7 million on anti-erosion measures. A priority is to keep improving water retention in the landscape and anti-erosion protection by building ponds, small water reservoirs, wetlands and structures to reduce water erosion.

Almost CZK 535 million was earmarked for science and research in 2023, of which CZK 78 million from the Ministry of Agriculture, CZK 100 million from the Ministry of the Environment and CZK 69 million from the Ministry of Education, Youth and Sports and CZK 288 million from the Technology Agency of the Czech Republic.

The main strategic objectives of the Ministry of Agriculture include educating the general public about the irreplaceable importance of water and water management. Every year, we actively promote water from a different perspective and run a contest for children on the occasion of World Water Day. The contest is always linked with the global theme for that occasion. For 2024, the Ministry of Agriculture chose the title "Using Water for Peace". In the report, you can see photos of the children's works nominated for the contest.

I hope that you will find plenty of interesting and inspiring information about water management as you read the Blue Report 2023. Water and care of it is essential for our lives and it rightly deserves your attention. I would like to continue fostering a responsible approach to water management and raising public awareness of its importance, current situation and water management activities. Ensuring the sufficiency of water resources in the context of climate change, constructing flood protection, interconnecting water supply systems and extending the water supply and sewerage network with the view of ensuring the quality of life of the people living the Czech Republic now and in the years to come remains my priority.

Marek Výborný Minister of Agriculture

Dear readers,

It is my great honour to present to you once again the "Blue Report", this time for 2023, which summarises the results and achievements in the field of water management in the past year. 2023 was a year full of challenges, but also of significant progress in the protection and management of our water resources.

It was the warmest year since 1961, with an average annual temperature of 9.7°C. The total annual precipitation was 732 mm, 107% of the long-term average, and while we saw significant precipitation deficits in some months, we were not significantly threatened by water scarcity thanks to effective water resource management.

By contrast, December 2023 saw the most significant flood event in the last three years. Due to increased temperatures and heavy rainfall, flood activity degrees were exceeded in a number of watercourses. However, despite such extreme conditions, the hydrological balance was maintained at a stable level.



A significant step towards water protection was the initiation of the debate about the so-called "emergency" amendment to the Water Act in the Chamber of Deputies of the Czech Republic. The proposal offered a comprehensive legislative solution for eliminating emergency situations at surface waters, which was primarily aimed at setting clear rules for coping with them and increasing penalties to their originators. However, in line with our political declaration, we also introduced preventive measures for the protection of water resources, namely continuous monitoring of discharged wastewaters from selected polluters and establishment of a digital register that will eventually include all discharges from surface water pollution sources to watercourses in the Czech Republic.

Significant legislative activities at the European level in the field of water protection in 2023 included, among others, the discussion of several amended European directives. What is expected to have great impact on water quality is certainly the amendment to Directive 91/271/EEC concerning urban wastewater treatment, which was discussed intensively and is to significantly tighten requirements for wastewater treatment; another important step is the addition of 23 critical substances to the list of priority substances under Directive 2008/105/EC on environmental quality standards, which pose a significant risk to the aquatic environment. These are mainly pesticides, pharmaceuticals, bisphenol A and a group of 24 per-a polyfluorinated alkyl compounds (PFAS). Furthermore, an evaluation of the Nitrates Directive (91/676/EEC) was launched; it is aimed at protecting waters from nitrates from agricultural sources, as they can pollute drinking water sources (including groundwaters) and lead to eutrophication of surface waters.

Last but not least, the continued modernisation and maintenance of water infrastructure was a key achievement at the national level. Particular attention was paid to the reconstruction and maintenance of water reservoirs, water supply and sewerage systems, which contributed to improved safety and reliability of water supply for the Czech population. These investments improved the quality of life of the population and enhanced the infrastructure resilience to climatic fluctuations, while support of water retention measures strengthened the landscape resilience to climate change. Implementation of many of such measures would not have been possible without financial support. The Ministry of the Environment provided support totalling to CZK 6,984.9 million under transnational and national subsidy programmes. CZK 4,167.8 million was received from the Operational Programme Environment and another CZK 2,817.1 million under other programmes administered by the State Environmental Fund of the Czech Republic.

In conclusion, I would like to express my gratitude to all those who contributed to achieving the results summarised in this report. I believe that the publication is not only useful for experts who use it as an important source of data and analyses supporting decision-making and design of follow-up strategies and policies, but also for the general public as a tool for raising awareness of the importance of water and the need for its rigorous protection, which is crucial for sustainable development and protection of precious natural resources.

Petr Hladík Minister for the Environment



A. Petlachová – With or Without Water, Secondary school, primary school and kindergarten in Přerov (Special Jury Prize)

I. HYDROLOGICAL BALANCE

1.1 Temperature and precipitation

The year 2023 was strongly above-average in terms of temperature in the Czech Republic, the average annual air temperature (9.7°C) was 1.4°C higher than the 1991–2020 average. Therefore, 2023 was the warmest year ever in terms of average annual air temperature since 1961. Before, the warmest year in the Czech Republic was 2018 with an average annual air temperature of 9.6°C, followed by, 2019 (9.5°C), 2014 and 2015 (9.4°C).

In 2023, all the months with the exception of April and May displayed a positive deviation from the 1991–2020 monthly average in the Czech Republic. Strongly warm months were January (deviation of +3.4°C), September (deviation of +3.5°C), October (deviation of +2.9°C) and December (deviation of +2.5°C). September was extremely above-average and was the warmest September recorded in the Czech Republic ever. January and October were strongly above-average, December

The Hvězda Pond in Třebovka (source: Elbe River Board, s.e.)

and also July (deviation of $+1.3^{\circ}$ C) were above-average in terms of temperatures. By contrast, April was a very cold month with an average temperature of 6.4°C (deviation of -2.1° C), thus rated as strongly below-average.

Interval limits for assessing normality (or abnormality) are defined for each month separately, meaning the limits may vary for different months. The table below shows what the intervals mean and how they are determined. Abnormality of a phenomenon is generally defined by quantile values Q_p , for which the following is true: $P(X \le Q_p) = p$ (i.e. the probability that a phenomenon reaches the quantile value of Q_p or lower equals to p). Temperature and precipitation are assessed in accordance with the classification in Table 1.1.1.

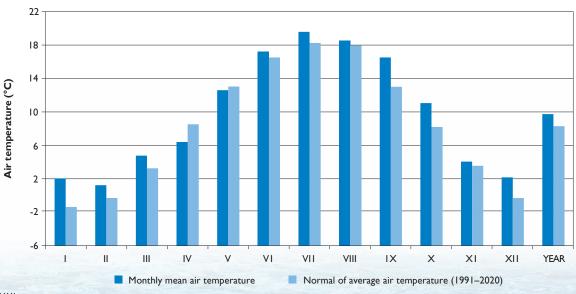
Table 1.1.1 Interval limits for assessing normality (abnormality)

| Degree | Interval limits by quantiles | Exceedance probability (climate hedge in %) |
|---------------------------|---|---|
| Extremely below-average | <q<sub>0.02</q<sub> | >98 |
| Strongly below-average | <q<sub>0.02, Q_{0.10})</q<sub> | (90, 98> |
| Below-average | <q<sub>0.10, Q_{0.25})</q<sub> | (75, 90> |
| Average | <q<sub>0.25, Q_{0.75}></q<sub> | <25, 75> |
| Above-average | (Q _{0.75} , Q _{0.90} > | <10, 25) |
| Strongly above-average | (Q _{0.90} , Q _{0.98} > | <2, 10) |
| Extremely above-average | >Q _{0.98} | <2 |

Source: CHMI

Graph 1.1.1

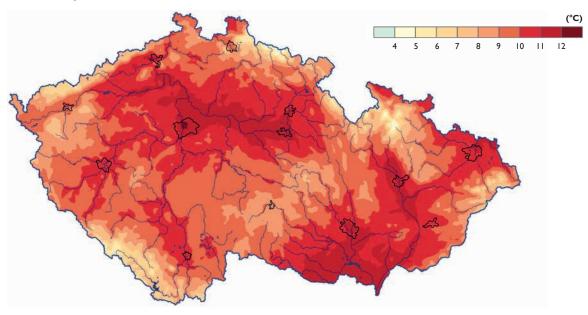
Average monthly air temperatures in the Czech Republic in 2023 compared to the 1991–2020 average



The winter of 2022/2023 was very warm in the Czech Republic. The average air temperature in the winter season (+1.2°C) was 1.9°C higher than the 1991–2020 average. All winter months had a positive deviation from the average monthly air temperature in the Czech Republic. December 2022 and February 2023 were rated as average (deviation +0.7°C and +1.6°C), January 2023 was strongly above-average (deviation +3.4°C). On I January 2023, the absolute maximum air temperature for January was exceeded when the highest daily air temperature of 19.6°C measured at the Javorník station (Jeseník District). The spring as a whole was a normal year in terms of temperatures, with the average air temperature in the

Czech Republic (7.9°C) being 0.4°C below-average. March was relatively warm, even though it was still considered a normal month (deviation from the average temperature of +1.5°C). April was very cold (deviation -2.1°C) and May was normal (deviation -0.5°C). The first summer day (i.e. a day with the maximum air temperature of 25°C or above) was recorded in the Czech Republic on 5 May at the Pilsen, Bolevec station (25.2°C). However, 25°C or more was not measured at other stations until 20 May. The summer in the Czech Republic, with an average air temperature of 18.5°C, was 0.9°C warmer than normal. All three summer months had a positive deviation from the average temperature. June and August were rated as

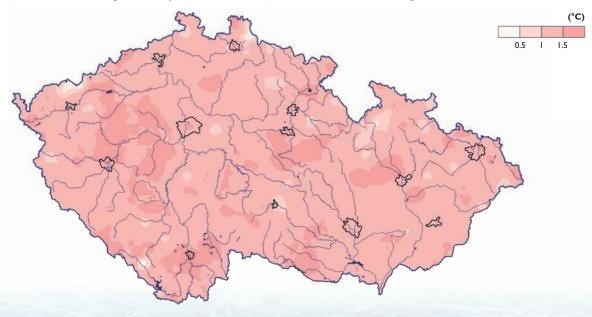
Figure 1.1.1 Average annual air temperature in 2023



Source: CHMI

Figure 1.1.2

Deviation of the annual average air temperature in 2023 from the 1991–2020 average



normal, with a deviation from the average of +0.7°C, while July was above-average (deviation of +1.3°C). The first tropical day (a day with the maximum air temperature of 30°C or higher) was recorded in our country on 18 June, when the air temperature reached 30°C at the Pilsen, Bolevec station (30.3°C) and Pilsen, Mikulka station (30.0°C). 20–22 June were particularly warm days, when deviations from the average daily temperature in the Czech Republic were higher than +5°C and the daily maximum air temperatures exceeded 30°C at more than 100 stations in the standard CHMI network. In July, we saw a significantly warm period between 7 and 19 July when daily maximum air temperatures often exceeded 30°C. On some days during this period, the air temperature even rose above 35°C. The autumn as a whole was strongly aboveaverage, its average temperature of 10.6°C being 2.4°C aboveaverage. September was exceptionally warm (deviation of +3.5°C), followed by a strongly above-average October (deviation of +2.9°C) and a temperature-normal November (deviation of +0.6°C). The daily maximum air temperature on most September days exceeded the summer maximum of 25°C. On 8-13 September and 17-18 September, the temperature exceeded the tropical 30°C at several stations. Also in October, temperatures were mostly above-average. On 26, 29 and 30 November, an ice day (a day when the maximum air temperature does not reach 0.0°C) was recorded at more than 100 CHMI stations. December 2023 was rated as aboveaverage in the Czech Republic, with the average monthly temperature (2.1°C) being 2.5°C above the normal. On I-5 December, frost prevailed all day at most stations. The period from 24 to 31 December was very warm, with the average daily temperature of 4-9.5°C above-average.

Precipitation in 2023 was average in the Czech Republic, with an average annual precipitation of 732 mm, which represents 107% of the 1991–2020 average.

Throughout the year, months that were rich in precipitation altered with poor months. April with 68 mm (174% of the average), August with 135 mm (173% of the average), November with 90 mm (200% of the average) and December with 92 mm (200% of the average) were above-average months in terms of precipitation. By contrast, September was very dry, with an average precipitation of only 18 mm (30% of the average) in the Czech Republic. May and June were also belowaverage, with 61% and 56% of the average, respectively.

The average precipitation in Bohemia in 2023 was 726 mm (107% of the average), whereas in Moravia and Silesia it was 743 mm (107% of the average). Total annual precipitations in all regions exceeded the 1991–2020 average. The highest precipitation compared to the average fell in the Liberec and Hradec Králové Regions, where the annual precipitation values exceeded 115% of the average. By contrast, the lowest precipitation values compared to the average (less than 105% of the average) were recorded in the Vysočina, Pilsen, Ústí nad Labem, Central Bohemian and Prague Regions.

In January, an average of 43 mm of precipitation fell in the Czech Republic, which is 98% of the average. Higher precipitation totals were recorded in the east of the country. The highest precipitation (more than 150% of the average) fell on average in the Zlín and Moravian-Silesian Regions and the

lowest in the South Bohemian and Pilsen Regions (69% and 70% of the average, respectively). Precipitation occurred throughout the month. On the night of 17–18 January, new snow also occurred at lower altitudes, mainly on the border of the Central Bohemian and Liberec Regions. Further snowfall in most parts of the Czech Republic, including lower altitudes, occurred on 20–22 January and 30 January. In February, the average precipitation in the Czech Republic (37 mm) equalled to 100% of the average. Significant precipitation occurred in the first days of the month, when high amounts of new snow were recorded, especially in the mountains. Afterwards, further significant precipitation occurred in the second half of the month. Winter storms were also recorded in some places on 1,3 and 24 February. The most snow (138 cm) fell on 4 February at the Labská Bouda station.

March in the Czech Republic was rated as normal (50 mm, 109% of the average), with more precipitation recorded in Bohemia (60 mm, 128% of the average) than in Moravia and Silesia (29 mm, 64% of the average). Precipitation was mostly in the form of rain, snowfall only occurred in most of the country on 10 and 27 March. This was followed by a very precipitationrich April, when an average of 68 mm (174% of the average) of precipitation fell in the country. In the South Bohemian, Vysočina and South Moravian Regions, even more than 230% of the average precipitation fell. The second decade of the month was particularly rich in precipitation. The most abundant precipitation was recorded on 14 March, when an average of almost 20 mm of rain fell in the Czech Republic and daily precipitation totals of 30 mm or more were measured at more than 100 stations. By contrast, May was a below-average month in terms of precipitation in the Czech Republic, with a monthly precipitation of 43 mm being 61% of the average. Significantly less precipitation fell in Bohemia (30 mm, 44% of the average) than in Moravia and Silesia (68 mm, 92% of the average). Very low totals were recorded mainly in north-west Bohemia, with only 14 mm (23% of the average) falling in the Ústí Region. Most precipitation fell on 14 and 16 May and on 23 May. On 16 May, precipitation occurred mainly in the east of the country, where daily totals often exceeded 30 mm.

The summer months of June and July were relatively poor in precipitation, followed by an above-average August. The average precipitation in June was 46 mm (56% of the average), while in July it was 59 mm (66% of the average). Precipitation in both of the two months was below-average throughout the Czech Republic. In June, the lowest precipitation occurred in the Olomouc, Zlín, Pardubice and South Moravian Regions (less than 50% of the average). In July, the lowest precipitation (less than 60% of the average) was recorded in the South Bohemian, Pardubice, South Moravian and Vysočina Regions. Precipitation was often associated with thunderstorms in June and July. In August, the average monthly precipitation in the Czech Republic (135 mm) was 173% of the long-term average. Precipitation totals in August were highly above-average throughout the Czech Republic, most notably in the Hradec Králové, Pardubice, Olomouc and Zlín Regions, where more than double of the long-term average precipitation fell. Precipitation occurred quite often in August and was often associated with thunderstorms. The highest totals were recorded on 5-7, 13-16 and 26-28 August, when daily totals of more than 50 mm were recorded at some locations. The highest precipitation totals were recorded on 26 August at the Brloh station (Český Krumlov District) 139.5 mm and Nýdek, Filipka (Frýdek-Místek District) 101.3 mm.

The autumn months were very uneven in terms of precipitation. September was strongly below-average (18 mm, 30% of the average), October (51 mm, 104% of the average) was average and November (90 mm, 200% of the average) was strongly above-average. In September, monthly precipitation totals were strongly below-average throughout the country. This was more pronounced in Bohemia (14 mm, 25% of the average) than in Moravia and Silesia (26 mm, 39% of the average). In October, higher precipitation totals were recorded in the north and west of Bohemia and the east half of Moravia and Silesia, where monthly totals were above-average. By contrast, the lowest precipitation in October (less than 80% of the average) was

recorded in the South Bohemian Region and the Vysočina Region, whereas the last decade of the month was the richest in precipitation. In November, monthly precipitation totals were significantly above-average throughout the Czech Republic, often more than double. At the beginning of the month, precipitation was mostly in the form of rain. Later, sleet or snow precipitation occasionally occurred at higher altitudes. From 24 November on it snowed almost all over the country.

December was a very rich month in precipitation. The average precipitation (92 mm) was 200% of the average. Precipitation in December occurred in the form of rain and snow. At the beginning of the month (I and 2 December) it snowed heavily throughout the country. Another heavy snowfall was on 22 and 23 December. Winter storms were also recorded in some places on 21 and 22 December.

Table 1.1.2
Renewable water resources 2015–2023

| Item | Annual totals (millions of m ³) | | | | | | | | | | | |
|---|---|--------|--------|--------|--------|--------|--------|--------|--------|--|--|--|
| item | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | | | |
| Precipitation | 41,957 | 50,240 | 53,868 | 41,170 | 50,004 | 60,411 | 53,674 | 49,984 | 57,150 | | | |
| Evapotranspiration | 32,165 | 40,223 | 43,424 | 33,305 | 40,369 | 47,477 | 41,719 | 41,365 | 37,475 | | | |
| Annual inflow to the Czech Republic from neighbouring countries | 398 | 402 | 339 | 320 | 405 | 840 | 785 | 593 | 819 | | | |
| Annual runoff from the territory of the Czech Republic | 10,190 | 10,419 | 10,783 | 8,185 | 10,040 | 13,774 | 14,035 | 10,043 | 13,864 | | | |
| Exploitable surface water resources () | 3,591 | 4,421 | 4,258 | 3,355 | 3,732 | 5,000 | 5,692 | 4,771 | 3,974 | | | |
| Exploitable groundwater resources | 939 | 925 | 911 | 765 | 789 | 978 | 1,213 | 817 | 962 | | | |

Source: CHMI

Note: 1) Flow rate in the major river basins with 95% confidence.

Graph 1.1.2

Average monthly precipitation in the Czech Republic in 2023 compared to the 1991–2020 average

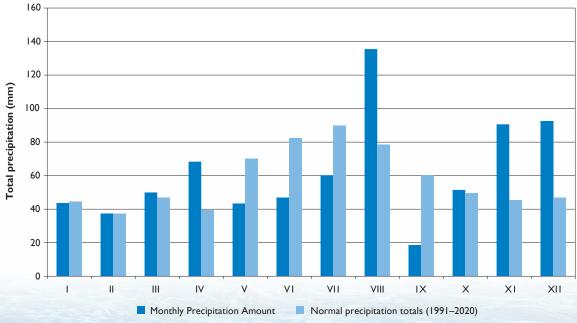


Figure 1.1.3 Total precipitation in 2023

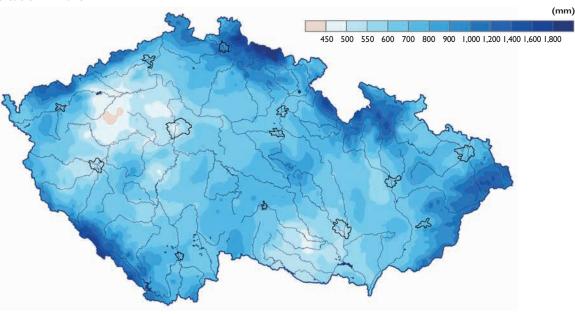
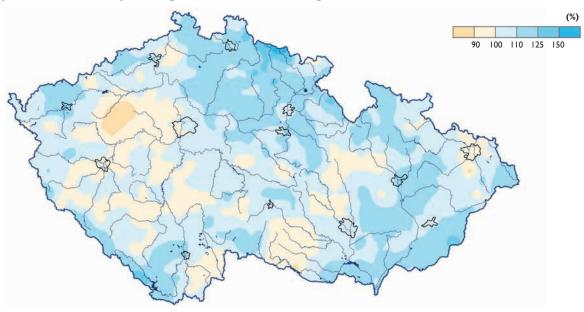


Figure 1.1.4
Total precipitation in 2023 as a percentage of the 1991–2020 average



Source: CHMI

1.2 Runoff

From the hydrological perspective, 2023 was an average year in terms of runoff. Both dry and very precipitation-rich periods occurred during the year. With the exception of October, runoff events occurred in all months, with FAD exceedances. The most significant spring flood event occurred in April, when after extensive precipitations in most parts of the country, flows exceeded FAD I and II. In terms of hydrological drought, the situation was most critical in June and July. However, after an above-average rainfall in August, when in a number of places FAD I was exceeded most often, the situation in terms of drought improved

significantly. A slight deterioration occurred only in September and early October, but after later on, flows indicating hydrological drought were very rare. The most significant runoff event of the recent years occurred in the last decade of December. The cause of such an extensive flood event was melting of a significant amount of snow cover that formed in early December, as well as significant precipitation totals from 19–26 December.

The winter months (January, February) were mostly average in terms of runoff. Only the Olše River had above-average runoff. In both months, more often in February, due to precipitation and snow cover melting, FAD I and occasionally FAD II was

exceeded. At the turn of the first and second decade of February, ice events affected a number of watercourses due to cooling.

In terms of runoff, January was mostly an average month in most of the major river basins. It was above-average only in the Olše River Basin. Average flows were mostly in the range of 45% to 140% of Q_1 for most of the month. The first significant rises in levels occurred in watercourses in the Bečva and Oder River Basins due to precipitation of 9 and 10 January. In the following days, until the middle of the month, the levels of watercourses fluctuated or rose in the rest of the territory due to further precipitation. In the Upper Elbe River Basin, on 15 and 16 January, FAD I was exceeded in some watercourses. After these precipitations, average flows increased and peaked at 4 times of Q_1 . By the end of the month, the levels of most watercourses fell or were stable.

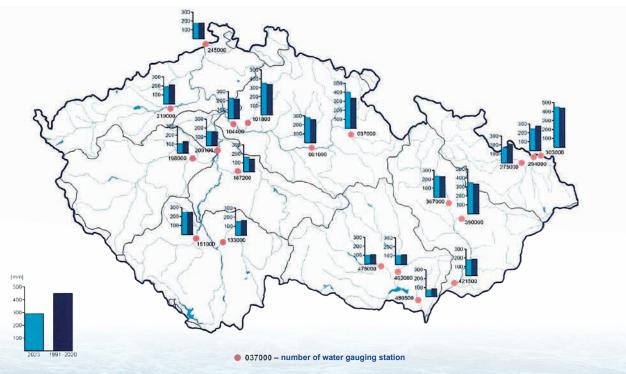
February was also a mostly average month in terms of runoff. Only the Olše River Basin continued to have above-average runoff. Average flow rates at the beginning of the month were mostly between 50% and 135% of Q_{II}. At the beginning of February, the levels of watercourses were mostly fluctuating or on the rise due to rain and melting snow cover. On 3 and 4 February, the Elbe River Basin in particular, as well as the Mandava, the Skalice and the Thaya River in Austria, peaked above FAD I. Thereafter, levels in all monitored river basins gradually decreased. As a result of low temperatures, a number of streams were affected by ice events from the end of the first decade until mid-February. At the end of the second decade of February, the levels of streams draining mountain areas and the Bohemian-Moravian Highlands rose again as a result of thawing. In 18–21 February, the flows in the Elbe, Upper Otava, Upper Sázava, Upper and Middle Morava, Oder and sporadically also

in the Thaya and Ohře Basins peaked above FAD I. The Elbe River culminated at FAD II at Vestřev ($Q_{<2}$) and the Divoká Orlice at Orlické Záhoří (Q_{s}). After that runoff episode, flow rates generally increased and extremely reached even 6 times the Q_{ii} in the third decade.

Each of the spring months (March, April and May) was quite different in terms of runoff. March was below-average to strongly below-average. May was rated as average in terms of runoff in all the basins. The most significant spring runoff situation occurred in mid-April, when, after extensive precipitations, flow rates in most places in the country exceeded FAD I or II. Rises above FAD levels also occurred in the second half of May, especially in the streams draining the Beskids and Carpathian Mountains.

In terms of runoff, March was a below-average to strongly below-average month in all major river basins. In the first week of March, flow rates in most of the country were below the long-term average, typically between 40% and 85% of $Q_{\scriptscriptstyle |||}$ Watercourse levels declined slowly or were stable for most of the first decade. Following the precipitation at the end of the first decade and combined with snowmelt, FAD I was exceeded in the Upper Otava, Berounka, Upper Elbe and Upper Morava River Basins on 9 and 10 March. The Otava in Rejštejn peaked briefly above FAD II (Q_{<2}). As a result, flow rates increased, with the highest values in the Upper Vltava and Upper Orlice River Basins (up to 2.5 times $Q_{\text{\tiny III}}$). By the end of March, flows were mostly stable or on a gradual decline, with only occasional slight fluctuations in levels in smaller mountain streams due to snowmelt. In the last days of March, the streams draining the Krkonoše and Jizera Mountains started to rise due to rainfall and snowmelt. The Upper Elbe and the Upper Jizera exceeded FAD I.

Figure 1.2.1
Annual runoff compared to the 1991–2020 long-term average



April was rated as below-average in the Olše, Oder and Morava River Basins. In the other basins, April runoff was above average. The highest flows in the first decade were mainly in the Berounka basin and on some tributaries of the middle Elbe (up to 2.5 times Q_w). Watershed flows from the end of March and beginning of April to the beginning of the first decade were decreasing or slightly fluctuating. The most significant spring flood episode was caused by an area-wide significant rainfall band advancing from the south from 13 to 14 April. The affected streams responded with general rises in levels and many of them exceeded FAD I and II with peaks in the period 14-19 April most often by Q₂. Higher water levels were only in the Červený Stream at the Hořovice profile (Q₅), where FAD I was exceeded. FAD II was exceeded by the following watercourses at the following profiles: the Novohradka in Luž and Úhřetice, the Chrudimka in Nemošice, the Podolský Stream in Barchov, the Malše in Roudný, the Nežarka in Lásenice and Hamr, and the Smutná in Rataje peaked, the Lužnice in Bechyně, the Sázava in Sázava and Kácov, the Želivka in Želiv, the Mochtínský Stream in Sobětice, the Úslava in Pradlo and Koterov, the Botič in Jesenice Kocanda and Prague Petrovice, the Thaya at the profiles of Raabs an der Thaya, Břeclav Ladná and Nové Mlýny Reservoir, Želetavka in Jemnice and Vysočany, Jevišovka at Jevišovice above the reservoir and Jevišovice Reservoir, the Svratka in Veverská Bítýška and Židlochovice, Jihlava in Bransouzy, Ptáčov and Ivančice, Oslava in Mostiště below the dam and Nesměř, the Balinka in Baliny, Rokytná in Příštpo and Moravský Krumlov. FAD III was exceeded only by the Moravian Thaya at the Janov profile (Q2). For more detailed information see the chapter Floods. Flows increased after this runoff episode and the highest values were reached especially by the flows in the basins of the Thaya and Vltava Rivers (up to 6 times the $\mathbf{Q}_{\text{\tiny IV}}\!);$ below-average flows remained throughout the month especially in Eastern Moravia and Silesia. At the end of April, flows mostly declined and flows were mostly in the range of 50 to 165% of Q_{IV}

In terms of runoff, May was rated as average. Stream levels in the first half of the month were mostly slowly decreasing or were stable. The highest flows continued to be in the basins of the Thaya and Vltava Rivers (up to 3.5 times Q,). After the rainfall of 16 and 17 May, which affected Moravia, Silesia and also South Bohemia, the affected catchments experienced rising water levels. On 17 May, the level of the Velička River in Velká nad Veličkou and Strážnice peaked above FAD III (coincidentally at Q20). The level of the Bystřice River peaked above FAD II at the profile Bystřička above the reservoir and Bystřička below the reservoir (coincidentally at Q_{s2}). Some other streams in the Morava and Oder River Basins rose above FAD I.A day later, the lower Morava River peaked above FAD I due to the influx. Average flows in the Morava and Oder basins then increased and occasionally reached up to 6 times Q. The renewed rises were recorded after the rainfall of 23 May. FADs were exceeded again on several streams on 23 and 24 May. The Ropičanka in the Řeka profile and the Jevišovka at the Plaveč profile peaked above FAD II (at Q₂). The Bystřice (tributary to the Vsetínská Bečva), Želetavka and Svinenský Stream peaked above FAD I.At the end of the month, flows were mostly in the range of 35 to 180% Q, with aboveaverage flows remaining in the south-east of our territory. Elsewhere, flows were below average to well below average.

A substantial part of the summer (June, July and August) was rated as well below average in terms of runoff. In late June,

flows of $Q_{\rm 355d}$ or less began to appear in all catchments for the first time of the year. Particularly during August, due to localised storms, but also heavy area rainfall, runoff episodes also occurred with reaches of FAD III, but most often FAD I.

June was rated as below average to well below average in terms of runoff. Only about a third of the Q_{v_l} flowed out of the Morava and Olše River Basins. Stream levels declined gradually or were persistent for most of the month and flows were mostly in the range of 20 to 85% of the Q_{v_l} . Fluctuations in levels or transient rises were recorded due to rainfall only from 5 to 10 June. However, only the upper section of the Sázava rose above FAD I on 9 June. At the end of the month, flows of Q_{355d} and less (at ca. 10% of the reporting profiles) started to appear in all catchments. The highest proportion of «dry» profiles was recorded on streams in the Lower Elbe and Ohře basins (about one third of the reporting profiles).

July was also rated as significantly below average in terms of runoff. Less than a fifth of the Q_{VII} flowed out of the Morava Basin. Most of the watercourses remained stable or slightly declined in July, with flows mostly ranging from 15 to 55% of the Q_{VII} . Fluctuations in levels with isolated exceedances of FAD I occurred on smaller streams due to local storms. FAD I was briefly exceeded on 17 July in the Bystřice (tributary to the Vsetínská Bečva), on 25 July in the Stonávka and on 26 July in the Ropičanka. In all the major river basins, the number of streams indicating hydrological drought increased during the month. At the beginning of the third decade, about a quarter of all reporting profiles indicated hydrological drought, which was the largest proportion of the whole year. The situation remained worst in the Lower Elbe and Ohře River Basins (about 80% of the reporting profiles).

August was strongly above-average in terms of precipitation, and the runoff situation improved in most catchments. Only the Vltava basin had significantly below average runoff. Flows at the beginning of the month were mostly between 30 and 120% of Qviii. After the heavy and widespread rainfall of 5 and 6 August, flows rose significantly in most areas. The Ropičanka at the Řeka profile and the Jevišovka at the Plaveč profile peaked above FAD II (at Q_{<2}). The Bystřice (tributary to the Vsetínská Bečva), Želetavka and Svinenský Stream peaked above FAD I.At the end of the month, flows were mostly in the range of 35 to 180% Q with above-average flows remaining in the south-east of our territory. Elsewhere, flows were below average to well below average. A substantial portion of the summer period (June, July and August) was rated as well below average in terms of runoff. In late June, flows of Q_{355d} or less began to appear in all catchments for the first time of the year. Particularly during August, due to localised storms, but also heavy rainfall in the country, runoff episodes also occurred with reaches of FAD III, but most often FAD I. June was rated as below average to well below average in terms of runoff. Only about a third of the Q_{vi} flowed out of the Morava and Olše River Basins. Stream levels declined gradually or were persistent for most of the month and flows were mostly in the range of 20 to 85% of the Q_{vi}.

The autumn months (September, October and November) were initially below average to well below average in terms of runoff. It was not until November that runoff was average or above average in most of the basins. Particularly during September and early October, flows indicating hydrological

drought were again more frequent, but not to the same extent as in the summer months. November was very rich in rainfall and often saw rises above FAD I or II.

September was rated as below average to well below average in terms of runoff. Stream levels during September were mostly gradually declining or persistent and flows were most often in the range of 20 to 85% of $Q_{\rm lx}$. During the month, flows again began to drop below the hydrological drought level (Q_{355d}), and in the second and third decade, «dry» profiles were indicated at ca. 10% of all reporting profiles. The highest proportion of «dry» profiles (ca. one third) was on streams in the Lower Elbe and Ohře Basins. A slight improvement occurred only in the short term, mainly due to localised precipitation accompanied by storms in the second decade. In response to the above-mentioned precipitation, the level of the Třebůvka, Jevíčka and Bělá (tributary to the Svitava) peaked above FAD I on I 3 and I 4 September, and the level of the Lusatian Neisse on I 8 September.

October was also still rated as below-average to significantly below-average in most of the catchment areas in terms of runoff, only in the Olše and Vltava catchments was the runoff average. In the first decade of October, stream levels declined very slowly or were persistent and flows were mostly in the range of 15 to 65% of Q_x . Water levels at Q_{355d} continued to be indicated at about 10% of all reporting profiles. Flows increased

slightly in the second half of the month due to intermittent precipitation or pond releases. In the basins of the Bečva, Olše and Upper Sázava Rivers they reached up to 2 times the Q_{χ} . From the second decade of October until the end of the year, water levels at the level of hydrological drought occurred only very sporadically.

November was very rich in precipitation. Most of the major river basins had average to above-average runoff, only the Thaya had below-average runoff. Stream levels were mostly fluctuating or rising due to frequent rainfall. Already on 3 November, isolated exceedances of FAD I occurred in the Upper Morava basin. After the rainfall episode of 13-15 November, the most frequent exceedances of FAD I occurred in the upper Otava basin and also in the Divoká Orlice. On 14 November, the Vydra in the Modrava profile (Q2) and the Otava in Rejštejn (Q) peaked above FAD II. As a result of the precipitation of 19 and 20 November, combined with snowmelt, flows in the upper Jizera and upper Elbe basins and in the Czech part of the Oder basin rose above FAD. On 20 November, the level of the Jizera River in Jablonec nad Jizerou peaked above FAD II (Q_). Flows were mostly in the range of 40 to 145% of Q_{x_1} for most of the month. In the north-east half of our territory and also in the streams draining the Bohemian Forest, where precipitation totals were the highest, flows at the beginning of the third decade reached 3 to 10 times Q_{χ_l} . In the last decade, due to cooling, the levels of the streams were mostly on a decline.

Table 1.2.1
Runoff in 2023 as percentage of long-term average monthly runoff in 1991–2020

| River | Profile | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII | Year |
|-------------------|--------------------|-----|-----|-----|-----|-----|----|-----|------|----|-----|-----|-----|------|
| Mivei | Trome | | | | | | | [%] | | | | | | |
| Orlice | Týniště nad Orlicí | 113 | 138 | 97 | 135 | 74 | 47 | 29 | 145 | 47 | 42 | 168 | 335 | 120 |
| Elbe | Přelouč | 101 | 122 | 89 | 132 | 81 | 44 | 31 | 109 | 52 | 44 | 137 | 314 | 108 |
| Jizera | Tuřice-Předměřice | 95 | 135 | 103 | 97 | 60 | 45 | 35 | 92 | 44 | 50 | 146 | 271 | 105 |
| Elbe | Kostelec nad Labem | 91 | 119 | 88 | 125 | 75 | 42 | 30 | 100 | 48 | 47 | 137 | 296 | 105 |
| Lužnice | Bechyně | 106 | 120 | 48 | 161 | 135 | 53 | 18 | 38 | 48 | 62 | 76 | 279 | 94 |
| Otava | Písek | 104 | 132 | 90 | 152 | 99 | 44 | 33 | 69 | 53 | 47 | 107 | 223 | 100 |
| Sázava | Nespeky | 114 | 142 | 63 | 189 | 122 | 50 | 31 | 64 | 50 | 57 | 79 | 407 | 116 |
| Berounka | Beroun | 59 | 67 | 73 | 178 | 80 | 35 | 37 | 54 | 46 | 41 | 58 | 190 | 82 |
| Vltava | Praha-Chuchle | 102 | 93 | 85 | 162 | 116 | 55 | 51 | 44 | 56 | 82 | 94 | 232 | 100 |
| Ohře | Louny | 48 | 65 | 80 | 105 | 80 | 35 | 52 | 86 | 84 | 70 | 111 | 230 | 89 |
| Elbe | Hřensko | 87 | 96 | 83 | 132 | 94 | 51 | 43 | 64 | 58 | 71 | 105 | 238 | 97 |
| Opava | Děhylov | 65 | 85 | 42 | 85 | 97 | 48 | 32 | 81 | 84 | 74 | 137 | 223 | 81 |
| Oder | Bohumín | 121 | 122 | 51 | 65 | 103 | 45 | 31 | 99 | 54 | 57 | 146 | 271 | 88 |
| Olše | Věřňovice | 161 | 175 | 60 | 53 | 112 | 37 | 49 | 115 | 47 | 104 | 170 | 233 | 102 |
| Morava | Olomouc-Nové Sady | 94 | 109 | 73 | 96 | 75 | 47 | 27 | 141 | 74 | 50 | 163 | 318 | 101 |
| Bečva | Dluhonice | 158 | 143 | 48 | 42 | 124 | 39 | 21 | 185 | 43 | 54 | 215 | 326 | 106 |
| Morava | Strážnice | 115 | 107 | 56 | 70 | 98 | 41 | 21 | 135 | 57 | 44 | 169 | 305 | 95 |
| Svratka | Židlochovice | 78 | 91 | 48 | 135 | 99 | 59 | 38 | 98 | 76 | 51 | 102 | 234 | 90 |
| Jihlava | Ivančice | 74 | 108 | 57 | 179 | 139 | 70 | 41 | 49 | 48 | 43 | 59 | 219 | 94 |
| Thaya | Ladná | 81 | 89 | 52 | 147 | 125 | 60 | 40 | 53 | 60 | 42 | 74 | 197 | 87 |
| Source: CHMI | | | | | | | | | | | | | | |
| Note: % of the av | verage 30 4 | 0 | 50 | 6 | 0 | 80 | ı | 00 | 120 | | 150 | 200 |) | 300 |

In the last month (December), our area experienced the most significant flood event in recent years. Flow rates in the first decade were mostly stagnant and some smaller streams experienced lockups due to cold temperatures. Water storage in the snowpack at the beginning of the month was the largest in terms of comparison of winter seasons assessed since 1980. Due to warming and significant rainfall, snow melted during the second decade, especially from the lower and middle elevations. At higher altitudes, it also melted in the third decade. Consequently, FADs (including the highest ones) were exceeded on a number of streams in the third decade of December.

December was rated as strongly above-average in terms of runoff, with most of the major river basins discharging about 2.5 times the $Q_{x_{II}}$ or more. Stream levels were mostly stable during the first decade, with flows most often in the range of 55 to 125% of $Q_{x_{II}}$. Due to cold temperatures, smaller streams were affected by ice events. During the second decade there were transient rises in stream levels due to the thaw, but without reaching FADs. Flows increased and were highest in the Oder and Morava basins (4 to 8 times Q_{xII}). At the beginning of the third decade, the most significant runoff event of 2023 took place in the Czech Republic. The first runoff response was caused by significant runoff, especially in the north of the country. On a number of streams, FADs were exceeded with peaks on 21 and 22 December. Above the level of the FAD III, the level of the Elbe in Vestřev, the Žejbro in Rosice and the Mandava in Varnsdorf peaked at $Q_{<2}$ or Q_2 . FAD II was exceeded in the Upper and Middle Elbe, Lower Elbe and Ohre and Morava River Basins, all peaking at $Q_{<2}$ or Q_2 . On 23 December, flows in the VItava River Basin also rose above FAD. The level of the Skalice in Zadní Poříčí $(Q_{\le 10})$ and the Litavka in Čenkov (Q_5) peaked above FAD II. Another significant flood occurred on 24 December. Gradually, numerous FAD exceedances occurred. The Elbe peaked above FAD III at $Q_{<2}$ or Q_2 at the profiles of Les Království, Litoměřice, Ústí nad Labem and Děčín, the Tichá Orlice in Čermná nad Orlicí, the Orlice in Týniště nad Orlicí, the Chrudimka in Padrty and Nemošice, the Doubrava in Pařížov, the Cidlina in Jičín and Sány, the Jizera in Jablonec nad Jizerou, the Vltava in Český Krumlov, the Nežárka in Lásenice, the Černovický Stream in Tučapy, the Sázava in Sázava, Kácov and Nespeky, the Želivka in Želiv and Poříčí, the Panenský Stream in Pertoltice, the Ploučnice in Stružnice, the Kamenice in Hřensko, the Mandava in Varnsdorf, the Smědá in Višňová, the Morava in Moravičany and Olomouc, the Svratka in Brno-Poříčí (measurements affected by construction in the channel), the Jihlava in Bransouzy and Ptáčov, the Oslava at Dolní Bory-Olší and the Balinka in Baliny. When water levels exceeded Q2, they peaked above FAD III of the Elbe in Vestřev (Q_s) , Stanovice (Q_s) , Němčice (Q_s) and Kostelec nad Labem (Q_{10}) , the Zdobnice in Slatina nad Zdobnici (Q_5) , the Novohradka in Luže (Q_s) and Uhřetice (Q₁₀), the Žejbra in Rosice (Q_s) , the Bystřice in Rohoznice (Q_s) , the Žirovnice in Žirovnice (Q_{cs}) , the Nežárka in Rodvínov (Q_{10}) , the Sázava in Chlístov (Q10), Světlá nad Sázavou (Q5) and Zruč nad Sázavou (Q_s) , the Ohře in Karlovy Vary (Q_s) , the Březná in Hoštejn (Q_s) , the Moravian Thaya in Janov (Q_s) and the Svratka in Dalečín (Q_s) . The most frequent peak flows at $Q_{<2}$ or Q_2 exceeding FAD II were in the Upper and Middle Elbe, Vltava, Sázava, Berounka, Ohře and Lower Elbe, Oder, Morava and Thaya River Basins. When water levels exceeded Q₂, the Divoká Orlice in Kostelec nad Orlicí (Q_5) , the Elbe in Přelouč (Q_5) , and the Šlapanka in Mírovka (Q10) peaked above FAD II, the Sázavka in Josefodol (Q_5) , the Svatava in Kraslice (Q_{10}) , the Teplá in Teplička (Q_{10}) and

at Březová hydroelectric power plant (Q_s) , the Třebůvka in Mezihoří (Q_s) , the Bystřice in Velké Bystřice (Q_s) and the Jihlava in Dvorce (Q_s) . Overall, the highest flow in terms of recurrence interval was achieved on 24 December during the December flood in the Svatava at the Svatava profile, with a recurrence interval of 20 years. More detailed information is provided in the Floods chapter, and a separate report on the situation was issued. Flows increased significantly in the third decade, reaching 10 to 20 times $Q_{\chi_{II}}$ in some places (flows in the Sázava, Morava and Thaya Basins and some tributaries of the Middle Elbe).

1.3 Groundwater regime

In 2023, the levels of groundwaters with shallow circulation and spring yields were generally average. The situation varied regionally, with the worst conditions in the Ohre and Lower Elbe Basins, where the level was generally strong and the yield extremely below-average (Figure 1.3.1, Figure 1.3.2). By contrast, in the Upper and Lower VItava River Basins the yield was slightly above-average (Figure 1.3.2). Overall, 62% of shallow wells and 42% of springs were normal. 12% of wells and 24% of springs were strongly or extremely below-average. Conversely, 7% of wells and 12% of springs were strongly or extremely aboveaverage. Overall, normal conditions prevailed in the shallow circulation and springs in the first quarter. The normal annual maximum in both level and discharge occurred in April (Graph 1.3.1, Graph 1.3.3), and in the Upper and Lower VItava and Berounka Basins (for wells), it was even strongly aboveaverage. The worst condition in the shallow circulation and at the springs was recorded in July, when the condition deteriorated from normal levels and slightly below-average yield in June to strongly below-average within a few weeks. In August and September, the condition improved and returned to normal. The annual low, slightly below-average in shallow circulation and strongly below-average at springs, occurred in October. The worst, extremely below-average condition, occurred again in the Ohre and Lower Elbe Basins in October. By the end of the year, the levels rose and the yield increased until it was strongly above-average in December. In parts of the Morava Basin in particular (Upper Oder and Morava, shallow wells), the annual strong to extremely above-average maximum occurred. Overall, 52% of shallow wells and 46% of springs were strongly or extremely above-average in December. December's water levels and yields were the best since 2010.

As for deep aquifers in the Czech Republic, the drought of previous years continued (Figure 1.3.3, Graph 1.3.5). Overall, the level of deep aquifers in the Czech Republic was strongly belowaverage in 2023 (Table 1.3.3). Regionally, however, the situation varied. Extremely below-average levels were in the North Bohemian Cretaceous, the Permo-carboniferous of Central and West Bohemia and the Sub-Ore Mountain basins. The level in the South Bohemian basins was slightly below-average. However, in other groups of hydrogeological regions the level was normal. Overall, 17% of the objects were extremely below-average, 22% were strongly below-average and 11% were slightly belowaverage, 38% were average, 4% were slightly above-average, 6% were strongly above-average and 1% was extremely aboveaverage. In terms of the whole country, deep aquifer levels were strongly below-average for most of the year (Graph 1.3.5, Table 1.3.3). Starting in January, the level rose to a slightly belowaverage annual maximum in May, followed by a decline to an

extremely below-average condition in July, and then the level declined slightly to a strongly below-average annual minimum in October, but improved very significantly to an overall normal condition in December. In the North Bohemian Cretaceous and Permo-carboniferous of Central and West Bohemia, levels were extremely below-average throughout the year. The level was also extremely below-average from January to April in the sub-Ore Mountains basins. On the other hand, in the Cenozoic of the North Bohemian Cretaceous, which has a distinctly perennial regime, the level was normal throughout the year. The best condition was recorded in the East Bohemian Permocarboniferous zone, where the level was normal for most of the year, slightly above-average in May, and in December there was a very significant rise to a strongly above-average level. The Moravian Tertiary also improved to slightly above-average in December (Table 1.3.3, Graph 1.3.6).

Shallow wells

Levels were mostly slightly rising in the first quarter and were average in most areas with regional variations. In the Upper Oder basin, the level was strongly above-average in January (11% of EC_m), while in March the level in the Morava and Thaya River Basins deteriorated to strongly below-average (86–89% of EC_m). The average annual maximum occurred in April (42% of EC_m, Graph 1.3.1), and in the Upper and Lower Vltava and Berounka Basins it was even strongly above-average (8–13% of EC_m). Afterwards, the level declined until July, when it reached an overall strongly below-average state (90% of EC_m) and in part of the river basin (the Berounka, Ohře and Lower Elbe, Lusatian Neisse, Graph 1.3.2) an annual strong to extremely below-average minimum occurred (Table 1.3.1). In July, 39% of shallow wells were strongly or

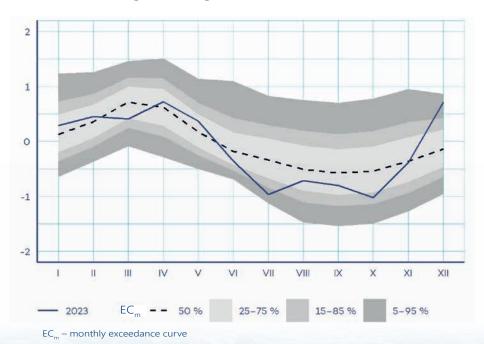


The Landštejn Reservoir, October (source: Morava River Board, s.e.)

extremely below-average, while no object was strongly or extremely above-average. In August and September, conditions returned to normal in most areas, except in the Ohre and Lower Elbe Basins, where moderate to severe drought continued. In October, an overall slightly below-average annual minimum (80% of EC__) occurred. By the end of the year, the level was rising and in November it was normal, except for a slightly above-average level in the upper Oder Basin (24% of EC_). In December, the level rose significantly to an overall strongly above-average level (7% of EC_) and almost reached the level of the annual maximum in April (Graph 1.3.1). In part of the basin, a moderate to extremely above-average annual maximum occurred (Ohře and Lower Elbe, Morava, Lusatian Neisse, Upper Oder 3-17% of EC, Table 1.3.1), with 55% of shallow wells reaching the overall annual maximum. Levels were strongly or extremely above-average in 52% of shallow wells, marking the best December since 2010.

Graph 1.3.1

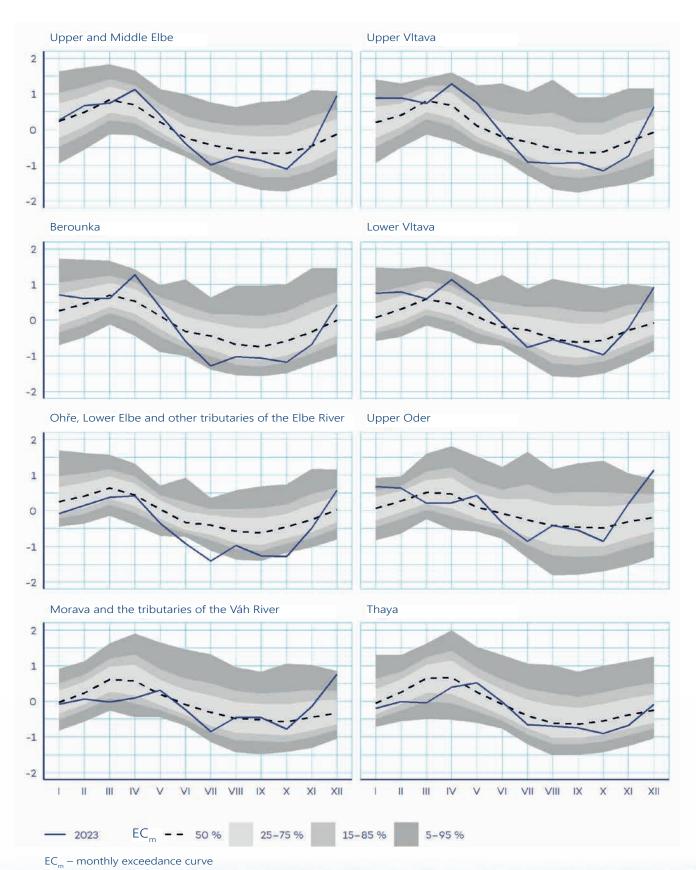
Average standardised groundwater levels at shallow wells in the monitoring network of the Czech Republic in 2023 (blue) compared to the 1991–2020 long-term average



Source: CHMI

Note: The graph also shows quantiles of monthly exceedance probability curves (EC_m) The vertical axis shows the standard deviation.

Graph 1.3.2 Average standardised level of shallow wells in the monitoring network in river basins in 2023 (blue) compared to the 1991–2020 long-term average



Note: The graph also shows quantiles of monthly exceedance curves (EC_m).

Extraordinarily below normal
High below normal
Normal
Normal

Figure 1.3.1
Groundwater levels in shallow wells in 2023, compared to the 1991–2020 period

Table 1.3.1 Probability of exceeding the average groundwater level in 2023 in river basins in % of EC_m (monthly exceedance curve for 1991–2020)

| Basin | | | | | Le | evel rat | ing on | EC _m in | % | | | | |
|-----------------------|-----|----|-----|----|----|----------|--------|--------------------|----|----|----|-----|------|
| | - 1 | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII | 2023 |
| Upper and Middle Elbe | 49 | 39 | 57 | 20 | 33 | 67 | 90 | 63 | 62 | 75 | 50 | 7 | 52 |
| Upper VItava | 16 | 17 | 57 | 13 | 14 | 44 | 84 | 71 | 65 | 80 | 71 | 15 | 39 |
| Berounka | 26 | 41 | 57 | 8 | 31 | 72 | 93 | 72 | 71 | 85 | 71 | 27 | 57 |
| Lower VItava | 16 | 20 | 50 | 9 | 15 | 41 | 82 | 51 | 57 | 76 | 45 | 5 | 35 |
| Ohře and Lower Elbe | 76 | 70 | 72 | 52 | 83 | 100 | 99 | 80 | 91 | 97 | 67 | 17 | 86 |
| Upper Oder | Ш | 19 | 74 | 66 | 29 | 71 | 81 | 50 | 54 | 69 | 24 | 3 | 41 |
| Lusatian Neisse | 84 | 62 | 55 | 27 | 64 | 98 | 98 | 66 | 71 | 84 | 47 | 5 | 68 |
| Morava | 54 | 65 | 89 | 79 | 42 | 62 | 84 | 47 | 46 | 63 | 32 | 6 | 58 |
| Thaya | 62 | 70 | 86 | 65 | 34 | 45 | 68 | 55 | 57 | 73 | 69 | 39 | 68 |
| Czech Republic | 37 | 41 | 76 | 42 | 33 | 68 | 90 | 64 | 65 | 80 | 52 | 7 | 56 |

Source: CHMI

Note: The red colour scale corresponds to the categories slightly (75–85%), strongly (85–95%) and extremely (95–100%) below-average levels. Blue colours indicate slightly (15–25%), strongly (5–15%) and extremely (0-5%) above-average yield

Springs

Spring yield was mostly increasing in the first quarter (Graph I.3.3, Graph I.3.4), with moderately to strongly above-average conditions in the Lower Vltava and Upper Vltava River Basins, while normal conditions prevailed in the rest of the area, with the exception of the Ohře and Lower Elbe River basins, where conditions were extremely below-average for most of the year (Table I.3.2). Overall, the average annual maximum occurred in April (52% of EC_m, Graph I.3.3), while in the Upper and Lower Vltava Basins it was strongly above-

average (5–9% of EC_m), and in the Ohře and Lower Elbe Basins it was extremely below-average (95% of EC_m, Table 1.3.2). Later, yields mostly decreased until the overall strongly below-average condition (91% of EC_m) in July, when yields were strongly or extremely below-average in 37% of the springs, while strongly or extremely above-average yields were recorded in only 3% of the springs. In August, the yield increased to a generally normal condition (75% of EC_m). Thereafter, it decreased until it reached an annual overall strongly below-average minimum in October (90% of EC_m) in all river basins. The Lower VItava Basin was regionally different,



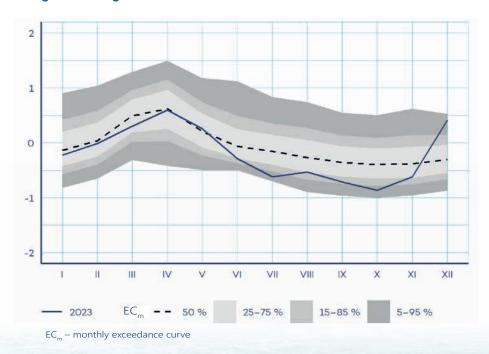
The Jezeří Reservoir – reconstruction, August 2023 (source: Ohře River Board, s.e.)

with an average annual minimum in October (43% of EC_m). By the end of the year, the discharge was increasing, and in November it was generally normal (74% of EC_m). In December, the yield increased significantly throughout the area to an overall strongly above-average level (7% of EC_m). In the Ohře and Lower Elbe Basins there was a slightly below-average

 $(81\% \text{ of EC}_m)$, in the Upper and Middle Elbe Basins a strongly above-average $(8\% \text{ of EC}_m)$ and in the Morava Basin even an extremely above-average $(4\% \text{ of EC}_m)$ annual maximum. Discharge was strongly or extremely above-average in 46% of the springs and this was the best December since 2010.

Graph 1.3.3

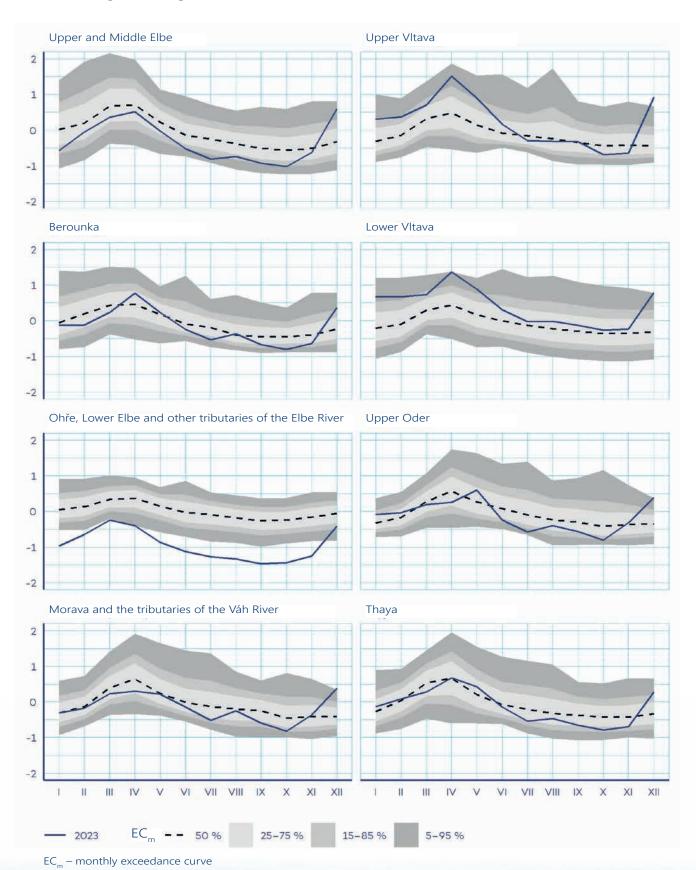
Average standardised yield of springs in the monitoring network of the whole Czech Republic in 2023 (blue) compared to the 1991–2020 long-term average



Source: CHMI

Note: The graph also shows quantiles of monthly exceedance curves (EC_{m}). The vertical axis represents the standard deviation.

Graph 1.3.4 Average standardised yield of springs in the monitoring network in river sub-basins in 2023 (blue) compared to the 1991–2020 long-term average



Note: The graph also shows quantiles of monthly exceedance curves (EC_m) .

Extraordinarily below normal Higly below normal Normal Higly abnormal

Figure 1.3.2
Spring yield in 2023, compared to the 1991–2020 period

Table 1.3.2 Probability of exceedance of spring yield in 2023 in partial basins in % of EC_m (monthly exceedance curve for 1991–2020)

| Basin | Water yield values in % of EC _m | | | | | | | | | | | | |
|-----------------------|--|----|-----|----|----|----|-----|------|----|-----|----|-----|------|
| | - 1 | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII | 2023 |
| Upper and Middle Elbe | 82 | 64 | 69 | 61 | 69 | 84 | 92 | 80 | 83 | 86 | 60 | 8 | 72 |
| Upper VItava | 16 | 16 | 24 | 9 | 14 | 31 | 64 | 56 | 48 | 76 | 71 | 3 | 18 |
| Berounka | 56 | 71 | 66 | 29 | 45 | 67 | 84 | 46 | 76 | 91 | 76 | 13 | 60 |
| Lower VItava | 12 | 13 | 19 | 5 | Ш | 30 | 43 | 37 | 39 | 43 | 41 | 5 | 21 |
| Ohře and Lower Elbe | 100 | 97 | 96 | 95 | 98 | 99 | 99 | 99 | 99 | 100 | 99 | 81 | 98 |
| Upper Oder | 23 | 35 | 58 | 70 | 29 | 80 | 91 | 64 | 73 | 86 | 45 | 5 | 59 |
| Lusatian Neisse | 93 | 93 | 91 | 89 | 88 | 90 | 93 | 89 | 84 | 86 | 82 | 51 | 92 |
| Morava | 50 | 55 | 64 | 72 | 52 | 62 | 81 | 54 | 79 | 84 | 46 | 4 | 65 |
| Thaya | 39 | 45 | 69 | 50 | 35 | 56 | 77 | 61 | 74 | 82 | 77 | 13 | 55 |
| Czech Republic | 58 | 55 | 67 | 52 | 46 | 76 | 91 | 75 | 83 | 90 | 74 | 7 | 63 |

Source: CHMI

Note: The red colour scale corresponds to the categories slightly (75–85%), strongly (85–95%) and extremely (95–100%) below-average levels. Blue colours indicate slightly (15–25%), strongly (5-15%) and extremely (0-5%) above-average yield.

Deep aquifers

Deep aquifer levels in several parts of the hydrogeologic region (HGR) groups were strongly or extremely below-average in 2023. Part 4B of the North Bohemian Cretaceous was the most affected by drought, where extremely below-average levels persisted throughout the year (Figure 1.3.3). The Permocarboniferous of Central and West Bohemia (HGR groups 8A, 8B, 8C), where strongly or extremely below-average situation persisted throughout the year, was the worst since 1991 (Table 1.3.3). The share of extremely below-average wells was 67%, I I% of aquifers were strongly below-average, and no object was above-average. Strongly below-average conditions persisted for most of the year in part 4C of the North Bohemian

Cretaceous, and parts 4D of the North Bohemian Cretaceous were also strongly or extremely below-average for part of the year (Figure 1.3.4). Overall, the post-2020 condition of the North Bohemian Cretaceous (HGR Group 4) was the second worst since 1991. The share of extremely below-average wells was 40% and 40% of wells were strongly below-average. However, the condition of part 4D of the North Bohemian Cretaceous improved significantly and returned to normal in December. In the South Bohemian basins, the levels fluctuated mainly between average and strongly below-average throughout the year, with relatively worse conditions in parts 2A and 2D. The condition of submontane basins was mostly extremely below-average at the beginning of the year, but improved to near normal by December. In East Bohemia the situation was better.



Sunset on the Elbe (author: Hubalová Petra)

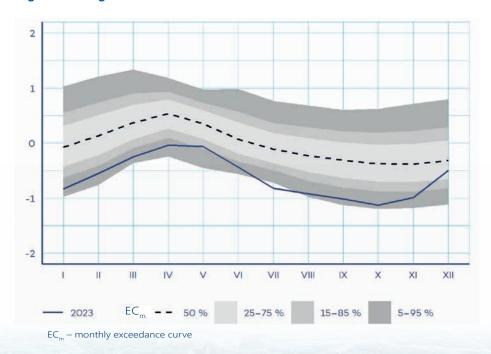
The situation in HGRs was normal for most of the year, except for part 5A of the East Bohemian Cretaceous, where the condition was mostly slightly below-average. On the other hand, in part 9A of the East Bohemian Permo-carboniferous and in part 5B of the East Bohemian Cretaceous the condition was slightly or strongly above-average in April, May and December. The condition of the Moravian Tertiary was average to strongly below-average throughout the year (the condition of part 3C was worse), improving to slightly above-average (3C) and strongly above-average (3B) in December. Levels in part 6A of the North Bohemian Cretaceous Cenomanian were slightly below-average throughout the year, while levels in parts 6D and 6E of the Cenomanian fluctuated between average and strongly below-average. Conversely, levels were consistently strongly and extremely above-average in parts 6B and 6C of the North

Bohemian Cretaceous Cenomanian, as they have a distinctly perennial regime.

Given the usual annual regime of levels, the condition of deep aquifers was worst in July, when 42% of them were strongly or extremely below-average, and only 5% of them were strongly or extremely above-average (Graph 1.3.5). In contrast, the best condition was recorded in December, when the share of aquifers with strongly or extremely below-average levels decreased to 26% and the share of aquifers with strongly or extremely above-average levels increased to 16%. Compared to the previous year, only 1% of the aquifers experienced a large drop in levels and 7% of aquifers experienced a drop in level. Conversely, 19% of aquifers experienced a rise in level and 2% of aquifers experienced a large rise in levels.

Graph 1.3.5

Average standardised deep aquifer level in the monitoring network in the Czech Republic in 2023 (blue) compared to the 1991–2020 long-term average values

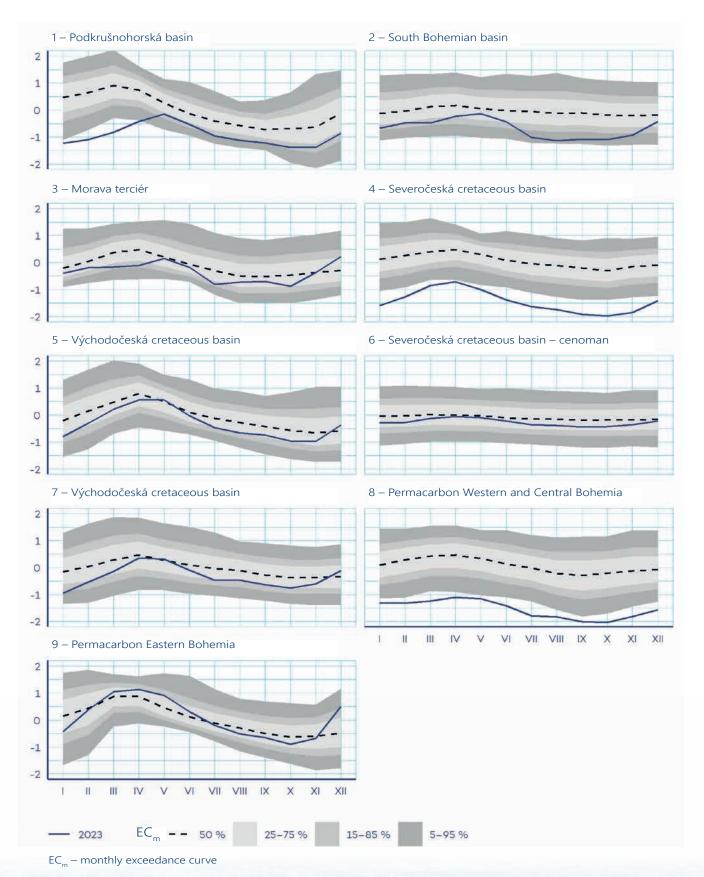


Source: CHMI

Note: The graph also shows quantiles of monthly exceedance curves (EC_m) . The vertical axis represents the standard deviation.

Graph 1.3.6

Average standardised deep aquifer levels in the monitoring network in groups of hydrogeological regions in 2023 (blue) compared to the 1991–2020 long-term average



Note: The graph also shows quantiles of monthly exceedance curves (EC_m) .

Figure 1.3.3
Groundwater levels in deep aquifers in 2023, compared to the 1991–2020 period

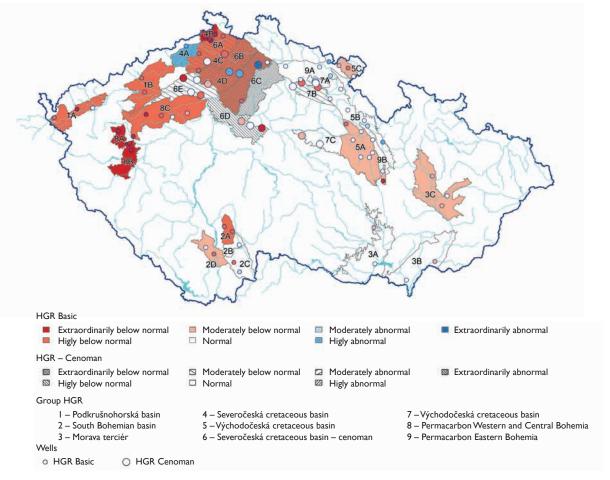


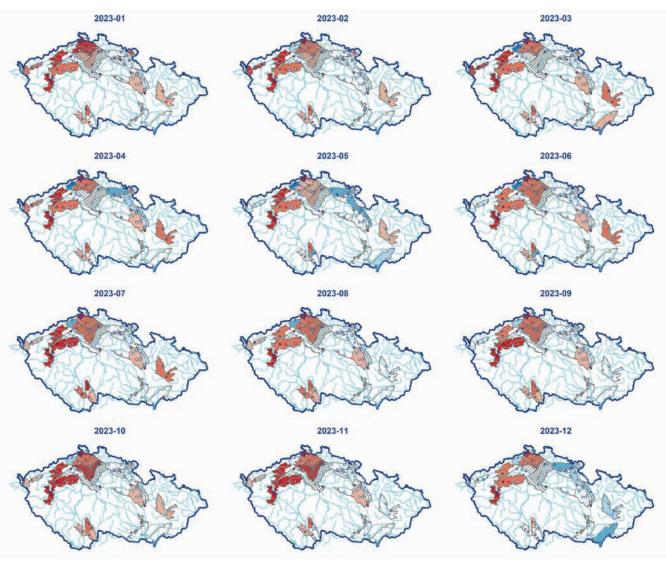
Table 1.3.3 Probability of exceedance in deep aquifers in hydrogeological groups (HGR) in 2023 in % of EC_m (monthly exceedance curve for 1991–2020)

| LICP aroun | Level rating on EC _m in % | | | | | | | | | | | | |
|--|--------------------------------------|----|----|----|----|----|-----|------|----|----|----|-----|------|
| HGR group | I | II | Ш | IV | V | VI | VII | VIII | IX | X | XI | XII | 2023 |
| Sub-Ore Mountains Basin | 96 | 98 | 99 | 95 | 78 | 79 | 86 | 87 | 86 | 83 | 80 | 78 | 96 |
| South Bohemian basins | 82 | 76 | 83 | 73 | 63 | 75 | 92 | 93 | 92 | 91 | 87 | 65 | 84 |
| Moravia – Tertiary | 65 | 68 | 82 | 83 | 53 | 59 | 82 | 63 | 61 | 74 | 50 | 23 | 69 |
| North Bohemian Cretaceous – Turon | 99 | 98 | 97 | 96 | 96 | 99 | 99 | 98 | 99 | 99 | 99 | 97 | 97 |
| East Bohemian Cretaceous - Turon | 78 | 71 | 64 | 64 | 46 | 59 | 76 | 75 | 70 | 73 | 67 | 39 | 66 |
| North Bohemian Cretaceous – Cenomanian | 66 | 67 | 59 | 54 | 56 | 59 | 65 | 66 | 68 | 67 | 62 | 54 | 65 |
| East Bohemian Cretaceous - Cenomanian | 87 | 77 | 71 | 56 | 47 | 62 | 76 | 73 | 74 | 76 | 66 | 36 | 69 |
| Permo-carboniferous of Central and West Bohemia | 97 | 97 | 98 | 96 | 96 | 98 | 99 | 97 | 97 | 97 | 98 | 98 | 97 |
| Permo-carboniferous of East Bohemia | 73 | 52 | 37 | 28 | 22 | 35 | 57 | 67 | 61 | 67 | 55 | 14 | 39 |
| Czech Republic | 92 | 90 | 92 | 90 | 83 | 91 | 97 | 94 | 93 | 94 | 90 | 64 | 88 |

Source: CHMI

Note: The red colour scale corresponds to the categories slightly (75–85%), strongly (85–95%) and extremely (95–100%) below-average yield. Blue colour indicates slightly (15–25%), strongly (5–15%) and extremely (0–5%) above-average yield.

Figure 1.3.4 Groundwater levels in deep aquifers in 2023



Note: When interpreting the results, it needs to be taken into account that assessment of deep aquifers is carried out on a smaller sample and often on shorter observation series than assessment of shallow wells and springs. While most of the deep wells have been observed since 1991, some of them have only been observed since 2008.



The Hájnický Pond Lower – Krnovsko (source: Forests of the Czech Republic)



T. Musilová – Endless Peace, Primary School Otevřená, Brno (Ist place II. category)

2. HYDROLOGICAL EXTREMES

2.1 Flood situations

2023 was a year very rich in floods, with FAD exceedance events occurring in almost all months. Winter flooding events were significantly more prevalent, caused by a combination of heavy rainfall, melting snow and often high winds. The most significant flood event took place in late December and was characterised by a large extent of the affected area, with FADs exceeded in all major river basins. Most catchments were also affected by floods in February, April, August and November. In the other months, floods were mainly of local extent. In terms of the magnitude of the recurrence period, the highest flow was reached by the Velička at Velká nad Veličkou and Strážnice on 17 May, by the Velička at Velká nad Veličkou, the Svatava at Svatava (all Q₂₀) and Kraslice (Q10), the Nežárka at Rodvínov and the Teplá at Teplička on 24 December and by the Novohradka at Úhřetice and the Sázava at Chlístov, the Šlapanka at Mírovka on 25 December and by the Elbe at Kostelec nad Labem on 27 December (all Q₁₀).

Winter season

The winter (January-April and November-December) of 2023 saw the majority of flood events. FADs were exceeded in all river basins, with the most affected flows in the Elbe, Ohře, Upper Morava, Sázava, Lužnice, and Svratka, Svitava and Thaya River Basins. The most significant flood event took place at the end of the year and was conditioned by a significant amount of snow, which fell at the beginning of December, then gradually melted and caused saturation of the soil profile in most of the Czech Republic. Subsequent very heavy precipitation in the last decade of December caused rapid rises in the levels of most



The Morava Straem – The Litovel Wier, flood December 2023 (source: Morava River Board, s.e.)

rivers. Flood situations also occurred in the following winter months, with more significant flood events in April and February (Figure 2.1.1).

Summer season

At the beginning of the summer (May–October) of 2023, in May, one of the highest flows (in terms of recurrence) of the year was reached in the Velička due to a very strong local storm. In June, July and October, flood conditions were almost non-existent or only local (Figure 2.1.2).

The assessment of floods is described in greater detail in the Annual Report on the Hydrometeorological Situation in the Czech Republic, which is prepared annually by the Czech Hydrometeorological Institute (https://www.chmi.cz/files/portal/docs/hydro/sucho/Zpravy/ROK_2023.pdf).



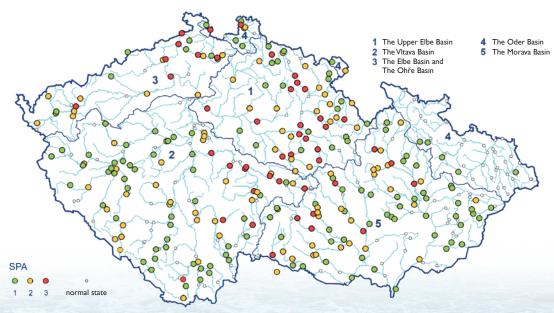
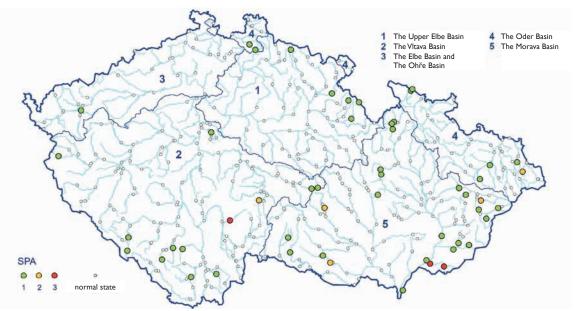


Figure 2.1.2
Highest flood activity degrees reached in summer 2023



2.2 Remedying flood damage

The Ministry of Agriculture administered two programmes aimed at remedying flood damage. Programme 129 320 «Support for Remedying Flood Damage to the Infrastructure of Water Supply and Sewerage Systems II», and programme 129 370 «Remedying Flood Damage to State-owned Water Management Assets III».

Since 2017, programme 129 320 (a follow-up to completed programme 129 140), is available with the view of responding quickly to consequences of damage or even destruction of water supply and sewerage infrastructure as a result of a natural disaster. In 2023, no support was provided for remedying flood damage to water supply and sewerage infrastructure. Programme 129 370 was launched in 2021 with the aim of remedying flood damage to watercourse systems,



Increased Flow on the Velička Stream (source: Morava River Board, s.e.)

including associated facilities, hydraulic structures, and stateowned riparian vegetation damaged by extreme stresses during floods and implementation of purposeful stabilization structures ensuring continued functionality of watercourse channels and associated facilities at failure points. In 2023, three projects were supported under the programme with a total amount of CZK 14.4 million.

For the case of flood damage, the Ministry of Agriculture administers subsidy programme 129 284 "Remedying Flood Damage to Ponds and Reservoirs". As there were no significant floods in 2023, the programme was not activated and no funds were provided.

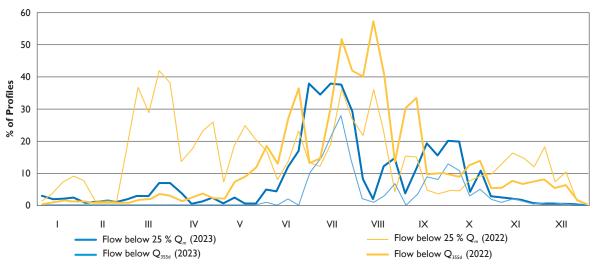
More detailed information, including financial implementation, is provided in Chapter 11 Financial support for water management.

2.3 Drought situation

Hydrological drought is defined as a shortage of surface waters and groundwaters. This chapter focuses on drought concerning surface waters; it is assessed according to the following characteristics: the number of profiles with flows lower than 25% of the monthly average (<25% of $Q_{\rm m}$) and the number of profiles with flows lower than Q_{355d} (i.e. a mean flow that was reached or exceeded 355 days per year at a given profile. If it is lower, it indicates hydrological drought) or Q_{364d} (a mean flow that was reached or exceeded at a given profile for the entire year).

From the drought perspective, 2023 was significantly richer in terms of water flows than the previous year (Graph 2.3.1). 2023 can be divided into three periods based on the number of profiles that were at or below the hydrologic drought level. From January to the end of May, "dry" profiles were almost non-existent due to frequent and heavy precipitation and snowmelt.

Graph 2.3.1
Drought development in the Czech Republic in 2022 and 2023



From the beginning of June, their number gradually increased and by October, profiles indicating hydrological drought occurred to a greater extent in most of the major river basins. In November, their number decreased again and by the end of the year their occurrence was sporadic. The situation was similar at profiles that were below 25% of $\rm Q_{\rm m}$. Compared to previous years, 2023 was the least dry year since 2020 (Graph 2.3.2).

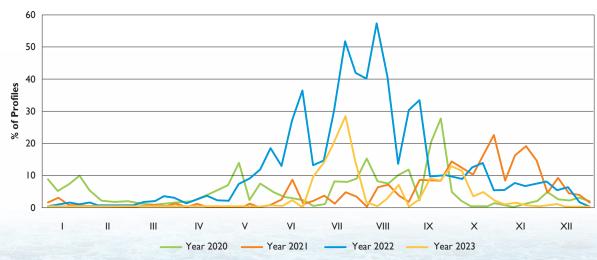
The first period from January to May followed the occurrence of profiles from the end of the previous year 2022, when profiles below Q_{355d} did not occur. In all major basins, average monthly flows were average or slightly below average compared to long-term values, and occasionally above average. The exception was March, when values in all basins were below average, with values in the Moravian basins falling to within 60% of $Q_{\rm III}$. The proportion of profiles with flow rates of less than 25% of $Q_{\rm m}$ was within 3% in that period, the exception being the second half of March, when the proportion slightly increased to 7% of the profiles monitored (23 profiles in total,

15 of which in the Morava River Basin). By the end of May, the proportion of profiles with flows of less than 25% of $Q_{\rm m}$ had fallen below 3% again.

In June, the number of profiles with flows below Q_{355d} gradually increased, and this period lasted until October. The proportion of profiles with flows less than 25% of Q_m also increased. Longterm monthly flow rates were average or below average or well below average in most of the main river basins during that period. Above-average values occurred only in August in the Olše and Morava River Basins (up to 127% of Q_{VIII}), while average values were in October in the Olše basin (up to 104% of Q_{X}). June and July were the least watery months in 2023, with most of the flows in the main basins below 50% of the long-term monthly average. The absolute maximum in terms of drought was in the second half of July, when almost 40% of the profiles (122 profiles in total) experienced flow rates less than 25% of Q_{VII} (Graph 2.3.3). Most of the profiles were in the Morava Basin (53%, 26 profiles) and in the Oder Basin (50%, 22 profiles).

Graph 2.3.2

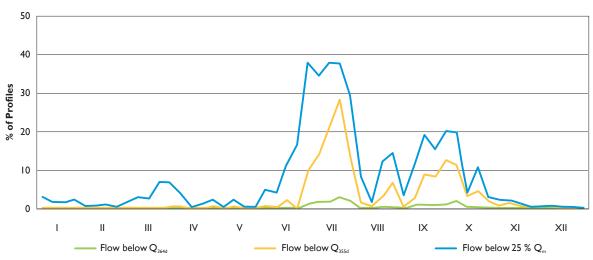
Drought development in the Czech Republic from 2020 to 2023





Flood measures - Poděbrady - December (source: Elbe River Board, s.e.)

Graph 2.3.3
Changes in average water levels in the monitoring profiles in the Czech Republic in 2023



The proportion of profiles with water levels below Q_{355d} in July ranged from 10 to 30% (31 to 91 profiles), with the highest proportions in the Lower Elbe and Ohře Basins (up to 79%, 19 profiles in total) and in the VItava Basin (32%, 33 profiles in total). The proportion of profiles with water levels below Q_{364d} was very low, with up to 3% (10 profiles) in mid-July.

In August, the situation in most of the basins improved significantly and the proportion of "dry" profiles decreased. In September, there was a gradual increase in profiles indicating hydrological drought, but not to the same extent as in the summer months. The number of profiles with water levels below $Q_{\rm 355d}$ increased to 12% at the end of September

(41 profiles in total), with the highest number in the Lower Elbe and Ohře Basins (29%, 7 profiles). Profiles with flow rates below 25% of $Q_{\rm m}$ were also the most frequent in late September and October, at 20% (65 profiles in total), of which 43% (19 profiles in total) in the Oder Basin. The situation improved in October with slight fluctuations.

In November and December, the number of profiles with flows less than 25% of $Q_{\rm m}$ fell below 3% and profiles indicating hydrological drought were almost non-existent. Except for the Thaya River Basin, flow values were average or above average in November, while in December they were well above average in all basins.

2.4 Interdepartmental commission WATER-DROUGHT

In 2023, the interdepartmental commission Water-Drought did not meet, but representatives of individual ministries participated in the preparation of the Position Report on the progress in implementation of the Drought Protection Concept for the Czech Republic in 2023.

The main tasks of the members of the Commission included the preparation of assessment of the implementation of the Drought Protection Concept for the Czech Republic in 2023. Specifically, the coordination of the documents of the involved ministries: the Ministry of Agriculture, the Ministry of the Environment, the Ministry of Industry and Trade, the Ministry of Regional Development and the Ministry of the Interior, for which measures were defined within the framework of the Drought Protection Concept for the Czech Republic, aimed at resulting to a reduction in consequences of drought and water shortage. The resulting Position Report on the implementation of the Concept was submitted to the Government for information by the required deadline at the end of February 2024.

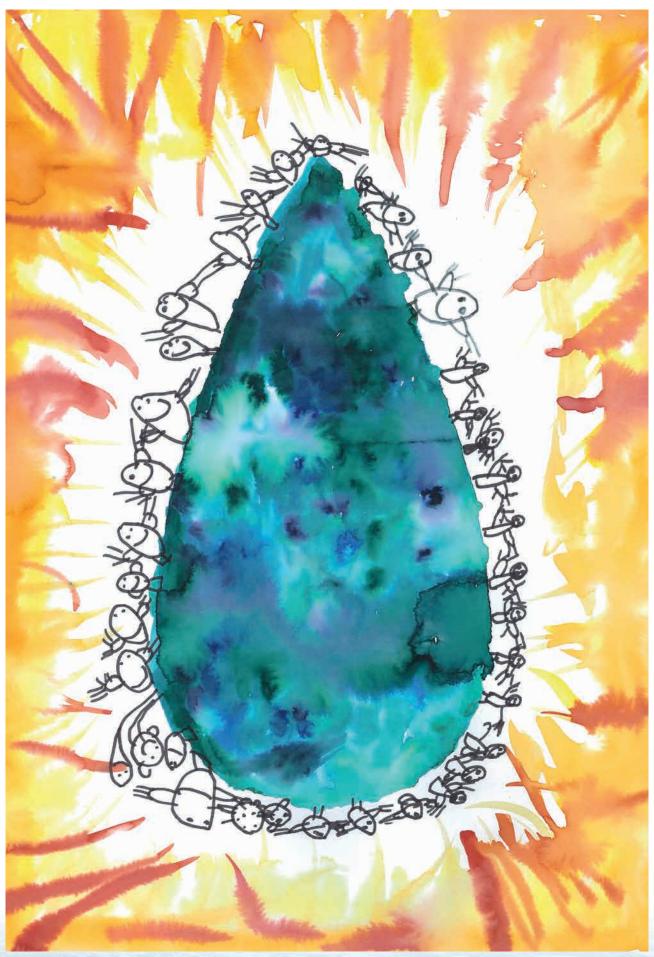
The information for each measure includes data on the implementation and data on costs, including the funds covering them. Financial resources are differentiated and the table in section 5.2.2 provides a comprehensive overview for all measures from the ministries. In 2023, a total of CZK 26.8 billion was spent (CZK 20.4 billion for MoA measures, CZK 4.9 billion for MoE measures and CZK 1.5 billion for Ministry of Industry and Trade measures). The resources from EU funds amounted to 69% and from the state budget 17%. It is important to mention the participation of investors' own resources for the implementation of water management measures, which amounted to 40% of the subsidy from the state budget.

As the Position Report was first for the new period 2023–2027, it was necessary to define indicators of the implementation and describe the current status (as a baseline) in order to assess the progress achieved in the 14 strategic objects at the end of the five-year implementation period, so that the 2027 final report can assess further achievements. The current situation is shown in the Annex to the Position Report.

More information on the drought, the WATER-DROUGHT Commission and the Concept of Protection Against Consequences of the Drought in the Czech Republic can be found on the website www.suchovkrajine.cz.



Signifikant Watercourse The Trusovický Stream above the Village of Bělkovice – Drought (source: Morava River Board, s.e.)



A. Razáková – Drop of Water for Children, Elementary School Litoměřice (Ist place III. category)

3. QUALITY OF SURFACE WATERS AND GROUNDWATERS

3.1 Surface water quality

Current surface water quality under ČSN 75 7221 compared to the 1991–1992 biennium

The map of surface water quality in selected watercourses in the Czech Republic was first prepared for the 1991–1992 biennium under ČSN 75 7221 Water quality – classification of surface water quality. From this biennium onwards, the same maps have been produced annually so that they can always be compared with the current water quality. With regard to the extent of the indicators monitored in the 1990s, only a basic classification could be used for this comparison. As of 1 December 2017, an amendment to ČSN 75 7221 Water quality – classification of surface water quality entered into force, having replaced the previous standard (ČSN 75 7221), which had been in force for the previous 19 years.

The subject of the amendment was to take into consideration the requirements concerning the current situation in surface water protection, both in terms of pollution indicators as well as the degree of acceptable pollution. The range of monitored indicators and limit values of the quality classes were reviewed. As a result, a new map of the quality of surface waters was produced for 1991–1992 (Figure 3.1.1) in accordance with the amended ČSN 75 7221 for the sake of objective comparison.

The indicators used for assessing the surface water quality were COD_{Cr}, BOD₅, N-NH₄, N-NO₃ and P_{total.} Figure 3.1.2 shows that water quality has improved over the past 31 years, however, there are still watercourse sections classified in

Class V. Most watercourses are classified in Class III – polluted water. Slowly but surely, more and more watercourse sections are classified in Classes I and II.

For the preparation of the abovementioned map of water quality in the watercourses of the Czech Republic for the period 2021–2022, the resulting assessment from selected profiles of the water quality monitoring network in watercourses provided by the Czech Hydrological Monitoring Institute (from primary data sent by individual River Boards) was used. The classification of the monitored profiles in terms of contamination according to the amended ČSN 75 7221 is as follows:

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,



The Pumping Station Stranná (source: Ohře River Board, s.e.)

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.

From the selected profiles of the watercourse quality monitoring network, 20% were classified in Class I and II as unpolluted or slightly polluted water, 47% of the profiles were classified in Class III as polluted water, 23% of the profiles were classified in Class IV as heavily polluted water and 10% of the profiles were classified in Class V as very heavily polluted water.

Figure 3.1.1 Surface water quality in the Czech Republic in 1991–1992

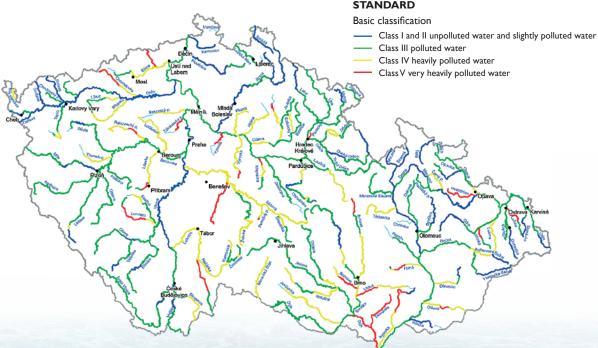
CLASSIFICATION UNDER CSN 75 7221 STANDARD Basic classification — Class I and II unpolluted water and slightly polluted water — Class III polluted water — Class IV heavily polluted water — Class V very heavily polluted water

Pribram Benesov Convince Convi

 $Source: \textit{T.G. Masaryk Water Research Institute, p.r.i., using data provided by the \textit{CHMI}}$

Figure 3.1.2 Surface water quality in the Czech Republic 2022–2023

CLASSIFICATION UNDER CSN 75 7221 STANDARD



Source: T. G. Masaryk Water Research Institute, p.r.i., using data provided by the River Boards and the CHMI

Radioactivity

In selected profiles of the state monitoring network, radiological indicators are monitored in surface waters on a long-term basis. The profiles are situated at sites of existing nuclear facilities and in watercourse stretches affected by mine water discharges and seepage from refuse dumps at locations where uranium ores were formerly mined or processed.

In surface waters of the VItava River, at the Kořensko Reservoir profile, downstream the Temelín Nuclear Power Station wastewater outfall, the highest tritium activity value was detected on a single occasion in 2023 of 41 Bq·l-¹. The highest acceptable pollution limits for tritium in surface waters under the environmental quality standard (EQS) or annual mean tritium value as per Government Decree No. 401/2015 Coll., were not exceeded.

In surface waters of the Jihlava River at the Mohelno profile, downstream the wastewater outfall from the Dukovany Nuclear Power Plant, a tritium activity value in the range of 129–249 Bq·l-l was detected, the values being lower than in 2022. The mean value exceeds the EQS limit value for tritium in surface watercourses. According to the characteristic value for tritium from the updated ČSN 75 7221 Water quality, this profile and the profile downstream in Ivančice are classified in Class III – polluted water.

The highest uranium concentrations of up to 217 $\mu g \cdot l^{-1}$ were detected in surface waters in the vicinity of the Dolní Rožínka uranium mine. Based on the uranium content, the quality of surface water at the Skryje profile in the Hadůvka River corresponds with ClassV – very heavily polluted water according to ČSN 75 7221. Elevated uranium content in surface waters is the source of elevated total alpha activity reaching a value of 8,000 mBq · l · l . The maximum value of the indicator of volumetric activity alpha exceeding the limit value of the EQS was detected at this profile, and at the Boudy profile in the Loučka River and at Veverská Bítýška in the Svratka River.

Significant pollution with uranium and radioactive indicators persists at a number of profiles in the vicinity of the Příbram deposits. Maximum uranium concentrations of 60–88 $\mu g \cdot l^{-1}$ were detected in surface waters of the Drásovský Stream at the Drásov profile and in the Kocába River at the Višňová profile and in the Příbramský Stream at the Brod profile. Given such typical values of uranium at these profiles, the watercourses are ranked in Class V – very heavily polluted water. Given the typical value of uranium of the Kocába River at the Štěchovice profile, it is classified in Class IV – heavily polluted water (lower class than in 2022). Nevertheless, because of the typical values of the total volumetric activity alpha, the monitored profiles remain in Class V – heavily polluted water.

The mean annual values as well as maximums of the total volumetric activity alpha in the Ploučnice River near the Stráž pod Ralskem depository (Stráž pod Ralskem, Horka, Mimoň, Brenná) exceed EQS limit. Based on the total volumetric activity alpha, the quality of the water is better than in 2022, now ranked in Class IV – heavily polluted water. Pollution of Class V – very heavily polluted water, only remains at the Noviny pod Ralskem profile in the Ploučnice River.The activity

of the radium 226 isotope was higher than in 2022. The highest value was recorded in the Ploučnice at the Horka profile, reaching up to 161 Bq \cdot l⁻¹, and is in Class IV – heavily polluted water, whereas at the other abovementioned profiles it is classified in Class III – polluted water.

In the Jáchymov District, in Ostrov nad Ohří in the Bystřice River and in its tributary, the Jáchymovský Stream, radioactive contamination from former mining and processing of radioactive raw materials persists; the quality of the surface water corresponds to class V – very heavily polluted water.

In the Tachov District, at the profiles of the Hamerský Stream (Brod nad Tichou, Broumov), the water quality is affected by the activity of radium 226 isotope and total alpha activity. Given lower activities of radium 226 isotope, reaching 50 Bq·l¹ at most, the surface water is classified in Class II – moderately polluted water.

At the site of the former uranium mines in the Jindřichův Hradec District, contamination of surface water with uranium and elevated alpha activity persists at the Nekrasín profile in the Račí Stream, the water quality is ranked in Class V – very heavily polluted water. The total alpha activity in surface waters in the vicinity of the Okrouhlá Radouň deposit in the Jindřichův Hradec District reaches values of around 830 mBq·l¹, activity of the radium 226 isotope was measured to be 65 mBq·l¹ and uranium concentrations with a maximum of 31 µg·l¹ (the values are lower than in 2022). In the area of the uranium ore deposit near Licoměřice in the Kurvice Stream at the Ronov profile, the total volumetric alpha activity decreased, the highest value being 421 mBq·l¹.

Raw water samples are analysed once every 3 months, while radioactivity is detected by monitoring the total volumetric alpha and beta activity at several water treatment plants and tributaries of reservoirs. Elevated activity of the radium-226 isotope up to 55 mBq·l-1 and total alpha activity up to 220 mBq·l-1 were detected in the Přísečnický Stream, a tributary of the Přísečnice Reservoir in the Ore Mountains. On the basis of the characteristic value, this surface water is classified as Class III - polluted water for the indicator total alpha activity and radium-226 isotope. The highest total alpha activity of up to 203 mBq·l⁻¹ was detected at the Křímov water treatment plant on the Křímovský Stream. This value of alpha activity does not exceed the maximum and mean annual limit value of permissible pollution as per Government Regulation No. 401/2015 Coll. No limit values for total volumetric activity alpha and beta set by Government Regulation No. 401/2015 Coll., for the use of surface water for the treatment of drinking water, were exceeded at any of the monitored water treatment plants.

Water quality in water supply and other reservoirs

The water quality in vast majority of reservoirs (except ponds) is relatively stable, which means the water quality is quite balanced in the long term, but traditional problems persist. The year-on-year variability depends not only on hydrological conditions of a given year, but also on the situation in each reservoir.

From the perspective of reservoirs in the Vltava River Basin, 2023 was an average year with relatively high flow rates in

tributaries to reservoirs in winter and spring, roughly until the beginning of May. This meant for some reservoirs (Lučina, Římov, Lipno, Karhov) a significant input of humic substances, still at a level that did not significantly impair the treatability of water abstracted by water supply companies. At the same time, there was also an increased input of phosphorus compounds, which resulted in a relatively high spring maximum of phytoplankton. This affected the abstraction horizon in some reservoirs (Žlutice), but impairment in water treatability was manageable. The second period of increased flow rates in August was not as significant and did not represent a major impact on the conditions in the monitored reservoirs. 2023 was generally a year of average water quality at the reservoir profiles; surface layer recovery was rather favourable, whereas oxygen conditions were rather impaired in the depth due to prolonged duration of the growing season with temperature stratification. In general, water quality is still threatened, at some places even affected, by eutrophication (i.e. excessive growth of algae and especially cyanobacteria) caused by excessive input of phosphorus compounds from the catchment area, especially from point sources of pollution. In some subbasins, e.g. the Orlík Reservoir and the Hracholusky Reservoir, the influence of highly eutrophic ponds is also present. In the area of threats and impacts on water quality from pesticides, there is a persistently unfavourable situation at the Švihov Reservoir. There is also an ongoing burden of pesticide breakdown products. High concentrations of highly hazardous PFOS substances were detected in the Velešínský Stream, which is a left-side tributary of the Římov Reservoir. Therefore, targeted monitoring of water quality and also sediments had been planned for 2023. While monitoring the situation is important, it is not the solution. Above all, uncompromising remediation of the source of such substances is necessary, which in this case is the premises of Jihostroj, a. s., Velešín.

Another persistent aspect is the introduction of erosion material from agricultural areas. The phenomenon is not linked to eutrophication, but to sedimentation of the upper parts of reservoirs, in particular with sedimentation upstream the catch basin of the Švihov Water Reservoir. As it turned out, climate change has made reservoirs more vulnerable to eutrophication processes and their consequences, especially for the oxygen regime. Therefore, in order to maintain at least the current water quality in the future, it is imperative to work systematically with the view of reducing the emission of phosphorus compounds into the aquatic environment. Water treatability is regularly impaired by eutrophication in the Lučina and Žlutice Reservoirs, and to a lesser extent in the Římov and Karhov Reservoirs; the Švihov Reservoir is significantly threatened, however, we expect a gradual improvement after the reconstruction of the Pelhřimov WWTP, which captures a significantly higher proportion of wastewater during rainfallrunoff events, and after an increase in the efficiency of eliminating phosphorus compounds at most municipal WWTPs. In other reservoirs, particularly Orlík, Lipno, Hracholusky and České údolí, eutrophication impairs their recreational use. For Orlík and Hracholusky, basic studies have already been carried out, including a proposal for measures to improve the situation. Special attention should be paid to the Lipno Reservoir, especially in connection with the new plans to build more recreational areas, whose wastewaters will be discharged directly into the reservoir, which, moreover, is completely inadequately treated, as the current legislation does not allow to deal with cases in such

exposed locations. The Lipno Reservoir is very vulnerable to eutrophication, both due to its morphology, recurring cyanobacterial blooms and its chemistry (virtual absence of nitrate ions). All these characteristics favour recycling of phosphorus in the aquatic ecosystem, where cyanobacterial water blooms can grow intensively. In the case of the Lipno Reservoir, we see a textbook example how an excessive pursuit of commercial recreational use threatens the actual recreational use and deteriorates attractiveness of the site. In order to achieve necessary reduction in eutrophication in reservoirs, reduction of phosphorus compounds in the water by ca. 50% is necessary. These are the conclusions of studies assessing the situation of the Hracholusky and Orlík Reservoirs, but the situation also concerns water supply reservoirs (Švihov, Žlutice, Římov). In order to achieve such an objective, it is necessary to reduce continuous phosphorus emissions from point sources with the aim of achieving concentrations below 0.5 mg/l of total phosphorus in wastewaters discharged, to minimise the impact of relieved wastewaters from the unified sewerage system and, last but not least, to reduce phosphorus runoff from ponds both throughout the year and at the harvesting season, including phosphorus bound to resuspended sediments. There are 12 separate water bodies (ponds) within the territorial jurisdiction of the Vltava River Board, state enterprise. Ponds have long been an under-addressed topic, even though they are very important links in the hydrographic network that transform material flows in river basins. Climate change, as observed in the territorial jurisdiction of the Vltava River Board, state enterprise, entails changes in the behaviour of ponds. Ponds currently tend to have worse phosphorus retention ability, which represents an increased eutrophication risk for reservoirs located downstream in catchments. Pond management therefore also needs to be given increased attention.

At the beginning of spring, the reservoirs managed by the Elbe River Board, state enterprise, were sufficiently filled in accordance with the applicable handling schedules. The volume of inflow in the growing season was below or close to the longterm median value in most reservoirs. Increased inflows were only recorded at the end of the year. Water temperatures were above-average in 2023. The long-term increase in water temperature, together with increasing length of periods with elevated temperatures, also has implications for reservoir surface evaporation and chemistry. The repair of the bridge deck of the dam at Křižanovice Reservoir started. For this reason, the operating level was decreased by ca. 2 metres for almost the entire growing season. Although the reservoir has a relatively high turnover ratio, July saw an intensive development of phytoplankton and a significant deterioration in water quality. The prevailing species was the cyanobacterium Microcystis aeruginosa. The water was treatable throughout the year. In the Vrchlice Reservoir, there was a clear oxygen stratification from the beginning of June, associated with the development of higher manganese concentrations in deeper oxygen-free layers of the reservoir. Significant development of small cyanobacteria was observed in sampling windows. The water supply company was regularly informed of development in different abstraction levels as well as of the entire situation in the reservoir. Hamry Reservoir experienced significant eutrophication as it does every year. The highest concentrations of chlorophyll-a were $88 \mu g/l$. Oxygen conditions deteriorated in deeper layers of the reservoir during the summer, while the water remained treatable throughout the period. Biomanipulation involving targeted

reduction of the carp stock with the aim of protecting filterfeeding zooplankton from grazing pressure is carried out to improve water quality. Good water quality was in Josefův Důl and Souš Reservoirs. Chlorophyll-a concentrations were up to 15 micrograms per litre. From the water supply perspective, both reservoirs are among the best sources of raw water. The water quality in the Labská Reservoir, which affects the water supply for the town of Vrchlabí in Herlíkovice, altered. The transparency dropped from 400 cm in April to 120 cm in September. There was also a significant development of primary production in the summer with a maximum chlorophyll-a value of 52 µg/l. In Seč Reservoir, which is the water supply source for the Seč group water mains, the significant effect of eutrophication in the upper half of the reservoir did not become apparent until the beginning of September. The highest chlorophyll-a values were as high as 200 µg/l. In 2023, part of an assessment of surface water intended for bathing by the sanitary services, water unsuitable for bathing was detected at Pastviny Reservoir in the Pardubice Region (August). The bathing water quality in Mšeno Reservoir was good. A sonar device was installed at this reservoir to improve the water quality. In the south of Rozkoš Reservoir, the water quality was suitable for bathing throughout the season. The trend in water quality of this type of reservoir was similar to previous years. In Bedřichov and Fojtka Reservoirs, transparency was reduced, around 150 cm. The lowest water quality was at the Pařížov Reservoir (transparency well below 100 cm and chlorophyll-a concentrations exceeding 320 $\mu g/l$) and Les Království (transparency well below 100 cm and chlorophyll-a concentrations of 220 µg/l). On 19 June 2023, monitoring of the Oplatil borrow pit, where an important water abstraction point of WSS Pardubice is located, was carried out on the basis of an order. At the time of monitoring, the water at the water supply intake was of good quality, with transparency of 440 cm and chlorophyll-a values ranging from 4.9 to 6.4 μ g/l.

Water quality in the reservoirs managed by the Ohře River Board, state enterprise, is regularly monitored by zonation measurements. Given the development of the climatological and hydrological situation in the past year, there was no significant threat to the raw water quality. Detailed information on any issues with water treatability can be obtained from individual operators of raw water treatment plants (SčVK, a.s. Teplice, Vodárny a kanalizace Karlovy Vary, a.s., Vodárna Sokolovsko, s.r.o., CHEVAK, a.s.). Reservoirs are located mainly in the upper parts of watercourses in the Ore Mountains. Due to lower population density, there is a lower anthropogenic impact on water quality, in particular the input of pollution (nutrients) from municipal wastewater is limited. Pollution in tributaries of the reservoirs is specified by the natural conditions in their catchment areas, e.g. the presence of peat bogs. TOC, COD, humic substances, Fe and Mn are indicators that regularly exceed the limits set in Government Regulation No 401/2015 Coll., as amended, and the limits for treatability of raw water to drinking water of category A3 as per Decree No 448/2017 Coll., as amended. In 2023, water quality was comparable to previous years. There was a slight improvement of microbiological pollution indicators (category AI) at Stanovice Reservoir, while a deterioration occurred in Chřibská Reservoir, where higher values of microbiological pollution (category A2) were recorded in August 2023. In Chřibská Reservoir, there was also an increase in the pollution values of two indicators: humic substances and Fe. The increase in pollution values is probably due to the ongoing large-scale forestry operations in the catchment area of

the Chřibská Reservoir. In the case of Podhora Reservoir there was an increase in the number of indicators exceeding A3 category (AOX,TOC, humic substances, Fe and Mn); logging also takes place in Podhora Reservoir catchment. The detected elevated pollution values may be due to the hydrological situation in the Czech Republic, where pollution concentrates during dry periods and is subsequently washed away during rainfall. The largest reservoirs in the Ohře River Basin not used for water-supply are Skalka, Jesenice and Nechranice Reservoirs and Mácha Lake and Stráž pod Ralskem Reservoirs in the Ploučnice River Basin. Despite the content of phosphorus, pesticides, halogens, etc. (municipal and agricultural pollution), the water quality in the reservoirs is generally good. In July 2023, the Ohre River Board, s.e., recorded an increased incidence of cyanobacteria and water bloom in Skalka Reservoir, which led to the water being labelled as unsuitable for bathing. This occurrence was detected one month earlier than in 2022, and a similar situation repeated in August 2023 in Jesenice and Nechranice Reservoirs. Furthermore, due to high mercury concentrations, consumption of fish from Skalka Reservoir is prohibited. The situation of flooded pits after opencast lignite mining is specific, as such reservoirs have no natural inflow or outflow. Farming (especially fishing) is strictly regulated. As a result, their water quality is at a high level. They show indicators of natural pollution. Manganese and iron are present in Lake Medard, phosphorus and arsenic in Lake Barbora and Lake Milada contains ubiquitous halogens.

The composition and quantity of phytoplankton in 2023 in the territory managed by the Morava River Board, s.e., was influenced by an exceptionally warm September, which caused a shift in the mixing of the reservoir and thus an extension of the growing season, associated with the continuation of the development of cyanobacterial blooms until autumn and favourable conditions for algal communities. Hypertrophic reservoirs, i.e., most affected by eutrophication were Mostiště and Fryšták Reservoirs, however, recreational reservoirs dominated the category, in particular: Jevišovice, Výrovice, Nové Mlýny – Middle Reservoir, Moravská Třebová, Vranov at the Farářka profile, Podhradský Pond, Plumlov, Luhačovice, the tributary part of the Brno Reservoir and also significantly deteriorated Bidelec Reservoir, which - after sediment removal - had ranked among reservoirs with lower trophic level for several years. Eutrophic reservoirs were Letovice, Brno - the Hráz profile, Nové Mlýny – Upper Reservoir, the Vodárna, Hráz and Bítov profiles of Vranov Reservoir, Nové Mlýny - Upper and Lower Reservoir, Upper Bečva and Bystřička (recreational); and Hubenov, Landštejn, Znojmo, Vír and Ludkovice (watersupply reservoirs). Nová Říše and Opatovice were mesotrophic, while the Bojkovice and Boskovice displayed slightly worse mesotrophic. There was a decrease in the number of reservoirs that could be classified as oligotrophic, i.e., with the most favourable degree. In 2023, oligotrophic were only the Slušovice, Karolinka and partly also Koryčany. Overall, the biological status of water rather deteriorated. The most significant deterioration was in Mostiště Reservoir, where a strong cyanobacterial bloom developed, and in the recreational reservoirs of Bidelec and Výrovice and in the tributary part of Brno Reservoir. Improvement was seen in the case of the water-supply reservoirs such as aforementioned Koryčany, Boskovice and Vír, and recreational reservoirs Nové Mlýny -Lower Reservoir, Bítov u Vranova and Letovice. In several hypertrophic or strongly eutrophic reservoirs, the invasive

species of *Ceratium furcoides* became extensively established (e.g. in Luhačovice Reservoir). The greatest development of cyanobacteria and cyanobacterial aquatic blooms occurred in Nové Mlýny – Lower and Middle (in particular), Jevišovice, Výrovice, in the tributary part of Brno Reservoir, in Vranov Reservoir at the Farářka and Bítov profiles, at the Podhradský Pond and at the Moravská Třebová. Overall, the situation of recreational and water-supply reservoirs slightly deteriorated in terms of phytoplankton, when compared to 2022.

The raw water quality in Sance, Kružberk and Morávka watersupply reservoirs, managed by the Oder River Board, s.e., was very good in 2023 and therefore did not require more complex treatment to produce drinking water. The vast majority of the parameters assessed were classified in the best category AI (as per Decree No 428/2001 Coll.). Such a favourable situation can be ensured mainly by making use of certain measures provided for by the Water Act within the established water resource protection zones, such as restrictions on development of the area, including tourism, regulation of farming, etc. The ${\sf A2}$ and A3 categories (as per Decree No 428/2001 Coll.) have traditionally included organic pollution indicators, which is due to the distortion caused by a higher presence of phytoplankton in the epilimnion of reservoirs. No objections were raised by raw water users in this respect. Strong vegetation turbidity developed in Morávka Reservoir during the growing season due to excessive cyanobacterial abundance. However, the cyanobacteria were detected only in the epilimnion of the reservoir and did not affect the quality of the raw water abstracted. In 2023, impaired water quality caused by excessive cyanobacteria was recorded in practically all recreational reservoirs managed by the Oder River Board, s.e. In Těrlicko and Slezská Harta Reservoirs, the deterioration was only of a local and episodic nature, which did not significantly affect the recreational use of the two reservoirs. By contrast, the situation in Žermanice Reservoir deteriorated gradually, with the water being classified as unsafe for bathing at the end of the growing season according to the Regional Hygienic Station methodology. In other reservoirs no intended for water-supply managed by the Oder River Board, s.e., the water quality was rated with first or second class, i.e. as water suitable for bathing, or as water suitable for bathing with slightly deteriorated properties, according to the Guidelines for Bathing Water Quality Assessment (Annex 6 to Decree No. 238/2011 Coll., on the determination of hygienic requirements for swimming pools, saunas and hygienic limits for sand in sandpits of outdoor play areas, as amended). Given the ongoing modernisation, in connection with which the reservoir was drained, the water quality of Baška Reservoir was not monitored.

Quality of water used for bathing in the 2023 bathing season

Act No. 258/2000 Coll., on the protection of public health and on amendments to some related acts, as amended, regulates the rights and obligations of natural and legal persons that must be fulfilled in the field of protection and promotion of public health; it also establishes the system of public health protection bodies, their scope and authority. One of the areas protected by this Act is outdoor bathing, the operation of outdoor swimming pools, artificial swimming pools, swimming pools and saunas. Decree No. 238/2011 Coll., on the establishment of hygiene requirements for

swimming pools, saunas and hygiene limits for sand in outdoor play areas, as amended, addresses the equipment of outdoor swimming pools and the requirements for the method of sampling and frequency of inspection and for the quality of bathing water.

For each holiday season, the Ministry of Health, in cooperation with the Ministry of Agriculture and the Ministry of the Environment, draws up a list of natural bathing sites on surface waters where the operator offers bathing services and other surface waters for bathing. This is a list of sites where the water quality will be monitored in the coming summer holiday season with respect to its use for bathing.

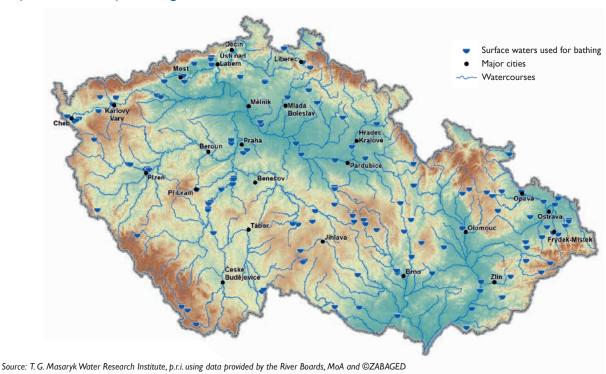
In the 2023 bathing season, a total of 287 bathing sites were monitored by public health authorities, including 167 natural outdoor bathing sites and 120 bathing areas. A total of 938 water samples were taken by public health authorities and 938 samples were taken by operators. On the basis of the assessment of the bathing water parameters monitored, a bathing ban (black symbol) was issued by the public health authorities at 19 sites in the Czech Republic in the summer 2023 holiday season. Water quality classified as unsuitable for bathing was found at 28 sites. Thus, a total of 47 sites, i.e. 16.4% of all sites monitored, had unsatisfactory bathing water quality.

Even during the 2023 holiday season, a significant number of natural outdoor bathing sites had problems with excessive growth of cyanobacteria, which was also the main reason for issuing a bathing ban. Cyanobacteria are present in our waters due to surface water pollution, mainly in the indicator phosphorus, which contributes to their excessive growth when the temperature and length of sunlight are increased. In order to improve water quality, priority should be given to preventing nutrients, especially phosphorus, from being added to surface waters, which can be achieved by completing the third stage of wastewater treatment at all existing wastewater treatment plants and by building new wastewater treatment plants in municipalities that do not yet treat wastewater consistently. Other measures (e.g. fish stocking, promotion of aquatic plant growth, precipitation of phosphorus by various coagulants) can be used directly in the reservoir. The elimination of already developed cyanobacterial blooms by algicides is highly risky from the point of view of protecting the health of bathers and the aquatic ecosystem (the use of these substances is subject to the following in accordance with Section 39(7) of Act No. 254/2001 Coll., on water and on amendments to certain acts (Water Act), as amended, is subject to authorisation by the competent water authority), and does not eliminate the cause, which is excessive nutrient supply, but is only a short-term solution.

Some areas have also experienced the occurrence of cercarial dermatitis. Cercarial dermatitis is a parasitic disease that manifests itself in humans by the formation of spots, blisters or even reddening of the skin and is accompanied by intense itching. It is caused by small parasitic animals whose life cycle is linked to aquatic gastropods and water birds (e.g. mallards).

A total of 47 monitored sites, i.e. 16.4%, displayed unsatisfactory bathing water quality in the 2023 holiday season. A ban on bathing was issued by public health authorities at 19 sites in 2023. The most frequent reason was an excessive occurrence

Figure 3.1.3
Surface waters used for bathing



of cyanobacteria. In the case of three biotopes the reason was unsatisfactory microbiological water quality and/or occurrence of parasites causing cercarial dermatitis (swimmer's itch).

The number of swimming pools and water bathing sites monitored by regional public health authority did not change much compared to previous years.

Quality of suspended matters and sediments

Stream load (i.e. suspended solids) and sediments are an important part of the aquatic environment, onto which inorganic and organic pollutants are sorbed that subsequently affect negatively life in fluvial ecosystems. Monitoring the quality of stream load and sediments makes an important contribution to the overall assessment of the quality of surface waters of the Czech Republics watercourses. Their analyses provide information on the presence of hazardous foreign substances in the aquatic environment, which subsequently allows for analysing the causes of pollution at individual sites. Long-term monitoring of the state of fluvial ecosystems is highly desirable and allows for the assessment of the development and environmental impacts of pollution. European Union Directives 2000/60/EC (the Water Framework Directive), 2008/105/EC and 2013/39/EU require longterm trend monitoring for a set of 25 selected priority hazardous substances for solid matrices.

PFor this purpose, concentrations of heavy metals, metalloids and specific organic substances were monitored at 48 profiles in 2023, with a focus on water policy priority substances for a total of 130 chemicals, of which 20 are on the priority list. These substances are hazardous to the health of humans, animals and

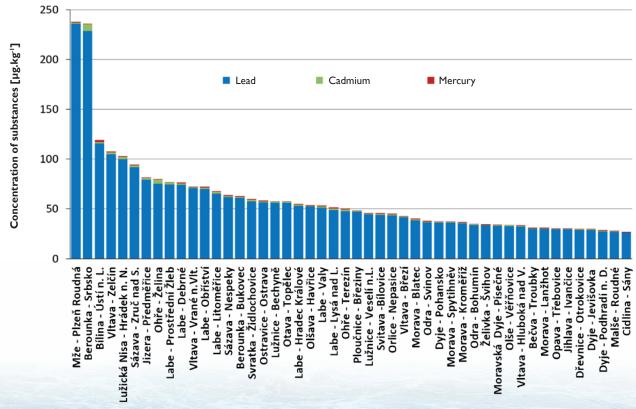
entire ecosystems, often being carcinogenic (e.g. polyaromatic hydrocarbons, perfluorooctane sulfonate), mutagenic (e.g. organochlorine pesticides) and harmful to the nervous, hormonal and immune systems (e.g. hexabromocyclododecane, polybrominated diphenyl ethers, tributyltin). Assessment of the monitoring results was conducted in accordance with Government Decree 401/2015 Coll., following an analysis of long-term trends in concentrations of selected priority substances that tend to cumulate in sediments and stream load. The degree of contamination was assessed on the basis of the average annual concentration of foreign substances in a given matrix with the ICPER sediment quality limits (used for assessment of the burden in the Elbe River), as these limits are not currently anchored in Czech legislation. The contamination of sediments, stream load and sedimentable stream load is highly heterogeneous in the Czech Republic and throughout all river basins, is related to geomorphology, land use and settlement. Often, excessive concentrations of different foreign substances are found downstream of industrial and urban agglomerations as well as areas affected by resource extraction.

The highest concentrations of heavy metals were found in sediments in North, West and Central Bohemia. The highest mean lead concentrations were recorded in the Mže River in Pilsen (236 mg·kg¹), the Berounka River at Srbsko (228 mg·kg¹), the Bílina River in Ústí nad Labem and the Lusatian Neisse River in Hrádek nad Nisou (Graph 3.1.1). The highest cadmium concentrations were found in the Berounka River at Srbsko (6.8 mg·kg¹), in the Ohře River at Želina (4.1 mg·kg¹) and in the Lusatian Neisse in Hrádek n. Nisou (2.4 mg·kg¹) and in the Lusatian Neisse in Hrádek n. Nisou (2.4 mg·kg¹, Graph 3.1.1). The highest concentrations of mercury were found in the Bílina in Ústí nad Labem, the Elbe in Lysá nad Labem, the Vltava at Zelčín and the Svratka in Židlochovice with identical concentrations (0.85 mg·kg¹). The highest arsenic concentrations were recorded in the Ohře River in Želina (90 mg·kg¹) and in



The Weir in Kadaň (source: Ohře River Board, s.e.)

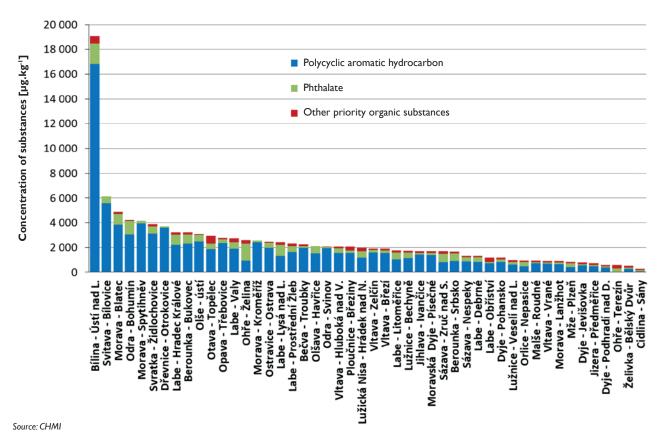
Graph 3.1.1
Average concentrations of selected heavy metals in sediments at monitored sites



Source: CHMI

Graph 3.1.2

Average concentrations of priority organic pollutants in sediments at the monitored sites



and chlorinated phenols, chlorinated pesticides (aldrin, eldrin, dieldrin dicofol, heptachlorepoxide, methoxychlor) their values were found below the limit of determination. However, the chlorinated benzenes (trichlorobenzene, pentachlorobenzene, hexachlorobenzene) were occasionally found at low concentrations (i.e. above the limit of quantification). Polyaromatic hydrocarbons, which are mainly produced by imperfect combustion, were the most abundant of the organic compounds, with the highest annual mean concentrations in the sediments, especially in the Bílina River in Ústí nad Labem (16,800 µg·kg¹), and in Bílovice in the Svitava River (5,590 µg·kg-1, Graph 3.1.2). Concentrations of polyaromatic hydrocarbons above 3,000 $\mu g \cdot k g^{-1}$ were measured in the Morava River in Blatec and Spytihněv, in the Oder - Bohumín, the Dřevnice – Otrokovice and the Svratka – Židlochovice profiles. The highest concentrations of phthalates (DEHP), which are used as plastic softeners, were analysed in sediments in the Bílina in Ústí nad Labem (1,650 µg·kg⁻¹), the Ohře in Želina (1,365 $\mu g \cdot kg^{-1}$) and the Oder in Bohumín (1,078 $\mu g \cdot kg^{-1}$, Graph 3.1.2). Organic substances that are used as flame retardants (PBDEs - polybrominated diphenyl ethers) were found at the highest concentrations in the Elbe River in Hradec Králové (1,300 μg·kg⁻¹) and Lysá nad Labem (1,200 μg·kg⁻¹). Among other organic substances, high concentrations of the pesticides sum-DDT (1,230 µg·kg¹) and chloralkanes

(230 µg·kg⁻¹) were recorded in the Bílina River at the Ústí

nad Labem profile. High levels of the pesticide AMPA were

detected in the Elbe River (Lysá nad Labem 1,100 µg·kg-1, Valy

530 μg·kg⁻¹, Litoměřice 350 μg·kg⁻¹). The highest levels of the

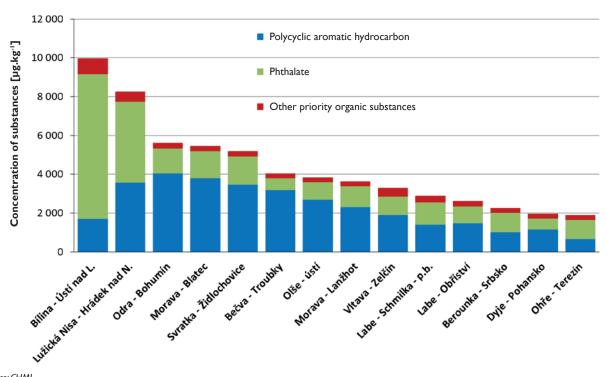
Terezín and in the Bílina River in Ústí nad Labem (68 mg·kg¹). For a number of organic substances, from the group of phenols



The Vlčkovice Small Water Reservoir after Restoration (source: Elbe River Board, s.e.)

sum-PCB (polychlorinated biphenyls) were detected in the Ohře River in Želina (167.8 $\mu g \cdot k g^{-1}$), which were slightly above the upper ICPER threshold (140 $\mu g \cdot k g^{-1}$). The highest levels of PCB isomers were detected in the Lusatian Neisse in Hrádek n. Nisou. Measurable levels of hexachlorobutadiene (33 $\mu g \cdot k g^{-1}$) were only at Bílina in Ústí nad Labem at the remaining sites below the detection limit.

The highest mean concentrations of lead and cadmium in sedimentable stream load – as the case was with sediments – were found in the Berounka River at Srbsko (Pb - 335 mg \cdot kg 1 , Cd – 10 mg \cdot kg 1), both values exceeding the upper threshold limit (for Pb 6-fold and cadmium 3-fold). In the Lusatian Neisse in Hrádek n. Nisou, lead concentrations (126 mg \cdot kg 1) exceeded the threshold limit by more than two-fold, while cadmium



Graph 3.1.3

Average concentrations of priority organic pollutants in sedimentable load at the monitored sites

Source: CHMI

concentrations (2.9 $\text{mg} \cdot \text{kg}^{-1}$) were slightly above the upper limit of the ICPER. The highest mercury concentrations, same as with sediments, were recorded in the Bílina at Ústí nad Labem (Hg – 1.9 $\text{mg} \cdot \text{kg}^{-1}$, with a 4-fold exceedance). The highest concentrations of arsenic were detected in the Bílina at Ústí nad Labem (70 $\text{mg} \cdot \text{kg}^{-1}$) and in the Ohře at Terezín (60 $\text{mg} \cdot \text{kg}^{-1}$).

In contrast to the occurrence of organic matter in sediments, the highest concentrations of polyaromatic hydrocarbons in sedimentable stream load were found in the Oder River at Bohumín and in the Lusatian Neisse River at Hrádek n. Nisou (Graph 3.1.3). The highest concentrations of phthalates (DEHP) were found in the Bílina River at Ústí nad Labem (10,480 µg·kg⁻¹) and in the Lusatian Neisse at Hrádek n. Nisou (10,400 µg·kg⁻¹). The highest burden of organic substances was detected in the Bílina at Ústí nad Labem (trichlorobenzene 9.6 µg·kg⁻¹,pentachlorobenzene 10 µg·kg⁻¹,hexachlorobenzene 580 µg·kg⁻¹,hexachlorobutadiene 13 µg·kg⁻¹,octachlorostyrene 14 µg·kg⁻¹, from pharmaceuticals it was methyltriclosan 10 μg·kg⁻¹, from pesticides AMPA 3,100 μg·kg⁻¹ and quinoxyfen 0.3 µg·kg-1). The highest concentrations of sum-PCB were found in the Vltava River at Zelčín (155.8 µg · kg-1), in the Elbe River at Obříství and in the Svratka at Židlochovice. The highest mean lead concentrations in stream load were recorded in the Berounka at Srbsko (124 µg·kg⁻¹), and in the Ostravice River at Ostrava (207 µg · kg⁻¹). The highest mean concentrations of cadmium (4.3 $\mu g \cdot k g^{-1}$) and arsenic (94.5 $\mu g \cdot k g^{-1}$) were detected in the Ohře River at Želina, and of mercury (0.9 µg·kg⁻¹) in the Elbe at Obříství.

The highest values of polyaromatic hydrocarbons in stream load were found in the Svitava at Bílovice (8,165 $\mu g \cdot k g^{-1}$), the Bečva in Troubky (6,524 $\mu g \cdot k g^{-1}$), the Morava in Blatec (4,728 $\mu g \cdot k g^{-1}$). The highest amount of sum-PCB (94.6 $\mu g \cdot k g^{-1}$)

was recorded in the Elbe at Obříství. Highest concentrations of pesticides were found in the Bílina River at Ústí nad Labem (sum-DDT 75 $\mu g \cdot k g^{-1}$), and in the Elbe at Prostřední Žleb and also in the Svratka at Židlochovice. High concentrations of chloralkanes were found in the Elbe at the Valy profile (700 $\mu g \cdot k g^{-1}$), in the Lusatian Neisse at Hrádek n. Nisou and in the Bílina at Ústí nad Labem.

The MannKendall test was used to analyse long-term trends in sediments and sedimentable load (2013-2023) for time series 2000-2023; a total of II cases of increasing trends were observed in sediments for the priority hazardous substances monitored. An increasing trend in sediments was statistically confirmed at 9 sites for 4 priority substances, namely for cadmium (the Elbe - Litoměřice, the Vltava - Vrané n. Vltavou, the Thaya - Podhradí, the Bečva - Troubky, the Dřevnice -Otrokovice and the Oder - Svinov), mercury (the Moravian Thaya - Písečné), anthracene (the Elbe - Debrné, the Vltava -Vrané n. Vltavou) and benzo[ghi]perylene (the Ploučnice -Březiny, the Moravská Thaya – Písečné). The situation was partly different in sedimentable stream load when compared to sediments, a total of 8 cases of increasing trend were recorded for the monitored hazardous priority substances. Significantly increasing trends in sedimentable stream load were discovered at 5 sites for 5 hazardous priority substances, namely for cadmium (the Bílina – Ústí n. Ohří – Terezín, the Berounka – Srbsko, the Thaya - Pohansko), lead (the Berounka - Srbsko), fluoranthene, benzo[ghi]perylene and indeno[1,2,3-cd]pyrene (the Vltava – Zelčín). A decreasing trend was observed at most of the monitored sites, for almost all of the monitored substances; 228 statistically confirmed cases of decreasing trend were recorded in sediments and 106 substances in sedimentable stream load.

Raw water quality

Data from 3,076 raw water abstraction points (139 surface water abstraction points and 2,937 groundwater abstraction points) from 642 operators were used to assess raw water quality in 2023. The treatability of raw water was assessed in 4 treatability categories according to Decree No 428/2001 Coll., as amended, see table with definitions of treatability categories.

Overall, more than 72% of abstraction points were of A2 or better quality in 2023. Surface raw water sources tend to be of poorer quality than groundwater sources, hence the higher proportion of surface water abstraction points with poorer treatability categories (only about 44% of these abstraction points had raw water qualities of A2 or better, in the case of groundwaters it is 73% of abstraction points). When comparing the quality of raw water in individual regions, it can be noted that the best quality (more than 80% of abstraction points in category A2 and better) in 2023 was found in raw water sources in Ústí, Hradec Králové, Liberec and Moravian-Silesian Regions and the worst in Zlín Region (only 52% of abstraction points in category A2 and better).

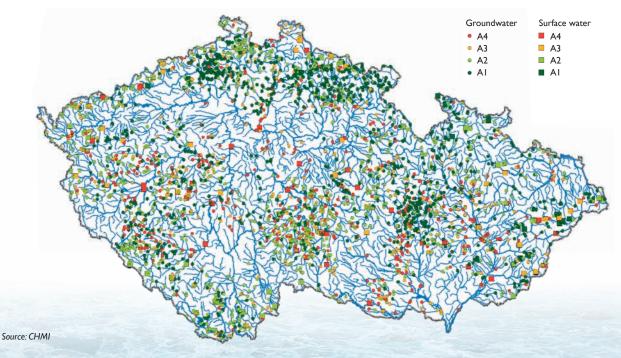
The most problematic indicators for raw surface water quality in 2023 were microbiological indicators, total organic carbon, adsorbable organically bound halogens (AOX), COD-Mn, iron,

Table 3.1.1
Treatability categories and corresponding treatment types

| Cate | gory | Types of modifications |
|------|------|--|
| A | Al . | Treatment of raw water with possible disinfection to remove compounds and elements that may affect its further use, in particular to reduce the aggressiveness towards the materials of the distribution system, including domestic installations (chemical or mechanical deacidification), as well as the removal of odours and gaseous components by aeration. Simple filtration to remove suspended solids and improve quality. |
| A | λ2 | Raw water requires simpler treatment, e.g. coagulation filtration, single-stage de-icing, de-manganisation or infiltration, slow biological filtration, treatment in a rock environment, all with final disinfection. Water stabilisation is suitable to improve the properties. |
| A | ٧3 | Treatment of raw water requires two or more stages of treatment by clarification, oxidation, de-ironing and demanganisation with final disinfection, or a combination of these. Other suitable processes are, for example, the use of ozone, activated carbon, flocculant aids and flotation. More economically demanding technically justified processes (e.g. sorption on special materials, ion exchange, membrane processes) shall be used on an exceptional basis. |
| A | λ4 | Exceptionally, water of this quality may be abstracted for the production of drinking water with an exemption granted by the competent regional authority. For the treatment of drinking water, technologically demanding processes consisting of a combination of the types of treatment specified for category A3 must be used, while ensuring the stable quality of the drinking water produced. However, the preferred solution in these cases is to eliminate the causes of pollution or to find a new source of water. |

Source: CHMI

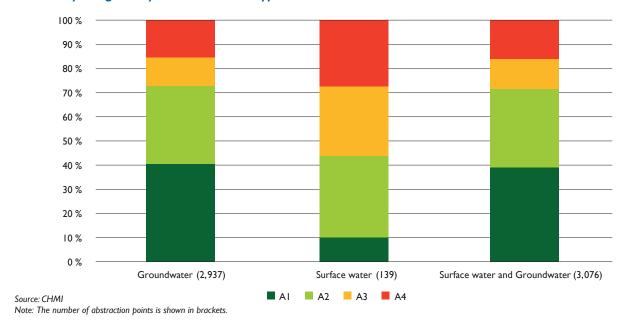
Figure 3.1.4
Raw water treatability categories at abstraction points in 2023



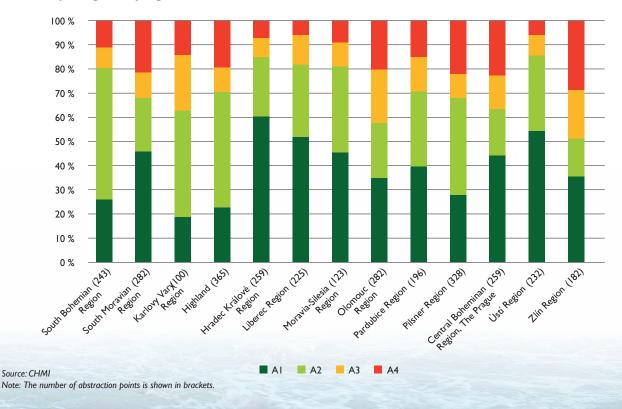
humic substances and pesticides, namely metazachlor ESA and metazachlor OA (metabolites of the herbicide metazachlor used for treating canola), metolachlor ESA (a metabolite of the herbicide metolachlor used for treating maize), AMPA (a metabolite of the total herbicide glyphosate) and chloridazondesphenyl (a metabolite of the herbicide chloridazon used for treating beet until 2020). The most problematic indicators of groundwater quality were adsorbable organically bound halogens (AOX), iron and manganese (only less than 3% of abstraction points), and pesticides, namely chloridazon-

desphenyl and choridazon-methyl-desphenyl (metabolites of the herbicide chloridazon used until 2020 for the treatment of canola), alachlor ESA (metabolite of the herbicide alachlor used for the treatment of canola, banned since 2008), metazachlor ESA (a metabolite of the herbicide metazachlor used for the treatment of canola), metolachlor ESA (a metabolite of the herbicide metolachlor used for the treatment of maize) and acetochlor ESA (a metabolite of the herbicide acetochlor used mainly for the treatment of maize, banned since 2014).

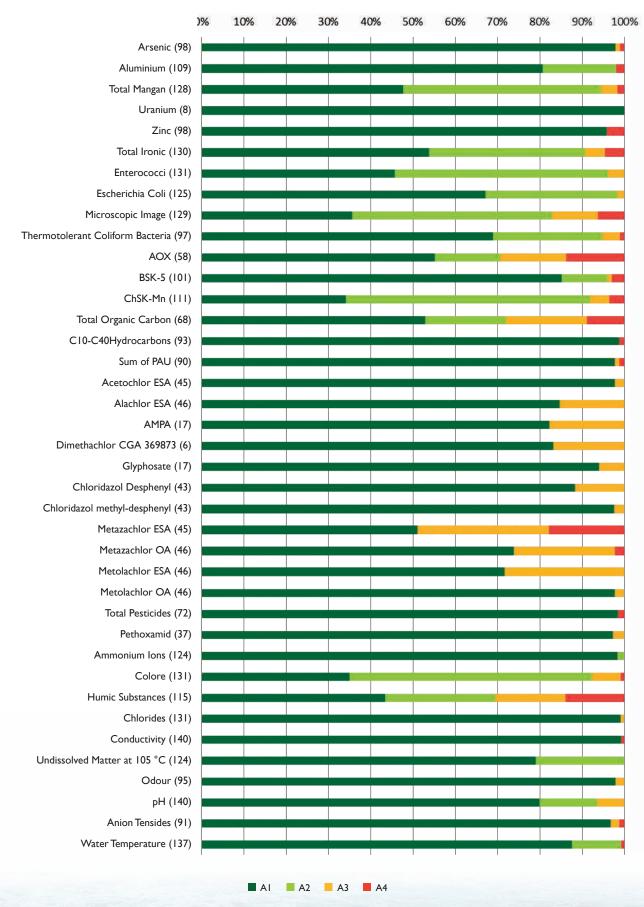
Graph 3.1.4
Treatability categories by raw water source types



Graph 3.1.5
Treatability categories by regions



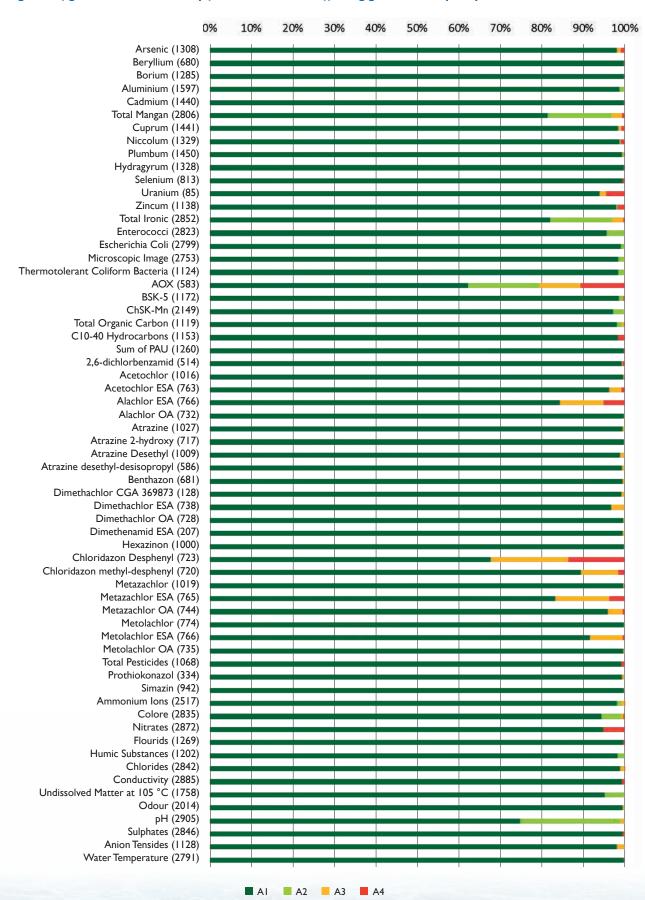
Graph 3.1.6
Categories of surface water treatability for indicators most affecting surface water quality



Source: CHMI

Note: The number of abstraction points is shown in brackets.

Graph 3.1.7
Categories of groundwater treatability for indicators most affecting groundwater quality



Source: CHMI Note:The number of abstraction points is shown in brackets.

Microcontaminants in surface waters

Organic micro-contaminants of surface waters are still among the substances that have been present in the whole territory of the Czech Republic for a long time. These are mainly residues of pesticide substances, which originate mainly from agriculture, and pharmaceuticals, radiopharmaceuticals, anti-corrosives and other specific substances originating from wastewater discharged into watercourses. For the two most important groups of these substances, an assessment of their occurrence in surface waters in 2023 was carried out.

Pesticides

Pesticide substances and their metabolites are the most closely monitored microcontaminants by laboratories of the River Boards. In 2023, results from a total of 579 profiles (a total of 5,528 samples) for 274 different analytes were processed. Pesticides were found in 546 profiles (94.3% of the profiles monitored) in a total of 4,506 samples (81.5% of samples). In 2023, a total of 127 pesticides and their metabolites were found in surface waters, of which 49 substances were found in more than 5% of the samples. The results are in line with the monitoring setup for these substances by the River Basins. Where a wider range of substances are monitored, pesticides are found more frequently. Similarly to 2022, metabolites of herbicides used for the treatment of canola were found most frequently, both those currently used (metazachlor, dimethachlor, pethoxamid, dimethoxamid) and those already banned (alachlor, acetochlor), maize (used: metolachlor, terbuthylazine, pethoxamid, dimethenamid; and banned: atrazine, acetochlor), beet (metabolites of chloridazon banned since 2021), and total herbicide glyphosate and its metabolite AMPA.

The most frequently found fungicides were the banned substance tebuconazole and a metabolite of azoxystrobin (allowed).

Most substances were found at the following profiles: Káňov Pond – Káňovský Stream (50 substances), Zruč nad Sázavou – Sázava (50), Luková – Cidlina (49), Sány – Cidlina (49), Pikovce – Sázava (47), Lysá nad Labem – Elbe (45), Dolní Slověnice – Miletínský Stream (44), Obříství – Elbe (44), Bechyně – Lužnice (43), Horusický Pond – Bukovský Stream (42), Želiv – Trnava (41), Kosičky – Bystřice (39), Střechov – Štěpánovský Stream (39), Nymburk – Mrlina (38), Kladina – Zadní Londrantka (38) and Valy – Elbe (38).

The highest total concentrations of pesticides were found at the following profiles: Káňov Pond – Káňovský Stream (average 9.76 µg/l, maximum 28.2 µg/l), Bykáň – Opatovický Stream (average 7.46 μg/l, maximum 14.72 μg/l), Kestřany – Vítkovský Stream (average 6.69 µg/l, maximum 9.96 µg/l), Vrchlice Water Reservoir – Švadlenka (average 6.53 μg/l, maximum 10.67 μg/l), Luková – Cidlina (average 4.92 μg/l, maximum 14.8 μg/l), Vrchlice Reservoir – Vidlický Stream (average 4.82 $\mu g/l$, maximum 8.44 µg/l), Vrchlice Reservoir - Vrchlice (average 4.67 µg/l, maximum 8.03 μg/l), Chrastovice – Čechtický Stream (average 4.56 µg/l, maximum 18.1 µg/l), Nymburk – Mrlina Stream (average 4.46 µg/l, maximum 9.97 µg/l), Vrchlice Reservoir -Vrchlice (average 4.42 µg/l, maximum 5.09 µg/l), Rašovice u Nymburka – Blatnice (average 4.25 µg/l, maximum 9.91 µg/l), Kladina – Zadní Lodrantka (average 4.22 µg/l, maximum 7.91 µg/l), Radonice - Blanice (average 4.22 µg/l, maximum 8.66 µg/l), Sány – Cidlina (average 4.13 µg/l, maximum 9.98 µg/l) and Želiv – Trnava (average 4.09 µg/l, maximum 10.06 µg/l).

Absolutely highest concentration of pesticides was detected on 26 July 2023 at the profile Káňov Pond – Káňovský Stream, when a concentration of 26 pesticides found was 18.6 µg/l.

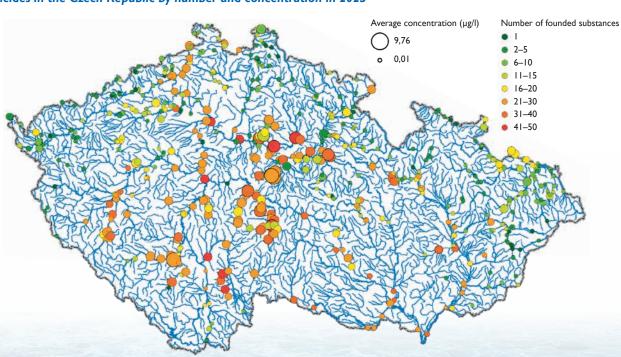
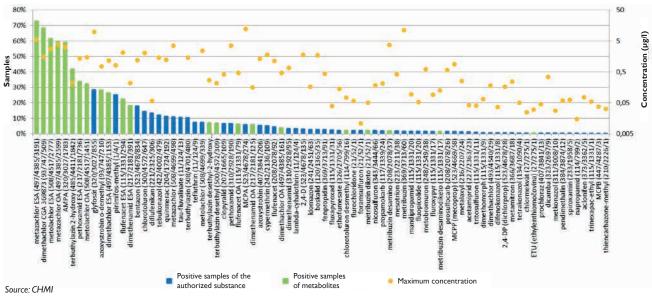


Figure 3.1.5
Pesticides in the Czech Republic by number and concentration in 2023

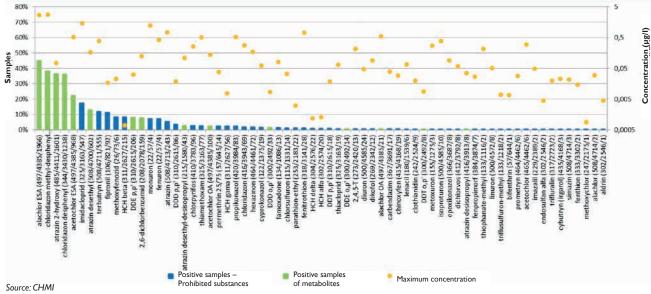
Source: CHMI

Graph 3.1.8
Frequency of occurrence of permitted pesticides and maximum concentrations in surface waters in the Czech Republic in 2023



Note: Brackets for each substance indicate the number of profiles / number of samples / number of positive samples.

Graph 3.1.9
Frequency of occurrence of banned pesticides and maximum concentrations in surface waters in the Czech Republic in 2023



Note: Brackets for each substance indicate the number of profiles/number of samples/number of positive samples

Pharmaceuticals

Significant amounts of pharmaceuticals and their metabolites get to surface waters from municipal sources. In 2023, monitoring results from 377 profiles (out of a total of 3,109 samples) for 82 different analytes were processed by the River Boards. The results are in line with the monitoring setup for these substances by the River Boards. Where a wider range of substances are monitored, pharmaceuticals are found more frequently. Similarly to 2022, the occurrence of pharmaceuticals was most frequent in smaller watercourses that drain large settlements. Pharmaceuticals were found at 348 profiles (92.3% of profiles monitored) in a total of 2,713 samples (87.3% of samples). The

most frequently found substances were oxypurinol (gout drug), telmisartan (antihypertensive), tramadol (analgesic), gabapentin (antiepileptic, analgesic), valsartan (antihypertensive), jomeprol (contrast agent), diclofenac (antirheumatic, analgesic), ibuprofen and its metabolites 2-hydroxy and carboxy (analgesic, antipyretic, antiphlogistic), metoprolol (antihypertensive), carbamazepine (antiepileptic), hydrochlorothiazide (diuretic), venlafaxine (antidepressant), antibiotics sulphamethaoxazole clarithromycin, paracetamol (analgesic, antipyretic), metformin (diabetes drug), irbesartan (antihypertensive), rosuvastatine (cholesterol drug), jopromid (contrast agent), furosemide (diuretic), fexofenadine (anthihistamine), naproxen (analgesic), bisoprolol (antihypertensive) and sulfapyridine (antibiotic).



Sunset over The Štěchovice Reservoir (author: Hubalová Petra)

The highest number of pharmaceuticals was found at the following profiles: Humpolec – Pstružný Stream (51 substances), Trhové Dušníky – Příbramský Stream (50 substances), Benešov – Benešovský Stream (49), Dolní Chlum – Rakovnický Stream (48), Klatovy – Drnový Stream (46), Rokycany – Klabava (46), Kralupy nad Vltavou – Zákolanský Stream (45), Dolní Kramolín – Kosový Stream (43), Běleč – Živný Stream and Senešnice – Novoveský Stream (42), Vlašim – Blanice (39), Radonice – Zubřina and Roztoky – Únětický Stream (37), Bavoryně – Červený Stream (tributary of Litavka) and Velvary – Červený Stream (36).

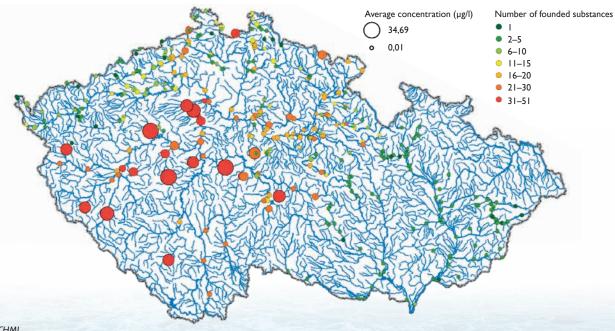
Similarly to 2022, the highest total pharmaceutical concentrations were found at the following profiles: Trhové Dušníky – Příbramský Stream (average 34.69 µg/l, maximum 90.02 µg/l), Benešov – Benešovský Stream (average 27.58 µg/l, maximum 101.28 µg/l), Dolní Chlum – Rakovnický Stream (average 25.8 µg/l, maximum

68.11 μg/l), Kralupy nad Vltavou – Zákolanský Stream (average 22.9 μg/l, maximum 54.7 μg/l), Klatovy – Drnový Stream (average 20.3 μg/l, maximum 69.02 μg/l), Humpolec – Pstružný Stream (average 17.98 μg/l, maximum 33.7 μg/l), Velvary – Červený Stream (average 15.9 μg/l, maximum 30.37 μg/l), Senešnice – Novoveský Stream (average 14.6 μg/l, maximum 35.72 μg/l), Běleč – Živný Stream (average 13 μg/l, maximum 43.92 μg/l), Žíšov –Výrovka Stream (average 12.17 μg/l, maximum 42.27 μg/l), Radonice – Zubřina (average 11.19 μg/l, maximum 39.19 μg/l) and Dolní Kramolín – Kosový Stream (average 10.88 μg/l, maximum 35.02 μg/l).

Absolutely highest concentration of pharmaceuticals was detected in the Benešovský Stream at the Benešov profile on 26 July 2023, when the concentration of 40 pharmaceuticals found was 75.2 µg/l.

Figure 3.1.6

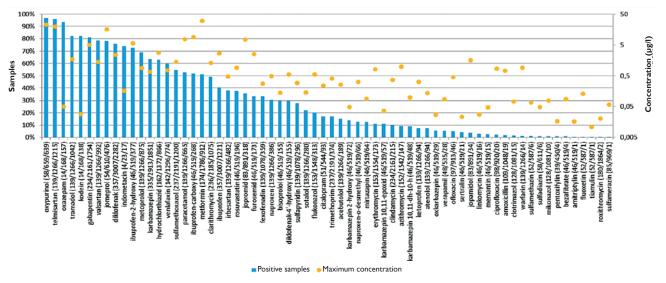
Pharmaceuticals detected in the Czech Republic by their number and concentration in 2023



Source: CHMI

Note: The monitoring results are affected by the fact that the individual River Boards monitor a different range of pharmaceuticals and a different number of profiles.

Graph 3.1.10 Frequency of occurrence of pharmaceuticals and maximum concentrations in surface waters in the Czech Republic in 2023



Source: CHMI

Note: Brackets for each substance indicate the number of profiles / number of samples / number of positive samples.

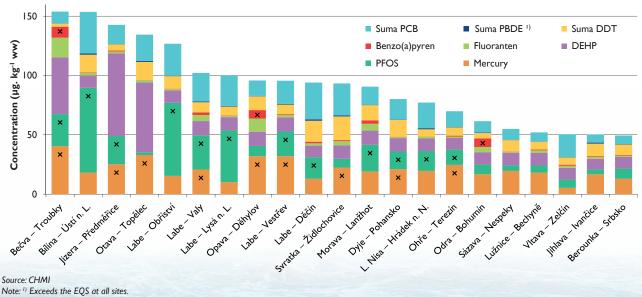
Accumulation biomonitoring of surface waters in 2023

The results of the annual monitoring carried out by CHMI show a long-term burden with hazardous substances in surface waters in the Czech Republic. These are persistent substances which, due to their high stability and lipophilicity, accumulate in biotic and abiotic components and food chains. These substances are formed as a result of a number of industrial and other anthropogenic activities, either intentionally (pesticides, flame retardants, plasticizers) or as unwanted by-products (PAHs). The CHMI regularly monitors the content of almost 90 substances at the profiles of important Czech and Moravian rivers. For some substances, Government Regulation No. 401/2015 Coll., as amended, sets the value of the environmental quality standard (EQS) against which the measured values are compared. Samples of adult fish (common chub), fish fry and benthic organisms (mainly larvae of sedgeflies, leeches and gammarus) are taken for chemical analysis.

Eight of the analysed substances were selected for more detailed assessment. The substances were polychlorinated biphenyls (sum-PCB), which were used industrially in the past.

Also, DDT and its metabolites (sum-DDT) as representatives of banned chlorinated pesticides, polybrominated diphenyl ethers (sum-PBDE) used in a number of materials as flame retardants, di(2 ethylhexyl) phthalate (DEHP) used mainly as a plastic softener, perfluorinated compounds (PFCs) used for various

Graph 3.1.11 Findings of hazardous organic substances in fish fry in 2023



x Exceeds the EQS.

surface treatments of materials, fluoranthene and benzo(a) pyrene as representatives of polyaromatic hydrocarbons (PAHs) which are formed during incomplete combustion, and mercury, mainly from combustion processes, mining and industry.

Most of these substances are classified as human carcinogens and endocrine disruptors with serious adverse effects on the reproductive system and embryonic development. The measured values are converted to wet weight (ww) and summarised for fish fry in Graph 3.1.11.

Overall, the most polluted profiles include the Bečva – Troubky (highest mercury concentrations: 40.5 µg.kg¹) and the Bílina – Ústí nad Labem (highest long-term PFC concentrations), followed by the Jizera – Předměřice and the Otava – Topělec, where the highest DEHP concentrations were measured. Among PAHs, the NEC value for fluoranthene (30 µg.kg¹) and benzo(a)pyrene (5 µg.kg¹) was determined, which was exceeded for benzo(a)pyrene at 3 profiles in the fish fry matrix. In the benthic matrix, the EQS was exceeded at 38% of the profiles for benzo(a)pyrene and at 14% for fluoranthene. As for the PFOS indicator, the EQS (9.1 µg.kg¹) was exceeded in the fish fry matrix at 57% of the profiles monitored, in benthic organisms at 24% of the profiles and in fish at the Bílina – Ústí

nad Labem and Elbe – Obříství profiles. The mercury concentration in the fish matrix, as in previous years, exceeded the EQS (20 $\mu g.kg^{-1}$) at all monitored profiles, in the fish fry at 24% of the sites, while in benthos the EQS was exceeded at 2 sites. Similarly to previous years, the sum-PBDE indicator exceeded the EQS (0.0085 $\mu g.kg^{-1}$) by several orders of magnitude at all profiles.

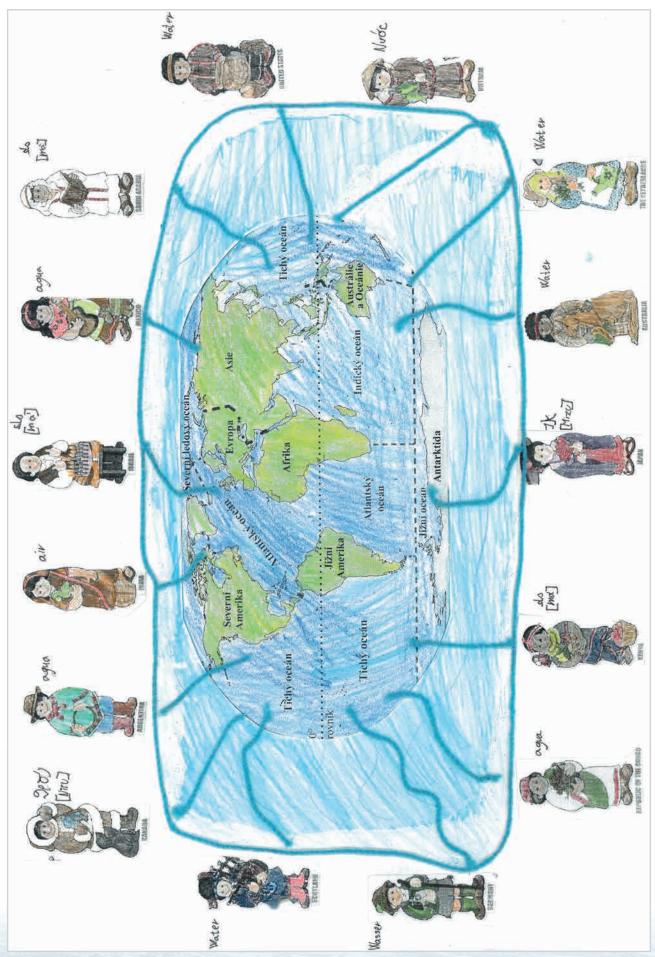
Monitoring of aquatic organisms provides information that cannot be detected by analysis of water samples; results from several matrices confirm complex pollution of the aquatic ecosystem. The information obtained is used to assess the chemical and ecological status of water bodies and to decide on measures to improve their condition.

3.2 Groundwater quality

V roce 2023 nebyl Českým hydrometeorologickým ústavem realizován program monitoringu jakosti podzemních vod podle schváleného programu monitoringu jakosti podzemních vod, z důvodu nezaviněných komplikací s výběrovým řízením na dodavatele vzorkovacích a laboratorních prací.



Reconstruction of a tributary of the Borusovský Stream – Svitavsko (source: Forests of the Czech Republic, s.e.)



N. Knafová – Water for all, Primary School Horní Slavkov (Ist place Ist category)

4. WATER MANAGEMENT

The monitoring of data on groundwater and surface water withdrawals and discharges is regulated by Decree No. 43 I/200 I Coll., on the content of the water balance, the method of its compilation and data for the water balance. In 2023, there was a slight year-on-year increase in groundwater abstraction, while surface water abstraction and discharges decreased.

On the basis of Section 10 of Decree No. 431/2001 Coll., the scope of reported data changed after 2001 - water abstractions, wastewater and mine water discharges exceeding 6,000 m³ per year or 500 m³ per month are recorded. The basis for the data collection are the reports of individual river basin managers, submitted to the Czech Statistical Office (CSO) by 31 March of the following year. The data for 2023 were broken down according to the CZ-NACE categorisation according to Eurostat. The comparison of the data for 2022 and 2023 was based mainly on the final official CSO data (www.czso.cz). Table 4.1 provides more detailed information on the classification of individual surface water and groundwater abstractions, wastewater and mine water discharges to surface water according to the classification CZ-NACE. This breakdown is valid for Tables 4.1.1, 4.2.1 and 4.3.1 below.

Table 4.1
Breakdown of users into groups according to CZ-NACE classification

| Water mains for public use | CZ-NACE 36 |
|--|-----------------|
| Sewerage for public use (without transfers) | CZ-NACE 37 |
| Agriculture (including irrigation), forestry and fishing | CZ-NACE 01 – 03 |
| Energy (electricity, gas and heat production and distribution) | CZ-NACE 35 |
| Industry (including mineral extraction – excluding energy) | CZ-NACE 05 – 33 |
| Other (including construction) | CZ-NACE 38 – 96 |
| Total (excluding ponds and transfers) | CZ-NACE 01 – 96 |

Source: CSO

4.1 Surface water abstractions

Longer-term monitoring shows that the amount of surface water abstracted has decreased annually since 2016. While 2022 was an exception, in 2023 the trend continued, with the amount of surface water abstracted decreasing from 1,089.5 million m³ in 2022 to 966.7 million m³.

A year-on-year decrease in surface water abstractions in 2023 was in the energy (by 16.2%, 87 million m^3), industry (by 17.7%, 35.6 million m^3) and agriculture (by 3.2%, 0.9 million m^3). Abstractions for agriculture increased by 33.2% (by 6.9 million m^3); abstractions in the category "other (including construction)" increased by 5.3%, whereas abstractions for water mains for public use were the same as in 2022.

All River Boards saw a decrease in surface water abstractions in 2023, most notably the Elbe River Board (by 18.9%), the Oder River Board (by 7.6%), followed by the Morava River Board (by 6.4%), the Ohře River Board (by 6.2%) and the Vltava River Board (by 3.9%).

After 1990, as a result of the adjustment of price relations for water services and changes in the structure of industrial and agricultural production, there was a significant decline in the degree of water resource exploitation in all areas of water use. This trend can be seen in Figure 4.1.1. Surface water abstractions in 2023 for public water supply decreased from 744.9 million m³ to 309.1 million m³, which was only 41.5% of the 1990 amount. There was also a decrease in abstractions for agriculture from 97.2 million m³ to 26.8 million m³, i.e. to 27.6% of the 1990 quantity. A significant decrease was in the industry sector from 830.1 million m³ to 165.9 million m³, i.e. to 20% of the 1990 level. The energy sector also saw a decrease compared to 1990, with consumption falling from 1,060.9 million m³ to 451.1 million m³, i.e. to 42.5%.

However, this does not mean that there is always a clear reduction in anthropogenic impact on water resources. For example, in the energy sector, on the contrary, the so-called irreversible consumption (the difference between consumption and discharge caused mainly by evaporation in

Table 4.1.1
Surface water abstractions by customers over 6,000 m³/year or 500 m³/month in million m³ in 2023

| River Board | Public water mains | | Agriculture including irrigation | | Energy | | Industry including mining | | Other incl. construction and public sewerage | | Total | |
|----------------|--------------------|--------|----------------------------------|--------|----------|--------|---------------------------|--------|--|--------|----------|--------|
| | Quantity | Number | Quantity | Number | Quantity | Number | Quantity | Number | Quantity | Number | Quantity | Number |
| Elbe | 34.3 | 27 | 10.7 | 76 | 257.1 | П | 69.4 | 58 | 2.4 | 88 | 373.9 | 260 |
| Vltava | 141.0 | 41 | 2.1 | 21 | 52.0 | 13 | 17.3 | 58 | 8.8 | 84 | 221.2 | 217 |
| Ohře | 39.8 | 18 | 2.1 | 43 | 31.3 | 8 | 30.7 | 39 | 0.9 | 26 | 104.8 | 134 |
| Oder | 58.9 | 22 | 0.1 | 2 | 6.0 | 14 | 39.0 | 33 | 0.5 | 25 | 104.5 | 96 |
| Morava | 35.1 | 37 | 11.8 | 48 | 104.7 | - 11 | 9.5 | 52 | 1.3 | 67 | 162.4 | 215 |
| Total | 309.1 | 145 | 26.8 | 190 | 451.1 | 57 | 165.9 | 240 | 13.9 | 290 | 966.8 | 922 |

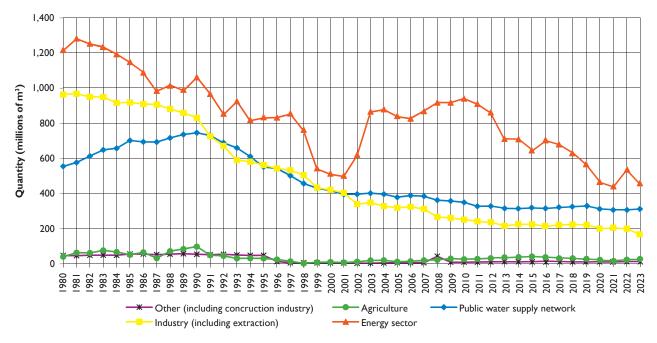
Source: River Boards

the cooling towers of thermal and nuclear power plants) has increased (given the ever-increasing electric power production in the Czech Republic).

The annual assessment of the impact on water resources is regularly carried out as part of the water balance drawn up in accordance with Decree No 431/2001 Coll., the principle of which is the aggregate assessment of the requirements for maintaining the minimum balance flow with the flows in the check profiles, which include all water management activities.

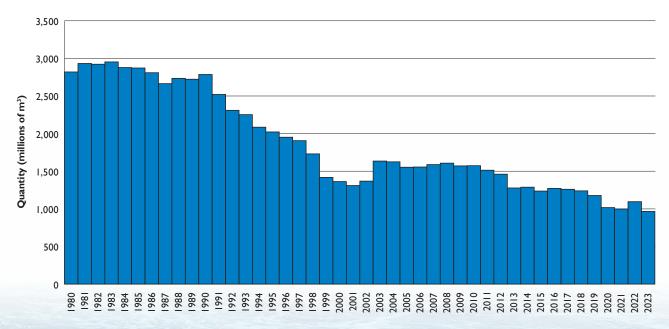
In the longer term, there has been a significant decline in the amount of surface water abstracted since 1990, which is due to economic and environmental factors, modernisation of production, which reduces the need for water, and a reduction in network losses. In 2023, there is an increase in surface water abstractions, especially in the Energy category. The impact of drought and the resulting availability of surface water resources can also be observed in the last five years. The year 2023 saw the lowest ever abstraction from surface water, with 966.7 million m³ abstracted.

Graph 4.1.1
Surface water abstractions in the Czech Republic by sector in 1980–2023



Source: T. G. Masaryk Water Research Institute, p.r.i. using data provided by the River Boards

Graph 4.1.2
Surface water abstractions by users over 6,000 m³/year or 500 m³/month for snowmaking in 2023



Source: MoA using data provided by the T. G. Masaryk Water Research Institute, p.r.i. and River Boards

Table 4.1.2 shows reported surface water abstractions for technical snowmaking where more than 6,000 m³/year or 500 m³/month (in thousand m³) were abstracted, broken down for each River Board.

Table 4.1.2 Surface water abstractions by users over 6,000 m³/year or 500 m³/month for snowmaking in 2023

| | Snowmakin | g *) |
|-------------|---------------------------|--------|
| River Board | Quantity (thousand m³) | Number |
| Elbe | 2,056.7 | 68 |
| Vltava | 615.1 | 15 |
| Ohře | 523.4 | 13 |
| Oder | 381.3 | 14 |
| Morava | 1,005.6 | 38 |
| Total | 4,582.1 | 148 |

Source: T. G. Masaryk Water Research Institute, p.r.i. using data provided by the River Boards Note: "Determined according to the internal VHB code "410 – technical snowmaking" used by the River Boards or by the name of the abstraction.

4.2 Groundwater abstractions

Groundwater abstractions increased to 357.4 million m³ in 2023. In 2022, groundwater abstractions amounted to 356.5 million m³.

A year-on-year increase in groundwater abstractions in 2023 was in the following categories: other (including construction industry) by 5.3%, agriculture by 4.8% and public water supply network. The energy sector saw a decrease in groundwater abstractions by 37.5% and industry by 2.1%.

The highest share of total groundwater abstractions was in the Morava River Basin (33.7%), the lowest in the Oder River Basin (4.6%).



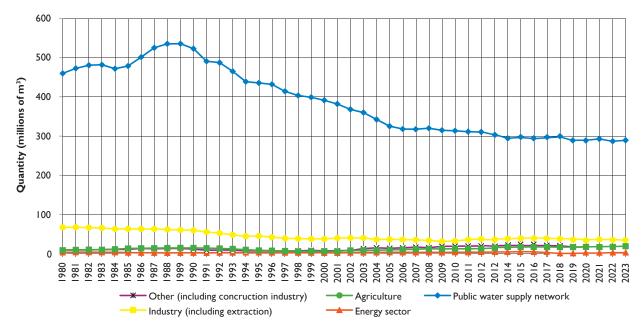
Spring Budding in Stromovka (author: Hubalová Petra)

Table 4.2.1
Groundwater abstractions (million m³) by users over 6,000 m³/year or 500 m³/month in 2023

| River Board | Public water mains | | Agriculture including irrigation | | Energy | | Industry including mining | | Other incl. construction and public sewerage | | Total | |
|----------------|--------------------|--------|--|--------|----------|--------|---------------------------|--------|--|--------|----------|--------|
| | Quantity | Number | Quantity | Number | Quantity | Number | Quantity | Number | Quantity | Number | Quantity | Number |
| Elbe | 91.5 | 687 | 3.6 | 245 | 0.5 | 8 | 7.3 | 140 | 2.6 | 113 | 105.5 | 1,193 |
| Vltava | 32.5 | 586 | 6.2 | 386 | 0.3 | Ш | 9.4 | 116 | 10.7 | 483 | 59.1 | 1,582 |
| Ohře | 44.0 | 310 | 0.8 | 31 | 0.6 | 5 | 8.0 | 114 | 2.0 | 36 | 55.4 | 496 |
| Oder | 14.5 | 157 | 0.5 | 34 | 0.0 | 0 | 1.0 | 30 | 0.3 | 25 | 16.3 | 246 |
| Morava | 105.2 | 701 | 6.3 | 353 | 0.1 | 9 | 7.2 | 167 | 2.3 | 105 | 121.1 | 1,335 |
| Total | 287.7 | 2,441 | 17.4 | 1,049 | 1.5 | 33 | 32.9 | 567 | 17.9 | 762 | 357.4 | 4,852 |

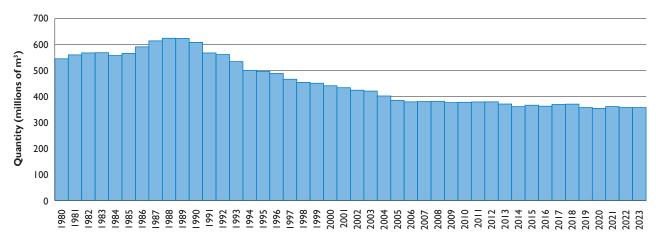
Source: River Boards

Graph 4.2.1
Groundwater abstraction in the Czech Republic by sectors in 1980–2023



Source: T. G. Masaryk Water Research Institute, p.r.i. using data provided by the River Boards

Graph 4.2.2
Groundwater abstractions in the Czech Republic 1980–2023



Source: MoA using data provided by the T. G. Masaryk Water Research Institute, p.r.i. and River Boards

From the perspective of abstracted volumes, an increase of 2.6% was recorded in the Ohře River Basin, of 0.8% in the Morava River Basin and 0.3% in the Elbe River Basin. Other River Boards saw a year-on-year decrease in abstractions in their river basins: the Oder River Board by 7.9% and the Vltava River Board by 0.7%.

A comparison of the data from the long perspective shows that the peak abstraction was recorded in 1988 and 1989, and that abstraction has been on a decline since then. Since 2006, the abstraction rate has stagnated. In 2023, the abstracted volume was approximately the same as in 2022 (356.5 million m³).

Table 4.2.2 shows the reported groundwater abstractions for technical snowmaking where more than 6,000 m³/year or 500 m³/month (in thousand m³) were abstracted for River Boards.

Table 4.2.2

Groundwater abstractions by users over 6,000 m³/year or 500 m³/month for snowmaking in 2023

| | Snowmaking *) | | | | | | |
|-------------|---------------------------|--------|--|--|--|--|--|
| River Board | Quantity (thousand m³) | Number | | | | | |
| Elbe | 8.8 | I | | | | | |
| Vltava | 5.4 | 2 | | | | | |
| Morava | 3.7 | I | | | | | |
| Total | 17.9 | 4 | | | | | |

Source:T. G. Masaryk Water Research Institute, p.r.i. using data provided by the River Boardsí
Note: "Determined according to the internal VHB code "410 – technical snowmaking"
used by River Boards or by the name of the abstraction point

4.3 Wastewater discharge

In 2023, 1,471.5 million m³ of wastewaters and mine waters was discharged into watercourses, a reduction of about 1.7% compared to the previous year.

As in previous years, the total amount of water discharged from pond systems was not included (due to the unification of the data administered by different River Boards).

An increase in volumes discharged in 2023 occurred in agriculture (by 3.7%), public water supply network (by 8.4%) and other including construction (by 0.5%). A year-on-year decrease in wastewater discharges occurred in the energy sector (by 17.8%) and industry (by 7.7%).

In terms of the volumes discharged, a year-on-year increase was recorded in the Morava River Basin (by 8.5%), Ohře River

Basin (by 4.4%), Oder River Basin (by 2.1%) and Vltava River Basin (by 0.7%), whereas only the Elbe River Basin saw a decrease in wastewaters discharged (by 11.1%).

The long-term trend in discharges of wastewaters and mine waters shows a slight decrease in the discharges recorded. This is mainly due to the system of reporting discharges, when previously free discharges directly to surface waters without connection to a WWTP prevailed and discharges were mostly estimated from invoiced water consumption. Extending of the sewerage system, construction of new WWTPs with accurate discharge measurements and adoption of the new Water Act in 2001 led to more accurate reporting on discharges.

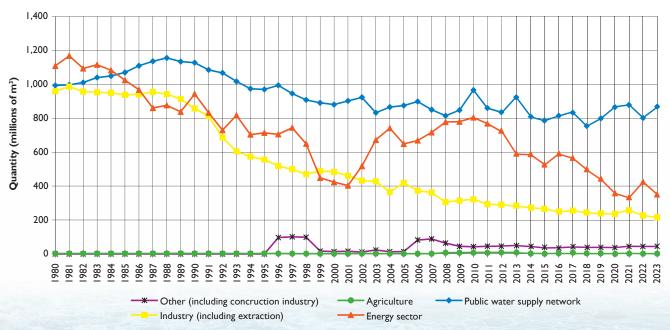
2023 saw the lowest volume of wastewater and mine water discharge ever, a total of 1,471.5 million m³ was discharged.

Table 4.3.1 Wastewater and mine water discharges to surface waters (million m³) for sources over 6,000 m³/year or 500 m³/month in 2023

| River Board | Public sewerage | | Agriculture, including irrigation | | Energy | | Industry, including mining | | Other incl. construction and public utilities water supply | | Total | |
|----------------|-----------------|-----------|---|-----------|----------|-----------|----------------------------|-----------|---|-----------|----------|-----------|
| | Quantity | Number of | Quantity | Number of | Quantity | Number of | Quantity | Number of | Quantity | Number of | Quantity | Number of |
| Elbe | 186.8 | 795 | 0.1 | 2 | 239.3 | 21 | 66.0 | 156 | 2.8 | 62 | 495.0 | 1,036 |
| Vltava | 283.2 | 807 | 0.7 | 6 | 17.3 | 22 | 22.5 | 140 | 29.6 | 770 | 353.3 | 1,745 |
| Ohře | 78.9 | 288 | 1.0 | 2 | 13.7 | 21 | 60.5 | 129 | 4.6 | 39 | 158.7 | 479 |
| Oder | 97.1 | 313 | 0.1 | 2 | 6.4 | 14 | 41.6 | 83 | 4.0 | 63 | 149.2 | 475 |
| Morava | 221.5 | 1,189 | 0.4 | 6 | 70.9 | 15 | 20.0 | 139 | 2.7 | 100 | 315.5 | 1,449 |
| Total | 867.5 | 3,392 | 2.3 | 18 | 347.6 | 93 | 210.6 | 647 | 43.7 | 1,034 | 1,471.7 | 5,184 |

Source: River Boards

Graph 4.3.1 Wastewater discharges in the Czech Republic in 1980–2023



Source: T. G. Masaryk Water Research Institute, p.r.i. using data provided by the River Boards

Graph 4.3.2 Wastewater discharges in the Czech Republic in 1980–2023



Source: MoA using data provided by the T. G. Masaryk Water Research Institute, p.r.i. and River Boards

4.4 Overall comparison of water management

In 1980–2023, there was a very clear decrease in both abstractions and discharges after 1990, after 2001 abstractions and discharges increased slightly, and after 2010 a further decrease in abstractions and discharges can be observed. The amount of surface water abstracted in 2023 decreased compared to the previous year to a record low of 966.7 million m³. Groundwater abstractions increased from 356.5 million m³ in 2022 to 357.4 million m³. The volume of discharges in 2023 was by some 25.2 million m³ lower than in 2022. Discharges were again slightly higher than abstractions.

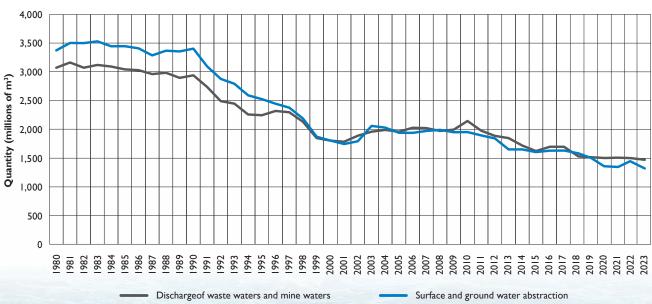
The significant difference between abstracted and discharged volumes before 1995 can be attributed to the different way of

reporting discharges, higher leakages from water supply networks and inconsistent sewerage networks in many smaller towns (agglomerations above 2,000 equivalent people [EP] were connected to a sewerage system only after EU accession, i.e. after 2004).

In dry years, the volumes of abstraction and discharge are similar, but in more watery years, discharge prevails over abstraction, which is given by the fact that part of rainwater gets to the sewerage, exceeding the measured consumption from the water supply network.

As 2023 was a normal year in terms of precipitations, the volume of water discharged was again slightly higher than water abstracted. Discharges amounted to 1.47 billion m³, while abstractions of surface waters and groundwaters were 1.32 billion m³.

Graph 4.4.1
Water abstractions and discharges in the Czech Republic in 1980–2023



Source: MoA using data provided by the T. G. Masaryk Water Research Institute, p.r.i. and River Boards



The Mlýnecký Stream - revitalization (source: Ohře River Board, s.e.)

Comparison of surface and groundwater abstractions by

00

Graph 4.4.2

600

0

water supply network

Public

sector in 2023

Source: MoA using data provided by the T. G. Masaryk Water Research Institute, p.r.i. and River Boards

Surface water

Energy sector

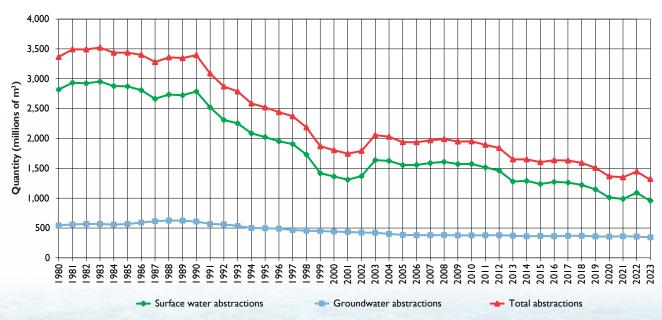
Groundwater

When comparing surface water and groundwater abstractions by sectors, it can be noted that abstractions for the water supply sector are almost perfectly balanced, while most other sectors use mainly surface water.

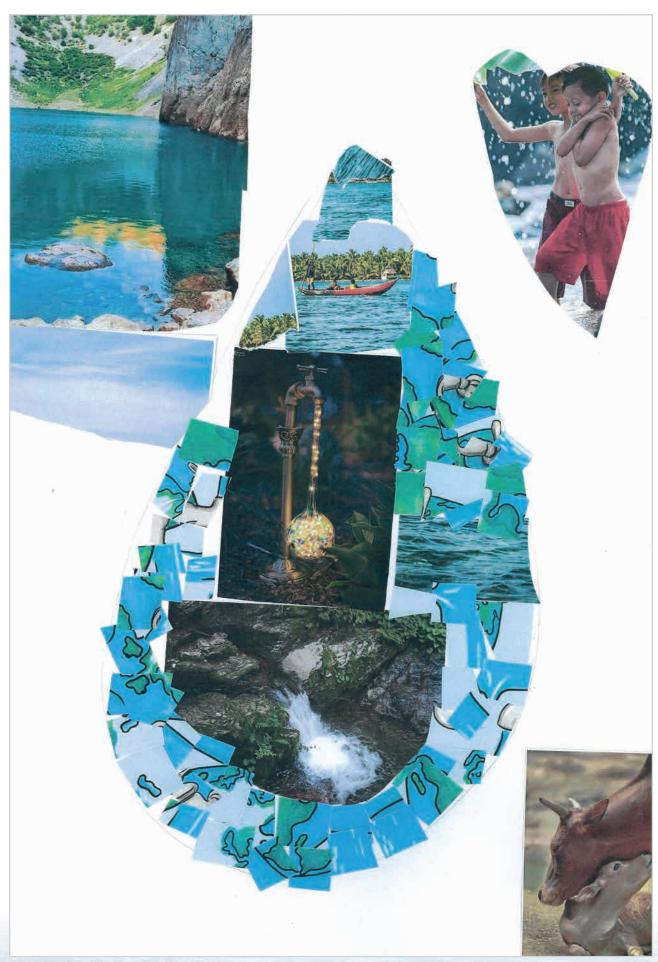
In 2023, as in previous years, more water was abstracted from surface sources for public water supply. Surface water is used almost exclusively for energy purposes, a similar situation concerns industries. Agriculture covers almost two thirds of its water needs from surface water. Only one sector (others including construction) uses more groundwater than surface water. This is probably given by the price of groundwater, which is significantly lower than that of surface water.

Graph 4.4.3 shows that the majority of abstractions are from surface waters, with surface water abstractions declining more significantly than groundwater abstractions since 1990.





Source: T. G. Masaryk Water Research Institute, p.r.i. using data provided by the River Boards



D. Heveš – Drop of Earth, Primary School and Kindergarten Tři Sekery (3rd place I. category)

5. SOURCES OF POLLUTION

5.1 Point sources of pollution

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

The 'produced pollution' refers to the amount of pollution contained in produced (untreated) wastewaters. In line with EU requirements, the Czech Republic pays increased attention to data collection and analysis of the situation concerning pollution. In particular, data are collected from a larger number of reporting entities under so-called water balance in line with requirements of Decree No. 431/2001 Coll., on the content of the water balance, the method of its compilation and the data for the water balance.

The produced pollution improved in 2023 in comparison with the previous year in five indicators: DIS (dissolved inorganic salts) by 4.1%, BOD_5 (biochemical oxygen demand) by 2.9%, COD_{Cr} (chemical oxygen demand) by 2.5%, NM (non-dissolved matters dried at $105^{\circ}C$) by 2.2%, P_{total} (total phosphorus) by 1.8%. On the other hand, the volume of Ninorg (inorganic nitrogen) produced increased by 3.9%

In 2023, the production of discharged pollution, i.e., pollution contained in wastewaters discharged to surface waters, decreased in three monitored indicators: COD_{Cr} (by 4%), BOD_{5} (by 2.7%) and DIS (by 2%). The volume of produced pollution increased in Ninorg (by 5.6%), NM (by 2.7%) and P_{total} (by 2.3%). The volumes of discharged and invoiced pollution for each indicator since 1990 are shown in Graph 5.1.1.

Between 1990 and 2023, there was a drop in discharged pollution of BOD_s by 96.8%, the production of NM decreased by 95.5% and COD_{Cr} by 91.4%. At the same time, discharges of hazardous and particularly hazardous pollutants were also reduced. A significant decrease in macronutrients (nitrogen, phosphorus) was due to introduction of biological removal of nitrogen and biological or chemical removal of phosphorus



The Myslivny Reservoir (source: Ohře River Board, s.e.)

in wastewater treatment technologies applied in new and intensified WWTPs.

Table 5.1.1 shows that monitored DIS values in discharged pollution in the Vltava River Basin and the Oder River Basin are higher than the produced pollution. Such a deviation in the resulting value of discharged pollution may be due to salt dosing used when reducing phosphorous chemically or when adding defoaming salts. Furthermore, the inflow and outflow to/from WWTPs of the indicator is not monitored with the same frequency and/or not in the same type of samples, and/or the data about produced pollution might not be complete.

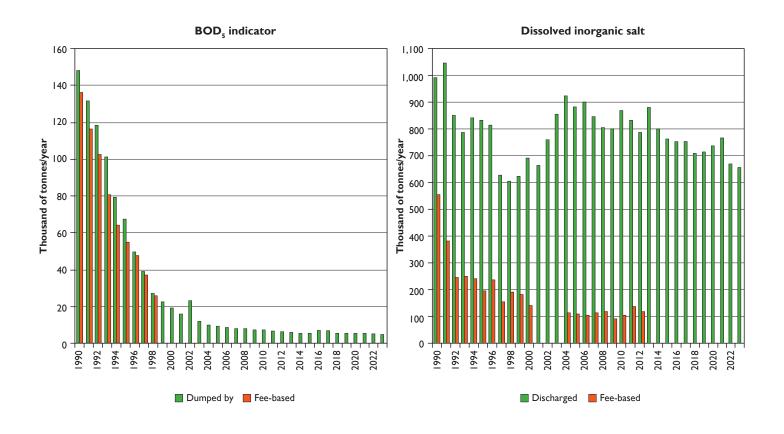
Table 5.1.1
Pollution produced and discharged in 2023

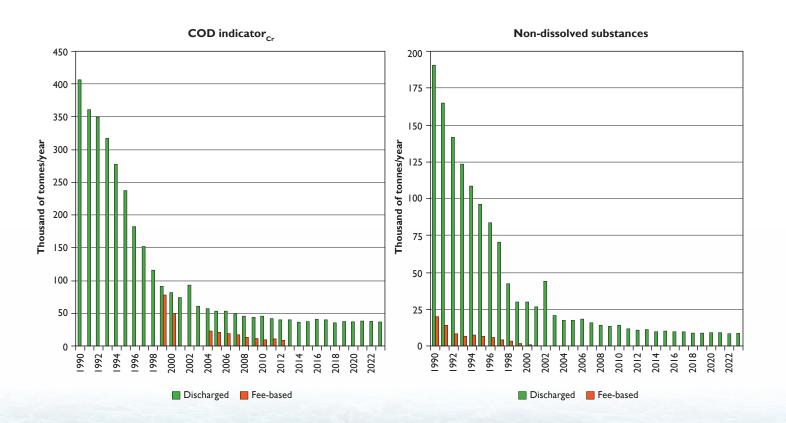
| River Board | | Pollution produced in t/year | | | | | | | Pollution discharged in t/year | | | | | |
|----------------|------------------|------------------------------|--------|---------|--------------------|--------------------|------------------|-------------------|--------------------------------|---------|-------|--------------------|--|--|
| | BOD ₅ | COD _{Cr} | NM | DIS | N _{inorg} | P _{total} | BOD ₅ | COD _{Cr} | NM | Dis | N | P _{total} | | |
| Elbe*) | 52,648 | 121,561 | 53,462 | 188,517 | 7,834 | 1,328 | 956 | 8,638 | 1,865 | 182,427 | 2,141 | 229 | | |
| Vltava | 91,748 | 217,432 | 97,943 | 114,950 | 10,269 | 2,373 | 1,451 | 10,019 | 2,404 | 120,554 | 2,768 | 283 | | |
| Ohře*) | 18,021 | 36,646 | 16,786 | 67,116 | 2,253 | 736 | 483 | 3,174 | 1,207 | 65,298 | 1,252 | 245 | | |
| Oder*) | 28,842 | 60,705 | 22,977 | 134,370 | 3,716 | 627 | 635 | 5,356 | 1,438 | 145,530 | 1,109 | 134 | | |
| Morava*) | 65,047 | 154,801 | 75,261 | 147,089 | 8,813 | 1,737 | 1,154 | 7,588 | 1,565 | 139,917 | 2,240 | 218 | | |

Source: T. G. Masaryk Water Research Institute, p.r.i., using data provided by the CSO and River Boards

Note: *) For the reported amount of pollution produced, values were calculated based on the values from the discharged pollution due to non-completion of the produced pollution by some of the notifiers.

Graph 5.1.1 Pollution discharges and charged pollution in 1990–2023





Source: T. G. Masaryk Water Research Institute, p.r.i., using data provided by the CSO and River Boards



Revitalised pond in Libotenice (source: Elbe River Board, s.e.)

5.2 Area sources of pollution

Surface water and groundwater quality is also significantly affected by area sources of pollution – such as pollution from farming, from atmospheric deposition and from erosive runoff from the landscape. While pollution from point sources keeps decreasing, the contribution of area pollution is on the rise. Surface water and groundwater quality is most significantly affected by nitrates, pesticides and acidification, less by phosphorus.

One of the most important measures aimed at reducing surface water pollution from agricultural sources is Government Regulation No. 262/2012 Coll., on the designation of vulnerable areas and the action programme, as amended by Government Regulation 277/2020 Coll. Under this regulation, so-called vulnerable areas are defined (registered) and an action programme is launched.

Agricultural land erosion and of hydroamelioration aspects

The Czech Republic, like other countries, is increasingly exposed to hydrological extremes due to climate change. It can be assumed that the areas affected by such extremes will expand significantly. One of the key factors that can mitigate the effects of climate change is suitable farming of agricultural land.

The occurrence of water erosion in the Czech Republic is significantly influenced by a number of factors, in particular the

largest size of soil blocks of the EU countries, the lack of organic matter in the soil, a very low level of landscape elements with soil (anti-erosion) protection and inadequate relations of farming entities to cultivated agricultural land. Water erosion results in soil loss and topsoil depletion, siltation of watercourse and reservoir beds. During prolonged droughts, sediments in watercourses may be subject to accelerated mineralization, with water quality deteriorating after re-flooding. Water erosion thus causes deterioration in water quality, contributing to eutrophication and impairment of water use. Together with some large-scale single-function drainage systems, water erosion reduces water retention and accumulation in the landscape.

The Research Institute for Soil and Water Conservation, p.r.i., has monitored agricultural soil erosion since 2012 (https://me.vumop.cz), its main objective is to ensure relevant evidence on the extent of the problem of agricultural soil erosion, the causes of erosion, correct targeting of existing policies aimed at eliminating erosion and the effectiveness (or ineffectiveness) of certain anti-erosion measures.

In 2021, Decree No. 240/2021 Coll., on the protection of agricultural land against erosion, which is directly related to the aforementioned system, came into force. As a result, it will be possible to assess the impact of this legislation on water pollution in the years to come.

Damage to water bodies was recorded in 26% of the events monitored in 2023. Thus, in 2023, the damage caused by erosion events was around the long-term average. The positive decline

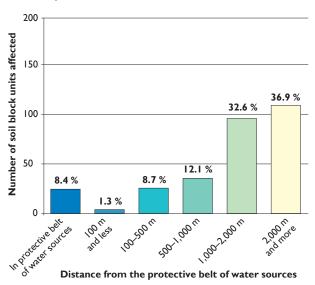
that occurred in 2022 can be considered exceptional and no significant improvement can be seen in terms of water erosion. The monitoring identified mainly visible damage, i.e. sediments. Erosion sediment runoff carries other substances (pesticides, fertilizers, nutrients, etc.) that can reach water resources through the hydrographic network. As such, the negative impact of erosion events on the quality of water resources has several degrees.

As Graph 5.2.1 shows, 18.4% of the soil blocks affected by erosion events were inside water resource protection buffer zones and/or within 500 m from the buffer zones (of which 8.4% of the blocks were located inside the zone. Thus, in 2023, there was a reduction in the number of erosion events in the buffer zones. It is the third consecutive year that this assessment shows a slight decrease in the order of single-digit percent.

As a result of erosion sediment runoff (according to analyses, about 1.4 million m³ of sediments from agricultural land) and introduction of other substances (pesticides, nutrients) that enter water resources through the hydrographic network and drainage systems affect adversely the water resource quality. The quality is also negatively affected by the majority of erosion events and by inputs of pollution through drainage systems; the amount of N-NO³ runoff from arable drained soil in the long-term average is approximately 30 kg/ha¹/year¹, while contribution of drainage water to water pollution with plant protection preparations is not negligible.

In order to mitigate the impacts and effects of hydrological extremes in the landscape, it is necessary to adapt farming methods and the use of agricultural landscapes. To design such measures, it is possible to use tools such as those published at https://geoportal.vumop.cz, in particular the Moisture Needs Calculator https://ylaha.vumop.cz, which can be used to perform moisture balances for specific cropping practices and locations (with precision to the soil block), to define enclaves

Graph 5.2.1
Recorded erosion events by distance from the water resource protection zone in 2023



Source: Research Institute for Soil and Water Conservation
Note: Number of affected SB = number of soil blocks where erosion was recorded.

at risk of different levels of drought, and to determine values of moisture needs or irrigation quantities. Using this tool, it was found that the water deficit of the moisture balance, i.e. the difference between the crop water requirement (according to FAO–56) and the available soil water resources (rainfall, amount of emergent water, soil water storage at the beginning of the growing season), increased significantly in the period 2009–2018 compared to the current climatic norm 1981–2010. The largest increases in areas under moderate and severe water stress were found in maize (from 9,746 to 11,383 km²) and semi-ploughed potatoes (from 10,077 to 12,125 km²). Crop water stress is defined as the lack of freely

Figure 5.2.1

Overview of erosion events in 2023

Recurrent erosion events in 2023

Recurrent erosion events

Frosion events

Geadqurters

Water reservois

Significant watercourses

The International river basin of the Elbe
the Oder
the Danube

Source: Research Institute for Soil and Water Conservation

available water in the soil that can be used by plants, defined by the value of the so-called point of reduced availability, which varies considerably for different soils and crops at different stages of their development.

Crop water stress, as well as increased runoff and pollutant input from the soil through subsurface runoff, can be mitigated by water retention measures at existing agricultural drainage structures. What has great potential in terms of agricultural drought reduction, improvement of water quality and stabilization of crop yield on drained soils are measures regulating drainage runoff. Given the conditions in the Czech Republic, drainage control systems (using an external water resource for irrigation) or systems with drainage runoff control (control of autochthonous water) have considerable potential for retaining water in a soil profile, its volume ranging between 800-1,500 m³/ha⁻¹/year⁻¹. Out of the total area of registered drainage structures in the Czech Republic (1.2 million ha), the areas with suitable conditions for application of such principles are estimated to be around 450 thousand ha (for drainage runoff control) and about 150 thousand ha (for drainage control). The potential for effective drainage runoff control is applicable to a total of approx. 195 thousand ha of existing agricultural drainage structures. These aspects are addressed in detail in the new methodology Regulatory Drainage and Proven Technology Increasing Yield Potential.

An analysis of small sub-basins (50–300 ha) in the Vltava River Basin (28,000 km²) focused on the need for biotechnical measures including upgrading and/or eliminating drainage systems aimed at dealing with hydrological extremes, increasing water retention and improving water quality was conducted (https://atlaspvl.vumop.cz/).

Measures taken at agricultural drainage structures are included in the new land consolidation methodology. The systematic consideration of drainage in the plans of common facilities, as also defined in the material "Plan of measures for drought management through land consolidation and adaptation of hydroamelioration in the 2030 horizon" by the Ministry of Agriculture, Research Institute for Soil and Water Conservation, SLO (30 June 2020), is still being carried out partially. However, the Research Institute for Soil and Water Conservation provides methodological support in this respect and, in some cadastral areas, it actually prepares documents and proposals for measures.

5.3 Accidental pollution

Accidental pollution is another negative factor affecting the quality of surface water and groundwater. In 2023, the Czech Environmental Inspectorate registered 237 cases of releases of hazardous substances, of which 160 releases into surface waters, 3 releases into groundwaters and 2 into both surface and groundwaters in the Czech Republic, and imposed 435 fines in the amount of CZK 16.7 million in the sphere of water management.

According to the Water Act, the Czech Environmental Inspectorate (CEI) has maintained a central register of accidents since 2002. In 2023, 237 accidents were recorded in this register



It will carry me away, The Brno Reservoir (author: Husák Vladimír)

that fulfilled the definition of an accident under Section 40 of the Water Act.

Accidents caused by traffic have declined on a year-on-year basis. In 2023, 52 accidents caused by traffic were recorded, accounting for 21% of the total number of cases. Fish mortality was a concomitant phenomenon in 34 cases that year, accounting for 14% of the total. Even this indicator saw a year-on-year drop. Groundwater pollution occurred in 3 cases, and in 2 other cases both groundwater and surface water were polluted simultaneously. The originator of the accident was known in 146 cases.

In 2023, the CEI received further announcements of accidents, which were not included in the central register due to their insignificant extent, with no impact on water quality.

Of the 237 cases recorded, the most numerous group of pollutants was oil products – III cases recorded, accounting for 46.8%, followed by wastewaters – 8.1% and chemicals (excluding heavy metals) – 7.1%. The nature of the pollutants was not detected in 42 accidents (20%).

In terms of the breakdown by the sector of the accident originator (CZ-NACE), the most frequent accidents were in section C – manufacturing (9.3%), followed by accidents in section H – transportation and storage (6.8%) and accidents in section E – water supply; waste and remediation activities (6.3%). The sector of the activity of the accident originator could not be classified in 53.6% of the cases.

In 2023, the CEI imposed a total of 435 fines for breaches of legal regulations in the field of water management, of which 396 fines became effective in 2023. The total amount of fines from decisions that became final in 2023, regardless of the date of the decision, including decisions of appeal bodies, amounted to CZK 16.7 million.



 $N. \ Ille\"{s}ov\'{a}-Using \ Water for \ Peace \ 2024, \ Elementary \ School \ Slezsk\'{a}, \ Orlov\'{a}-Poruba \ (2nd \ place \ Ist \ category)$

6. WATERCOURSE MANAGEMENT

6.1 Professional management of watercourses

The inland position in the heart of Central Europe predetermines the Czech Republics relationship to the European river network. The basic hydrographic network consists of almost 100,000 km of watercourses with natural and modified channels. Watercourses of the Czech Republic are divided into major and minor watercourses according to the Water Act. Their professional management is carried out in accordance with the provisions of Section 47 of the Water Act.

Important watercourses administrators under the MoA are River Boards: the Elbe River Board, s.e., Morava River Board, s.e., Oder River Board, s.e., Vltava River Board, s.e. and Forests of the Czech Republic, s.e. They manage 94.4% of the total length of watercourses in the Czech Republic. The remaining 4.6% of the length of watercourses is managed by other administrators (the Ministry of Defence, national park administrations, municipalities, other natural and legal entities).

Table 6.1.1 Professional management of watercourses

| Category | Administrator | Leng watercou | |
|-------------|-------------------------------|------------------|--------|
| | | 2022 | 2023 |
| | Elbe River Board | 3,640 | 3,640 |
| . S | Vltava River Board | 5,546 | 5,500 |
| cant | Ohře River Board | 2,377 | 2,377 |
| Significant | Oder River Board | 1,111 | 1,111 |
| Sig | Morava River Board | 3,762 | 3,762 |
| 7 | River Boards in total | 16,436 | 16,390 |
| ses | Forests of the Czech Republic | 38,439 | 38,449 |
| our | River Boards in total | 38,742 | 38,715 |
| Minor | Other administrators () | 5,539 | 5,593 |
| | Total | 82,720 | 82 757 |
| Watercours | es in total | 99,156 | 99,147 |

Source: MoA

 $\label{thm:control} \textbf{Note: Digital lengths of streams from the Central Watercourse Register are given.}$

¹⁾ Including administrations of national parks, the Ministry of Defence (military area offices), municipalities and other natural and legal persons.

All significant watercourses are listed in Annex No. I to Decree No. 178/2012 Coll. that defines a list of significant watercourses and methods for conducting activities linked with watercourse management. It is an overview of 819 watercourses including their identifiers (watercourse ID); the overview also includes minor watercourses that are so-called 'transboundary' watercourses. Significant watercourses with total length of 16,390 km are administered by the respective River Boards



The Číhalínský Stream – Třebíč region (source: Forest of the Czech Republic, s.e.)

under the provision of Section 4 of Act No. 305/2000 Coll., on river basins. The backbone watercourses are the Elbe River (369 km), the Vltava River (424 km) and the Ohře River (254 km) in Bohemia, the Morava River (269 km) and the Thaya River (194 km) in the south of Moravia and the Oder River (135 km) and the Opava River (131 km) in the north of Moravia and Silesia.

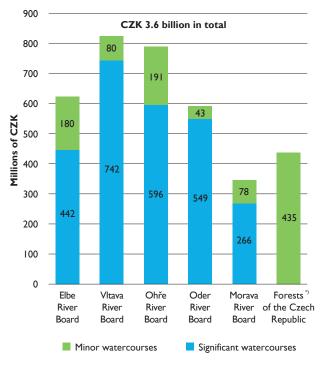
All the other watercourses are classified as minor watercourses pursuant to Section 43 of the Water Act; they are administered based on the respective appointment by the MoA (provision of Section 48(2) of the Water Act). If no administrator of a minor watercourse is appointed, such a watercourse is administered in accordance with the provision of Section 48(4) of the Water Act, by the administrator of the recipient into which such a watercourse flows. It is administered by such an authority until watercourse administrator is appointed in accordance with Section 48(2) of the Water Act. Minor watercourses may be administered by municipalities through which minor watercourses flow, natural persons or legal entities or organizational body that either use such a minor watercourse or is related to their activity. The template and content of an application to appoint the administrator of a minor watercourse is specified in detail in the abovementioned Decree No. 178/2012 Coll. According to the Central Registry of Watercourses (CRW), the total length of minor watercourses is 82,757 km. The drawings of minor watercourses are reassessed, refined and reclassified on an ongoing basis.

The CRW online application, available on the MoA website (www.eagri.cz) and on the Water Information Portal (www.voda.gov.cz), serves for informing the public administration and the general public about the management of each watercourse.

At the end of February 2022, the MoA and the MoE, with strong support of organisations under their management, launched a new joint website of the so-called Information System for Public Administration in Water Management (ISVS WATER) on the existing website www.voda.gov.cz, which replaced the version operated by CENIA, formerly available on the eAGRI website. The main objective of the website is to present information on water management at a single place in a comprehensive and unified way, independently of how competences are divided in water management.

In 2023, the administrators of significant and minor watercourses under the jurisdiction of the Ministry of Agriculture expended funds from their own and other sources amounting to a total of CZK 3.7 billion.

Graph 6.1.1 Funds expended on watercourse management in 2023



Source: MoA

Note: ${}^{\circ}$ The item includes funds for management of watercourses and reservoirs.

The acquisition value of tangible fixed assets related to watercourses in 2023 increased by CZK 1.65 billion compared to the previous year to almost CZK 60 billion.

The year-on-year increase mainly reflects additions to tangible fixed assets acquired through the renewal and planned development of the entrusted assets in the form of routine investment construction and ongoing inclusion of assets taken over and completed hydraulic structures. Even in 2022, none of the watercourse administrators completed, approved or took over a hydraulic structure that would significantly influence the indicators reflecting the acquisition values of tangible fixed assets.

Table 6.1.2
Acquisition value of tangible fixed assets related to watercourses

| Watercourse administrator | 2022 | 2023 | | |
|-------------------------------|-------------|-------|--|--|
| watercourse auministrator | billion CZK | | | |
| Elbe River Board | 10.92 | 10.98 | | |
| Vltava River Board | 11.95 | 12.45 | | |
| Ohře River Board | 10.76 | 11.04 | | |
| Oder River Board | 6.58 | 6.70 | | |
| Morava River Board | 9.10 | 9.19 | | |
| Total River Boards | 49.31 | 50.36 | | |
| Forests of the Czech Republic | 8.5 | 9.1 | | |
| Total | 57.81 | 59.46 | | |

Source: MoA

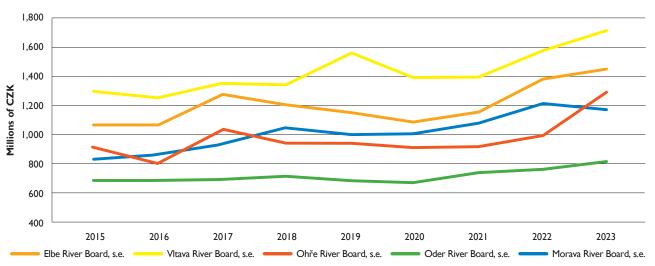
6.2 River Boards, state enterprises

Total revenues generated by the River Boards amounted to CZK 6,431 million in 2023, which means a year-on-year increase of CZK 509 million, i.e., by 9%. The largest increase was in revenue from electricity generation (by 97%) and other revenues (by 22%). By contrast, a significant decrease was recorded in the special-purpose non-investment grants provided (by 33%) and also in payments for surface water abstractions (by 2%).



At the Water, The Hrabětický Stream, Hrabětice (author: Procházková Lenka)

Graph 6.2.1
Revenues of the River Boards in 2015–2023



Source: MoA

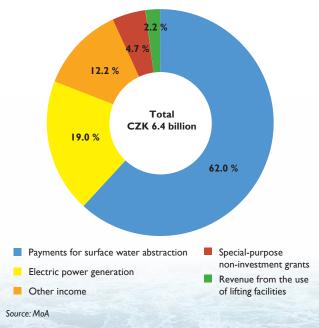
Table 6.2.1
Revenue structure of the River Boards in 2023

| | River Board | | | | | | | | |
|--|---------------|-----------|------------|---------|-----------|-----------|--|--|--|
| Indicator | Elbe | Vltava | Ohře | Oder | Morava | Total | | | |
| | thousands CZK | | | | | | | | |
| Payments for surface water abstractions | 1,063,815 | 911,835 | 608,724 | 625,501 | 775,794 | 3,985,669 | | | |
| Electricity generation | 92,970 | 443,803 | 474,340 *) | 111,458 | 101,356 | 1,223,927 | | | |
| Revenue from the use of lifting facilities | 8,062 | 122,764 | 3,267 | 0 | 4,956 | 139,049 | | | |
| Other income | 190,634 | 196,193 | 188,626 | 71,330 | 136,167 | 782,950 | | | |
| Special-purpose non-investment grants () | 93,652 | 32,692 | 17,276 | 4,209 | 151,580 | 299,409 | | | |
| Total River Boards | 1,449,133 | 1,707,287 | 1,292,233 | 812,498 | 1,169,853 | 6,431,004 | | | |

Source: River Boards

Note: *) The item includes revenues from photovoltaic power plants.

Graph 6.2.2
Revenue structure of the River Boards in 2023



The total costs of the state-owned enterprises of the River Boards in 2023 increased by 9.3% compared to the previous year to a total of CZK 6,136 million. The largest increase was in the energy and fuel item, while the financial costs item saw a significant decrease.

Costs increased significantly in the following items: energy and fuel (by CZK 339 million, i.e. an increase by 207%) and other costs (by CZK 192 million, i.e. by 8%). A year-on-year decrease occurred in financial costs (by 41%). Repair costs decreased slightly (by 3%), while most River Boards conducted a higher volume of repairs than in the previous year.

All the River Boards were in black numbers in 2023, the total profit amounting to CZK 295 million. This was a year-on-year decrease by almost 4%, i.e., by CZK 11 million.

In the year under review, the Ohře, Oder and Morava River Boards saw a high increase in profits. Such an increase in the Ohře River Board's profit was due to higher revenues from electricity generation (increase in power prices) and higher revenues from green bonuses. The increase in the profit of the

¹⁾ Including all special-purpose non-investment grants for small watercourses, subsidies from the STIF and other non-investment subsidies.

Oder River Board was mainly due to higher revenues from electricity generation given by favourable hydrological conditions in 2023. The Morava River Board had a steep increase in revenues from, among others, electricity generation, whereas its revenues were only CZK 15 million in 2022.

The Elbe and Vltava River Boards saw a significant drop in profits by almost 55% (the Elbe River Board's profit dropped by CZK 99 million and the Vltava River Board's by CZK 53 million). This was primarily due to the fact that the Vltava River Board performed a priority task set by its founder,

whereby all the company's funds exceeding the maximum after-tax profit defined by the founder were to be used for repair and maintenance costs throughout the year.

The profit of the Elbe River Board was lower in 2023 than in 2022, however, it was higher than the set profit approved by the financial plan for 2023; the higher than planned profit was achieved thanks to exceptional revenue from financial economic activities and a partial increase in the price of surface water abstractions in the second half of the year.

Table 6.2.2
Costs of the River Boards in 2022 and 2023

| | | | | River Boards | ; | | Total | | | |
|------------------|------|-------------|---------|--------------|-------|---------|---------|--|--|--|
| Costs | Year | Elbe | Vltava | Ohře | Oder | Morava | iotai | | | |
| | | million CZK | | | | | | | | |
| Write-offs | 2022 | 186.4 | 327.6 | 178.8 | 156.2 | 167.0 | 1,016.0 | | | |
| VVIILE-OIIS | 2023 | 175.7 | 329.9 | 183.6 | 152.9 | 174.1 | 1,016.2 | | | |
| Donaina | 2022 | 176.9 | 303.9 | 209.4 | 136.0 | 491.1 | 1,317.3 | | | |
| Repairs | 2023 | 242.8 | 369.2 | 220.4 | 155.4 | 295.7 | 1,283.5 | | | |
| Material | 2022 | 36.6 | 31.6 | 19.2 | 35.4 | 52.8 | 175.6 | | | |
| Material | 2023 | 38.2 | 31.1 | 21.7 | 33.8 | 47.9 | 172.6 | | | |
| F 16.1 | 2022 | 48.3 | 46.0 | 39.6 | 6.4 | 23.4 | 163.6 | | | |
| Energy and fuel | 2023 | 47.9 | 52.4 | 38.1 | 8.7 | 23.8 | 170.9 | | | |
| Personal costs | 2022 | 639.4 | 579.4 | 473.4 | 324.3 | 479.8 | 2,496.3 | | | |
| rersonal costs | 2023 | 693.5 | 639.1 | 516.8 | 325.8 | 513.0 | 2,688.2 | | | |
| Services | 2022 | 70.1 | 88.5 | 63.1 | 31.2 | 30.6 | 283.5 | | | |
| Ser vices | 2023 | 62.5 | 89.3 | 75.8 | 38.5 | 35.6 | 301.7 | | | |
| Financial costs | 2022 | 0.4 | 0.6 | 0.1 | 0.1 | 0.7 | 2.1 | | | |
| Fillancial Costs | 2023 | 0.4 | 0.4 | 0.2 | 0.1 | 0.2 | 1.3 | | | |
| Other costs | 2022 | 34.0 | 100.1 | 12.3 | 51.7 | -35.9 | 162.2 | | | |
| Other costs | 2023 | 103.2 | 152.3 | 142.9 | 32.8 | 70.1 | 501.3 | | | |
| Total costs | 2022 | 1,192.1 | 1,477.7 | 995.9 | 741.3 | 1,209.5 | 5,616.4 | | | |
| Total costs | 2023 | 1,364.2 | 1,663.7 | 1,199.5 | 748.0 | 1,160.4 | 6,135.8 | | | |

Source: River Boards

Note: *) The negative value is due to the drawdown of the accounting provision for repairs to assets.

Table 6.2.3
Financial results of the River Boards (profit, loss) in 2016–2023

| River Board | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|-------------|-----------------|---------|---------|---------|---------|--------|---------|---------|
| | thousand of CZK | | | | | | | |
| Elbe | 22,026 | 60,276 | 22,880 | 15,631 | 9,534 | 10,563 | 183,809 | 84,913 |
| Vltava | 13,711 | 73,880 | 49,221 | 67,123 | 74,489 | 24,379 | 96,751 | 43,629 |
| Ohře | 27,422 | 169,652 | 73,346 | 41,380 | 25,387 | 18,262 | 104 | 92,719 |
| Oder | 20,845 | 22,291 | 53,053 | 9,503 | 14,826 | 17,224 | 20,973 | 64,508 |
| Morava | 112,916 | 11,721 | 17,875 | 12,300 | 8,619 | 4,098 | 4,498 | 9,493 |
| Total | 196,920 | 337,820 | 216,375 | 145,937 | 132,855 | 74,526 | 306,135 | 295,262 |

Source: River Boards

Table 6.2.4
Distribution of profit of River Boards, s.e., in 2023

| | | | | Distributio | on of profit o | or coverage of los | SS | | | | | | |
|----------------|--------|-----------------|---------------|-------------|------------------------|--------------------|----------------------------------|---|--|--|--|--|--|
| River Board | Profit | Reserve Fund | hasic further | | Remuneration Fund*) | Own capital | Unsettled loss of previous years | | | | | | |
| | | thousand CZK | | | | | | | | | | | |
| Elbe | 84,913 | 0 | 4,958 | 4,781 | 0 | 5,174 | 70,000 | 0 | | | | | |
| Vltava | 43,629 | 0 | 4,524 | 9,187 | 0 | 0 | 29,921 | 0 | | | | | |
| Ohře | 92,719 | 0 | 3,473 | 0 | 0 | 0 | 89,246 | 0 | | | | | |
| Oder | 64,508 | 0 | 2,207 | 0 | 150 | 0 | 62,151 | 0 | | | | | |
| Morava | 9,493 | 2,094 | 3,753 | 3,646 | 0 | 0 | 0 | 0 | | | | | |

Source: River Boards

Note: *) Created in accordance with Section 19(5) of Act No. 77/1997 Coll., on State Enterprise, as amended.

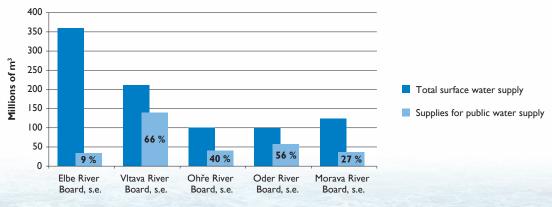
Table 6.2.5
Surface water supplies in the territorial jurisdiction of the River Boards, s.e., for a fee in 2016–2023

| River Board | | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | | |
|--------------|------------|-------------|-----------|-----------|-----------|---------|---------|----------|---------|--|--|
| River Board | | thousand m³ | | | | | | | | | |
| File | a) | 614,377 | 583,838 | 526,598 | 460,970 | 372,872 | 357,935 | 448,241 | 359,852 | | |
| Elbe | b) | 37,707 | 38,873 | 39,017 | 38,861 | 35,806 | 34,705 | 32,458 | 33,031 | | |
| Vlance | a) | 204,885 | 219,138 | 224,819 | 224,871 | 216,160 | 217,840 | 220,701 | 210,807 | | |
| Vltava | b) | 134,333 | 139,485 | 142,813 | 140,292 | 135,106 | 135,765 | 138,775 | 139,543 | | |
| Ol. š- | a) | 119,384 | 122,837 | 124,054 | 122,628 | 109,849 | 103,809 | 107,993 | 101,623 | | |
| Ohře | b) | 40,305 | 40,953 | 40,919 | 42,243 | 42,955 | 40,504 | 40,561 | 40,269 | | |
| Oder | a) | 127,995 | 124,144 | 125,379 | 115,696 | 108,655 | 112,874 | 109,450 | 100,887 | | |
| Oder | b) | 62,306 | 60,592 | 60,901 | 60,204 | 57,150 | 57,529 | 56,739 | 56,481 | | |
| Mayer | a) | 151,857 | 156,666 | 168,582 | 176,873 | 162,369 | 155,580 | 155,429 | 123,860 | | |
| Morava | b) | 32,816 | 35,763 | 37,715 | 39,478 | 37,144 | 33,321 | 36,146 | 34,226 | | |
| River Boards | a) | 1,218,498 | 1,206,623 | 1,169,432 | 1,101,038 | 969,905 | 948,038 | 104,1814 | 897,029 | | |
| in total | b) | 307,467 | 315,666 | 321,365 | 321,078 | 308,161 | 301,824 | 304,679 | 303,550 | | |

Source: River Boards Note: a) for a fee in total,

b) of which for water supply for public use.

Graph 6.2.3
Water supplies in the territorial jurisdiction of the River Boards for a fee by purpose in 2023



Source: River Boards

The average price for other surface water abstractions per m³ in 2023 was CZK 6.51, a year-on-year increase of 18.2%. The price of surface water abstracted from watercourses and other surface waters is a cost-based price, which can only reflect economically justified costs, a reasonable profit and tax according to the relevant tax regulations.

In addition to flow-through cooling and other abstractions, abstraction levels and surface water prices for the purposes of chargeable agricultural irrigation and the flooding of artificial depressions have been collected since 2003. In 2023, abstractions for agricultural irrigation were made within the territorial scope of all the River Boards with the exception of the Oder and Morava River Boards. The abstractions totalled 174 thousand m³, a decrease compared to the previous year. Surface water abstractions for flooding of artificial depressions in the landscape were again not recorded by any of the River Boards in 2023.

Table 6.2.6

Price of surface water abstraction for flow-through cooling in 2016–2023

| River Board | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | | | |
|-------------|--------|------|------|------|------|------|------|--------|--|--|--|
| River Board | CZK/m³ | | | | | | | | | | |
| Elbe | 0.72 | 0.74 | 0.77 | 0.79 | 0.82 | 0.96 | 1.1 | 1.41*) | | | |
| Vltava | 1.27 | 1.32 | 1.32 | 1.34 | 1.37 | 1.41 | 1.45 | 1.52 | | | |
| Morava | 1.21 | 1.22 | 1.23 | 1.25 | 1.28 | 1.38 | 1.44 | 1.51 | | | |

Source: River Boards

Note: The price per m³ is given without VAT.

Table 6.2.7
Price of other surface water abstraction in 2016–2023

| River Board | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | | |
|-----------------|--------|------|------|------|------|------|------|---------|--|--|
| River Board | CZK/m³ | | | | | | | | | |
| Elbe | 4.49 | 4.58 | 4.72 | 4.82 | 4.99 | 5.38 | 5.57 | 6.18**) | | |
| Vltava | 3.69 | 3.84 | 3.84 | 3.9 | 3.98 | 4.1 | 4.22 | 4.42 | | |
| Ohře | 4.69 | 4.92 | 4.97 | 5.07 | 5.17 | 5.61 | 5.89 | 5.99 | | |
| Oder | 4.33 | 4.46 | 4.62 | 4.78 | 4.97 | 5.47 | 5.74 | 6.2 | | |
| Morava | 6.65 | 6.68 | 6.69 | 6.79 | 6.93 | 6.99 | 7.19 | 7.55 | | |
| Average price*) | 4.64 | 4.77 | 4.88 | 4.97 | 5.10 | 5.50 | 5.60 | 5.84 | | |

Source: River Boards

Note: The price per m³ is given without VAT.

^{**)} CZK 6.18 is a weighted average of two prices – in 2023, prices were increased during the year as customers did not abstract the contracted amount of water. The price from 01/01 to 31/07 2023 was CZK 6.10 and from 01/08 to 31/12 2023 CZK 6.29.



Rowing to the target, we'll be there soon, the Ludkovice Reservoir (author: Nejezchleb Martin)

The current surface water abstraction prices do not reflect the value of surface water in today's terms, but reflect the costs incurred by the individual river basin districts for the management of watercourses and river basin management. These prices are subject to regulation in the form of price regulation pursuant to Act No 526/1990 Coll., on prices, as amended, and to the rules laid down by decisions of the Ministry of Finance issuing a list of goods with regulated prices, published in the Price Bulletin of the Ministry of Finance.

Revenues from surface water abstraction is the most significant source of revenue. In 2023, they decreased by 5.3% compared to 2022, i.e., by CZK 96 million. The total revenue was CZK 3,986 million.

⁵ CZK 1.41 is a weighted average of two prices – in 2023, prices were increased during the year as customers did not abstract the contracted amount of water. The price from 01/01 to 31/07 2023 was CZK 1.3 and from 01/08 to 31/12 2023 CZK 1.52.

^{*)} Calculated using weighted average.

Table 6.2.8
Payments for surface water abstractions in 2016–2023

| River Boards | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | | |
|-----------------------|-------------|-------|-------|-------|-------|-------|-------|-------|--|--|
| River Boards | million CZK | | | | | | | | | |
| Elbe | 996 | 1,001 | 1,027 | 993 | 882 | 976 | 1,103 | 1,064 | | |
| Vltava | 745 | 832 | 852 | 861 | 838 | 872 | 908 | 912 | | |
| Ohře | 560 | 604 | 617 | 622 | 568 | 582 | 636 | 609 | | |
| Oder | 554 | 554 | 579 | 553 | 540 | 617 | 628 | 626 | | |
| Morava | 672 | 715 | 804 | 827 | 786 | 759 | 808 | 775 | | |
| River Boards in total | 3,527 | 3,706 | 3,879 | 3,856 | 3,614 | 3,806 | 4,083 | 3,986 | | |

Source: River Boards

Another significant source of income for the River Boards is electricity generation, accounting for more than 11% of the total income. The number of small hydroelectric power plant in operation did not increase in 2023, the total number remains to be 106. Total revenue in this item increased by more than 98% compared to the previous year and amounted to almost CZK 1,224 million.

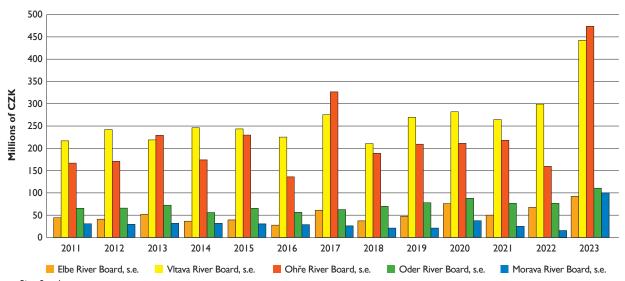
The highest revenues from power generation are repeatedly reported by the Vltava and Ohře River Boards, s.e.. The Morava and Oder River Boards, s.e., also reported high revenues last year. The record revenues of the Vltava River Board were due to the price of electricity on the wholesale market. This was the reason why all the River Boards had all-time high revenues. Details of the own hydroelectric power plants in the River Basins are given in Table 6.2.9 and Figure 6.2.4.

Table 6.2.9
Small hydropower plants of the River Boards in 2016–2023

| River Board | Indicator | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|----------------|------------------------------|---------|---------|---------|---------|---------|---------|---------|-----------|
| | Number of SHPPs | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Elbe | Installed power (kW) | 6,795 | 6,819 | 6,819 | 6,989 | 7,001 | 7,001 | 7,001 | 7,048 |
| Libe | Electricity generation (MWh) | 12,288 | 22,440 | 13,835 | 16,327 | 24,796 | 23,343 | 20,632 | 23,884 |
| | Revenues (thousands CZK) | 27,754 | 61,268 | 38,012 | 48,758 | 76,808 | 50,914 | 67,568 | 92,970 |
| | Number of SHPPs | 19 | 19 | 20 | 20 | 21 | 21 | 22 | 22 |
| Vltava | Installed power (kW) | 22,128 | 22,128 | 22,328 | 22,328 | 21,950 | 21,950 | 22,040 | 22,040 |
| VILAVA | Electricity generation (MWh) | 99,497 | 77,475 | 77,922 | 91,123 | 91,693 | 102,569 | 106,526 | 96,678 |
| | Revenues (thousands CZK) | 225,704 | 276,114 | 211,048 | 271,244 | 283,769 | 265,892 | 299,867 | 443,803 |
| | Number of SHPPs | 21 | 22 | 22 | 22 | 22 | 22 | 23 | 23 |
| Ohře | Installed power (kW) | 16,966 | 17,091 | 17,091 | 17,091 | 17,091 | 17,091 | 17,113 | 17,113 |
| Onre | Electricity generation (MWh) | 84,910 | 84,244 | 72,908 | 76,484 | 67,024 | 92,537 | 73,279 | 77,617 |
| | Revenues (thousands CZK) | 136,223 | 327,221 | 189,511 | 211,005 | 212,222 | 218,543 | 160,079 | 474,340 |
| | Number of SHPPs | 23 | 23 | 26 | 25 | 26 | 26 | 26 | 26 |
| Oder | Installed power (kW) | 6,236 | 6,236 | 6,352 | 6,262 | 6,524 | 6,524 | 6,714 | 6,714 |
| Oder | Electricity generation (MWh) | 21,569 | 23,181 | 25,073 | 27,612 | 29,943 | 26,673 | 24,793 | 30,891 |
| | Revenues (thousands CZK) | 56,669 | 62,813 | 69,487 | 79,630 | 89,112 | 77,183 | 75,162 | 111,458 |
| | Number of SHPPs | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Moravia | Installed power (kW) | 3,497 | 3,497 | 3,497 | 3,551 | 3,635 | 3,588 | 3,567 | 3,567 |
| 1º101 avia | Electricity generation (MWh) | 11,008 | 9,609 | 8,239 | 7,566 | 14,614 | 15,576 | 10,747 | 14,991 |
| | Revenues (thousands CZK) | 28,812 | 26,039 | 22,279 | 22,215 | 38,744 | 26,748 | 15,237 | 101,356 |
| | Number of SHPPs | 98 | 99 | 103 | 102 | 104 | 104 | ,106 | 106 |
| | Installed power (kW) | 55,622 | 55,771 | 56,087 | 56,221 | 56,201 | 56,154 | 56,435 | 56,482 |
| Total | Electricity generation (MWh) | 229,272 | 216,949 | 197,977 | 219,112 | 228,070 | 260,698 | 235,977 | 244,061 |
| | Revenues (thousands CZK) | 475,162 | 753,455 | 530,337 | 632,852 | 700,655 | 639,280 | 617,913 | 1,223,927 |

Source: River Boards

Graph 6.2.4
Revenues of small hydropower plants of the River Boards in 2011–2023



Source: River Boards



Boat races (author: Procházková Lenka)

Other revenues of the River Boards in 2023 increased by more than CZK 58 million compared to the previous year. Their total amount was almost CZK 700 million.

Other revenues is an item that represents an aggregate of less significant items such as leases of land, non-residential premises and water bodies and other business activities. The most significant items are income from machinery and vehicle

transport, laboratory work and from design and engineering activities. Other revenues are often significantly affected by a number of unplanned items (insurance claims, increased interest received and carryovers of certain defined revenues which, although relating to previous periods, were only realised in the given review) which cannot always be predicted and can therefore fluctuate significantly from year to year.

Table 6.2.10
Other revenues of the River Boards in 2016–2023

| River Boards | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | | |
|--------------|---------------|---------|---------|---------|---------|---------|---------|---------|--|--|
| River Boards | thousands CZK | | | | | | | | | |
| Elbe | 73,388 | 149,163 | 91,122 | 86,446 | 69,515 | 70,926 | 162,782 | 107,652 | | |
| Vltava | 71,409 | 78,738 | 120,231 | 108,072 | 96,952 | 112,483 | 214,169 | 196,193 | | |
| Ohře | 75,702 | 85,264 | 108,496 | 96,623 | 111,563 | 89,726 | 176,029 | 188,626 | | |
| Oder | 41,191 | 49,013 | 61,595 | 45,375 | 34,989 | 40,101 | 58,640 | 71,330 | | |
| Moravia | 56,462 | 48,295 | 130,084 | 61,124 | 52,585 | 84,013 | 30,286 | 136,167 | | |
| Total | 318,152 | 410,473 | 511,528 | 397,640 | 365,604 | 397,249 | 641,906 | 699,968 | | |

Source: River Boards

A number of special-purpose non-investment and investment subsidies are regularly used to support the core activities of the River Boards. The total volume of subsidies provided in 2023 decreased by almost 46% compared to the previous year to a total of CZK 1.2 billion.

State subsidies are necessary for systematic activities ensuring implementation of state priorities, such as implementation of flood protection measures, delineation of floodplains, preparation of conceptual studies, removing flood consequences, etc. In 2023, investment subsidies dropped significantly, by almost 22% year-on-year (i.e. a decrease of CZK 376 million), special-purpose non-investment subsidies fell by 31% (almost CZK 140 million).

Grants were allocated for both prevention and flood damage recovery programmes from previous years. In the year under review, subsidies were provided from the MoA budget, funds from the Operational Programme Environment (OPE), funds from the Cohesion Fund, the European Regional Development Fund (ERDF), and some regional authorities and cities also contributed to flood protection measures.



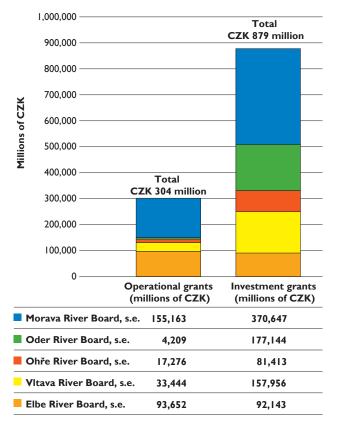
The Lysá nad Labem Lock Chamber (source: Elbe River Board, s.e.)

Table 6.2.11
Investments of the River Boards in 2016–2023

| Direct Decord on | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | | |
|-------------------|--------------|---------|---------|---------|---------|---------|---------|---------|--|--|
| River Board, s.e. | millions CZK | | | | | | | | | |
| Elbe | 514.6 | 401.2 | 360.0 | 461.6 | 447.9 | 448.1 | 261.5 | 379.8 | | |
| Vltava | 286.0 | 410.9 | 493.0 | 495.3 | 452.8 | 670.4 | 930.4 | 782.7 | | |
| Ohře | 210.7 | 161.6 | 221.2 | 346.1 | 188.8 | 323.4 | 451.8 | 622.5 | | |
| Oder | 568.2 | 453.4 | 445.5 | 176.2 | 284.2 | 411.7 | 205.8 | 481.4 | | |
| Morava | 283.7 | 468.0 | 823.7 | 851.7 | 1,243.0 | 1,118.8 | 919.3 | 519.0 | | |
| Total | 1,863.2 | 1,895.1 | 2,343.4 | 2,330.9 | 2,616.7 | 2,972.4 | 2,768.8 | 2,785.4 | | |

Source: River Boards

Graph 6.2.5
Subsidies drew down by the River Boards in 2023

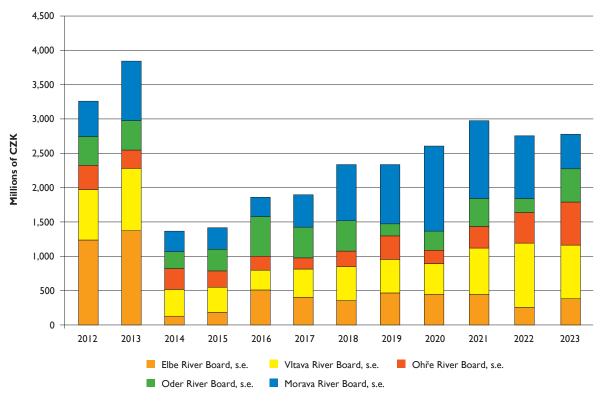


Source: MoA, River Boards

Investments of the River Boards saw a slight increase of 0.6% in 2023. Almost CZK 2.8 billion was spent on their implementation, with 32% from third party sources and 68% from own resources.

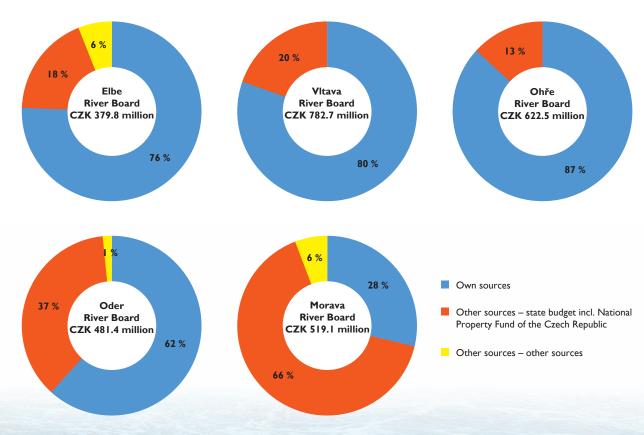
The year-on-year increase in the total investments of the River Boards represents a rise of CZK 16.9 million. Third party sources covered investment construction with almost CZK 881 billion, of which 93% were financial sources from the state budget and 7% from other sources. Other sources included funds from the OPE, regions, cities and gratuitous transfers. Own resources earmarked for investments amounted to more than CZK 1.9 billion.

Graph 6.2.6
Investment construction of the River Boards in 2012–2023



Source: MoA, River Boards

Graph 6.2.7
Structure of investment funds drawdown by source in the River Boards in 2023



Source: MoA, River Boards

Similarly to the previous year, the number of employees was reduced by 39 in 2023 compared to the previous

year, with a total of 3,455 employees working for the River Boards.

Table 6.2.12
Number of employees of the River Boards in 2016–2023

| River Board, s.e. | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Elbe | 904 | 894 | 884 | 878 | 874 | 865 | 863 | 858 |
| Vltava | 855 | 861 | 867 | 873 | 865 | 863 | 866 | 864 |
| Ohře | 614 | 605 | 617 | 614 | 611 | 611 | 598 | 599 |
| Oder | 465 | 463 | 464 | 458 | 452 | 446 | 442 | 436 |
| Morava | 737 | 742 | 739 | 746 | 744 | 742 | 725 | 698 |
| Total | 3,575 | 3,565 | 3,571 | 3,569 | 3,546 | 3,527 | 3,494 | 3,455 |

Source: River Boards

Note: Average headcount, rounded to whole numbers.

In 2023, the average monthly salary in the River Boards increased by 9%, the average salary was CZK 46,025.

The year-on-year increase in the average monthly salary in the River Boards amounted to CZK 3,926, while in the Morava

River Board it increased by more than CZK 4,500. and in the Vltava River Board by almost CZK 4.3 thousand, other River Boards saw also an increase, although not that high. Salary in the Ohře River Board has been the highest in the long term, whereas it is the lowest in the Morava River Board.

Table 6.2.13
Average salary in the River Boards in 2016–2023

| River Board | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | | |
|-------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--|--|
| River Board | CZK/month | | | | | | | | | |
| Elbe | 32,538 | 33,653 | 35,050 | 37,472 | 39,074 | 40,686 | 43,342 | 47,310 | | |
| Vltava | 31,087 | 31,550 | 32,740 | 35,017 | 37,131 | 39,044 | 41,292 | 45,574 | | |
| Ohře | 33,505 | 34,541 | 37,079 | 38,365 | 39,683 | 40,490 | 43,929 | 47,927 | | |
| Oder | 31,787 | 32,629 | 34,409 | 36,695 | 38,232 | 40,040 | 42,782 | 44,671 | | |
| Morava | 28,392 | 29,782 | 32,464 | 34,981 | 36,674 | 37,320 | 39,661 | 44,217 | | |
| Average salary *) | 31,497 | 32,357 | 34,221 | 36,383 | 38,094 | 39,460 | 42,099 | 46,025 | | |

Source: River Boards

Note: $^{*)}$ Calculated using weighted average.



The View from Letná (author: Hubalová Petra)

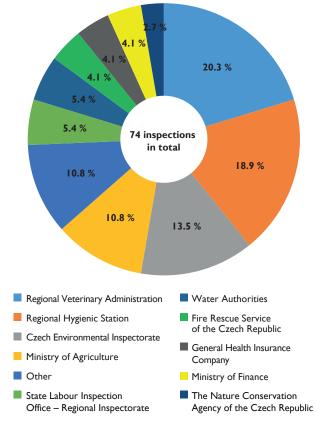
Audits of the activities of the River Boards are carried out regularly by competent external audit authorities. In 2023, 74 audits were carried out.

An overview of the audits is shown in Graph 6.2.8. The other audit authorities include those that carried out one audit in 2023, i.e., the SZIF, the SFE, the State Office for Nuclear Safety, the Czech Accreditation Institute, public-benefit organization, the Trade Union of Woodworking, Forestry and Water Management, the Digital and Information Agency Prague, the State Veterinary Administration and the Labour Office of the Czech Republic.

Minor deficiencies identified were eliminated during a regular monitoring inspection.

Graph 6.2.8

Audits in the River Boards by authorities in 2023



Source: River Boards

6.3 Forests of the Czech Republic, s.e.

Forests of the Czech Republic, s.e., administer designated minor watercourses and streams as one of non-productive functions of the forest. In 2023, they managed 38.4 thousand km of watercourses and 1,051 small reservoirs.

Watercourse management within the scope of the Forests of the Czech Republic consists in administration of watercourserelated assets with an acquisition value of CZK 9.1 billion; mainly watercourse modifications, damming structures on



The Plumlov Reservoir with a view of the castle (source: Morava River Board, s.e.)

streams and ravines, flood protection measures and reservoirs. Watercourse management was carried out by seven organisational units — watercourse managers with territorial jurisdiction by the river basins.

In 2023, activities of the Forests of the Czech Republic in the sphere of water management focused mainly on:

- implementation of investment and non-investment actions aimed at flood damage recovery, flood protection, channel stabilisation and anti-erosion measures,
- construction, restoration and repair of reservoirs, dams and wetlands with the view of slowing surface runoff and retaining water in the landscape, and preparation of other projects to mitigate negative effects of drought and water scarcity in the Czech Republic,
- implementation of actions aimed at repairing and maintaining the assets,
- care of riparian vegetation, revitalization of previously inappropriately modified watercourses, non-productive functions of the forest, support for endangered animal species, elimination of invasive non-native plant species, etc,
- maintenance of the Central Register of Watercourses and Reservoirs and register of other hydraulic structures owned by third parties, subject to technical safety supervision in the Public Administration Information System.

Watercourse management, the measures implemented and their preparation were funded both from the company's own resources and from subsidies. The subsidies include measures carried out in the public interest pursuant to Section 35 of the Forestry Act and funding from the state budget for programmes of the MoA pursuant to Section 102 of the Water Act. Namely, these are the programmes ,Support for Flood Prevention' and ,Support for Measures on Small Watercourses and Small Water Reservoirs'. In addition, sources from EU funds and landscape programmes of the MoE were used. Activities carried out in connection with watercourse management are of a noncommercial nature and bring practically no profit with the view of the total funds spent.

In connection with management of streams and reservoirs, the Forests of the Czech Republic expended a total of CZK 828.1 million in 2023, of which investment expenditures amounted to CZK 393.2 million. The amount includes not only investments in constructions, but also in land purchases necessary for care of watercourses. Own sources amounted to CZK 194.0 million. CZK 434.9 million was spent on management of designated small watercourses, repair and maintenance of assets related to the management. Of this, CZK 401.2 million was from own funds. A total of CZK 44.7 million was spent on flood damage recovery, of

which CZK 42.7 million from own resources. The amounts include all costs related to management of watercourses and reservoirs. The funding structure is shown in Table 6.3.1.

Revenue from surface water abstractions paid to watercourse managers in 2023 amounted to CZK 27.6 million. Table 6.3.2 shows revenues from surface water abstractions and unit prices.

Graphs 6.3.1 and 6.3.2 show a longer timeline of total annual investment expenditures on water management and funds spent on repair and maintenance of water assets.

Table 6.3.1
Forests of the Czech Republic, s.e. – Funding structure – water management in 2023 (full costs)

| | Total | Total own | Total subsidies | Of which flood damage | | | | | | | |
|----------------|--------------|-----------|-----------------|-----------------------|-------------|--|--|--|--|--|--|
| Event | Total | sources | iotal subsidies | Subsidies | Own sources | | | | | | |
| | millions CZK | | | | | | | | | | |
| Investment | 393.2 | 194.0 | 199.2 | 1.3 | 22.5 | | | | | | |
| Non-investment | 434.9 | 401.2 | 33.7 | 0.7 | 20.5 | | | | | | |
| Total | 828.I | 595.2 | 232.9 | 2.0 | 42.7 | | | | | | |

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

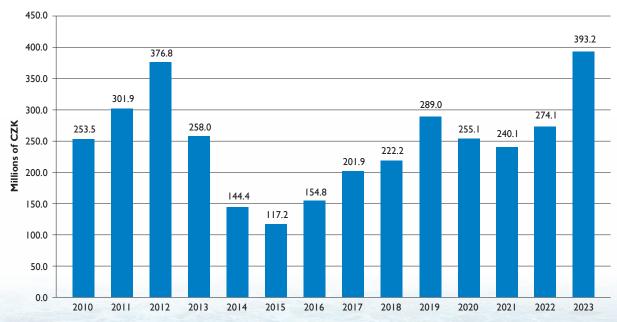
Table 6.3.2
Forests of the Czech Republic, s.e. – Revenues from surface water in 2012–2023

| Year | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|-----------------------------|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | thousands CZK | | | | | | | | | | | |
| Revenue | 13,679 | 12,211 | 11,544 | 10,682 | 13,192 | 15,106 | 15,481 | 15,610 | 14,946 | 18,035 | 23,000 | 27,615 |
| Price per m ^{3 *)} | 1.96 | 2.00 | 2.05 | 2.06 | 2.26 | 2.52 | 2.65 | 3.06 | 3.47 | 4.00 | 4.57 | 5.30 |

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

Note: *) The unit price per m^3 is given without VAT in CZK.

Graph 6.3.1
Forests of the Czech Republic, s.e. – Investment expenditures 2010–2023 – water management



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

500.0 434.9 450.0 396.0 395.0 400.0 373.3 352.9 338.5 345.7 346.3 334.5 343.2 350.0 327.5 309.9 295.3 Millions of CZK 300.0 250.0 200.0 150.0 100.0 50.0

2016

2017

2018

2019

Graph 6.3.2

Forests of the Czech Republic, s.e. – Expenditures in 2010–2023 – repair and maintenance of watercourses and reservoirs (full costs)

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

2010

2011

0.0

In May, heavy rains occurred in the Hodonín District. Torrential rainfall passed through South Bohemia at the end of August and then in September 2023 the area north of Blansko near Brno was hit by flash floods. More than CZK 2.8 million was spent on immediate flood protection works and flood damage recovery in 2023.

2012

2013

2014

2015

In the context of the ongoing climate change, the "Returning Water to the Forest" programme continued to contribute to water retention in the landscape. The programme aims to implement measures to mitigate negative effects of drought and water scarcity. This includes measures aimed at slowing down surface water runoff (revitalisation of forestry drainage and watercourses), creating and restoring water features in the landscape, such as pools, wetlands and small reservoirs. In total, 115 structures and 70 small landscape measures were completed in 2023, representing 276 pools with a total area of over 4.9 ha. More than 45 more constructions were started and preparation of other constructions is underway.

Major measures implemented in the river basins administered:

Watercourse administration of the Oder River Basin, based in Frýdek-Místek implemented significant flood protection measures and modifications at the Kozlovická Ondřejnice in Kozlovice in the Frýdek-Místek District and at the Červený Stream in Stará Červená Voda. Damming of the Ciroš Stream near Frýdlant nad Ostravicí was carried out in the public interest. Several streams were maintained by removing sediments: the Lánský Stream in Uhelná, the Žlebník in Česká Ves in the Jeseník District, the Melčský Stream and the Hrabyňka in Silesia.

The most important projects of restoration and reconstruction of reservoirs included Rýžovník in the Bruntál District and

Vražné in the Nový Jičín District. Furthermore, U Antoníčka Reservoir near Jeseník and the Hájnický Lower Pond in the non-urban area of Úvalno in the Krnov District were reconstructed: the reservoir is indirectly linked up with the Hájnický Upper Pond, completed in 2020.

2020

2021

2022

2023

Watercourse administration of the Thaya River Basin implemented flood protection measures at the Klemovský Stream in the Blanensko District, at the right-hand tributary of the Křetínka in Letovice, at the Hornohut'ský Stream in Dolní Cerekev near Jihlava and at the Číhalínský Stream in the Třebíč District. Other important projects include reconstruction and repair of the Libochovka in the Žďár nad Sázavou District and

repair of the Libochovka in the Žďár nad Sázavou District and the Kovalovický Stream in Kovalovice, Brno-Country District. The artificially straightened channel of the left-bank tributary of the Lovecký Stream in the Rybníky Nature Park in Pouště, the Jihlava District, was revitalised.

Several reservoirs in the basin were renovated: the Rakovec I in Brno, the Obůrka near Podhradí nad Dyjí, the Velké Pole and Kulatý Palouk near Moravský Krumlov, the Rumunská Bažantnice near Židlochovice, the Novecký Pond and Kozinec near Třešť in Vysočina, the Augustov, Skokan and Spálené near Moravské Budějovice, the Havlenka near Boskovice, a system of two reservoirs called Libušín near Český Rudolec and three reservoirs called Omice near Rosice u Brna.

In order to mitigate the current effects of climate change resulting to deterioration of floodplain forests, a project was initiated in Soutok – Podluží, a special area of conservation in the Břeclav District consisting in constructing of a flap weir on the Thaya River and related revitalisation measures in the area such as restoration of pools, wetlands and revitalisation channels. Implementation of the measures will effectively simulate past flood flows and improve the hydrological conditions of that valuable area.

Watercourse administration of the Elbe River completed the second stage of the revitalisation of the source part of the Černý Stream, located in the upper parts of the Jizera Mountains in the first zone of the Protected Landscape Area. This resulted in significant retention of rainwater in peat areas. Furthermore, the Čertoryjský Stream in the municipality of Hrubá Skála was revitalised with the aim to correct inappropriate human intervention in the landscape and thus support natural development and character of the area that is part of the Bohemian Paradise Protected Landscape Area.

In the Liberec Region, construction of Perlík Retention Reservoir was completed near Nové Město pod Smrkem, and in the Hradec Králové Region, Žabinka Reservoir was reconstructed in the Bydžov District. At the same time, Na Křemenci Reservoir near Staré Nechanice was restored and defunct Stará Obora Reservoir was restored near Běstvina below the Iron Mountains.

In order to maximise surface water retention in forests, selected amelioration drainage channels above Bedřichov near Jablonec nad Nisou on a tributary of the Červený Stream were dammed with log structures. In Miřetice near Nasavrky in the Pardubice Region, the second stage of damming of the amelioration network aimed at water retention in the landscape was completed. In the Novopleský Forest south of Jaroměř, construction of additional wooden dams increased the area where effects of insensitive drainage solution from the past were mitigated. In the Kryštofovo Údolí near Liberec, damming of the gorge on Šachetní Vrch in the ravine terrain was carried out with stabilisation belts and bank fortification.

Watercourse administration of the VItava River Basin paid great attention to preparation and implementation of construction projects funded from subsidies. With the support of MoA subsidies, construction works were completed at four reservoirs: the Rybná and Obrdlák in the Jindřichův Hradec District, the Pod Homolkami near Prachatice and the Pod Hradem near Rožmberk nad VItavou. Under the auspices of the Regional Council of the South Bohemian Region, in accordance with Section 35 of the Forestry Act, reconstruction or restoration of other reservoirs were completed: the Voprava in the Tábor District, the Bílichov III near Slaný, the Lesník near Třeboň and a system of reservoirs on a tributary of the Třebánky River in the Prachatice District.

The implementation of pools, mainly in forest complexes, and revitalisation of the Dlouhá Louka in Písek were partly funded from the MoE landscape programmes with the support of the Nature Conservation Agency of the Czech Republic and the Protected Landscape Areas.

Watercourse administration of the Berounka River Basin restored Kamýky and U kostelíka Reservoirs in a forest complex near Kozel Castle in the Pilsen Region. In addition,

reconstruction of UTrojky Reservoirs near Bělá nad Radbuzou and U Jána in the Tachov District, which is part of Zone II of the Bohemian Forest Protected Landscape Area, was completed. Two reservoirs were built west of Pilsen near Stříbro: one at the area of a historical pond V douglaskách and the other, completely new one, Horské Domky.

A new dam was built on the Sklářský Stream to allow water to spill into the Pavlova Hut' Nature Reserve in the Tachov District, enabling development of endangered species of the mountain pine.

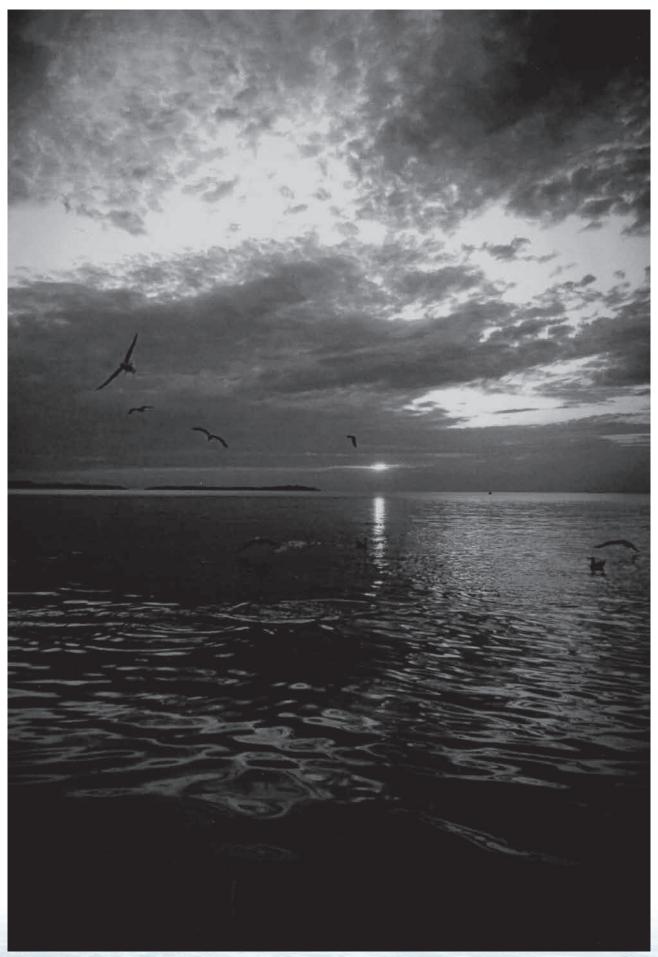
Watercourse administration of the Ohře River Basin reconstructed a safety spillway at Vykmanov Reservoir near Vykmanov on the slopes of the Ore Mountains. Similar works were also carried out on the Načetín Pond above the municipality of Načetín u Kalku near the border with Germany. Other reservoirs were reconstructed with the view of supporting the water regime and water retention in the forest: Upper and Lower Zlaťák Reservoirs in the forests near Bečov nad Teplou in the Karlovy Vary Region and the Upper Dam and Upper Švýcarský Pond in the forest near Petrohrad in the Podbořany District.

A dam was repaired and sediment was removed from the Bočský Stream in the Chomutov District. Repair of longitudinal fortifications was completed in the urban area of Jílové and similarly, in Dobrná, repair of retaining walls in the stream bed was carried out to ensure stability of the structures. On the Folgenský Stream near Děčín, the dam was reconstructed. Repair of longitudinal fortification was also carried out on a tributary of the Bělský Stream in Bělá u Děčína.

Watercourse administration of the Morava River Basin completed works on flood damage elimination, which consisted of repairing and reconstructing of the longitudinal and transverse fortification of the bed of the Dražůvka Stream in Šumvald in the Olomouc Region. The repairs of the structures and the removal of sediments were carried out in the Tvrdkovský Stream in the Bruntál District, in the Oskava, in the Klepáčovský Stream in the Šumperk District and in the Teplička in Újezd u Uničova. In the Pardubice Region, modifications to the Držkovský Stream and a tributary to the Borušovský Stream were completed.

In Halenkov in the Vsetín District, two reservoirs were restored with the aim of retaining water in the landscape and creating a biotope pond for aquatic animals. Repairs and reconstructions were also carried out at Doubrava I and II Reservoirs in the Olomouc Region, at Malenovice Reservoir in the Zlín Region and at Sovín Reservoir near Uherské Hradiště.

Revitalisation of the Ospirský Stream in the Šumperk District and small pools in forests were implemented under the landscape programmes of the MoE.



D. Lukavská – Freedom, Church Primary and Secondary School Plzeň (2nd place II. category)

7. LAND CONSOLIDATION AND LAND AMELIORATION STRUCTURES

Land consolidation

In 2023, the priority within the framework of land consolidation was again long-term water retention in the landscape and erosion protection, i.e. building ponds, small reservoirs, wetlands and elements providing erosion protection. As at 31 December 2023, water management measures had been built on an area of more than 859 ha and erosion protection measures on an area of approximately 941 ha as part of the land consolidation carried out since 1991. In 2023, water management measures worth CZK 358 million were implemented as part of land consolidation and anti-erosion measures worth CZK 116.7 million.

Land accessibility measures and ecological measures, i.e. transport and green infrastructure, were also built. All of these measures (called ,common facilities') are usually designed as multifunctional, e.g. field paths are supplemented with drainage and catchment ditches, newly designed plots are divided by borders, swales or anti-erosion dykes supplemented with planting of shrubs and trees, and planting of greenery is also added around the reservoirs under construction and along roads. In addition to their transport and ecological function, the measures also serve to protect the soil and improve water management in the landscape. In total, more than CZK 1,735 million was spent on implementation of common facilities in 2023.

In order to be able to build these measures in the landscape, it is necessary to secure suitable land for their implementation. The most effective tool for a new arrangement of land is land consolidation, which is used in the public interest to arrange land ownership and create conditions for sensible land management by landowners. At the same time, they provide conditions for improving the environment, protecting and improving the soil fund, forestry and water management, especially in the sphere of reducing adverse effects of floods and drought, addressing runoff conditions and increasing ecological stability of the landscape.

The State Land Office (SLO) is the competent authority for implementation of land consolidation pursuant to Act



Maintenance of the main drainage system in Bílovec (source: SLO)

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 implementing Decree No. 13/2014 Coll.

Land consolidation is carried out either as comprehensive or simple. Currently, comprehensive and simple consolidation has been completed for 40.8% of the agricultural land, while land consolidation is underway on another 11.9% of agricultural land. More than CZK 456 million was spent on their design, including other non-investment activities in 2023.

Table 7.1
State Land Office – Use of funds for land consolidation in 2023

| Non-investment Implementation | | | | | | | Total non- | | |
|-------------------------------|---|-----------|-----------|--------------------------|------------------------------------|---------------------------|------------|--|--|
| Total | of which land development proposals | Total | roads | anti-erosion measures | of which water management measures | environmental measures | other *) | investment activities and implementation | |
| thousands CZK | | | | | | | | | |
| 456,973 | 384,487 | 1,734,990 | 1,094,221 | 116,745 | 358,043 | 123,642 | 42,339 | 2,191,963 | |

Source: SLO

Note: *) Operational and technical activities.

One of the main results of the comprehensive land consolidation in particular, apart from the new digital cadastral map, is the above-mentioned common facilities plan, which is closely linked to the master plan. It is approved by the municipal council and the land where common facilities are intended is usually transferred to the ownership of the municipality.

Land consolidation and the related clarified ownership relations allow the SLO to implement the proposed measures. The SLO ensures design of land consolidation and implementation of common facilities by drawing continuously funds from the General Treasury Administration, the SLO budget, relevant EU funds (RDP, OPE, and from 2021 also the National Restoration Plan) and other funds (Regional Development Agency, municipal and city budgets, private entities). For the next programming period, disbursement of funds for land consolidation is set within the framework of the Strategic Plan of the Common Agricultural Policy for the period 2023–2027 so that projects aimed at reducing the negative impact of climate change are implemented as a priority. Grant support for land consolidation projects from the National Recovery Plan is provided under activity/investment 2.6.4 Implementation of land consolidation with a positive impact on erosion prevention and precipitation capture.



Revitalization of the main drainage facility Kašov (source: SLO)

Figure 7.1

Comprehensive land consolidation in the regions as at 31 December 2023

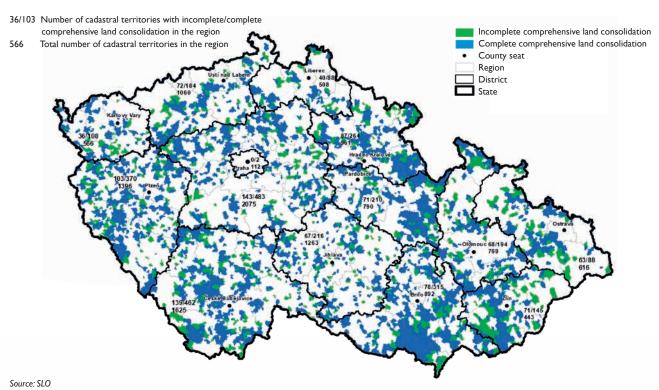
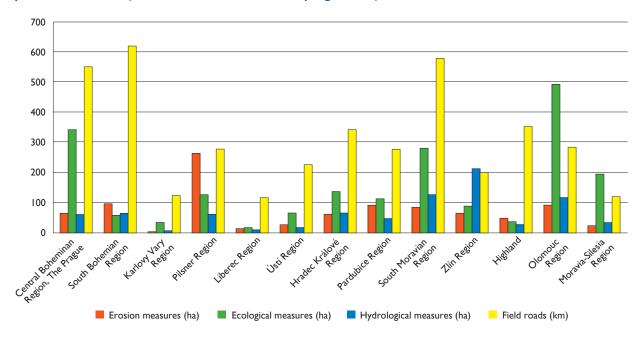


Table 7.2
State Land Office – Total implemented common facilities – as of 31 December 2023

| Type of measure | Anti-erosion measures | Ecological measures | Water management measures | Pathways |
|-----------------|-----------------------|------------------------|---------------------------|----------|
| | | ha | | km |
| Total | 940.53 | 1,984.63 | 859.41 | 4,056.96 |

Source: SLO



Graph 7.1
Implemented common facilities in land consolidation by region as of 31 December 2023

Source: SLO

Amelioration structures

In 2023, funds from the state budget from the budget chapter of the Ministry of Agriculture in the total amount of CZK 51.7 million were spent on administration, maintenance and operation of water amelioration structures on land owned by the state and under the jurisdiction of the State Land Office. Routine maintenance works and repairs were carried out in the total amount of CZK 14.4 million. The costs of operation and repairs of pumping stations (drainage and irrigation), including the costs of electricity consumption, totalled CZK 37.2 million.

The SLO is responsible for management of structures used for water management land amelioration and related hydraulic structures within the meaning of Section 56(6) of Act No. 254/2001, on water and amendments to some acts (the Water Act), as amended, and Section 4(2) of Act No.503/2012 Coll., on the State Land Office and on amendments to some related acts, as amended. It thus manages, maintains, repairs and operates major drainage facilities, major irrigation facilities and anti-erosion measures owned by the state. As of 31 December 2023, the assets had a total acquisition value of CZK 2.57 billion. The assets consisted of 18,897 items of tangible fixed assets, including 8,878.172 km of canals (5,120.484 km open and 3,757.688 km covered), 20 reservoirs and 129 pumping stations.

Agendas related to administration of hydraulic structures used for land amelioration are ensured by the Department of Water Management Structures of the State Land Office. In addition to its routine operation, the Department's activities focused on modernisation of the entrusted irrigation systems. The modernisation of irrigation systems administered by the State Land Office is funded through MoA programme 129 310

"Support for Competitiveness of Agri-food Complex – Irrigation – Stage II", sub-programme 129 313 "Support for Optimisation of Irrigation Systems Administered by the State Land Office", from which subsidies totalling to CZK 4,639,140.91 were drawn for 5 projects in 2023 (I implementation, 2 project documentations). Furthermore, subsidies were drawn from programme 129 050 "Development and Renewal of the Technical Base of the Management System of the Ministry of Agriculture", sub-programme 129 053 "Implementation of Modifications of the Main Drainage Facility for Water Retention in the Landscape" for I project in an amount of CZK 29,645.00 (author's supervision).

In 2023, the State Land Office completed two pilot projects consisting in implementing revitalisation measures of main drainage facilities. At the same time, another 160 main drainage facilities suitable for revitalisation and water retention in the landscape were selected. The proposed measures are implemented by the means of land consolidation. Thus, the State Land Office gradually implements the tasks arising from the Plan of Measures for Drought Management through Land Consolidation and Adaptation of Water Amelioration with a deadline in 2030.

In order to maintain proper operation of the irrigation systems and continuity of their operation in future, regardless of the entity currently operating the irrigation systems on the basis of public procurement, the Department of Water Management started in 2023 with gradual processing of the operating rules of the structures. At the same time, the Department of Water Management Structures fulfilled public contracts concerning maintenance on a large scale through a dynamic purchase system. Following an order of the Chief Director of the Water Management Department, Ing. Aleš Kendík, the lines of the managed structures are refined and entered in the ISVS water information system on an ongoing basis.



J. Chvalkovský – Water for All, Elementary School Pelhřimov (2nd place III. category)

8. WATERWAYS

According to Act No. 114/1995 Coll., on Inland Navigation, as amended, the Ministry of Transport is responsible for development and modernisation of important waterways. The activities concern, in particular, development of the Elbe-Vltava Waterway, which is the most important transport-significant waterway in the Czech Republic and is the only navigation link between the Czech Republic and the Western European waterway network.

The main European waterway E 20 Elbe and its branch line E 20-06 Vltava is an internationally important waterway. Within the meaning of Regulation (EU) No. 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for development of the trans-European transport network, the entire Elbe Waterway from the Czech Republic/Germany state border to Pardubice and the Vltava Waterway from Mělník to Třebenice are part of the TEN-T network.

From this perspective, investment projects on the Elbe Waterway are of highest importance.

From the Ústí nad Labem - Střekov Reservoir to Přelouč on the Elbe River and to Třebenice on the Vltava River, navigability is ensured by a system of structures that form a fully functioning transport system independent of external natural conditions. However, in the section from Střekov to the state border of the Czech Republic/Germany, navigation is dependent on water conditions and on the actual flows and on the overall water management situation of the entire Elbe and Vltava River Basins. In order to ensure navigation of the Elbe-Vltava Waterway it is crucial to improve the conditions in the 40-km-long section between Ústí nad Labem and the state border.

Currently, the strategic material of the Ministry of Transport entitled "Water Transport Concept for the 2026–2035" is being prepared.

Development and modernisation of waterways are the responsibility of Waterway Directorate of the Czech Republic, the Elbe, Morava and Vltava River Boards. Operation and maintenance of waterways is ensured by the Vltava, Elbe and Morava River Boards. More detailed information, including financial performance, is provided in Chapter 11.1 herein.



The Locks Roudnice nad Labem (source: Elbe River Board, s.e.)



J. Horák – Life, Primary School and Primary School of Diakonie ČCE Vrchlabí (3rd place III. category)

9. WATER SUPPLY AND SEWERAGE FOR PUBLIC USE

9.1 Drinking water supply

In 2023, 10.279 million inhabitants in the Czech Republic, i.e., 94.5% of the total population, were supplied from water supply systems.

A total of 583.02 million m^3 of drinking water was produced in all water supply systems. 476.9 million m^3 of drinking water was delivered for payment (invoiced), of which 325.3 million m^3 of drinking water was for households. Drinking water losses amounted to 85.1 million m^3 , i.e., 14.8% of the water intended for consumption.

The data provided by the CSO was based on a sample of 1,698 respondents, i.e., 321 professional water supply and sewerage operators and a selected sample of 1,377 municipalities that operate their own water infrastructures. The published outputs for the regions and the Czech Republic are the result of a mathematical calculation.

The specific quantity of total invoiced water is the proportion of total water invoiced (to households, industry and other customers) per connected inhabitant per day, and represents how many litres of total water consumption (invoiced water) is per connected inhabitant. In 2023, consumption of the



Omice – Rosice u Brna reservoir system (source: Forests of the Czech Republic)

specific quantity of water invoiced decreased slightly by 3 l/person/day to 127.1 l/person/day and consumption of water invoiced to households also decreased by 2.7 l/person/day to 86.7 l/person/day.

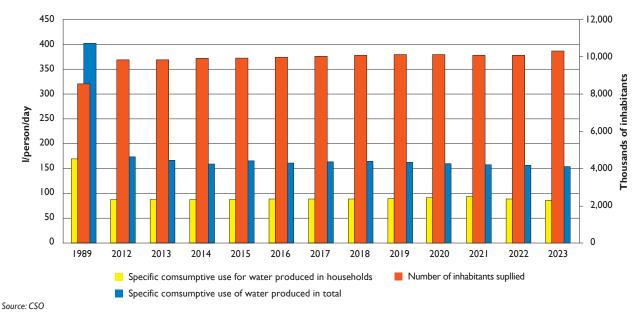
Table 9.1.1 Water supply from waterworks in 1989 and 2017–2023

| Indicator | Unit | 1989 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|--------------------------------|--------------------------|-------------|----------|----------|----------|----------|----------|---------|
| Population (medium) | thousands of inhabitants | 10,362 | 10,626 | 10,669 | 10,700 | 10,501 | 10,530 | 10,878 |
| Residents actually supplied | thousands of inhabitants | 8,537.0 | 10,064.1 | 10,090.1 | 10,126.3 | 10,075.9 | 10,069.0 | 10,279 |
| with tap water | % | 82.4 | 94.7 | 94.6 | 94.6 | 96.0 | 95.6 | 94.5 |
| \\\\ | million m³/year | 1,251.0 | 609.7 | 602.4 | 589.4 | 587.2 | 584.3 | 583.0 |
| Water produced from taps | % k 1989 | 100.0 | 48.7 | 48.2 | 47.2 | 46.3 | 46.0 | 46.6 |
| Total water invoiced | million m³/year | 929.4 | 490.4 | 492.6 | 479.0 | 478.7 | 478.I | 476.9 |
| iotai water invoiced | % k 1989 | 100.0 | 52.8 | 53.0 | 51.5 | 51.5 | 51.4 | 51.31 |
| Specific need from water | l/person/day | 401.0 | 165.9 | 163.5 | 159.5 | 157.5 | 156.7 | 155.39 |
| produced | % k 1989 | 100.0 | 41.4 | 40.8 | 39.8 | 39.3 | 39.1 | 38.75 |
| Specific amount of water | l/person/day | 298.0 | 133.5 | 133.8 | 129.2 | 130.2 | 130.1 | 127.1 |
| invoiced total | % k 1989 | 100.0 | 44.7 | 44.9 | 43.4 | 43.7 | 43.7 | 42.65 |
| Specific amount of water | l/person/day | 171.0 | 89.2 | 90.6 | 91.1 | 93.2 | 89.4 | 86.7 |
| invoiced for household | % of 1989 | 100.0 | 52.2 | 52.3 | 52.6 | 54.5 | 52.3 | 50.70 |
| Water losses per 1 km of lines | I/km day | 16,842.0 *) | 3,303.5 | 2,993.5 | 3,042.3 | 2,955.1 | 2,855.6 | 2,862.3 |
| Water losses per 1 inhabitant | l/person/day | 90.0 *) | 25.8 | 23.4 | 23.8 | 23.5 | 23.0 | 22.7 |

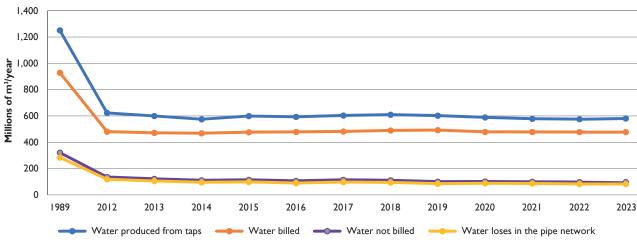
Source: CSO

Note: *) Data for the water supply systems of the main operators.

Graph 9.1.1 Inhabitants supplied with water, specific needs for water produced and specific amount of water invoiced to households in 1989 and 2012–2023



Graph 9.1.2
Water produced from water supply and total invoiced water in 1989 and 2012–2023



Source: CSO



The Vrchlice Reservoir (source: Elbe River Board, s.e.)

The highest share of the population supplied with drinking water from water supply systems in 2023 was in the Karlovy Vary Region (100%), the capital city of Prague (100%), the Moravian-Silesian Region (99.8%) and the Ústí Region (97.7%), while the lowest share of the population supplied with drinking water was in the Pilsen Region (85.6%) and the Central Bohemian Region (86.1%).

The length of the water supply network was extended by 421 km to 81,426 km in 2023, taking into account the number of inhabitants supplied with water it means there is an average of 7.92 m of water supply per inhabitant.

The number of water supply connections increased by 23,081 to 2,290,339. The number of water meters installed increased by 22,111 to a total of 2,291,795. There are almost five inhabitants per water connection. These figures reflect the consequences of the relatively massive construction of family houses.

Table 9.1.2

Population supplied with water, production and supply from water supply systems in 2023

| | | Residents | | Wate | er invoiced | | | |
|--------------------------|------------------------------------|--|----------------|-----------|------------------------------------|--|--|--|
| Region | water supply from waterworks | proportion of the population supplied with water out of the total population | Water produced | total | water supply from waterworks | | | |
| | (number) | (%) | | (thous. m | (thous. m³) | | | |
| City of Prague | 1,374,334 | 100,0 | 103,400 | 77,711 | 52,065 | | | |
| Central Bohemian Region | 1,248,658 | 86, I | 55,914 | 55,689 | 39,238 | | | |
| South Bohemian region | 589,736 | 90,2 | 33,765 | 26,292 | 16,813 | | | |
| Pilsen Region | 521,990 | 85,6 | 29,886 | 24,935 | 16,038 | | | |
| Karlovy Vary Region | 294,964 | 100,0 | 18,768 | 13,895 | 9,061 | | | |
| Ústí Region | 794,114 | 97,7 | 46,432 | 36,411 | 26,060 | | | |
| Liberec Region | 414,590 | 92,0 | 25,330 | 18,702 | 12,713 | | | |
| Hradec Králové Region | 528,744 | 95,0 | 30,733 | 23,466 | 15,567 | | | |
| Pardubice Region | 515,308 | 97,2 | 26,757 | 22,356 | 14,757 | | | |
| Vysočina Region | 487,373 | 94,3 | 24,102 | 21,073 | 13,971 | | | |
| South Moravian Region | 1,165,821 | 95,3 | 63,022 | 54,872 | 38,091 | | | |
| Olomouc Region | 595,227 | 94,1 | 28,415 | 25,538 | 17,891 | | | |
| Zlín Region | 560,235 | 96,4 | 27,564 | 22,713 | 15,761 | | | |
| Moravian-Silesian Region | 1,188,080 | 99,8 | 68,934 | 53,251 | 37,286 | | | |
| Czech Republic | 10,279,174 | 94,5 | 583,022 | 476,904 | 325,312 | | | |

Source: CSO

9.2 Discharge and treatment of municipal wastewaters

In 2023, 9.428 million inhabitants of the Czech Republic lived in houses connected to the sewerage system, which is 86.7% of the total population. A total of 454 million m³ of wastewater was discharged into sewerage (excluding invoiced rainwater). Of this amount, 97.7% of the wastewater was treated (not including rainwater), which amounts to 444.3 million m³.

The number of inhabitants connected to the sewerage system increased by 236,573 year-on-year. The volume of wastewater discharged into the sewerage system excluding rainwater increased by 1.5 million m³ year-on-year. The volume of treated water (including rainwater) increased by 69.6 million m³ year-on-year.

The highest share of population connected to the sewerage system in 20232 was in the Karlovy Vary Region (100.0%) and the capital city of Prague (99.9), the lowest share was in the Liberec Region (72.7%) and the Pardubice Region (77.2%).

Table 9.2.1 Wastewater disposal and treatment from sewerage in 1989 and 2017–2023

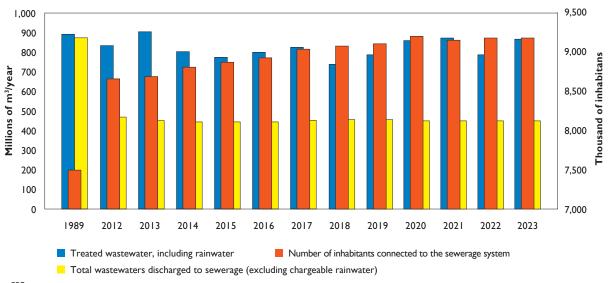
| Indicator | Unit | 1989 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|--|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Population (medium) | thousands of inhabitants | 10,364 | 10,590 | 10,626 | 10,669 | 10,700 | 10,501 | 10,530 | 10,878 |
| Permanent residents in houses | thousands of inhabitants | 7,501 | 9,052 | 9,090 | 9,120 | 9,211 | 9,174 | 9,191 | 9,428 |
| connected to the sewerage system | % | 72.4 | 85.5 | 85.5 | 85.5 | 86.1 | 87.4 | 87.3 | 86.7 |
| Total wastewater discharged | million m ³ | 877.8 | 453.3 | 457.3 | 461.1 | 450.5 | 451.8 | 453.0 | 454.5 |
| to the sewerage system (excluding chargeable rainwater) | % k 1989 | 100.0 | 51.6 | 52.1 | 52.5 | 51.3 | 51.5 | 51.6 | 51.72 |
| Treated wastewater including rainwater 1) | million m ³ | 897.4 | 826.2 | 743.6 | 792.6 | 863.0 | 877.6 | 799.7 | 869.3 |
| Total treated wastewater excluding | million m ³ | 627.6 | 442.2 | 446.3 | 450.3 | 439.3 | 440.7 | 442.4 | 444.3 |
| rainwater | % of 1989 | 100.0 | 70.5 | 71.1 | 71.7 | 69.9 | 70.2 | 70.5 | 70.79 |
| Proportion of treated wastewater excluding rainwater ²⁾ | % | 71.5 | 97.5 | 97.6 | 97.7 | 97.5 | 97.5 | 97.7 | 97.7 |

Source: CSO

Note: 1) In 1989, the figures are for the main operators' sewerage.

²⁾ A proportion of water discharged to sewerage (excluding charged rainwater).

Graph 9.2.1 Inhabitants living in houses connected to the sewerage system and the amount of wastewater discharged and treated in 1989 and 2012–2023



Source: CSO

Table 9.2.2 Inhabitants living in houses connected to sewerage system and the volume of wastewater discharged and treated in the regions in 1989 and 2012–2023

| Region | Residents permanently living in houses connected to the sewerage system | | Wastewater discharged to the sewerage (excl. charged rainwater) | Treated wastewater excl. rainwater | | |
|-----------------|---|-------|---|------------------------------------|-------|--|
| Region | Total | Share | Total | Total | Share | |
| | (number) | (%) | (thous. m³) | (number) | (%) | |
| City of Prague | 1,372,864 | 99.9 | 77,758 | 77,758 | 100 | |
| Central Bohemia | 1,124,194 | 77.5 | 53,917 | 53,840 | 99.86 | |
| South Bohemia | 559,884 | 85.6 | 27,279 | 26,278 | 96.33 | |
| Pilsen | 517,082 | 84.7 | 26,221 | 25,204 | 96.12 | |
| Karlovy Vary | 294,964 | 100.0 | 13,455 | 13,418 | 99.73 | |
| Ústí | 704,036 | 86.6 | 31,178 | 30,845 | 98.93 | |
| Liberec | 327,633 | 72.7 | 14,315 | 14,085 | 98.39 | |
| Hradec Králové | 445,795 | 80.1 | 20,938 | 20,163 | 96.30 | |
| Pardubice | 409,218 | 77.2 | 18,046 | 17,887 | 99.12 | |
| Vysočina | 445,995 | 86.3 | 19,872 | 18,233 | 91.75 | |
| South Moravia | 1,115,415 | 91.2 | 52,733 | 52,210 | 99.01 | |
| Olomouc | 550,957 | 87.1 | 27,924 | 27,529 | 98.59 | |
| Zlín | 559,954 | 96.4 | 26,143 | 24,141 | 92.34 | |
| Moravia-Silesia | 999,873 | 84.0 | 44,763 | 42,678 | 95.34 | |
| Czech Republic | 9,427,864 | 86,7 | 454,542 | 444,269 | 97.74 | |

Source: CSO

The length of the sewerage network was extended by 799 km to reach 52,367 km in 2023. According to the CSO, the total

number of WWTPs increased by 44 year-on-year to a total of 2,959 WWTPs across the country.

9.3 Development of water and sewerage prices

In 2023, according to a survey of the Czech Statistical Office, the average price excl. VAT for water was 53.10 CZK/m³ and the average price for sewerage was 48.40 CZK/m³.

Before the amendment to Act No. 76/2006 Coll. came into force, i.e. until 2006, information on the average price for water and sewerage was determined on the basis of data sent by selected water supply and sewerage operators at the request of the Ministry of Health. An amendment, in accordance with the provisions of Art. 36(5) of Act No. 274/2001 Coll., on water supply and sewerage systems for public use and on amendments to certain acts (Act on water supply and sewerage systems), defined an obligation for the owners and operators, if authorised by the owner, to send to the MoA, annually, by 30 April of the following calendar year at the latest, complete information on the comparison of all items of the price calculation according to the price regulations for water and

sewerage and the actual situation achieved in the previous calendar year. The data on prices including VAT are obtained by the MoA by means of an investigation, the mean values are obtained by a weighted average. Given the deadline for submission of the comparison, it is not possible to evaluate and process the data before the deadline of this publication. For this reason, only the data obtained from the CSO survey are presented as a share of sales from customers and the quantity of drinking water supplied and wastewater discharged (including charged rainwater). The aggregated CSO data for the Czech Republic are not obtained as a weighted average and therefore cannot be compared with data from the MoA.

According to the CSO survey, the highest average water charges were in the Ústí Region, where it reached 62.20 CZK/m³. In relation to the national average, it was 16.7% higher. The highest average price for sewerage was in the capital city of Prague, which at 56.8 CZK/m³ was 18.0% higher than the nation-wide average. By contrast, the lowest average price for water charges (45.6 CZK/m³) was in the Olomouc Region. The lowest average price for sewerage (37.7 CZK/m³) was in the Vysočina Region.

Table 9.3.1 Water and sewerage charges in 2022 and 2023

| Indicator | Unit | 2022 | 2023 | Index 2023/2022 |
|--|-----------------|--------|--------|-----------------|
| Total water charges | million CZK | 22,058 | 25,310 | 1.15 |
| Total water invoiced | million m³/year | 478. I | 476.9 | 1.00 |
| Average water charges | CZK/m³ excl.VAT | 46.1 | 53.1 | 1.15 |
| Total sewerage | million CZK | 21,507 | 25,424 | 1.18 |
| Wastewater discharged into the sewerage system*) | million m³/year | 524.0 | 525.7 | 1.00 |
| Average price for sewerage | CZK/m³ excl.VAT | 41.0 | 48.4 | 1.18 |

Source: CSO

Note: *) Since 2013, including rainwater charged for.

Table 9.3.2
Water consumption, average of water and sewerage charges excl. VAT in 2023

| Region | Specific quantity of water invoiced in total | Specific quantity of water invoiced to households | Average price for water charges | Average price for sewerage | | |
|-----------------|--|---|---------------------------------|----------------------------|--|--|
| | (l/pers | son/day) | (CZK/m³ excl.VAT) | | | |
| City of Prague | 154.9 | 103.8 | 59.6 | 56.8 | | |
| Central Bohemia | 122.2 | 86.1 | 57.1 | 48.3 | | |
| South Bohemia | 122.1 | 78. I | 47.7 | 37.9 | | |
| Pilsen | 130.9 | 84.2 | 52.1 | 39.0 | | |
| Karlovy Vary | 129.1 | 84.2 | 52.5 | 47.5 | | |
| Ústí | 125.6 | 89.9 | 62.2 | 53.1 | | |
| Liberec | 123.6 | 84.0 | 59.0 | 54.5 | | |
| Hradec Králové | 121.6 | 80.7 | 46.9 | 46.8 | | |
| Pardubice | 118.9 | 78.5 | 49.6 | 49.9 | | |
| Vysočina | 118.5 | 78.5 | 49.7 | 37.7 | | |
| South Moravia | 129.0 | 89.5 | 48.5 | 49.6 | | |
| Olomouc | 117.5 | 82.3 | 45.6 | 46.7 | | |
| Zlín | 111.1 | 77.1 | 50.7 | 46.9 | | |
| Moravia-Silesia | 122.8 | 86.0 | 49.1 | 46.9 | | |
| Czech Republic | 127.1 | 86.7 | 53.1 | 48.4 | | |

Source: CSO

9.4 Regulation of the water supply and sewerage sector

In 2023, the Ministry of Agriculture conducted a total of 31 audits of operators of water supply and sewerage systems for public use.

The Ministry of Agriculture sees the main objectives of the regulation of water supply and sewerage for public use as being mainly in the following four key areas: monitoring the long-term sustainability of water supply and sewerage for public use, especially in relation to the financing plan for renewal and its implementation, increasing the transparency of price regulation for water and sewerage, continuously improving protection of customers and obtaining a basis for proposals for amending legislation in the field of water supply and sewerage for public use, and increasing protection of customers. In 2023, audits of the Ministry of Agriculture, carried out by the Department of the Chief Regulator and Supervision of the Water Supply and Sewerage (WSS) sector, continued to focus on supervising fulfilment of the obligations of owners and operators of water supply and sewerage systems arising from Act No. 274/2001 Coll., The Ministry of Agriculture carried out a total of 31 audits of owners and operators of public water supply systems in 2023.

The audits focused primarily on fulfilment of essential legal obligations of owners and operators of water management infrastructure. Their content was the operating permits and the compliance of selected data from the operating records ("VÚPE") and selected data from the property records ("VÚME") of the operated waterworks assets with issued permits for operation of waterworks for public use, operating contracts concluded between the owners and operators of waterworks, written agreements between the owners of related WSSs, the obligatory contractual relationship between the operator and its professional representative, obligatory elements of customer contracts, and compliance of accounting documents issued for water and sewerage charges with the published price, including control of compliance with the procedures for determining the quantity of water supplied and wastewater discharged. Processing of sewerage rules, including their approval by the water authority and processing of the complaints procedure were also audited. Particular attention was paid to the compulsory preparation of rehabilitation financing plans and the setting aside of funds for the rehabilitation of the water supply system and the evidence of their use for this purpose.

When any deficiencies were identified, the Ministry of Agriculture requested that corrective action be taken. Recurring major deficiencies include, for example, complete absence or incorrect preparation of the plans for renovation funding, failure to have mandatory elements in customer contracts, non-compliance of the VÚME and VÚPEs with the issued permits for operation of WSSs for public use, absence of decisions to operate a WSS, absence of agreements between owners of related water supply and/or sewerage systems, etc.

The Ministry of Agriculture finds significant differences between inspected entities. It is continuously confirmed that some municipalities, as owners of water supply systems for public use, underestimate the complex issues in the field, regardless of whether they lease the infrastructure or operate it on their own behalf and under their own responsibility. In some cases, this is reflected, for example, in determining water and sewerage prices in relation to plans for funding renovation of water and sewerage systems. The Ministry of Agriculture also provides methodological assistance to the inspected entities as part of their audits, if they are interested. On the basis of the aforementioned experience, the Ministry of Agriculture collects and evaluates the basis for any proposals for refining the legislation in force.

In addition to the aforementioned audits, the Department of the WSS regulation also deals with analytical activities, aimed primarily at providing relevant information on the situation in the WSS sector necessary for designing and adopting adequate regulatory measures. Since 2016, the MoA has run, on an annual basis, two separate projects: Benchmarking of Owners and Benchmarking of Operators.

In 2022, the projects were able to include data representing a 99% share of the drinking water market and a 99% share of the wastewater market.

The Benchmarking of Owners project emphasizes, in particular, monitoring of achieving the highest possible level of self-funding of the water infrastructure. From this point of view, insufficient generation of funds for renovation of water infrastructure assets from water and sewerage charges appears to be the most significant problem. From 2016 to 2022, according to the current methodology, the theoretical shortfall in generation of funds for renewal of water and sewerage infrastructure assets was calculated at a total of CZK 13.3 billion, see the table below. The MoA does not have sufficient information on the extent to which this deficit is compensated by subsidies from public and/or private sources.

Table 9.4.1 Number of audits conducted at owners and operators of water supply and sewerage systems in 2023

| Entities inspected | Number of audits |
|--|------------------|
| Owners of water supply and sewerage systems | 9 |
| - of which cities and municipalities | 7 |
| Owners and operators of water supply and sewerage systems | 16 |
| of which cities and municipalities in the model of independent operation | 15 |
| Operators of water supply and sewerage systems | 6 |
| of which operators in the owner- operator model | 5 |
| Total audits conducted | 31 |

Source: MoA (Report on audits at owners and operators of water supply and sewerage systems for public use in the Czech Republic in 2023)

The Operator Benchmarking analyses focus on the quality of services provided, pricing and environmental impacts. The emphasis is mainly on the quality of drinking water supplied,

Table 9.4.2 Missing funds for renovation 2016–2022

| Missing funds | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Total | | | |
|------------------|------------------|----------|----------|----------|----------|----------|----------|-----------|--|--|--|
| riissiiig iulius | million CZK/year | | | | | | | | | | |
| Drinking water | 456.46 | 460.21 | 532.36 | 507.84 | 817.07 | 862.38 | 929.59 | 4,565.91 | | | |
| Drainage | 758.85 | 808.21 | 1,045.56 | 1,033.58 | 1,534.21 | 1,681.71 | 1,836.36 | 8,698.48 | | | |
| Total per year | 1,215.31 | 1,268.42 | 1,577.92 | 1,541.42 | 2,351.28 | 2,544.09 | 2,765.95 | 13,264.39 | | | |

Source: MoA

monitoring of drinking water losses, and development of the share of non-compliant samples of drinking water and wastewater.

The average value of water losses of water intender for consumption has seen a slightly decreasing trend in the past four years, reaching 12.36% in 2022, indicating a stable level of care for water supply assets and working with the loss indicator when improving operational performance. The quality of drinking water supplied has been constantly on a high level each year.

The main problem in addressing the shortcomings identified in both benchmarking projects is the large number of owners and operators of water supply and sewerage systems. Such an atomisation of the WSS sector is negatively reflected in various processes, including provision of services to the public. The

largest shortcomings were repeatedly identified in municipal operators, which invoice less than 0.4 million m³ of water. These shortcomings include insufficient financial support for infrastructure renewal, unsystematic maintenance of assets, a lower level of expertise and insufficient compliance with the obligations under the WSS Act and its implementing Decree No. 428/2001 Coll.

Transparency in the WSS is ensured through the Benchmarking Report and the presentation of analysed data, which is available on the MoA website in the Water – Water Supply and Sewerage – WSS Benchmarking section.

More detailed information on the activities of the MoA in the field of WSS regulation can be found on the MoA's website in the section dedicated to the WSS.



Confluence of the Svratka and the Jihlava Streams, The Nové Mlýny hydroelectric power station (source: Morava River Board, s.e.)



E. Slezáková, B. E. Absolonová – The Last Water, Bishop's Grammar School, Krupka (3rd place II. category)

10. FISHING AND FISH FARMING

There are currently approximately 24,000 ponds and reservoirs in the Czech Republic with a total area of around 52,000 ha. In 2023, 18.6 thousand tonnes of marketable fish were caught in the Czech Republic.

Fishing in the Czech Republic is divided into production and recreational fishing, and is governed by Act No. 99/2004 Coll., on fish farming, execution of fishing right, fishing guard, protection of marine fishing resources and the amendment of certain acts (the Fishery Act) and its implementing Decree No. 197/2004 Coll. Production fishing is a traditional part of agricultural production.

The actual fish farming takes place on more than 41 thousand hectares of ponds and reservoirs. There are more than 180 major fish producers in the Czech Republic (i.e. with a production of over 5 tonnes of fish per year) and several hundred small-scale breeders. The decisive fish and poultry producers, fish processors, fishery research and education institutions and fishermen's associations are brought together by the Fishermen's Association of the Czech Republic, based in České Budějovice.

More than 2 thousand fishing grounds with an area of approximately 42 thousand ha are defined in the Czech Republic, while approximately 350 thousand recreational fishermen are registered in the Czech Republic. The fishing grounds are divided into off-trout and trout fishing grounds, and their largest users are the Czech Fishermen's Association, i.o., and the Moravian Fishermen's Association, i.o. Every year, recreational fishermen catch about 3–4 thousand tonnes of fish in fishing grounds, the main fish caught is the common carp.

The Czech fishing industry has faced many negative factors for a long time. One of the main problems affecting both production and recreational fishing is an increased pressure from piscivorous predators such as heron, river otter and cormorant. The damage caused by these predators amounts to hundreds of millions CZK each year. Fisheries are also affected by ongoing climate change, which is reflected in both fish production and the fish stocks in fishing grounds. Restrictions on economic activities given by nature conservation requirements also cause, in some cases, difficulties for production fishermen in particular, and a compromise between nature conservation and fish production has to be found.

Table 10.1

Market production of farmed fish in the Czech Republic in 2013–2023

| Time | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Туре | | | | | | tonnes | | | | | |
| Carp | 16,809 | 17,833 | 17,860 | 18,354 | 18,460 | 18,430 | 17,945 | 17,370 | 17,616 | 16,437 | 15,903 |
| Total | 19,358 | 20,135 | 20,200 | 20,952 | 21,685 | 21,751 | 20,986 | 20,401 | 20,991 | 19,259 | 18,613 |

Source: MoA and Fishermen's Association of the Czech Republic



New Fish Crossing at the Nedakonice Weir on the Morava Stream (source: Morava River Board, s.e.)

Of the total production in 2023, 17.8 thousand tonnes of fish were harvested from ponds, 768 thousand tonnes from special facilities (mostly salmonid flow-through or recirculating aquaculture systems) and 12 tonnes from dams.

6,316 tonnes of live fish were delivered to the Czech market, a year-on-year decrease of 81 tonnes. Exports of live fish amounted to 8,424 tonnes, a decrease of 977 tonnes. In 2023, 2.2 thousand tonnes of live weight fish were processed, i.e., 11.6% of the total of market fish caught.

The species distribution of marketable fish is relatively stable and did not change significantly compared to the previous years. Carp accounted for 75.8% of the total catch, salmonids accounted for 3.1%, herbivorous fish for 4%, tench 0.7% and predatory fish 1.4% of the total catch.

The domestic market continued to favour live fish supplies, which accounted for 33–36% of production from farming over the last three years. Exports of live fish accounted for 45–49% of the total catch in the past three years, confirming a stable demand for fish produced mainly by entities from the professional association. Fish processing plants processed 11.6% of the freshwater marketable fish into products.

Consumption of freshwater fish in the Czech Republic obtained from farming was 0.8 kg/person/year. The total consumption of freshwater fish per capita in 2023 was calculated considering population on 31 December 2023 of 10,900,555.



The Opatovice nad Labem Wier (source: Elbe River Board, s.e.)



The Hranice Weir, The Fish Crossing (source: Morava River Board, s.e.)

Table 10.2
Consumption of marketable fish produced by farming in the Czech Republic in 2013–2023

| | | | Of which *) | | | | | | |
|------|------------------|--|---------------------------------|---------------------|--|--|--|--|--|
| Year | Total production | sales of live fish in the Czech Republic | processed fish (live weight) | export of live fish | | | | | |
| | thousand tonnes | | | | | | | | |
| 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 | | | | | |
| 2016 | 21.0 | 8.3 | 2.5 | 11.0 | | | | | |
| 2017 | 21.7 | 8.2 | 2.4 | 11.1 | | | | | |
| 2018 | 21.8 | 8.4 | 2.2 | 10.3 | | | | | |
| 2019 | 21.0 | 8.5 | 2.4 | 10.3 | | | | | |
| 2020 | 20.4 | 7.6 | 2.4 | 9.2 | | | | | |
| 2021 | 21.0 | 7.6 | 2.4 | 9.7 | | | | | |
| 2022 | 19.3 | 6.4 | 2.4 | 9.4 | | | | | |
| 2023 | 18.6 | 6.3 | 2.2 | 8.4 | | | | | |

 $Source: \textit{MoA} \ \textit{and} \ \textit{Fishermen's} \ \textit{Association} \ \textit{of the} \ \textit{Czech} \ \textit{Republic}$

Note: $^{\circ}$ Includes beginning and end of year stocks, losses and imports of live freshwater fish.

Table 10.3 Fish consumption in the Czech Republic in 2013–2023

| Type | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|----------------|------|------|------|------|------|------|------|------|------|------|
| Туре | kg/person/year | | | | | | | | | | |
| Total fish | 5.3 | 5.4 | 5.5 | 5.1 | 5.4 | 5.6 | 6.0 | 5.7 | 5.6 | 5.1 | x) |
| of which freshwater produced and caught in the Czech Republic | 1.4 | 1.3 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.1 | ×) |

Source: CSO and Fishermen's Association of the Czech Republic Note: **) Figures not known at the moment of this publication.



A. Kallová – Using Water for Peace, Primary School Otevřená, Brno

II. FINANCIAL SUPPORT FOR WATER MANAGEMENT

II.I Financial support from national and transnational programmes

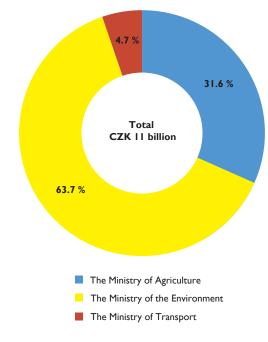
Financial support for water management includes selected national and transnational subsidy programmes related to water management. In 2023 this support represented funding of CZK 10,972 million. The Ministry of Agriculture accounted for 31.6% of the total amount (funding of CZK 3,466 million), the Ministry of the Environment for 63.7% (CZK 6,985 million) and the Ministry of Transport for 4.7% (CZK 521 million).

Table 11.1.1
Key state financial support in water management in 2023

| Department | Total funds spent in million CZK |
|-----------------------------|----------------------------------|
| Ministry of Agriculture | 3,466 |
| Ministry of the Environment | 6,985 |
| Ministry of Transport | 521 |
| Total | 10,972 |

Source: MoA using sources of the MoE and the Ministry of Transport

Graph 11.1.1 Financial support for water management by ministries in 2023



Source: MoA using sources of the MoE and the Ministry of Transport



The New Pond (source: Ohře River Board, s.e.)

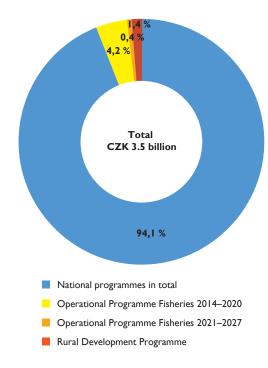
11.1.1 Funding provided by the Ministry of Agriculture

In 2023, the Ministry of Agriculture administered 16 grant programmes related to water management, of which 13 national and three funded from national or supranational sources. In total, funds amounting to CZK 3,466 million were disbursed.



The Písník Oplatil (source: Elbe River Board, s.e.)

Graph 11.1.1.1
Drawdown of funds of the Ministry of Agriculture in 2023



Source: MoA

Table 11.1.1.1 Funds provided for water management by the Ministry of Agriculture in 2023

| Programme No. | Name | Funds in million CZK |
|-----------------------|---|----------------------|
| 129 400 | Support for measures to mitigate negative impacts of drought and water scarcity | 945.50 |
| 129 410 | Support for construction and technical upgrading of water supply and sewerage infrastructure III | 1,102.85 |
| 129 420 | Support for purchase and integration of water supply and sewerage infrastructure | 0.00 |
| | Subsidy of part of the interest on commercial loans under the 229 310 and 129 180 programmes | 0.004 |
| 129 360 | Support for flood prevention IV | 496.02 |
| 129 280 | Support for water retention in the landscape – ponds and reservoirs | 102.09 |
| 129 310 | Supporting competitiveness of the agri-food complex – irrigation – Stage II | 22.67 |
| 129 370 | Remediation of flood damage to state water management assets III | 14.44 |
| 129 390 | Support for measures on small watercourses and small reservoirs – Stage II | 436.37 |
| Skalička Reservoir | Purchase of land for implementation of Skalička Reservoir | 0.00 |
| 129 330 | Vlachovice – settlement of rights to immovable property affected by the planned construction of the reservoir | 124.44 |
| 129 340 | Settlement of rights to immovable property affected by the planned implementation of a comprehensive drought solution in Rakovník | 0.00*) |
| 17 | Support for the non-productive functions of fishing grounds | 18.00 |
| National pro | grammes in total | 3,262,38 |
| | Operational Programme Fisheries 2014–2020 | 144.09 |
| | Operational Programme Fisheries í 2021–2027 | 12.8 |
| | Rural Development Programme 2014–2020 | 47.0 |
| Total | | 3,466,27 |

Source: MoA

Note: *) Due to the lack of availability of funds from the state budget.

Assurance of the quality of surface water resources

Support for limiting pesticide use on arable land in protection zones of a water resource was approved as part of the Common Agricultural Policy (CAP) Strategic Plan and concerns 4 reservoirs (Švihov, Římov, Vrchlice and Opatovice). Applications are received as of 2024.

Water supply and sewerage

In 2023, investors received support in the form of both subsidies and «soft loans». Under programme of the Ministry of Agriculture 129 410 «Support for construction and technical improvement of water supply and sewerage infrastructure III», support was provided for 92 projects in the total amount of approx. CZK 1,103 million.

The 129 410 programme was approved for 2021–2025. It is aimed at implementing measures to comply with European Union directives in the field of water supply and sewerage and at development of the water supply and sewerage sector itself.

In 2023, a total of 25 projects were supported by the state budget in the form of subsidies totalling approximately CZK 126 million under sub-programme 129 412 (measures focused on water supply) and a total of 67 project for a total amount of approx. CZK 976 million under sub-programme 129 413 (sewerage measures).

"Soft loans" were granted for projects under the 129 180 and 229 310 programmes that had been closed. They were provided in the form of reimbursement of part of the interest on commercial loans for a total of 102 investment-intensive projects from 2008–2013 for loans with loan agreements totalling approximately CZK 1,578 million and had a maximum maturity of 10 years. In 2023, the total subsidies paid amounted to CZK 220 million. The last outstanding loan was repaid in 2023 with subsidies for interests of approx. CZK 4.4 million. These were non-investment funds, kept outside the programme funding.



The Vidhostice Reservoir – reconstruction (source: Ohře River Board, s.e.)

Implementation of two other subsidy programmes, namely 129 400 «Support for measures to mitigate negative impacts of drought and water scarcity» and 129 420 «Support for purchase and integration of water supply and sewerage infrastructure», approved until the end of 2025, also continued.

Under programme 129 400, aimed at increasing availability of drinkable water from the water systems for public use in areas with shortage of water and drought-affected areas, support from the state budget totalling CZK 946 million was provided for 50 projects in 2023.

Under programme 129 420, aimed at supporting integration and transfer of ownership rights to Czech cities and municipalities, no new application was filed in 2023, the programme was extended until the end of 2025.

No funds were expended from Chapter 397 OSFA (Operation of state financial assets) for these programs.

Table 11.1.1.2
State budget funds provided under the Ministry of Agriculture programmes 129 400, 129 410, and 129 420 and subsidies for part of the interest on commercial loans in 2023

| Forma of support | Water supply and treatment plants | Sewerage and water treatment plants | Renovation of water supply and sewerage systems after floods | Total | | |
|--|-----------------------------------|-------------------------------------|--|-----------|--|--|
| | million CZK | | | | | |
| Subsidies for the development and renewal of water supply infrastructure | 1,071.805 | 976.550 | 0 | 2,048.355 | | |
| Subsidies for the purchase and consolidation of the WSS infrastructure | 0 | 0 | 0 | 0.000 | | |
| Subsidies for part of interests on commercial loans | 0 | 0.004 | 0 | 0.004 | | |
| Total subsidies | 1,071.805 | 976.555 | 0 | 2,048.360 | | |
| Repayable financial support | 0 | 0 | 0 | 0 | | |
| Total | 1,071.805 | 976.555 | 0 | 2,048.360 | | |

Source: MoA

Table 11.1.1.3

State support for construction of water supply systems, water treatment plants, sewage systems and wastewater treatment plants within the Ministry of Agriculture in 2018–2023

| Financial resource | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | |
|-----------------------------|-------------|------|-------|-------|-------|-------|--|
| rinanciai resource | million CZK | | | | | | |
| Repayable financial support | 0 | 0 | 0 | 0 | 0 | 0 | |
| State budget subsidies | 597 | 974 | 1,087 | 1,895 | 1,998 | 2,048 | |
| Support from state budget | 597 | 974 | 1,087 | 1,895 | 1,998 | 2,048 | |
| Soft loan (EIB and CEB) | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total support | 597 | 974 | 1,087 | 1,895 | 1,998 | 2,048 | |

Source: MoA



The Voprava Reservoir (source: Forests of the Czech republic)

Flood protection

In 2023, the Ministry of Agriculture funded projects under the 129 360 programme «Support for flood prevention IV». The programme follows the previous phase, with greater emphasis on implementation of measures with retention effects. Immediate implementation of important projects straight after the programme was launched was possible due to project preparation ensured as part of the previous third stage. In 2023, 16 projects were supported, the total allocated funds exceeded CZK 496 million.

The programme is divided into four sub-programmes, focused on supporting preparation of projects for major constructions, support for flood protection measures with retention, support for flood protection measures along watercourses and also on preparation and implementation of selected constructions related to the construction of Nové Heřminovy Reservoir.

Sub-programme I 29 363 "Support for project documentation" is intended to support project documentation for major flood control measures that will subsequently be implemented under other sub-programmes and pre-project preparation for projects prepared on the basis of Government Resolution

No. 243 of 18 April 2018, on preparation of constructing reservoirs in drought-affected regions as an effective measure to reduce water scarcity and the proposal for their funding and other major hydraulic structures.

The subject of sub-programme 129 364 "Support for flood protection measures with retention" is the establishment of new retention areas, modifications to existing reservoirs with retention effect to increase the level of flood protection, flood spill measures and the establishment and reconstruction of polders including other accompanying measures.

The objective of sub-programme 129 365 "Support for flood protection measures along watercourses" is to build flood protection measures along watercourses by constructing, for example, protective dykes and increasing the capacity and stabilisation of watercourse channels (especially in urban areas).

In 2019, the programme was expanded to include a new subprogramme 129 366 "Support for preparation and implementation of induced investments and constructions related to the construction of Nové Heřminovy Reservoir", the aim of which is to prepare the site for the planned construction of the hydraulic structure by carrying out preparatory work and technical measures. The sub-programme implements the Government Resolution No. 386 of 3 June 2019 concerning the Report on the state of preparation and implementation of measures aimed at reducing flood risks in the Upper Opava River Basin, including a proposal of securing funds for preparation and implementation of investments and constructions resulting from the "Measures on the Upper Opava River" project.

As in previous years, implementation of the measures of the 129 360 programme is ensured by the watercourse administrators (the River Boards and Forests of the Czech Republic and administrators of small watercourses designated by the Ministry of Agriculture pursuant to Section 48(2) of the Water Act). Municipalities actively participate in the programme as applicants for support in construction of locally-significant measures aimed at reducing the risk of flooding from heavy precipitation on small watercourses.

The programme also allows for involvement of municipalities, associations of municipalities, towns, cities and regions in the

process of designing flood protection measures as so-called proponents, where implementation of the measures proposed by them will be ensured by the relevant administrators of watercourses.

In 2023, funds from the European Commission's National Recovery Plan were used to finance 10 projects to support investments and reforms and to kick-start recovery of the Czech economy affected by the Covid-19 pandemic. Under sub-component 2.6.1 Flood protection, almost CZK 315 million was used in 2023.

In 2023, administration of the 129 500 programme «Support to flood prevention V» started. The programme follows up the previous stages, again with an emphasis on implementation of measures with retention effects.

In 2023, 27 applications were administered. In view of the amount of funding provided by the state budget to the MoA chapter, MoA funding is to start in 2024.

Table 11.1.1.4

Disbursement of funds for selected major actions of the Ministry of Agriculture 129 360 programme in 2023

| Watercourse administrator | Name | Date | Total costs | Subsidies in 2023 |
|-------------------------------|--|-------------|-------------|-------------------|
| auministrator | | | million CZK | |
| Ohře River Board | Nechranice Reservoir | 05/21-06/26 | 122.910 | 32.700 |
| Vltava River Board | Orlík Reservoir – protection against floods | 09/21-06/27 | 1,906.709 | 100.000 |
| Elbe River Board | Mrlina, Vestec – Rožďalovice, increasing municipality protection by building polders – the Mlýnec Polder | 01/23-06/25 | 73.352 | 26.203 |
| Oder River Board | Tributary to Vyšní Lhota – Žermanice, channel at 0.000 – 3.633 km, 2nd stage | 11/22-01/24 | 163.485 | 136.028 |
| Morava River Board | Letovice Reservoir – reconstruction including sediment removal | 08/21-08/24 | 246.309 | 74.569 |
| Forests of the Czech Republic | Křetínky Natural Park in Letovice | 08/22-04/24 | 10.053 | 6.528 |

Source: MoA as of 05/2024

Table 11.1.1.5
Disbursement of state budget funds under the Ministry of Agriculture 129 360 programme by individual watercourse administrators in 2023

| Owners and | Investments | Non-investments | | | |
|-------------------------------|--------------|-----------------|--|--|--|
| administrators | millions CZK | | | | |
| Elbe River Board | 46.955 | 50.000 | | | |
| Vltava River Board | 101.803 | | | | |
| Ohře River Board | 45.396 | | | | |
| Oder River Board | 160.549 | | | | |
| Morava River Board | 72.358 | 12.429 | | | |
| Forests of the Czech Republic | 6.528 | | | | |
| Municipalities | 0 | | | | |
| Total | 433.589 | 62.429 | | | |





Revitalisation of the Trkmanka Stream in Velké Pavlovice (source: Morava River Board, s.e.)

Removing flood damage

In 2023, the Ministry of Agriculture continued the 129 370 programme «Flood Damage Remediation on State-owned Water Management Assets III». Three projects were supported with a total amount of more than CZK 14.4 million.

Programme 129 370 provides for recovery of flood damage to watercourse channels including related structures, constructions and riparian vegetation owned by the state, damaged by extreme stress during floods and for construction of purposeful stabilization structures and modifications to structures, ensuring constant functionality of watercourse channels and related structures and facilities in areas exposed to damage.



The Tuchlovská Pond (source: Ohře River Board, s.e.)

Table 11.1.1.6
Use of state budget funds and number of funded projects under the 129 370 programme in 2023

| Owners and administrators | Investments | Non-investments | Total | Number of funded projects |
|-------------------------------|-------------|------------------|--------|---------------------------|
| | | idilded projects | | |
| Forests of the Czech Republic | 0 | 0 | 0 | 0 |
| Morava River Board | 0 | 14.439 | 14.439 | 3 |
| Total 129 370 | 0 | 14.439 | 14.439 | 3 |

Source: MoA

For the case of flood damage, the Ministry of Agriculture administers subsidy programme 129 284 "Remediation of flood damage to ponds and reservoirs". As no significant floods occurred in 2023, the programme was not activated and no aid was granted.

Small watercourses and small reservoirs

In 2022, the Ministry of Agriculture continued the programme 129 390 «Support for measures on small watercourses and small reservoirs – Stage 2», which is divided into two sub-programmes, sub-programme

129 392 and 129 393. A total of 244 projects were supported with a total amount of almost CZK 436.4 million.

Subprogramme 129 392 "Support for measures on small watercourses, ponds and small reservoirs – 2nd stage" is intended for the River Boards and Forests of the Czech Republic, s.e. In 2023, it provided financial support for 110 projects with a total volume of CZK 222 million.

Subprogramme 129 393 "Support for measures on ponds and small reservoirs owned by municipalities – 2nd stag" is intended

Table 11.1.1.7
Use of state budget funds and number of funded projects under the 129 390 programme in 2023

| Owners and administrators | Investments | Non-investments | Investments | Number of funded projects |
|-------------------------------|-------------|-----------------|-------------|---------------------------|
| | | ranaca projects | | |
| Ohře River Board | 14.014 | 15.289 | 29.303 | 6 |
| Forests of the Czech Republic | 77.452 | 22.790 | 100.242 | 78 |
| Morava River Board | 18.022 | 22.722 | 40.744 | 9 |
| VItava River Board | 10.860 | 8.381 | 19.241 | 9 |
| Oder River Board | 16.341 | 4.209 | 20.550 | 3 |
| Elbe River Board | 12.040 | 0 | 12.040 | 5 |
| Total 129 392 | 148.729 | 73.391 | 222.120 | 110 |
| Total 129 393 | 190.466 | 23.780 | 214.246 | 134 |
| Total 129 390 | 339.195 | 97.171 | 436.366 | 244 |

Source: MoA

for municipalities and associations of municipalities. Under this sub-programme, financial support for 134 projects amounting to CZK 214 million was provided in 2023.

In 2023, funds from the European Commission's National Recovery Plan were used. The plan is aimed at supporting investments and reforms and to kick-start recovery of the Czech economy affected by the Covid-19 pandemic. Under subcomponent 2.6.2 Support for measures on small watercourses and small reservoirs, almost CZK 311 million was used in 2023.

Water in the landscape

In 2023, the Ministry of Agriculture continued to administer the 129 280 programme «Support for water retention in the landscape – ponds and reservoirs», the funding of which runs from 2016 to 2024. The total amount allocated was CZK 102.09 million and 17 projects were funded.

The objective of programme 129 280 is support for renovation and improvement of landscape retention ability, improvement of the technical state of the ponds in the Czech Republic and renewal of water management functions of ponds and reservoirs, increasing safety of ponds and reservoirs during floods and ensuring their passability during floods with flow rates of Q_{100} and higher, ensuring a minimum flow in watercourses below ponds and reservoirs even in periods of prolonged droughts, removing new flood damage at dams and facilities pertaining to ponds and reservoirs and removing emergency situation and their consequences on ponds and reservoirs.

Programme 129 280 is divided into three sub-programmes, namely sub-programme 129 282 "Support for construction,

Table 11.1.1.8 Use of state budget funds under programme 129 280 in 2023

| Subnuaguamama | Number or | Financial support | | |
|---------------|-----------|-------------------|--|--|
| Subprogramme | projects | million CZK | | |
| 129 282 | 15 | 92.45 | | |
| 129 283 | 2 | 9.64 | | |
| 129 284 | 0 | 0.00 | | |
| Total | 17 | 102.09 | | |

Source: MoA



The Jakubov Weir (author: Hubalová Petra)

restoration, reconstruction and de-mudding of ponds and reservoirs", sub-programme 129 283 "Remediation of emergency situations on ponds and reservoirs" and sub-programme 129 284 "Remediation of flood damage on ponds and reservoirs".

In 2023, financial support was provided under sub-programme 129 282 to 25 projects in a total amount of CZK 92.45 million; and under subprogramme 129 283 to 2 projects with a total amount of CZK 9.64 million.

In 2023, the notification process for the follow-up programme 129 380 "Support for water retention in the landscape – ponds and reservoirs – 2nd stage" also continued.

In 2023, the Ministry of Agriculture continued the programme 129 310 «Support for the competitiveness of the agri-food complex – irrigation – Stage II». Under the 129 310 programme, financial support was provided for 17 projects in the amount of CZK 22.67 million.

The objective of the 129 310 programme is to reduce the need for water for irrigation, energy and personnel intensity of operating irrigation systems, greater flexibility of irrigation systems in meeting different irrigation requirements, a reduction in total water consumption per irrigation dose and the use of the positive environmental and non-economic effects of irrigation as one of the adaptation measures to climate change, thereby increasing the competitiveness of agricultural companies and stabilising agricultural production.

Table 11.1.1.9
Use of state budget funds for selected projects under programme 129 280 in 2023

| Annlicant | Ducinet manne | Implementation | Total costs | Subsidies in 2023 | |
|---------------------------------|---|----------------|--------------------|-------------------|--|
| Applicant | Project name | date | million CZK | | |
| Rašelina a.s. | Construction of two reservoirs: Velký rybník and Svánkov | 7/21–6/24 | 46.666 | 22.155 | |
| Klatovské rybářství-správa a.s. | Mohelnický Pond | 12/22–12/23 | 14.152 | 11.000 | |
| Rybniční hospodářství s.r.o. | De-mudding and reconstructing the dam at the Skříň Pond | 6/21–12/23 | 56.998 | 10.363 | |

Source: MoA

The 129 310 programme is divided into two sub-programmes. Subprogramme 129 312 "Support for rehabilitation and construction of irrigation details and optimisation of irrigation networks — Stage II" is intended to support rehabilitation and construction of irrigation details and rehabilitation, construction and optimisation of irrigation networks. Sub-programme 129 313 "Support for optimisation of irrigation networks managed by the State Land Office" is aimed at supporting rehabilitation, construction and optimisation of irrigation networks.

In 2023, financial support under sub-programme 129 312 was provided to 12 projects totalling to CZK 18.03; under sub-programme 129 313 to 5 projects in the amount of CZK 4.64 million.

Table 11.1.1.10
Use of state budget funds under the Ministry of Agriculture 129 310 programme in 2023

| Sub- | Number of | Financial support |
|-----------|-----------------|----------------------|
| programme | funded projects | million CZK |
| 129 312 | 12 | 18.03 |
| 129 313 | 5 | 4.64 |
| Total | 17 | 22.67 |

Source: MoA

Table 11.1.1.11
Use of state budget funds under the Ministry of Agriculture 129 310 programme for selected projects in 2023

| Applicant | Project | Implementation date | Total costs | Subsidies in 2023 |
|-------------------------|---|---------------------|-------------|-------------------|
| | | uate | million CZK | |
| ZD Dřísy (cooperative) | Purchase of irrigation II | 9/23-12/23 | 15.535 | 6.948 |
| AGARDEN Rostliny s.r.o. | Irrigation modernisation | 6/23-10/23 | 5.902 | 2.951 |
| AGRO KLIMUS s.r.o. | Modernisation of the Uherčice pumping station | 1/23–5/23 | 5.055 | 2.527 |

Source: MoA

Preparation for construction of hydraulic structures

In September 2022, documentation for the new programme 129 430 «Support for measures aimed at mitigating drought impacts – project preparation and implementation of necessary investments» and the Ministry of Agriculture began its administration.

The programme focuses on pre-project preparation and implementation of investments related to the planned construction of the following reservoirs: Vlachovice, Kryry, Senomaty and Šanov, which are intended to mitigate drought impacts. The measures need to be implemented before the actual construction of each reservoir is initiated. It is a set of induced and accompanying investments, changes to the infrastructure, changes to landscape use and implementation of measure ensuring long-term use of the new water resource and stabilisation of the new situation in the landscape.

In 2023, 5 applications were administered. Given the amount of the funds provided from the state budget to the MoA chapter, they start to be funded in 2024.

The I29 330 programme of the Ministry of Agriculture «Vlachovice – settlement of rights to immovable property affected by the planned construction of the reservoir» continued in 2023. Funds amounting to CZK I22.4 million were used under the programme.

The aim of the 129 330 programme is to implement the task resulting from the Government Resolution No. 257 of 15 April 2019, which approved the Principles for settlement

of rights to immovable property affected by the planned implementation of Vlachovice Reservoir. The main purpose of the programme is to settle the property rights of all owners affected by the implementation of the future Vlachovice Reservoir in accordance with the approved incentive compensation by 2023. The 129 330 programme contains one sub-programme 129 332 "Vlachovice – settlement of rights to immovable property affected by the planned construction of the reservoir", through which the actual property rights settlement will be implemented. The beneficiary of the subsidy is the Morava River Board, s.e.

Vlachovice Reservoir is a key source of drinking water for the Zlín Region and will be able to supply water to the adjacent parts of the South Moravia and Olomouc Regions through group water supply systems. This is one of the most important measures aimed at mitigating the consequences of climate change in the Czech Republic.

In 2023, the 129 340 programme «Settlement of rights to immovable property affected by the planned implementation of a comprehensive drought solution in the Rakovník District» continued at the Ministry of Agriculture. No funds were allocated under the programme in 2023 because of a shortage of funds available in the state budget.

The aim of the 129 340 programme is to implement the task resulting from the Government Resolution No. 971 of 5 October 2019, which approved the Principles for settlement of rights to immovable property affected by the planned implementation of the comprehensive drought solution in the Rakovník District, Stage I, and approved funding totalling

to CZK 485 million in 2020–2025. In the first stage, immovable property affected by construction of Kryry, Senomaty and Šanov Reservoirs is settled.

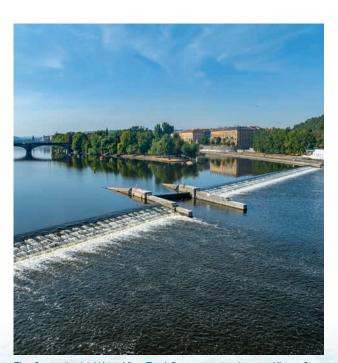
The 129 340 programme is divided into two sub-programmes, namely sub-programme 129 342 "Kryry Reservoir – settlement of rights to immovable property affected by the planned implementation of the reservoir", where the Ohře River Board is the beneficiary of the subsidy, and sub-programme 129 343 "Senomaty and Šanov – settlement of rights to immovable property affected by the planned construction of the reservoir", where the Vltava River Board is the beneficiary of the subsidy.

At the beginning of 20223 documentation was approved to extend the 129 340 programme with a new sub-programme 129 344 "Water tributaries to Kryry Reservoir – Vidhostice Reservoir; the Kolešovický Stream and the Rakovnický Stream – settlement of rights to immovable property affected by the planned implementation of the tributaries", where both the Ohře and Vltava River Boards are the beneficiaries; applications to the programme are accepted during 2024.

Kryry Reservoir is a crucial element in the planned system of measures aimed at addressing drought in the Rakovník District. Together with the small reservoirs of Senomaty and Šanov in the Rakovnický Stream catchment area and the relevant tributaries, it represents an effective solution to enhancing water resources and alleviating the water deficit in the area.

Fisheries

In order to support non-productive functions of fishing grounds, the Ministry of Agriculture established the national subsidy programme 17 «Support for non-productive functions of fishing grounds» on the basis ofthe provisions of Art. 1, 2, 2(d) of Act No. 252/1997 Coll., on Agriculture, as amended. In 2021, it was divided



The Staroměstský Weir, After Total Reconstruction (source: Vltava River Board, s.e.)

into DT 17.A – Support of non-productive functions of fisheries and DT 17.B – Support of fish community recovery after a water clarity accident. In 2023, DT 17.A funds amounting to CZK 17.526 million were used and 57 applications were funded. In 2023, funds were drawn for DT 17.B in the amount of 0.446 million and 1 application was funded.

Grant Programme 17 was launched by the Ministry of Agriculture in 2015. Grant Programme 17.A was created to promote biodiversity of fish stocks in surface waters for users of fishing grounds. The subsidy rate is per hectare of fishing grounds. Funds may only be used for costs covering introduction of those fish species that are introduced in accordance with the predetermined stocking levels. The 17.B grant program was created with the view of restoring fish populations in surface waters after an accident deteriorating water clarity resulting in a low number of survived fish community, intended for users of fishing grounds. The subsidy rate is per hectare of fishing grounds. Funds may only be used for costs covering restocking with those fish species that were planted in accordance with the predetermined stocking levels.

Table 11.1.1.12
Use of state budget funds under the Ministry of Agriculture subsidy programme 17 "Support for non-productive functions of fisheries" in 2023

| Programme | No. of applications | No. of projects funded | Financial support |
|-----------|---------------------|------------------------|-------------------|
| 17.A | 67 | 63 | 17.526 |
| 17.B | I | I | 0.446 |
| Total | 68 | 64 | 17.980 |

Source: MoA

Operational Programme Fisheries 2014–2020

In 2023, the Ministry of Agriculture paid subsidies to 159 projects from the Operational Programme Fisheries 2014–2020 in the total amount of approximately CZK 144.1 million.

The Operational Programme Fisheries 2014–2020 is a programme under which fishermen can benefit from funding from the European Maritime and Fisheries Fund under Union Priority 2 - Supporting environmentally sustainable, innovative and competitive knowledge-based and resource-efficient aquaculture for productive investments in aquaculture, supporting new farmers, planting eels in selected fisheries in the Elbe and Oder River Basins and strengthening the competitiveness of aquaculture businesses. Under Union Priority 3 - Supporting implementation of the Common Fisheries Policy, data collection and traceability of fisheries and aquaculture products shall be supported. Under Union priority 5 Support for marketing and processing, the subsidy shall cover promotion, investment in fish processing and strengthening the competitiveness of aquaculture enterprises and fish processors.

Table 11.1.1.13
Operational Programme Fisheries 2014–2020 – Use of funds in 2023

| Union priority | Measure number | Name of the measure | Number of projects | Funds reimbursed million CZK |
|---|----------------|--|--------------------|------------------------------|
| | 2.1 | Innovation | 3 | 4.45 |
| | 2.2 | Productive investments in aquaculture | 119 | 92.77 |
| 2 – Supporting environmentally | 2.3 | Support for new breeders | 0 | 0 |
| sustainable, innovative and competitive knowledge-based | 2.4 | Recirculation equipment and flow systems with aftertreatment | 2 | 6.17 |
| and resource-efficient aquaculture | 2.5 | Aquaculture providing environmental services | 4 | 3.53 |
| | 2.6 | Strengthening the competitiveness of aquaculture enterprises | 0 | 0 |
| Total Union Priority 2 | | | 128 | 106,92 |
| 3 – Support for implementation | 3.1 | Data collection | 6 | 13.26 |
| of the Common Fisheries Policy | 3.2 | Product traceability | 8 | 12.57 |
| Total Union Priority 3 | | | 14 | 25,83 |
| F C . () | 5.1 | Production plans | - | - |
| 5 – Support for marketing and processing | 5.2 | Marketing of products | 3 | 1.64 |
| p. 0 cc338 | 5.3 | Investment in product processing | 4 | 2.98 |
| Total Union Priority 5 | 7 | 4.62 | | |
| Technical aid | 10 | 6.72 | | |
| Total | | | 159 | 144.09 |

Source: MoA

Operational Programme Fisheries 2021–2027

In 2023, the Ministry of Agriculture paid subsidies to 228 projects from the Operational Programme Fisheries 2021–2027 in the total amount of approximately CZK 288.2 million.

In 2023, the MoA issued decisions to allocate funds to 176 projects in the total amount of approximately CZK 138.8 million and paid funds amounting to approx. CZK 12.8 million to 30 projects.

The Operational Programme Fisheries 2021–2027 is a programme under which fishermen can benefit from funding from the European Maritime, Fisheries and Aquaculture Fund under Priority I – Supporting sustainable fisheries and the restoration and conservation of aquatic biological resources for eel planting. Under Priority 2 – Supporting sustainable aquaculture activities, processing and marketing of fisheries and aquaculture products contributing to food security in the Union, innovation, investments in aquaculture and processing, compensation and promotion campaigns are supported.

Rural development programme

The Rural Development Programme of the Czech Republic for 2014–2022 is based on the Common Strategic Framework, the Partnership Agreement and other strategic documents and was prepared in accordance with Regulation No. 1305/2013 of the European Parliament and of the Council. Water

management is partially concerned by the Land Consolidation section of the Programme.

The RDP subsidies are co-funded by the European Agricultural Fund for Rural Development (EAFRD) and the state budget of the Czech Republic. The support from EAFRD for the period 2014–2020 amounts to EUR 2.3 billion (CZK 63 billion), the state budget of the Czech Republic will provide additional EUR 1.2 billion (approx. CZK 32 billion). Funding under the RDP 2014–2022 takes form of pre-funding from the state budget, i.e., all payments to beneficiaries are first covered from national sources.

Within the framework of RDP 2014–2022, land consolidation is supported, for which a single beneficiary of the subsidy is defined – the SLO, or its regional branches. The support builds on the previous RDP 2007–2013 programme.

100% of eligible expenditures are reimbursed. The EAFRD contribution is 49.5% of public expenditures, contribution of the Czech Republic is 50.5% of public expenditures. For 2014–2022, EUR 152.6 million (approx. CZK 3.9 billion) was allocated, applications were received as of 22 February 2016.

Under the RDP 2014–2022 programme, a total of 346 applications for subsidies in the amount of CZK 3.5 billion were registered under Operation 4.3.1 Land Consolidation as at 31 December 2023, while 334 applications in the amount of CZK 3.3 billion were approved and 333 projects in the amount of CZK 3.3 billion were actually reimbursed, of which CZK 500.8 million were reimbursed. In 2023, 4 projects were reimbursed with a total amount of CZK 47 million.

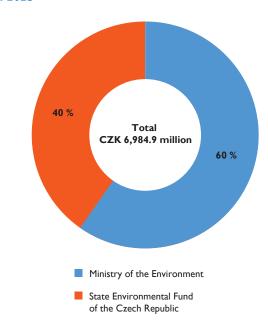
The subsidy title 4.3.1 Land Consolidation, under the Strategic Plan for the Common Agricultural Policy for 2023–2027 is followed by intervention 46.73 Land Improvement. As in the Rural Development Programme 2014–2022, the rate of support will be 100% of eligible expenditures and the beneficiaries will be regional branches of the State Land Office. Applications for subsidies are to be received on an ongoing basis with start in 2024. The total allocation for the period is EUR 105.4 million (approx. CZK 2.6 billion).

11.1.2 Financial support from the Ministry of the Environment

In 2023, the Ministry of the Environment provided financial support under supranational and national subsidy programmes. Financial support under the Operational Programme Environment amounted to CZK 4,167.8 million. Financial support under programmes administered by the State Environmental Fund (SEF) of the Czech Republic was provided in the amount of CZK 2,817.1 million. Thus, the funds provided by Ministry of the Environment in the field of water management amounted to CZK 6,984.9 million.

More detailed information about the programmes and economic activities of the SEF can be found in a document "Report on the Management of the SEF of the Czech Republic in 2023".

Graph 11.1.2.1
Use of funds provided by the Ministry of the Environment in 2023



Source: MoE. SEF

Table 11.1.2.1
Funds provided for water management by the Ministry of the Environment in 2023

| Programme | Programme funding million CZK |
|--|-------------------------------|
| Operational Programme Environment 2014–2020 | 1,692.1 |
| Operational Programme Environment 2021–2027 | 2,475.7 |
| Ministry of the Environment – total | 4,167.8 |
| National Programme Environment, (excl. NRP calls) | 2,152*) |
| Loans from the State Environmental Fund to OPE (Calls No. 2/2016, 1/2019 and 1/2022) | 260.1 |
| Norwegian funds | 37.6 |
| National recovery plan (NRP) | 367.4 |
| State Environmental Fund of the Czech Republic – total support provided | 2,817.1 |
| Total support provided by the Ministry of the Environment | 6,984.9 |

Source: MOE, SEF

Note: *) Call No. 4/2019 was partially reimbursed from the Slovak Republic.

Operational Programme Environment 2014–2020

The Ministry of the Environment provides financial support under programmes co-financed from EU funds in the form of the Operational Programme Environment. In 2023, funds were drawn under the 2014–2020 OPE from the Cohesion Fund and the European Regional Development Fund under Priority Axes I and 4 for water management and nature in the field of landscape care and protection in the total amount of CZK I,692.I million.

Under Priority Axis I – Improving water quality and reducing flood risks – I project with a total contribution from the EU of CZK 71.473 million was approved for funding in 2023.

4 projects were issued with a legal act for support from the EU of CZK 35.84 million.

In 2023, applications for grants started to be received under one call in specific objective I.I, part of priority axis I - Improving water quality and reducing flood risks (allocation of CZK 100 million).

Under Priority Axis 4 – Protection and care for nature and landscape, 105 projects were approved for funding under Specific Objective 4.3 – Strengthening natural functions of the landscape, with a total contribution from the EU of CZK 104.95 million for 2023. A legal act on granting support was issued for 47 projects under Specific Objective 4.3 with a total contribution from the EU of CZK 43.61 million and for

two projects from Specific Objective 4.4 (Improving quality of the environment in settlements) with a contribution from the EU in the amount of CZK 2.53 million.

For 2023, reception of applications for grants under the OPE 2014–2020 in the field of water management and landscape

care and protection was launched under one call under specific objective 4.4 focused on implementation of nature-friendly measures and introduction of soil protecting technologies aimed at slowing surface water runoff, anti-erosion protection and climate change adaptation.

Table 11.1.2.2
Projects approved for funding from the Operational Programme Environment 2014–2020 in the field of water management in 2023

| Priority axis | Area of | Number | | Total eligible costs | EU contribution | |
|---------------|---------|--------|-------------|----------------------|-----------------|--|
| | support | | million CZK | | | |
| I | 1.1 | 1 | 631.63 | 112.11 | 71,43 | |
| 4 | 4.3 | 105 | 358.03 | 296.96 | 104,96 | |
| TOTAL 106 | | 989.66 | 409.07 | 176.39 | | |

Source: Monitoring System of the European Structural and Investment Funds for the 2014–2020 programming period

Note: A project approved for funding is a project approved by the Selection Committee of the Managing Authority of the Operational Programme Environment.

Table 11.1.2.3
Projects with legal act on granting support from the Operational Programme Environment 2014–2020 in the field of water management in 2023

| Priority axis | Area of support | Number | Total costs | Total eligible costs | EU contribution |
|-----------------------|-----------------|--------|-------------|----------------------|--------------------|
| | | | million CZK | | |
| | 1.3 | 2 | 6.13 | 6.10 | 5.19 |
| | 1.4 | 2 | 48.49 | 43.79 | 30.65 |
| Priority axis Total | | 4 | 54.62 | 49.89 | 35.84 |
| 4 | 4.3 | 47 | 159.62 | 131.73 | 43.61 |
| 4 | 4.4 | 2 | 3.29 | 3.29 | 2.53 |
| Priority axis 4 Total | | 49 | 162,91 | 135.02 | 46.14 |
| Total | | 53 | 217.53 | 184.91 | 81.98 |

Source: Monitoring System of the European Structural and Investment Funds for the 2014–2020 programming period Note: A project with an issued legal act is a project with an issued Action Registration and Grant Decision.

Table 11.1.2.4
Drawdown of funds under the Operational Programme Environment 2014–2020 in 2023

| Area of support | EU contribution million CZK |
|--|-----------------------------|
| 1.1 – Reducing the amount of pollution discharged to surface water and groundwater from municipal sources and input of pollutants to surface water and groundwater | 140.00 |
| I.2 – Ensuring supply of drinking water of adequate quality and quantity | 15.27 |
| 1.3 – Ensuring flood protection in urban areas | 336.37 |
| 1.4 – Supporting preventive flood control measures | 372.36 |
| Priority axis Total | 864.00 |
| 4.3 – Strengthening natural functions of the landscape | 741.49 |
| 4.4 – Improving quality of the environment in settlements | 86.59 |
| Priority axis 4 Total (4.3, 4.4) | 828.08 |
| Total | 1,692.08 |

Source: Monitoring System of the European Structural and Investment Funds for the 2014–2020 programming period

Table 11.1.2.5

Calls under the Operational Programme Environment 2014–2020 in the field of water management in 2023

| Ca No | | No. and name of specific target | Allocation of EU funds million CZK | Start of receipt of applications | End of receipt of applications |
|----------|----|--|------------------------------------|----------------------------------|--------------------------------------|
| 1 | 65 | 4.3 – Strengthening natural functions of the landscape | 250 | 05/04 2023 | 31/07 2023 |
| 1 | 69 | I.I – Reducing the amount of pollution discharged to surface water and groundwater from municipal sources and input of pollutants to surface water and groundwater | 100 | 16/08 2023 | 18/09 2023 |

Source: Monitoring System of the European Structural and Investment Funds for the 2014–2020 programming period

Operational Programme Environment 2021–2027

Under the OPE 2021–2027, support for water management and climate change adaptation projects or support for important aquatic habitats and species is directed towards the following specific objectives and measures:

- 1.3 Supporting climate change adaptation, disaster risk prevention and resilience, taking into account ecosystem approaches
- 1.3.1 Supporting nature-friendly measures in the landscape and settlements
- 1.3.3 Implementation of flood protection measures
- 1.3.4 Implementation of measures to slow down runoff, for collection, retention and storage of rainwater, including its further use; implementation of green roofs; measures for

the use of grey water; measures for controlled groundwater recharge

- 1.3.5 Support for preventive measures against floods and drought, in particular building, extension, improvement and renewal of monitoring, forecasting, reporting, warning and alert systems; elaboration of digital flood plans, elaboration of runoff analysis
- 1.3.6 Supporting flood preparedness, raising awareness of flood risk, increasing resilience of vulnerable structures against floods
- 1.3.7 Monitoring and rebalancing of long-term usable groundwater resources for municipalities in the Bohemian Massif
- 1.3.11 Supporting nature-friendly measures in the landscape and settlements (ERDF)

Table 11.1.2.6

Calls for the Operational Programme Environment 2021–2027 announced in 2023 in the field of access to water, sustainable water management and support for climate change adaptation

| Call No. | Number and name of the specific objective | Allocation of EU funds million CZK | Start of receipt of applications | End of receipt of applications |
|-----------|--|------------------------------------|----------------------------------|--------------------------------|
| 05_23_032 | MoE_32nd call, SC 1.3, measure 1.3.1, ongoing | 200 | 18/01 2023 | 04/01 2024 |
| 05_23_036 | MoE_36th call, SC 1.3, measure 1.3.4, ongoing | 200 | 01/02 2023 | 31/10 2023 |
| 05_23_039 | MoE_39th call, SC 1.3, measure 1.3.1, ongoing | 150 | 09/08 2023 | 31/07 2024 |
| 05_23_042 | MoE_42nd call, SC 1.4, measure 1.4.1, 1.4.2, 1.4.3 rounds | 2 000 | 30/08 2023 | 30/09 2023 |
| 05_23_043 | MoE_43rd call, SC 1.4, measure 1.4.1 ongoing | I 500 | 06/09 2023 | 20/09 2023 |
| 05_23_044 | MoE_44th call, SC 1.4, measure, 1.4.4, 1.4.5 rounds | 500 | 30/08 2023 | 30/09 2023 |
| 05_23_046 | MoE_46th call, SC 1.3, measure 1.3.11, ongoing for MRR | 600 | 12/07 2023 | 26/04 2024 |
| 05_23_047 | MoE_47th call, SC 1.3, measure 1.3.11, ongoing for PR | 600 | 12/07 2023 | 26/04 2024 |
| 05_23_048 | MoE_48th call, SC 1.3, measure 1.3.5, ongoing | 250 | 28/06 2023 | 15/12 2023 |
| 05_23_049 | MoE_49th call, SC 1.3, measure 1.3.5, ongoing | 150 | 23/08 2023 | 24/11 2023 |
| 05_23_050 | MoE_50th call, SC 1.3, measure 1.3.5, ongoing | 150 | 20/09 2023 | 23/02 2024 |
| 05_23_051 | MoE_51st call, SC 1.3, measure 1.3.2, ongoing | 30 | 16/08 2023 | 31/07 2024 |
| 05_23_052 | MoE_52nd call, SC 1.3, measure 1.3.1, 1.3.3 a 1.3.4, ongoing ITI | 427 | 27/09 2023 | 30/09 2024 |
| 05_23_053 | MoE_53rd call, SC 1.3, measure 1.3.11, ongoing ITI for MRR | 33 | 27/09 2023 | 30/09 2024 |
| 05_23_054 | MoE_54th call, SC 1.3, measure 1.3.11, ongoing ITI for PR | 173 | 27/09 2023 | 30/09 2024 |

- I.4 Supporting access to water and sustainable water management
- I.4.1 Construction of wastewater treatment plants; completion and construction of sewerage systems
- 1.4.2 Intensification of wastewater treatment plants for increased removal of specific pollution
- 1.4.3 Measures to limit the discharge of wastewater from the relief works to the sewerage system (storage tanks, retention tanks, chemical pre-treatment, etc.)
- I.4.4 Construction and modernisation of water supply pipelines and water supply lines; construction of water treatment plants; construction, intensification or revitalisation of existing water sources
- 1.4.5 Intensification of drinking water treatment plants.

In 2023, 15 calls for support for water infrastructure in the field of water management and climate change adaptation were launched under this programme.

In 2023, 54 projects were approved for support under 1.3 – Climate Change Adaptation with an EU contribution of CZK 1,197.410 million. These were mainly projects concerning flood protection, rainwater management and support for preventive measures against floods and droughts. Of these, 46 legal acts granting support amounting to CZK 1,091.163 million were issued in 2023 and CZK 15.373 million was allocated.

In the area of support under 1.4 aimed at supporting water management infrastructure, 241 projects were approved for support in 2023 with an EU contribution of CZK 8,193.764 million for which legal acts granting support amounting to CZK 7,673.233 million were issued in 2023. Funds amounting to CZK 803.478 million was allocated to the projects in 2023.

Table 11.1.2.7

Number of projects approved for funding from the Operational Programme Environment 2021–2027 in the field of support for access to water, sustainable water management and support for climate change adaptation in 2023

| Area of support | Number of projects | Total costs (million CZK) | Total eligible costs (million CZK) | EU contribution (million CZK) |
|-----------------|--------------------|------------------------------|------------------------------------|-------------------------------|
| 1.3.3 | 6 | 1,126.728 | 944.439 | 662.812 |
| 1.3.4 | 33 | 307.103 | 271.247 | 222.333 |
| 1.3.5 | 14 | 309.480 | 298.753 | 257.388 |
| 1.3.7 | I | 64.604 | 64.561 | 54.877 |
| SC 1.3 total | 54 | 1,807.914 | 1,579.000 | 1,197.410 |
| 1.4.1 | I48dd | 10,054.502 | 8,337.419 | 5,810.450 |
| 1.4.2 | 14 | 698.372 | 566.116 | 177.987 |
| 1.4.3 | I | 6.799 | 5.666 | 3.966 |
| 1.4.4 | 73 | 3,653.982 | 3,047.876 | 2,123.284 |
| 1.4.5 | 5 | 275.310 | 227.851 | 78.077 |
| SC 1.4 total | 241 | 14,688.96 | 12,184.92 | 8,193.76 |
| TOTAL | 295 | 16,496.88 | 13,763.93 | 9,391.17 |

Source: SEF

Table 11.1.2.8

Drawdown of funds under the Operational Programme Environment 2021–2027 in 2023

| Area of support | Call No. | EU contribution in million CZK | | |
|------------------------------------|---------------------------------|--------------------------------|--|--|
| 1.3 - Rainwater and flood measures | 05_22_019 | 15.373 | | |
| SC 1.3 (1.3.4) total | 15,373 | | | |
| I.4 – Wastewaters | 05_22_002 | 887.763 | | |
| I.4 – Wastewaters | 05_22_021 | 769.128 | | |
| SC 1.4 (1.4.1, 1.4.2) total | 1,656,892 | | | |
| I.4 – Drinkable water | 05_22_003 | 434.491 | | |
| I.4 – Drinkable water | 1.4 – Drinkable water 05_22_026 | | | |
| SC 1.4 (1.4.4, 1.4.5) total | | 803,478 | | |
| Total SC 1.3 | 15,373 | | | |
| Total SC 1.4 | 2,460,371 | | | |
| TOTAL | 2,475,744 | | | |



The Jesenice Reservoir – the abrasion (source: Ohře River Board, s.e.)

State Environmental Fund of the Czech Republic

The State Environmental Fund of the Czech Republic, established by Act No. 388/1991 Coll., is a specifically focused institution that is an important financial source for supporting implementation of measures aimed at protecting and improving the state of the environment and its components.

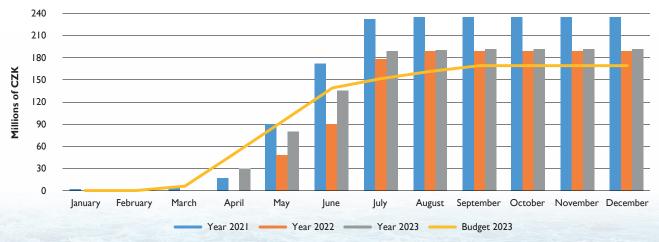
The total revenue of the State Environmental Fund of the Czech Republic (SEF) included revenues from environmental pollution charges in the amount of CZK 2,392.8 million. Revenues from fines and financial penalties amounted to CZK 49.4 million. In the area of water protection, this includes a fee for discharge of wastewaters into surface waters and a fee for abstraction of groundwater.

Table 11.1.2.9
State Environmental Fund – Revenue structure (water only) – 2023

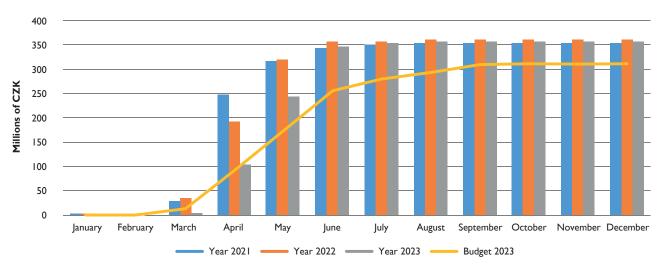
| Environmental component (in water protection) | Budget 2023 | Revenue As of 31/12 2023 | Fulfilment | Difference |
|---|-------------|--------------------------|------------|-------------|
| (iii water protection) | millio | n CZK | % | million CZK |
| Wastewater | 170.0 | 192.8 | 113 | 22.8 |
| Groundwater | 310.0 | 356.4 | 115 | 46.4 |

Source: SEF

Graph 11.1.2.2
State Environmental Fund – Revenues from fees under the wastewater item in 2019–2023



Graph 11.1.2.3
State Environmental Fund – Revenues from fees under the groundwater item in 2019–2023



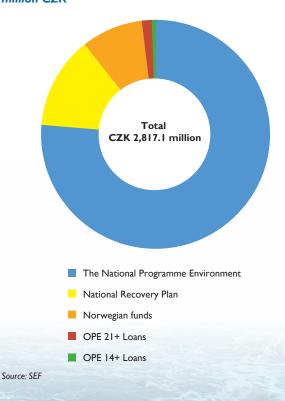
Source: SEF

National programmes administered by the State Environmental Fund of the Czech Republic

The State Environmental Fund of the Czech Republic ensures drawing of financial resources from national programmes and the European Union Structural Funds for the environmental sector. From its own resources, the State Environmental Fund of the Czech Republic provides financial support to projects under the National Programme Environment. The

Graph 11.1.2.4

State Environmental Fund – administered programmes (in water management) – drawdown of funds in 2023 in million CZK



State Environmental Fund of the Czech Republic disbursed approx. CZK 2,817.1 million to water management under the programmes it administered (except the OPE, which is accounted as SR costs in Chapter 315 – MoE) in 2023.

National Environment Programme

The National Environment Programme supports projects to protect and improve the environment in the Czech Republic from national resources. It is intended mainly for cities and smaller municipalities. It is financed from the funds of the State Environmental Fund obtained from environmental fees and complements other subsidy titles dealing with water protection, mainly the OPE, NRP and the National Fund.

In 2023, the SEF administered a total of 16 calls, details of which are shown in Table 11.1.2.10. Under the announced calls, 1,443 applications will receive funds amounting to a total of CZK 2,519.4 million.



The Reservoir on the Tributary of the Třebánky Stream – Prachatice Region (source: Forests of the Czech Republic)

Table 11.1.2.10
Calls administered under the National Environment Programme in 2023

| | | | cations eived | Applications approved | | Applications paid | |
|-----------|---|--------|-----------------------------|-----------------------|-----------------------------|-------------------|-----------------------------|
| Call No. | Name | number | subsidies million CZK | Number | subsidies million CZK | Number | subsidies million CZK |
| 12/2017 | Rainwater II | 0 | 0 | 346 | 16.1 | 383 | 17.7 |
| 2/2018 | Drinking water resources | 0 | 0 | 0 | 0 | 141 | 240.7 |
| 8/2018 | WWTPs and sewerage | 0 | 0 | 0 | 0 | 9 | 40.5 |
| 4/2019 | Water supply and sewerage | 0 | 0 | 0 | 0 | 173 | 1 573.8 |
| 12/2019 | Household WWTPs | 0 | 0 | 0 | 0 | 8 | 40.2 |
| 3/2021 | Flexible supply of drinking water supply/ Drought plans | 0 | 0 | I | 0.2 | 13 | 5.9 |
| 4/2021 | Tree planting – individual projects | 0 | 0 | 30 | 6.8 | 617 | 133.5 |
| 7/2021 | Household WWTPs | 20 | 174.0 | 23 | 148.7 | 3 | 9.5 |
| 9/2021 | Drinking water resources | 148 | 266.6 | 43 | 70.1 | 7 | 9.1 |
| 10/2021*) | Water management in municipalities | 0 | 0 | 56 | 189.0 | 74 | 367.4 |
| T/2021 | Extraordinary subsidy measures – sub-area: Natural disasters (Natural disaster of 24/06 2021) | 0 | 0 | 4 | 36.5 | 8 | 63.0 |
| P/2022 | Infrastructure renovation after fire | 0 | 0 | 1 | 1.0 | 7 | 18.1 |
| 3/2023 | Monitoring groundwaters and surface waters | I | 37.0 | 0 | 0 | 0 | 0 |
| 4/2023*) | Adaptation of ecosystems to climate change – watercourse administrators | 15 | 193.78 | 0 | 0 | 0 | 0 |
| 5/2023 *) | Adaptation of ecosystems to climate change – municipalities and regions | 5 | 48.77 | 0 | 0 | 0 | 0 |
| 9/2023 | Water supply and water treatment plants | 31 | 619.58 | 0 | 0 | 0 | 0 |
| Total | | 220 | 1,340 | 474 | 462 | 1,443 | 2,519.4 |

Source: SEF

Note: *) Calls of the NPE, NRP.

Loans under the SEF (Call No. 2/2016 PU, No. 1/2019 PU, No. 1/2022 PU according to Directive No. 8/2017 of the MoE)

The first call was announced in 2016 with the aim of strengthening own resources for implementation of projects supported under the OPE 2014–2020, priority axis I, specific objective 1.1 and 1.2,

which aim to improve the quality of drinking water supplied to the population. Reception of applications started on 17 October 2016 and continued until 31 December 2018 or until CZK 690 million was allocated. In 2021, CZK 309.1 million was allocated. CZK. In 2019, Call No. 1/2019 was announced with a total allocation of CZK 500 million in priority axis I, applications received as of 02/01 2020.

Table 11.1.2.11

Overview of closed Call No. 2/2016 PU, Call No. 1/2019 PU and Call No. 2/2022 PU for loans for implementors of water management projects under the Operational Programme Environment in 2016–2023

| Call | Maturity in years | Allocation | Applications submitted (RM amount) | Application administered | Applications with an issued Ministerial Decision | Contracts concluded with beneficiaries | Reimbursed to beneficiaries | | |
|--------|-------------------|------------|------------------------------------|--------------------------|--|--|-----------------------------|--|--|
| | | | million CZK | | | | | | |
| 2/2016 | max. 10 | 690 | 674,4 | 0 | 0 | 674,4 | 664,6 | | |
| 1/2019 | max. 10 | 500 | 334,9 | 0 | 0 | 334,9 | 333,0 | | |
| 1/2022 | max. 10 | 794,5 | 737,8 | 0 | 68,7 | 669,1 | 244,8 | | |

In 2022, Call No. I/2022 PU was announced for submission of applications for support in the form of a loan and possible additional subsidy according to the directives of the Ministry of the Environment No. 8/2017 on the provision of financial support from the Ministry of the Environment and the directive of the Ministry of the Environment No. 4/2015 on the provision of funds from the Ministry of the Environment through the National Environment Programme. The loan and subsidies are provided to municipalities up to 2 thousand inhabitants to strengthen their own resources, and to beneficiaries under the OPE 2021–2027 under specific objective 1.4 Supporting access to water and sustainable water management. Subsidies will be granted where acquisition of appropriate wastewater treatment technology is necessary in the interest of nature conservation.

In 2023, a total of CZK 15.3 million was reimbursed under OPE14+ and a total of CZK 244.8 million under OPE21+.

Norwegian Funds – the Environment, Ecosystems and Climate Change Programme

The programme is funded by the Norwegian Financial Mechanism 2014–2021, with the SEF co-funding 15% of the programme. The programme focuses on improving the condition of ecosystems, reducing air and water pollution, including monitoring and, last but not least, on adaptation and mitigation measures related to climate change.

In the first third of 2023, projects were selected for support under the previous two calls announced in autumn 2022 (Call-4B Stavanger and SGS-2 Svalbard); in the second half of the year, contracting and advance payments for both calls were completed. In total, all ten calls of the Programme were launched and closed. Ministerial decisions were issued and contracts were concluded with more than 165 beneficiaries, most projects being in advanced stages of implementation. The exceptions are calls SGS-3 Oslo and SGS-4 Reine, where all supported projects were completed except for two beneficiaries who withdrew from the implementation of their approved projects.

In the field of water, the programme focuses on water through two calls. Call-3A Ålesund was intended for acquisition of instruments for micropollutant analysis and introduction or optimisation of analytical methods for surface water monitoring. It contributed to strengthening the monitoring of substances according to the Water Framework Directive 2000/60/EC (list of priority substances and a watch list) and supported 3 projects with an amount of CZK 53.5 million. Implementation of projects leading to reduction of pharmaceutical pollution in surface waters was supported by Call-3BTrondheim (a total of 6 projects with support of CZK 77.1 million). In 2023, CZK 37.6 million was disbursed to the 9 projects.

National Recovery Plan

The National Recovery Plan (NRP) is the Czech Republic's roadmap for reforms and investments aimed at mitigating economic and social damage caused by the Covid-19 pandemic, at enhancing the green transition, and at facilitating digital transformation and economic relaunch. As a result of the energy crisis and in light of the geopolitical situation, the NRP was updated in 2023. Among other things, a new REPowerEU pillar was added to accelerate the overall energy transition and

reinforce energy security. For these ends, the Czech Republic draws funds from the Recovery and Resilience Facility in the form of grants amounting to approximately CZK 179 billion in grants and CZK 19.4 billion in loans for 2021–2026.

The role of the SEF in implementation of selected activities is based on the MoE Directive No. 9/2023 on the implementation of the National Recovery Plan in the framework of activities where the Ministry of the Environment acts as the owner of the component and binding methodological guidelines for the NRP. It consists primarily in the process of administration of beneficiaries' projects.

In 2021, a call for water management in municipalities was announced with a total allocation of CZK 1,754 million (Call No. 10/2021, activities 2.9.1 and 2.9.2) and two calls in the field of ecosystem adaptation to climate change for water retention projects in the landscape with a total allocation of CZK 758.4 million in 2023 (Calls No. 4/2023 and No. 5/2023, activity 2.9.4). At the same time, SEF/MoE projects contribute to the objectives of Component 2.6.1, which is now under shared responsibility of the MoE and the Ministry of Agriculture.

Table 11.1.2.12 Overview of National Recovery Plan assets and disbursed funds in 2023

| Activities of the NRP administered by the SEF | Allocation million CZK | Reimbursed in 2023 CZK million |
|--|------------------------|--------------------------------------|
| 2.9.1 Ensuring protection against drought and nature-friendly flood protection of Brno urban areas | 762.0 | 157.11 |
| 2.9.2 Ensuring rainwater management in city agglomerations | 992.0 | 186.55 |
| 2.9.4 Adaptation of water, non-forest and forest ecosystems to climate change | 758.4 | 0 |
| 2.6.1 Flood protection | 32.4 | 23.8 |
| TOTAL | 2,544.88 | 367.44 |

Source: SEF

11.1.3 Financial support from the Ministry of Transport

In 2023, funds from the State Transport Infrastructure Fund in the total amount of CZK 521.01 million were spent on the development, modernisation and maintenance of waterways of transport importance through the Directorate of Waterways of the Czech Republic, of which, investment expenditures amounting to approx. CZK 436 million and non-investment expenditures of approximately CZK 86 million.

State Transport Infrastructure Fund

The State Transport Infrastructure Fund (STIF) was established by Act No. 104/2000 Coll., on the State Transport Infrastructure Fund, as amended. Representatives of the Ministry of Transport

are members of the STIF Committee. The purpose of the STIF is to finance construction, modernisation, repairs and maintenance of roads and motorways, national and regional railways and transport-significant inland waterways within the extent provided for in the Act.

Directorate of Waterways of the Czech Republic

The Directorate of Waterways of the Czech Republic was established by the Ministry of Transport and Communications of the Czech Republic on I April 1998 pursuant to Section 51(I) of Act No. 219/2000 Coll., on the property of the Czech Republic and its representation in legal relations, as amended, as an organisational unit of the State. The main activity of the unit is to ensure development of the waterway infrastructure of the Czech Republic by the means of the STIF funds. It is thus an investment organisation of the Ministry of Transport.

In 2023, STIF funds in the total amount of approx. CZK 521.01 million were spent on development, modernisation and repairs of transport-significant waterways through the subordinate unit of the Ministry of Transport, i.e., the Waterways Directorate of the Czech Republic, of which, investment expenditures amounted to approx. CZK 435.46 million and non-investment expenditures amounted to approx. CZK 85.55 million.

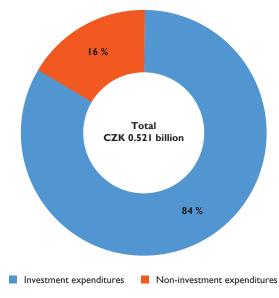
In 2023, the drawdown of the above-mentioned funds from the STIF was primarily due to the following projects: "Extension of the navigability of the Otrokovice – Rohatec – LC Rohatec Waterway" in the amount of CZK 75.34 million, "Waiting berth for small vessels at the Vltava River" in the amount of approximately CZK 47.97 million, where the works in Vrané nad Vltavou were completed in July 2023 and implementation in Roztoky started at the end of the same year. Another significant project "Service Centre Roudnice nad Labem" that is ongoing; approximately CZK 26.68 million was drawn down, with completion expected in 2024. Last but not least, there were other projects such as "Poděbrady Wharf" with a drawdown of approximately CZK 15.85 million and "Veselí nad Moravou Recreational Harbour" with costs amounting to CZK 7.61 million.

Under the global item Investment Project with budgeted costs below CZK 30 million, a total amount of CZK 185.29 million was spent in 2023 on smaller projects such as "Čelákovice Wharf' with a drawdown of approx. CZK 19.89 million, "Davle Wharf' with a drawdown of approx. CZK 17.99 million, "Brno Wharf' with a drawdown of approx. CZK 17.76 million, "RoudniceWharf" with a drawdown of approx. CZK 8.68 million, "Štětí Wharf" with a drawdown of approx. CZK 8.45 million, "Brandýs nad Labem Wharf" with a drawdown of approx. CZK 6.00 million and "Modernisation of the OLD Ústí nad Labem-Vaňov berth" with a drawdown of approx. CZK 4.95 million. Furthermore, we can mention projects such as "Strážnice Wharf - increasing the wharf capacity" with a drawdown of approx. CZK 39.22 million, "Modernisation of protective berths of service vessels in Prague and Nymburk" with a drawdown of approx. CZK 25.21 million, "Modernisation of protective berths in Lovosice and Hřensko" with a drawdown of approx. CZK 15.92 million, "Renovation and modernisation of vessel berths in the Peutehafen Wharf" with a drawdown of approx. CZK 3.68 million, "Inspection vessel of the Directorate

of Waterways" with a drawdown of approx. CZK 8.20 million, and "Directorate of Waterways – Renovation and construction in the Hamburg area (Peutehafen Wharf)" with a drawdown of approx. CZK 4.46 million.

Significant financial resources amounting to approximately CZK 52.10 million were expended on intensive preparation of further investment projects aimed at comprehensive development of the entire network of transport-significant waterways. The main obstacle to the continued preparation of the "Děčín Navigation Weir" consists in determination of compensatory measures identified in the SEA assessment of the Water Transport Concept and the need to amend the Děčín City Master Plan. Furthermore, the EIA assessment of the "Bělov Lock Chamber" and "Kroměříž Recreational Wharf" projects was completed in the preparatory stage, the construction permit for the "Extension of the navigability of the Otrokovice - Rohatec - Rohatec Waterway" project was obtained, the combined permit for the waiting berths for small vessels in Hořín, Roztoky and Dolánky and the protective berth for service vessels in Brná were obtained.

Graph 11.1.3.1 Directorate of Waterways – Use of funds in 2023

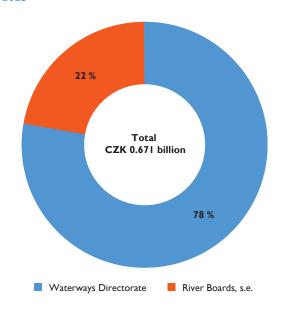


Source: Ministry of Transport

In 2023, the River Boards expended funds of CZK 253 million on the operation and maintenance of waterways, of which more than CZK 102 million was financed from their own resources and more than CZK 150 million from subsidies. Subsidies were drawn by the River Boards from the State Transport Infrastructure Fund.

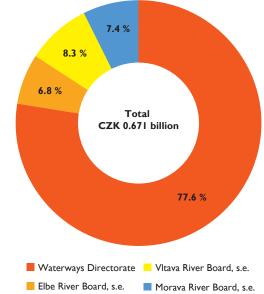
Within the framework of its activities, the Vltava, Elbe and Morava River Boards drew funds for reconstruction, operation and maintenance of waterways under their competence. They drew subsidies from the STIF in the total amount of CZK 150.7 million, of which investment subsidies amounted to CZK 61.1 million and special-purpose non-investment grants to CZK 89.6 million.

Graph 11.1.3.2 Use of funds from the State Transport Infrastructure Fund in 2023



Funds spent on transport-significant waterway through the Ministry of Transport in 2023

Graph 11.1.3.3



Source: MoA, using sources of the River Boards and the Ministry of Transport

Source: MoA using data provided by the Ministry of Transport and River Boards

Table 11.1.3.1
Waterways – selected projects of the River Boards in 2023

| River Board | Project name | Total costs million CZK | Source of funding |
|----------------|--|-------------------------|----------------------|
| | Střekov Reservoir, repair of the LC upper gate | 31.7 | STIF |
| | Elbe, Lhotka – Lovosice, removing sediments (river km 784.99–787.38) | 11.6 | STIF |
| Elbe | WS Klavary, repair of the arched intake entrance gate | 0.397 | STIF |
| | VS Lysá nad Labem, repair of the weir sections | 70.5 | own resources |
| | VS Dolní Beřkovice, repair of small LC upper gate openers | 0.070 | own resources |
| | Smíchov Wharf – anti flood measures (construction of a closure) | 26.9 | STIF + own resources |
| Vltava | Vltava, river km 24.0–26,5 Chvatěruby strait – removal of sediments | 22.1 | STIF + own resources |
| | LC Vrané – repair of bypass and shaft technology | 29.5 | STIF + own resources |
| | Baťa Canal, Valcha – Sudoměřice Weir, repair of fortifications | 9.6 | STIF |
| Morava | Baťa Canal, LC Spytihněv, LC Veslí nad M. – overhaul | 13.3 | own resources |
| | Bridge over the Babice Canal – repair of the road surface, replacement of bridge beams | 1.1 | own resources |

Source: River Boards, s.e.

Table 11.1.3.2
Funds spent by the River Boards on repairs, maintenance, construction, reconstruction and modernisation of waterways under their management in 2023

| River Board | Own sources | Special-purpose non- investment subsidies *) | Investment subsidies*) | Total subsidies | Total own resources and subsidies |
|----------------|-------------|---|------------------------|-----------------|-----------------------------------|
| Воаги | | | thousands CZI | (| |
| Elbe | 51,646 | 43,652 | 1,692 | 45,348 | 96,994 |
| Vltava | 44,270 | 23,000 | 32,508 | 55,508 | 99,778 |
| Morava | 6,792 | 22,943 | 26,920 | 49,863 | 56,655 |
| Total | 102,708 | 89,595 | 61,120 | 150,719 | 253,427 |

Source: River Boards Note: *) Subsidy provider – STIF.

11.2 Financial support from foreign cooperation and the EU

Water management projects in the 2014–2020 / 2021–2027 programming period

All programmes in the 2014–2020 / 2021–2027 programming period are successfully implemented. Specifically, there are seven separate programmes consisting of:

Cross-border cooperation

- Interreg V-A Czech Republic Poland
- Interreg V-A Slovak Republic Czech Republic
- Interreg V-A Austria Czech Republic
- Cooperation Programme Free State of Saxony Czech Republic 2014–2020
- Transnational cooperation Czech Republic Free State of Bavaria ETC Goal 2014–2020
- INTERREG programme Bavaria Czechia 2021-2027

Transnational and interregional cooperation

- Interreg CENTRAL EUROPE
- Interreg DANUBE
- Interreg EUROPE

Under these nine programmes, projects contributing to environmental improvement, risk prevention (natural and technological risks, including climate change and impact on the water sector, etc.) were submitted, approved and subsequently supported. 2022 was the year of full implementation for all of the above programmes, with new projects approved to a lesser extent, including projects focused on the above themes.

- Cross-border Cooperation Programme Czech Republic - Free State of Bavaria ETC Objective 2014–2020
- Joint research on natural substances from cyanobacteria as a model for the development of cross-border scientific partnerships / Gemeinsame Erforschung von Naturstoffen aus Blaualgen als Entwicklungsmodell der grenzüberschreitenden wissenschaftlichen Partnerschaft

Partner on the Czech side: I Partner's budget:

Institute of Microbiology of the CAS, p.r.i.: EUR 897,107.40

The aim of the project is to connect two important research and innovation centres located in the region: the ALGATECH Centre of the Institute of Microbiology of the CAS in Třeboň and the Wissenschaftszentrum Straubing in Bavaria. The scope of the project is the joint research of cyanobacteria as a source of valuable substances (high-value products) while using other parts of cultivated biomass. The Czech side brings to the joint project know-how in the field of mass cultivation of suitable organisms, methods of increasing production and methods of extraction of valuable substances, the Bavarian side brings to the project its experience in testing substances, further processing technologies and testing application potential. The target group of the project is the partners' research institutions, researchers and students.

Administration of this project has been completed.

2. Silva Gabreta Monitoring – Implementation of transboundary biodiversity monitoring and water regime, Silva Gabreta Monitoring – Realisierung eines grenzübergreifenden Monitorings von Biodiversität und Wasserhaushalt

Partners on the Czech side: 3 Partners' budget:

- Bohemian Forest National Park Administration: EUR 513,674.10
- Czech University of Life Sciences Prague: EUR 79,215.00
- Masaryk University: EUR 53,955.00

The objective of the project is to build a functional infrastructure of a cross-border monitoring network and to monitor biodiversity of forests, peatlands and waters in both national parks for the first time in history, using standardized modern methods. Furthermore, the project will enable sharing and evaluation of data from a jointly created biodiversity database. The results will be an important basis for further steps towards convergence of conservation management in the jointly shared area of the Bohemian Forest and the Bavarian Forest. Crossborder application of standard methodological procedures will enable creation of a unified dataset, which will be a valuable basis for improving conservation and scientific cooperation between neighbouring national parks.

Administration of this project has been completed.

3. Measures on the Kössein and Röslau Rivers to mitigate the mercury problem in Skalka Reservoir, Project No. 214

Partner on the Czech side: I Partner's budget:

- The Ohře River Board, s.e.: EUR 37,725.29

The water, sediments and fish in the Kössein, Röslau and Ohře Rivers are contaminated with mercury of anthropogenic origin. Subsequently, mercury-laden sediments are deposited in Skalka Reservoir. The degree to which its effects are harmful on the food chain in the reservoir and on human use of the reservoir has not yet been sufficiently investigated.



Revitalisation of the Nedakonice Junction (source: Morava River Board, s.e.)

Such an investigation will result in a risk analysis to be prepared by the Czech partner. This risk analysis will serve as a basis for the Bavarian side to negotiate remedial measures and to prioritise selected measures. Within the framework of the project, the Bavarian partner will examine all measures that could be considered in a feasibility study. The measures will be evaluated in terms of their effectiveness, sustainability, costs and feasibility (technical and legal, including compliance with the Water Framework Directive). In the case of longterm measures for the reinforcement of long bank strips and subsoils and measures in valley floodplains, restrictions are foreseen on account of European special area of conservation (SAC, Natura 2000). Therefore, 4 or 5 specific measures are expected to be implemented in the framework of the maintenance of the watercourses, where a sustainable approach will be tested in close cooperation with the nature conservation authorities, taking into account nature conservation principles.

Administration of this project has been completed.

 Green infrastructure measures from multipurpose sludge recovery (green IKK) through cross-border interregional cooperation, Project No. 70

Partner on the Czech side: 2 Partner's budget:

- CHEVAK Cheb a. s.: EUR 47,584
- Forestry and Game Research Institute, p.r.i.: EUR 124,854.50

The objective is to create guidelines for multiple use, develop green infrastructure/ecosystem service measures specifically for organisations and businesses in the target regions (e.g. development of fertilisers from sludge nutrients, elimination of harmful substances contained in waste sludge / ash), development of options for utilisation of nutrients contained in sludge / ash, utilisation of trace elements through nutrient management etc. including compliance with water protection, ecological and legislative requirements, application guidelines for the target region etc. Environmental protection promoting the use of sustainable energy - through sustainable, efficient, regional, decentralised, energy recovery of waste sludge. Ensuring/restoring water quality through nutrient retention/recovery and retention/elimination of organic and inorganic pollutants such as heavy metals, polymers, etc. from sewage sludge and wastewater as well as from energy recovery Environmental risk management through targeted nutrient recovery such as mainly phosphorus and pollutant retention to protect water, soil and air.

Administration of this project has been completed.

5. Water – Wasser 2020, Project No. 287

Partner on the Czech side: I Partner's budget:

Green Treasure Foundation Budget: EUR 125,409.40

Project description:The project "Water – Wasser 2020" wants to contribute to the positive motivation and education of educators, municipal leaders, public administration and local government staff to address the future of the threatened water shortage. The aim is to positively motivate the target group to

change the status quo on issues related to inefficient stormwater management, while at the same time it is necessary to develop and put into practice as soon as possible strategies for the protection of groundwater, which is threatened by climate change (extreme droughts with drastic impacts on humans, nature and the environment).

Administration of this project has been completed.

6. Granite and Water, Project No. 307

Partner on the Czech side: 2 Partner's budget:

- Town of Planá: EUR 6,974.33
- Sokolov Museum, c.o. of the Karlovy Vary Region: EUR 91,949.27

The project creates sustainable transboundary value by preserving, making accessible, enhancing and connecting several of the most valuable geological and Montane-historical monuments of the Czech-Bavarian border region. The sustainability of these monuments is ensured in the project on two levels through awareness-raising and research activities leading to the preservation of information and raising awareness of the value of geological monuments and through the promotion of sustainable tourism. The monuments in question are located on the granite bedrock of the Moldanubian Zone, which runs from Bohemia to Bavaria, and represent different aspects of how the granite bedrock visibly influences the life and economy of the area: Flossenbürg (granite mining/ building material), Jerome Mine (granite ore source/ establishment of mining settlements) and Planá (granite and groundwater). These sites form an imaginary diagonal through the transboundary geopark area and thus connect the hitherto unappreciated peripheral areas of the geopark. The project will preserve both tangible industrial and cultural heritage and intangible heritage through studies of stonework and mining for water extraction.

Administration of this project has been completed.

7. Promotion of biodiversity and development of a concept for protection of forest ecosystems in the Bohemian Forest, Project No. 316

Partner on the Czech side: I Partner's budget:

Bohemian Forest National Park Administration:
 EUR 178.507.55

Implementation of a set of habitat improvement measures to maintain diversity of species (insects, mushrooms, lichens and bryophytes) associated with trees and decomposing wood. It includes activities to promote the quantity and quality of decomposing wood and planting of rare trees. In addition, experimental measures are to be implemented to support populations of extremely rare species. An important component is the accompanying scientific monitoring to evaluate the activities carried out and to improve knowledge on the ecology of such groups of species with the view of optimising transboundary protection of forest ecosystems.

Administration of this project has been completed.

8. Sustainability and environmental protection at school, work and in society, Project No. 320

Partner on the Czech side: I Partner's budget:

 Secondary School and Secondary Vocational School, Sušice: EUR 148,083.20

Deepening cooperation in the field of professional competences with an emphasis on environmental protection and sustainability at work, school and in society. It includes a new format for Czech pupils' work experience in Bavaria, preparatory training and courses to familiarise them with the language content, development of new teaching materials for specialist language teaching and creation of supplementary working materials, actual language teaching, study stays of school groups at the partner school, working meetings of pupils, teachers and lecturers, workshops with experts, field trips and updating of the common website.

Administration of this project has been completed.

Rapid and accurate determination of carbon, nitrogen and risk substances in soil using the NIRS procedure, Project No. 322

Partner on the Czech side: I Partner's budget:

- T. G. Masaryk Water Research Institute, p.r.i.: EUR 149,350

Development and validation of a calibration equation for the measurement of carbon, nitrogen and risk elements in soil in the Czech-Bavarian border area in the basins of the Odrava (Wondreb), Ohře, Otava and Mže Rivers using near-infrared spectroscopy (NIRS). It includes data inventory and soil samples using samples from previous surveys and studies, measurements of archived soil samples using the NIRS procedure, development of calibration equations for prediction of soil quality parameters and collection of c. 100 new soil samples for subsequent validation of the calibration equations and overall evaluation of the obtained data including scientific publications.

Administration of this project has been completed.

10. Presentation of mining and modern research of the rock environment in the Bohemian Forest and Bavarian Forest, Project No. 326

Partner on the Czech side: I Partner's budget:

- Institute of Geophysics of the CAS, p.r.i.: EUR 415,564.37

Introducing the rock environment, history and nature of the Bohemian Forest and the Bavarian Forest to the public in a popular educational form. A former seismic station will be reconstructed in the Kristina Adit Visitor Centre. The centre will be further expanded with 2 exhibitions and 3 educational visitor programmes. On the Bavarian side, the Granitzentrum will be expanded by I exhibition and 2 programmes and the Arberland by I exhibition. An educational publication on the history of the Bohemian Forest and the Bavarian Forest in terms of geophysics, geology and geomorphology, a geological map and a video on geological history have also been published.

Administration of this project has been completed.



The Blatenský příkop (source: Ohře River Board, s.e.)

- Program INTERREG Bavaria - Czechia 2021-2027

1. Living gems underneath the Bohemian Forest water surface, Project No. BYCZ01-020

Partners on the Czech side: 2 Partner's budget:

- Biology Centre CAS, p.r.i.: EUR 637,045.00
- University of South Bohemia in České Budějovice: EUR 628,111.00

The main objective of the project is to obtain accurate knowledge based on modern and non-intrusive monitoring methods and, on the basis of these data, to develop common documents for the establishment of a coordinated conservation concept for natural populations of the indicating trout species in outdoor waters. This will strengthen resilience of its populations to climate change, ensure maintenance of functioning ecosystems for future generations and fulfil the long-term objectives and concepts for area covered by the programme (e.g. management principles in both national parks).

Such project outputs will be communicated with the institutions responsible for watercourse management covered by the programme with the view of enhancing management effectiveness. Similarly, the project results will be disseminated through the media to fisheries enterprises, fishermen's clubs and associations, as well as to the general public and educational institutions.

2. Earth, water, climate, Project No. BYCZ01-080

Partner on the Czech side: I Partner's budget:

 Zelený poklad (Green Treasure) Foundation: EUR 150,840.24

The main objective of the project is to expand and enrich the offer of environmental education. We want to focus on educators at all levels, with an emphasis on EVVO coordinators, environmental NGOs and municipal representatives, and offer them training in current trends in EVVO combined with an exchange of experience in this field. We will thematically focus education on climate change, water, soil and geology.

- Interreg V-A Austria - Czech Republic

 Plants4cooling – cooling effect of plants and application of innovative tools for climate change adaptation, Project No.ATCZ00093

Partners on the Czech side: 5 Partners' budget:

- South Bohemian Silva Nortica: EUR 357,193.26
- Czech Union for Nature Conservation Kněžice: EUR 99.372.00
- Přírodní zahrada (Natural Garden), i.o.: EUR 70,826.41
- South Bohemian Region: EUR 215,254.00 €
- Regional Union NS MAS of the Czech Republic, South Bohemian Region: EUR 57,924.00

Project implementation: 01/07 2023 - 31/12 2026

Plants4cooling is a project focusing on the cooling effect of plants and aims to develop a suitable and simple methodology, to test it in reality on the example of our diverse cross-border Czech-Austrian district in cooperation with cities and municipalities, while making it available to the public. One of the sub-activities is expected to establish a basis for a quantitative assessment of the hydrological function of surface water drainage systems in urban areas. Water storage capacity, permeability, resistance to pollutant input and energy expenditure during construction determine the potential for climate change adaptation. The result will be a science-based recommendation of suitability for use based on hydrological functionality and will contribute to comprehensive rainwater management practices in municipalities. The innovative approach consists in improving rainwater availability for green infrastructure and associated relief for drainage.

Decreasing emission in the aquaculture through sustainable use of wastewater and nutrients, Project No.ATCZ00002

Partner on the Czech side: I Partner's budget:

 University of South Bohemia in České Budějovice: EUR 376,689.60

Project implementation: 01/02 2024 - 31/01 2027

The aim is to create a catalogue of measures aimed at reducing emissions in the aquaculture. The main objective is an approach based on circular economy using wastewater and nutrients, leading to savings of up to 70% of freshwater, avoiding nutrient emissions to the environment and reducing disposal costs. SMEs can use their systems more efficiently by processing residues into fertilisers, algae, plants and energy through optimised solid-liquid separation.

How to save water in the increasing drought prone agricultural cross-border region of Weinviertel and Southern Moravia, Project No.ATCZ00048

Partners on the Czech side: 3 Partners' budget:

- Global Change Research Institute CAS, p.r.i.: EUR 220,032.08
- Regional Chamber of Agriculture South Bohemia: EUR 41,610.24
- T. G. Masaryk Water Research Institute, p.r.i.: EUR 146,286.00

Project implementation: 01/07 2024 - 30/06 2027

The project has three main objectives:

- (a) In cooperation with the two agrarian chambers and academic institutions, to compile a catalogue of measures and examples of best practices focused on specific landscape management, suitable in terms of water-resource enhancing within the given area;
- b) Propose and quantify feasible and farmer-implementable measures aimed at increasing resilience to drought and assess their impact on water resources in the given river basins:
- c) Propose and examine the feasibility of innovative and hitherto unconsidered measures for better management of existing water resources and possible ways of enhancing such resources in the given region.

- Interreg Programme Saxony - Czechia 2021-2027

1. Impacts of climate change to transboundary water bodies at the CZ-GER border, Project No. 100694066

Partner on the Czech side: I Partner's budget:

T. G. Masaryk Water Research Institute, p.r.i.: EUR 628,099.12

Project implementation: 01/01 2024 - 31/12 2026

The objective of the project is to identify environmental risks caused by climate change in polluted transboundary watercourses and to propose appropriate measures to minimise them. Six particularly polluted rivers in the border area (the Polava, Rožanský Stream, Jiříkovský Stream, Spree, Mandava and Lužnička) were selected for the project. A detailed programme of measurements will be carried out at several locations on each river to determine the type, extent and causes of pollution in these rivers. Appropriate transboundary measures will then be proposed to address the identified causes and improve the condition of the watercourses. Transboundary seminars will be held to exchange experience and raise awareness.

- Interreg V-A Programme Czech Republic - Poland

1. CZ.11.2.45/0.0/0.0/15_003/0000266 — AQUA MINERALIS GLACENSIS

Partners on the Czech side: 2 Partner's budget:

- City of Náchod: EUR 622,917.00 form the ERDF
- City of Hronov: EUR 534,803.97 from the ERDF

The project addresses the access to the potential of mineral waters through revitalization of spa parks, related buildings, so as to increase attractiveness for tourists and consequently increase economic growth and employment growth in the Kłodzko County, which has the largest occurrence of mineral and medicinal springs. The main objective of the project is to create a Czech-Polish spa region exploiting the potential of unique mineral waters.

2. CZ.11.4.120/0.0/0.0/17_028/0001633 — SUWAT: Cross-border cooperation in monitoring of chemical and radiation contamination of surface waters by mine waters

Partner on the Czech side: I Partner's budget:

 Technical University of Ostrava: EUR 137,109.42 from the ERDF

Objective: The project proposal is based on the synergistic potential of the existing and proven inter-institutional cooperation between Technical University of Ostrava (VŠB-TUO) and GIG. In the framework of the project, the cooperation will be further intensified by jointly addressing a new and topical issue such as possible contamination of surface water by highly saline and otherwise contaminated mine waters. The joint research will be carried out in locations burdened by intensive mining activities in the border regions.

- Interreg V-A Programme Slovakia - Czech Republic

1. D168 – Living banks – joint protection of river ecosystems

Partner on the Czech side: I Partner's budget:

Krok Kyjov, i.o.: EUR 211,034.41

2. S251 - Together against water erosion and wetland drying

Partner on the Czech side: I Partner's budget:

ZO ČSOP Valašské Meziříčí: EUR 160,519.88

The project focuses on measures to protect wetlands by assembling an international team of experts and practical measures at dozens of sites in the Czech Republic and Slovak Republic. These measures are aimed at monitoring the erosion process and establishing a common action plan to promote and protect wetlands.

Both projects have been successfully completed.

- Interreg EUROPE programme

Water Technology Innovation Roadmaps (PGI05062 – iWATERMAP)

Partner on the Czech side: I Partner's budget:

- CREA Hydro&Energy, i.o.: EUR 122,650.00

The project focuses on promoting innovative policies in water management sectors and thus contributes to increasing the critical amount of innovation ecosystems in the partner regions. The overall objective of the project is to improve innovation policies to enhance the critical mass development of innovation ecosystems in water technology sectors. The project is coming to an end. Remains to certify the expenditures for 9th–10th semester, as per Project Application the project ends in 05/2023, as per information from the project, i.e., the leading partner (JS) a request for completion of certification by 31/03/2023 was sent, the leading partner is supposed to send documents for review by 28/02/2023.

2. Water reuse policies advancement for resource efficient European regions (PGI05592 – AQUARES)

Partner on the Czech side: I Partner's budget:

 Regional Development Agency of the Pardubice Region: EUR 143.860.00

Water reuse is a key way to boost resource efficiency in Europe's scarce areas, as well as to take advantage of opportunities in the expanding water market, thereby easing pressure on Europe's wetlands and coastal areas. The Strategic Implementation Plan of the European Innovation Partnership on Water was launched to promote water efficiency in Europe, where water scarcity affects I I % of the population. In this context, AQUARES is to support identification of viable strategies for harnessing water reuse, tackling inefficient water use and more.

The project partner is expected to submit a final report for the 9th and 10th monitoring period.

- Program Interreg DANUBE

I. Reducing the flood risk through floodplain restoration along the Danube River and tributaries (DTP2-003-2. I Danube Floodplain)

Partner on the Czech side: I Partner's budget:

- The Morava River Board, s.e.: EUR 151,407.50

The main output of the project will be improvement and sustainability of transnational flood risk management in the Danube River Basin. The project will contribute to a harmonised approach to floodplain protection and restoration, to consensus of local stakeholders on priority measures and to wider public support for integration of flood management with floodplain protection and restoration.

Administration of this project has been completed.

2. Drought Risk in the Danube Region (DTP1-182-2.4 DriDanube)

Partner on the Czech side: I Partner's budget:

Global Change Research Institute CAS, p.r.i.: EUR 179,000.00

Objectives: Water scarcity and drought have often affected the Danube Region and have had a major impact on the economy and people's well-being. Despite the damage in recent decades, drought is still not considered a high priority problem. The main objective of the project is to increase the capacity of the Danube Region and address drought-related risks. The objective has been identified as a response to issues related to shortcomings in both the drought monitoring process and in the separate drought management systems.

Administration of this project has been completed.

- Program Interreg CENTRAL EUROPE

I. Integrated Approach to Management of Groundwater Quality in Functional Urban Areas (Amiiga — CE32)

Partners on the Czech side: 2 Partner's budget:

- Town of Nový Bydžov: EUR 159,681.50
- Technical University of Liberec: 235,219.60

The project addresses, in particular, the issue of groundwater contamination from brownfields, which is common in central Europe.AMIIGA provides a balanced combination of technical, research, management and professional expertise that allows for exchanging and transferring the knowledge needed to address groundwater contamination in a comprehensive way.

Administration of this project has been completed.

2. Integrated Heavy Rain Risk Management (Rainman – CE968)

Partners on the Czech side: 2 Partner's budget:

- T.G. Masaryk Water Research Institute, p.r.i.: 201 170,00 EUR
- South Bohemian Region: EUR 72,380.99

The main objective of the project is to improve the integrated management capacity of public authorities to mitigate the risks of heavy rainfall and the implementation of warning infrastructure in the participating regions. Partners from six countries are jointly developing innovative practice-oriented methods and new tools to reduce death toll and damage caused by torrential/heavy rainfall.

Administration of this project has been completed.

3. Increased renewable energy and energy efficiency by integrating, combining and empowering urban wastewater and organic waste management systems (CE946 – REEF 2W)

Partners on the Czech side: 2 Partner's budget:

- University of Chemistry and Technology: EUR 172,533.25
- VEOLIA: EUR 207,634.25

The main focus of the project is to increase energy efficiency and renewable energy production in public infrastructures.

Administration of this project has been completed.

4. Enhancing environmental management capacities for sustainable use of the natural heritage of Central European SPA towns and regions as the driver for local and regional development (CE1308 HealingPlaces)

Partner on the Czech side: I Partner's budget:

Mendel University in Brno: EUR 22,948.38

The project focuses on sustainable development of spas while protecting the unique groundwater resources that form its foundation. This will be achieved by expanding knowledge and awareness of the impact of various factors on groundwater deposits and building multi-level and multi-territorial management models for the management of valuable natural spa resources. A critical element of the project will be development of a collaborative, innovative and web-based tool for assessing threats and pressures on mineral and hot water deposits. HealingPlaces will design, test and implement innovative solutions for sustainable mineral water management in spas through different participatory models.

Administration of this project has been completed.

5. Board for Detection and Assessment of Pharmaceutical Drug Residues in Drinking Water — Capacity Building for Water Management in CE (CE1412 boDEREC-CE)

Partner on the Czech side: I Partner's budget:

Czech University of Life Sciences Prague: EUR 33,290.24

Recent research has shown that the aquatic environments from which we produce drinking water in Europe contain anthropogenic substances that were unknown just a few years ago. The boDEREC-CE project sets up an innovative approach by implementing pilot sites in central European countries to monitor emerging contaminants, mainly pharmaceuticals and

personal care products (PPCPs). boDEREC-CE therefore not only focuses on studying the behaviour of PPCPs, special attention is paid to assessing the effectiveness of mitigating this specific type of pollution, using different types of technological treatments of drinking water: the main output is an innovative decision based on a model that can be used as an early warning tool in view of future legal limits. This tool will be tested in waterworks under different conditions. Furthermore, activities will be launched to inform the public about measures to reduce the use and wastage of PPCPs.

Administration of this project has been completed.

6. JoinT Efforts to increase water management Adaptation to climate Changes in central EuRope (CE1670 – TEACHER-CE)

Partner on the Czech side: I Partner's budget:

Czech University of Life Sciences Prague: EUR 56,000.00

TEACHER-CE integrates and harmonises the results of previously funded projects recognising their links to the topic of climate change adaptation and risk prevention. The main territorial challenge to be addressed is the development of effective climate change adaptation and water risk prevention processes in Central Europe, where effects can now be

clearly observed and could have a strong impact at territorial level in the years to come. The main objective is to develop an integrated set of tools aimed at water resources management, including climate change adaptation, flood/ heavy rain/drought risk prevention, small-scale water retention measures and water resources protection through sustainable land management, based on integration of tools from selected projects: RAINMAN, FRAMWAT, PROLINE-CE, SUSTREE, LUMAT (all chemicals and products); H2020 FAiRWAY; LifeLocalAdapt; DRIDANUBE and DAREFFORT (DTP), C3SDisaster sectoral information system for risk reduction and C3S soil erosion case demo. The project focuses on providing project outputs/tools at the municipality/ regional level; the TEACHER-CE project will build on the integrated water management tools, including climate change adaptation and risk prevention of previously funded projects. Lessons learned at the local level under TEACHER-CE will be used to maximize the use of the toolbox for effective and robust climate change adaptation in sector plans. The TEACHER-CE innovation is a guided and documented process of integrating the outputs and numerous tools of previously funded projects from different grant programmes in a single toolbox with testing and validation in nine pilot projects in eight countries.

Administration of this project has been completed.



The Pastviny Reservoir (Elbe River Board, s.e.)



L. Pavlíková, A. Vlasáková – STONE DRINK, Bishop's Grammar School, Primary School and Kindergarten Bohosudov

12. LEGISLATIVE MEASURES

12.1 Water Act and implementing regulations

In 2023, the Water Act was indirectly amended by Act No. 149/2023 Coll., amending certain acts in connection with the adoption of the Uniform Environmental Opinion Act.

On 5 June 2023, Act No. 148/2023 Coll. on the Unified Environmental Opinion came into force, which introduces the so-called Unified Environmental Opinion (JES), together with the accompanying amending Act No. 149/2023 Coll., which amends certain acts in connection with the adoption of the JES. The new legislation entered into force on I January 2024. However, in view of the so-called transitional period under the provisions of Section 334a of the Building Act, to which the transitional provision of Section 19(6) of Act No. 148/2023 refers, the JES is issued from I January 2024 to 30 June 2024 only for projects of assigned buildings as specified in Annex 3 to the Building Act. For other projects, the JES is issued from I July 2024.

The JES is a tool for procedural integration of the state administration in the field of environmental protection and is issued in the form of a binding opinion under the Administrative Procedure Code for all projects permitted under the Construction Act, whether they are projects requiring an EIA or other projects, and for projects subject to an environmental impact assessment and subsequently permitted under a law other than the Building Act, e.g. the Mining Act. The JES is the basis for the decision on the authorisation of the project under the Building Act, or (in the case of projects under EIA) also for other so-called follow-up proceedings within the meaning of the Environmental Impact Assessment Act (e.g. proceedings for the authorisation of mining activities). A major benefit of the introduction of the JES from the point of view of the applicant $% \left(1\right) =\left(1\right) \left(1\right) \left($ (typically the builder) is the concentration of the administrative acts necessary for the authorisation of the project with respect to the environment into a single act.

The accompanying amendment act (Act No. 149/2023 Coll., amending certain acts in connection with the adoption of the Act on the Unified Environmental Opinion) contains related amendments made in other acts, including the Water Act. The JES substitutes 26 administrative acts contained in 9 different environmental laws (and also in the Funeral Act), which according to the current and effective legislation mostly take the form of a binding opinion, but in some cases also a decision or statement. In the case of the Water Act, two administrative acts are integrated into the JES, namely consent for buildings, facilities and/or activities which do not require a permit under the Water Act but which may affect water conditions (Section 17(1) of the Water Act) and a binding opinion (Section 104(3) of the Water Act).

Decree No. 50/2023 Coll., on river basin management plans and flood risk management plans

After twelve years, a new decree on river basin plans and flood risk management plans was issued, replacing and repealing the

previous Decree No 24/2011 Coll. on river basin plans and flood risk management plans, as amended.

The main reason for the new legislation was the transposition of Article 8 of Directive (EU) 2020/2184 of the European Parliament and of the Council of 16 December 2020 on the quality of water intended for human consumption, which lays down requirements for assessment and management of risks in parts of the river basins linked with water abstraction points intended for human consumption. Furthermore, the need for the legislation is based on the experience gained from application of the original Decree. Practical experience from the past three planning periods showed that it is necessary to supplement the proposed legislation with new definitions, to make the text of the Decree generally clearer by common provisions for river basin management plans and flood risk management plans and separate sections for each type of plan.

12.2 Act on water supply and sewerageh

Act No. 274/2001 Coll., on water supply and sewerage for public use and on amendments to certain acts (the Water Supply and Sewerage Act), did not undergo any direct amendment in 2023. A direct amendment to the Water Supply and Sewerage Act was made by Act No. 167/2023 Coll., amending Act No. 258/2000 Coll., on the protection of public health and amending certain related acts.

The amendment was made to transpose Directive (EU) 2020/2184 of the European Parliament and of the Council of 16 December 2020 on the quality of water intended for human consumption. In particular, the amendment to the Act introduces a comprehensive approach to water safety based on the assessment and management of the risks of parts of the river basins related to water abstraction points and assessment and management of the risks of the water supply system. The amendment to the Water Supply and Sewerage Act, effective from 1 January 2025, also introduces obligation provide information with the aim of raising awareness among customers of the impacts of water consumption and prices, including provision of online information on water infrastructure.

Decree No. 428/2001 Coll., which implements the Water Supply and Sewerage Act, was amended in 2023 in connection with the amendment of Decree No. 256/2023 Coll. This Decree, effective from 1 September 2023, regulates the scope of full and reduced analyses of raw water based on the results of the risk assessment prepared in accordance with Decree No. 252/2004 Coll., No. 50/2023 Coll., on river basin plans and flood risk management plans.

Furthermore, the amended Decree regulates the procedure where a new part of a water supply system is connected to the existing water supply system and such a connection could affect the ability to supply drinking water. In such a case, an assessment shall be made to determine whether such a supply

of drinking water in the required quantity will adversely affect drinking water supply, including pressure conditions of existing or new customers.

With effect as of I January 2025, the Decree sets out the scope of the information that operators are obliged to publish on their websites. It also sets out the scope of the specific data on water and sewerage charges that must be provided to customers on a regular basis in invoices or in an e-application.

In 2023, the Interpretation Committee for the Public Water Supply and Sewerage Act approved four interpretations. All interpretations are published on the MoA website at Water – Legislation – Interpretations.

Act No. 167/2023 Coll., amending Act No. 258/2000 Coll., on the protection of public health and on amendments to certain related acts, as amended, and other related acts (which entered into force on I July 2023), amended in part four the aforementioned Act on Water Supply and Sewerage, concerning, inter alia, restrictions on access to information and the obligations of operators and owners of water supply or sewerage systems concerning the provision of information. The Act entered into force on I July 2023.

In 2023, Decree No. 256/2023 Coll. of the Ministry of Agriculture was published in the Collection of Laws, amending Decree No. 428/2001 Coll., which implements Act No. 274/2001 Coll., on water supply and sewerage systems for public use and on amendments to certain laws (the Water Supply and Sewerage Act), as amended, with effect from I September 2023. The aim of the decree is primarily to complete the transposition of Directive (EU) 2020/2184 of the European Parliament and of the Council of 16 December 2020 on the quality of water intended for human consumption. In this context, the scope of full and reduced analyses of raw water was adjusted on the basis of the results of the risk assessment prepared in accordance with Decree No. 252/2004 Coll., laying down the sanitary requirements for drinking and hot water and the frequency and scope of inspections of drinking water, as amended. The Decree also regulates, on the basis of Directive 2020/2184, the water supply and sewerage system owners' and operators' obligation to provide information. It concerns, in particular, the scope of the information to be published by water supply and/or sewerage system operators on their websites, the extent of the specific data on water and sewerage charges that must be regularly provided by water supply and sewerage system owners and operators to customers. The abovementioned Decree entered into force on I September 2023.

12.3 Supervision of state administration in the field of water management

The Ministry of Agriculture and the Ministry of the Environment are supreme water supervisors and they are charged with the exercise of supreme state supervision by Act No. 2/1969 Coll., on the establishment of ministries and other central bodies of state administration of the Czech Republic, as amended, through the provisions of Section 111 of Act

No. 254/2001 Coll., on water and on amendments to certain acts (the Water Act), as amended.

Audits of regional authorities are conducted in accordance with Government Resolution No. 689 of 11 September 2013 on Planning, Assessment and Coordination of Audits of the Exercise of Delegated and Independent Competence of Territorial Self-Government Units by Central Administrative Authorities, Regional Authorities, the Prague City Hall and the Municipalities of Territorial Statutory Cities. The Ministry of the Interior of the Czech Republic prepared a three-year audit plan for regions and the Capital City of Prague for 2023–2025.

Ministry of Agriculture

Auditing of the exercise of delegated competences in water management is carried out within the organizational structure of the Ministry of Agriculture by the Department for State Administration in Water Management and for River Basin Administration as the central water authority. In 2022, five audits were carried out at regional water authorities. Another 19 audits were carried out at water administration offices of municipalities with extended competences.

Audits carried out by the MoA focus primarily on implementation of the Water Act in matters where the MoA acts as the central water administration authority, and regulations issued pursuant to the Act; the Water Supply and Sewerage Act, as amended, and regulations issued pursuant to the Act; Act No. 106/1999 Coll. on free access to information, as amended, Act No. 500/2004 Coll., the Code of Administrative Procedure, as amended; and Act No. 183/2006 Coll., on spatial planning and building rules (the Building Act), as amended, and its implementing legal regulations. Audits at regional offices focus on adherence to the provisions of Section 67(1)(a), (b), (c) and (e) of Act No. 129/2000 Coll., on regions (establishment of regions), as amended; and at municipal offices with extended competences on adherence to the provisions of Section 61 of Act No. 128/2000 Coll., on municipalities (establishment of municipalities), as amended.

In addition to the above-mentioned legislative framework, functioning of the water authorities was also examined, including their personnel, material and organisational security, in particular the qualifications and experience of their employees.

A random sample of files was examined during each audit. The MoA writes a report from each audit, including description of any shortcomings found. On the basis of the audits, it can be concluded that the performance of delegated competence of the regional authorities in the field of water management has long been at a high level. A positive effect consists in regional water authorities striving to provide professional methodological guidance to the authorities within their area of competence. No corrective measures had to be imposed on any of the audited entities, the irregularities found were mainly of a formal nature and in none of the cases did they cause illegality of the decisions under examination.

The MoA uses findings from their audits at water authorities as feedback which not only helps to deepen mutual communication at all levels of the administrative hierarchy, it is

also very beneficial to the MoA as it brings insight into regional and local water issues. Audit results are subsequently used for methodological guidance of water authorities. Findings about application of regulations under the responsibility of the MoA and current water management issues are presented annually at a working meeting of the Water Management Section of the MoA with individual water authorities (in 2023, the meeting was held on 23–25 October 2022 at the Palcát Hotel in Tábor).

Ministry of the Environment

Auditing activities of the Ministry of the Environment in the field of water management are carried out annually by Departments of State Administration (central water authorities). Inspections of regional authorities were prepared in accordance with Government Resolution No. 689 of 11 September 2013, pursuant to Article 6(2) of the related material File No. 978/13, and in accordance with the Ministry of the Interior> «Plan of audits of the exercise of delegated competences by the regions and the Capital City of Prague for 2023–2025» (the subject of audits in 2023 were the Olomouc Region, Ústí Region and South Moravian Region) and the Ministry of the Environments «Plan of state supervision for 2023». Auditing activities at the Czech Environmental Inspectorate and at municipalities with extended competences (water authorities) were prepared in accordance of with the **Ministry** Environments «Plan of state supervision for 2023».

Auditing activities are an essential element of verifying the level of state administration, its purpose is to supervise how lower administrative authorities (regional authorities, water authorities and the CEI) carry out state administration in the entrusted area of water management, how they implement provisions of the Water Act and regulations issued under it. The areas monitored

are, in particular, correct application of legal regulations, relevant statutory provisions concerning competence and compliance with Act No. 500/2004 Coll., the Administrative Procedure Code. Audits also focus on the way how the work of water authorities is ensured, on qualification and experiences of officials, on work organisation and the material equipment of organisational units.

The purpose of the supreme state supervision is primarily to eliminate defects of a systemic nature. In individual cases, a defective decision may be amended by means of an extraordinary remedy (review a defective decision in a review procedure, reopening of the proceedings).

Audits at water authorities form a smaller part of the MoE's audit activities. More frequent and extensive in scope are audits of regional authorities and other entities.

No deficiencies that would require imposition of corrective measures were found, only minor administrative deficiencies and partial deficiencies consisting in procedural errors were noted in the initiation of water administrative proceedings which were not initiated by notification as required by the Administrative Procedure Code, lacking indication of the legal validity, which, however, did not affect the validity or legality of the administrative acts issued and were discussed with the officials during the actual performance of supreme water administration within the framework of methodological assistance.

However, apart from such partial errors, it could be stated that the exercise of delegated competences in the field of water protection by the water authorities audited in 2023 is still ensured at a very good level, the decisions issued contain the requirements prescribed by the Administrative Code and references to the relevant provisions of the Water Act. The methodologies and directives of the MoE are respected in the procedure and decision-making.



Confluence of the Svratka and the Jihlava Streams, the Nové Mlýny Hydroelectric Power Station (source: Morava River Board, s.e.)



Jůlie Kalichová – Ask the Sea, Primary School Otevřená, Brno

13. PRIORITY TASKS, PROGRAMMES AND KEY DOCUMENTS IN WATER MANAGEMENT

13.1 Water planning

In 2023, implementation of measures according to the approved river basin management plans and flood risk management plans for the period until 2027, i.e. for the 3rd planning period under the Water Framework Directive and the 2nd planning period under the Floods Directive, continued. Voluntary electronic reporting of management plans to the European Commission was completed in July 2023. The preparation of the next planning period 2027–2033 started.

The river basin management plans for the current 3rd planning period were approved on 19 January 2022. 2023 was the second year of implementation of the plans, including measures for achieving the objectives set. Voluntary electronic reporting of river basin management plans to the European Commission was completed on 21 July 2023, following on from the mandatory reporting of river basin management plans under Article 15(1) of the Water Framework Directive in the previous year. The reporting outputs can be found on the portal of the T.G.M. Water Research Institute (http://heis.vuv.cz/projekty/rsv).

Decree No. 50/2023 Coll., on river basin management plans and plans for flood risk management, was issued replacing the twelve-year-old Decree No. 24/2011 Coll., on river basin plans and plans for flood risk management, as amended.

Preparatory work for draft of river basin management plans and flood risk management plans commenced in accordance

with Section 25(1)(a) of the Water Act. As part of the preparatory work for the third stage of implementation of the Floods Directive, a preliminary flood risk assessment and identification of areas with significant flood risk were carried out. In total, 208 sections of watercourses with a length of approx. 2,700 km were identified in the Czech Republic. Subsequently, preliminary assessment was published, comments were received from water users and the public and the comments were addressed. In addition, an update of the methodological procedures and documents for preparation of flood hazard, threat and risk maps and the development of Flood Risk Management Plans was initiated. Implementation of the flood risk management measures proposed in the previous stages of implementation of the Floods Directive continues.

At the same time, preparation of a timetable and work programme started; the programme defines the tasks to be taken in the water planning process and assigns responsibility for fulfilling the tasks. A draft timetable and work programme have to be published for six months for comments by water users and the public and at least 3 years before the start of the period covered by the river basin management plans and flood risk management plans, i.e., no later than by 22 December 2024. Preparations also included the start of updating model river basin management plans in accordance with the new Decree No. 50/2023 Coll. on river basin management plans and flood risk management plans. The model river basin management plans define in detail the content, structure, form, data sources and methodological procedure for the preparation

Figure 13.1.1

Areas of Potential Significant Flood Risk for the 2nd planning cycle under the Floods Directive

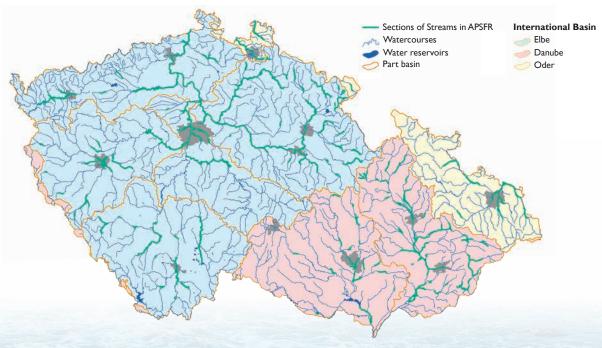
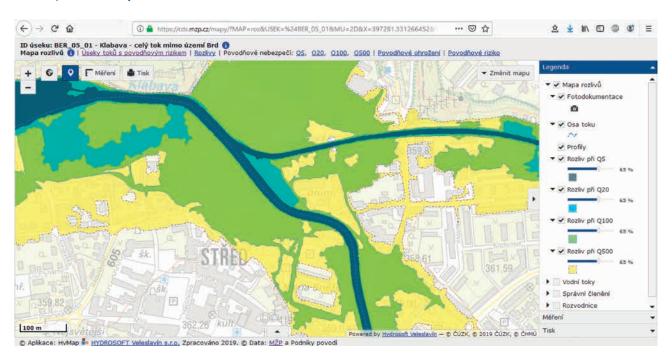


Figure 13.1.2
Online flood risk map



Source: MoE

of river basin management plans and will thus contribute to uniformity of plan preparation at national and regional level.

Information on the water planning process, including materials and minutes from the Water Planning Commission meetings, is published on the MoA website (https://eagri.cz/public/portal/mze/voda/planovani-v-oblasti-vod) with links to the MoE website and websites of each River Board. For the purposes of implementation of Directive 2007/60/EC of the European Parliament and of the Council on the assessment and management of flood risks, the Flood Information System (https://www.povis.cz/) is used as a communication platform, where information on the process of elaboration of flood risk management plans is published, flood hazard, threat and risk maps are available at https://cds.mzp.cz/.

13.2 Water supply and sewerage development plans

The Water Supply and Sewerage System Development Plan in the Czech Republic, prepared pursuant to Section 29(1)(b) of Act No. 274/2001 Coll., on water supply and sewerage systems for public use and on amendments to certain related acts, as amended, is available on the website of the Ministry of Agriculture.

Water supply and sewerage development plans in the Czech Republic (WSSDP, RWSSDP) including their updates represent a medium-term continuously updated concept of the water supply and sewerage sector.

The Regional Water Supply and Sewerage Development Plans in the Czech Republic (RWSSDP) are the basis for the use of

European Community funds and national financial resources for the construction and renewal of water supply and sewerage infrastructure. Therefore, the obligations of each applicant for the provision and use of state financial support include documenting the compliance of the technical and economic solution submitted with the valid WSSDP.

The Water Supply and Sewerage Development Plan in the Czech Republic (WSSDP) is based on a synthesis of information from the RWSSDPs prepared, discussed and approved by the regional councils, including their updates. It builds on other strategic documents and departmental policy documents and also respects the requirements arising from the relevant European Community regulations. The WSSDP includes statements of the MoA issued on each of the updates of the RWSSDP.

In its general part, the WSSDP defines the framework objectives and main principles of government policy for ensuring long-term public interest in the field of water supply and sewerage in the Czech Republic, i.e., sustainable use of water resources and water management while adhering to requirements for water management services (drinking water supply, sewerage and wastewater treatment).

Pursuant to Section 29(1()c) of the Act, the Ministry of Agriculture continued to issue statements on the approved RWSSDPs concerning the proposed updates to the technical solutions for drinking water supply, sewerage and wastewater treatment.

In 2023, 205 opinions were issued. A total of 9,698 opinions of the MoA were issued from 2006 to 2023, which accounts for approx. 56.5% of the 17,166 municipalities and local districts of the Czech Republic addressed in the WSSDP and RWSSDP.

The WSSDPs in the Czech Republic are used by the MoA, MoE, regions (regional authorities), municipalities with extended powers (water authorities), municipalities, owners and operators of water supply and sewerage systems and the professional and general public.

13.3 Programmes and measures aimed at reducing surface water pollution

Water quality protection structures built in 2023

Among the most significant projects at pollution sources above 2,000 EP, the following wastewater treatment plants (WWTPs) were completed in 2023: N = nitrification, DN = denitrification, BPR = biological phosphorus removal, CPR = chemical phosphorus removal.

Action programme under Council Directive 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, which is transposed in the Czech Republic in the Act on Fertilisers, the Water Act and Government Regulation No. 262/2012 Coll., on the designation of vulnerable areas and the action programme, as amended. Vulnerable areas are locations where contamination of groundwaters and surface waters by nitrates exceeded or could exceed the defined nitrate concentration limit of 50 mg/l; such areas are subject to review at least every four years after their designation.

Among the main measures aimed at reducing surface water pollution by nitrates from agricultural sources is Government Regulation No. 262/2012 Coll., on the designation of vulnerable areas and the action programme, as amended. Within the

Table 13.3.1

New and reconstructed wastewater treatment plants with a capacity of more than 2,000 equivalent inhabitants in 2023

| S | Wastewater treatment | Locations | Capacity | Nitrification | Denitrification | Chemical phosphorus removal |
|------------------------|----------------------|---------------------------------------|---------------|---------------|-----------------|-----------------------------|
| Status | plans | Locations | Number of EPs | YES/NO | YES/NO | YES/NO |
| | industrial | | x | x | x | x |
| | | Boskovice*) | 20,000 | YES | YES | YES |
| | | Pečky*) | 7,000 | YES | YES | YES |
| new | | Šestajovice*) | 6,000 | YES | YES | YES |
| _ | municipal | Votice*) | 9,950 | YES | YES | YES |
| | | Perná | 3,000 | YES | YES | YES |
| | | Mukařov (Mukařov, Srbín, Žernovka) | 2,000 | YES | YES | YES |
| | | Tuchlovice | 3,500 | YES | YES | NO |
| | | Lipence | 6,000 | YES | YES | YES |
| | industrial | Komerční zóna Nová Hospoda | 3,200 | YES | YES | YES |
| | | Davle | 3,255 | YES | YES | YES |
| P | | Chýnov | 3,250 | YES | YES | YES |
| reconstructed/extended | | Bašť | 3,500 | YES | YES | YES |
| /exte | | Mělnické Vtelno | 2,240 | YES | YES | YES |
| cted | | Železný Brod | 3,500 | YES | YES | YES |
| ıstru | | Bořetice | 2,300 | YES | YES | YES |
| ecor | municipal | Dolní Němčí | 3,768 | YES | YES | YES |
| _ | титистрат | Boskovice | 20,000 | YES | YES | YES |
| | | Hluk | 4,800 | YES | YES | YES |
| | | Okříšky | 2,200 | YES | YES | YES |
| | | Židlochovice | 6,400 | YES | YES | YES |
| | | Brumov-Bylnice | 12,500 | YES | YES | YES |

Source: SEF, River Boards

Note: *) WWTPs with support from the SEF.

framework of this legislation, so-called Nitrate Vulnerable Areas (NVAs) are defined and an action programme for the agricultural sector is announced. The above-mentioned measures are updated and announced at regular intervals not exceeding four years according to the current provisions of Council Directive 91/676/EEC concerning protection of waters against pollution caused by nitrates from agricultural sources (the Nitrates Directive). Significant amounts of nitrates, and nutrients in general, are washed into surface waters as part of water erosion, see more in Chapter 5.2 Area sources of pollution.

In addition to nitrate concentrations in surface water and groundwater profiles, other aspects such as surface water eutrophication in a given locality are also taken into account when defining vulnerable areas, where sources of pollution other than surface pollution may be the source of such pollution. In the Czech Republic, the share of NVA is currently about 42% of its total area, NVAs cover about 50% of the total agricultural land area.



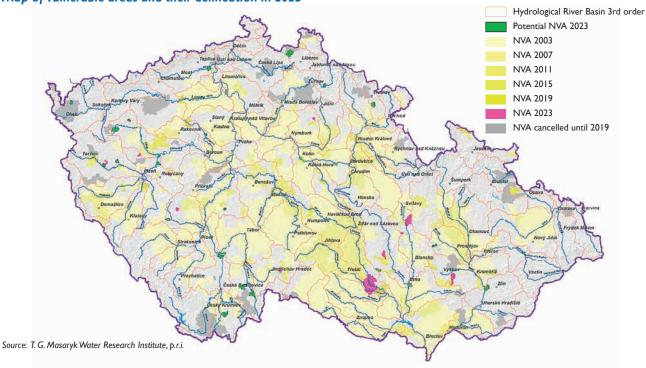
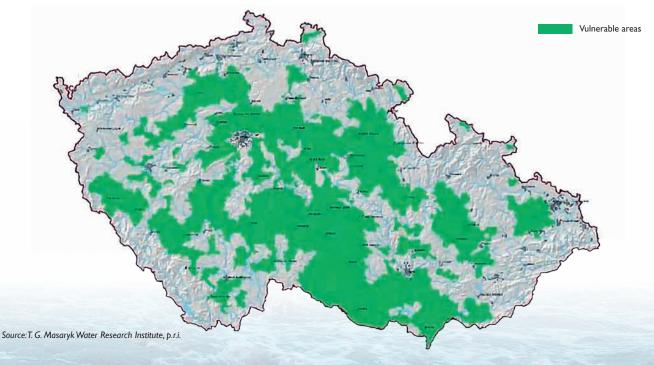


Figure 13.3.2

Map of vulnerable areas as per Government Regulation No. 262/2012 Coll., on the designation of vulnerable areas and the action programme – Amendment No. 277/2020 Coll., effective until 30/06 2024



In 2023, the T.G. Masaryk Water Research Institute, p.r.i. prepared a new update of the nitrate vulnerable area delineation. The changes to the nitrate vulnerable area delineation are based on the monitoring data obtained over the past four-years and will be reflected in the amendment to Government Regulation No. 262/2012 Coll., on the designation of vulnerable areas and action programme effective from 1 July 2024. The new NVA delineation is shown in Figure 13.3.1.

Vulnerable areas containing nitrate-polluted waters cover 1.8 million hectares, i.e., more than half of the agricultural land in the Czech Republic

The measures of the Action Programme include a period with a ban on fertilizing, fertilization limits according to crop yield levels, crop rotation — restriction of maize cultivation in 3rd application zone, storage of fertilizers, nitrogen balance, farming on slopes and in the vicinity of surface water bodies. The measures set out in the Action Programme have to guarantee that no farm using organic and/or organic-mineral fertilizers for farming in vulnerable areas exceeds the limit of 170 kg of nitrogen/ha/year.

2023 was the first year of the programming period 2023-2027 under which instruments of the Common Agricultural Policy Strategic Plan were applied, which aims, inter alia, at promoting sustainable development and efficient management of natural resources such as water, soil and air. In particular, a requirement to earmark buffer strips alongside water on arable land contributes to water protection under the whole-farm ecoscheme payment, both at the basic and premium levels. This condition is linked to the standard DZES 4 - buffer strips for surface water bodies. They are grass strips with a minimum width of 6 or 12 m and prevent pesticides and pesticide residues from being washed away, reduce nutrient losses through runoff to surface waters and also contribute to reducing erosion. Another related condition of the whole-farm eco-payment is the support of adding organic matter into soil and of organic matter balance, which is key to improving soil quality and reducing erosion risk. The baseline conditionality requires that the subsidy policy is linked to compliance with the Nitrates Directive and the Water Framework Directive, in addition to the aforementioned standard DZES 4, in terms of mandatory requirements to reduce diffuse sources of phosphate pollution.

13.4 Reporting of the Czech Republic to the European Union

Reporting under Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 on the management of bathing water quality and repealing Directive 76/160/EEC.

In terms of European legislation, the issue of bathing waters is governed by Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC.

Every year before the bathing season, a list is compiled pursuant to Section 6g(1)(a) of Act No. 258/2000 Coll., as amended by Act

No. 151/2011 Coll. (the List). The List is drawn up by the Ministry of Health in cooperation with the Ministry of the Environment and the Ministry of Agriculture. In the Czech Republic, waters used for bathing in the open air are divided into natural surface water bathing sites (i.e., surface waters where operators offer bathing services) and surface waters where a large number of people can be expected to bathe and for which a permanent bathing ban or a permanent warning against bathing has not been issued by the competent public health authority (so-called other surface bathing waters). Prior to the 2023 bathing season, a list of waters designated as bathing waters for the 2023 recreational season was submitted to the EC.

The MoE, in cooperation with the Ministry of Health, submitted to the EC a report on the results of the monitoring and assessment of the quality of the surface waters listed for the 2023 bathing season, which was prepared in accordance with the requirements of Directive 2006/7/EC. Bathing waters were classified as unsatisfactory, acceptable, good or excellent on the basis of their quality. The assessment was made on the basis of a set of quality data compiled for the 2023 bathing season and the four preceding bathing seasons. The reports from each European country are published annually on the EC portal http://ec.europa.eu/environment/water-bathing/indexen.html once the results are compiled.

The most frequent water quality problems in the Czech Republic are related to the mass development of cyanobacteria, which led to the announcement of a bathing ban at 12 reported locations (three bans were issued at a single location) in the 2023 bathing season. Out of a total of 153 reported bathing waters, no site was classified as non-compliant according to the requirements of Directive 2006/7/EC -2 were classified as acceptable, 21 good and 121 of excellent quality, 9 locations were not assessed due to an insufficient number of samples (e.g., in the case of newly monitored sites), or because they were shut down for reconstruction.

Reporting under Directive of the European Parliament and of the Council 2000/60/EC of 23 October 2000 that defines the framework for the activity of the Community in the field of water policy

Reporting of the river basin management plans resulting from Directive 2000/60/EC (Water Framework Directive) was duly completed for the Czech Republic in 2022. At the same time, voluntary reporting of the river basin management plans was prepared, completed, sent and subsequently approved by the European Commission in 2023. It was prepared according to the requirements of the guideline document valid on the date of uploading. It was also completed to make the collected data available for reporting purposes in the form of an interactive map, tables and graphs. The solution also included data analysis of monitoring and status of surface water bodies, including comparison of results for 2019-2021 and 2016-2018 (i.e. evaluation for 3rd river basin management plans). The results of the analysis were used for more detailed evaluation to support planning and were also made available to authorized users in an interactive form in a web-based environment. The reported data are available in the CDR at https://cdr.eionet. europa.eu/cz/eu/wfd2022/districts. For use in the Czech Republic, it is also available as a shape file in the form of geographic data and MS Excel in the form of descriptive data.



 $\textbf{\textit{T. Neumanov\'a}-Water} \text{ is the key, but people are the lock, } \textbf{\textit{Elementary School Otev\'ren\'a, Brno}$

14. INTERNATIONAL RELATIONS

International cooperation of the Czech Republic in water protection is based on the principles of the «UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes», to which the Czech Republic is a party.

Within the framework of international cooperation in water protection, the so-called Joint Technical Commission between the then Czechoslovak Republic and the Republic of Austria was established as early as 1928 to deal with technical and economic modifications of the border sections of the Danube, the Thaya and the Morava Rivers, as well as watercourses in the Malše and Lužnice River Basins. Currently, the Czech Republic is a contracting partner to nine international treaties in the field of water protection.

14.1 Cooperation within the UNECE



The Convention on the Protection and Use of Transboundary Watercourses and International Lakes is intended to strengthen national

measures for the protection and environmentally sound management of transboundary surface waters and groundwaters. The Convention encourages the contractual parties to prevent, control and reduce transboundary impacts and use water in a sustainable manner.

The basic principle is bilateral cooperation between neighbouring countries on the basis of international agreements, treaties and conventions in the field of transboundary water management. Emphasis is placed on mutual exchange of information, joint research and development (e.g., through bilateral and multilateral projects, international commissions, etc.), improvement of warning and alarm systems, as well as public access to information.

UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes

The document entered into force on 6 October 1996 and the Czech Republic has been a party to it since 10 September 2000. Representatives of the Czech Republic participate in activities related to the areas of integrated management of water resources and aquatic ecosystems, protection of waters against accidental pollution from industrial sources, support for international cooperation on transboundary waters and in international river basin commissions. Cooperation under the Convention also focuses on the relationship between water quality and human health. In 2023, the Czech Republic participated in the meeting of the Working Group for Integrated Water Resources Management, where countries shared examples of replication for transboundary water cooperation, especially as inspiration for new and possibly new members. Furthermore, low-cost and low-staffing water monitoring options that would ease the situation particularly in less developed countries were discussed.

Protocol on water and health

This document was produced in collaboration with the World Health Organization (WHO) and addresses the link between water and human health. The Protocol entered into force in 2005, but the Czech Republic has been a party to the Protocol since 2001 and the national targets of the Czech Republic are updated within the framework of the Protocol. The Ministry of Health is the promoter of the Protocol in the Czech Republic. The Council for Health and Environment entrusted a permanent working team consisting of representatives of the MoH, the MoE, the MoA and the State Institute of Health with the preparation of drafting national objectives and supervision of their implementation.

More information about the Convention and the Protocol can be found at www.unece.org/env/water.



The Lednice Castle Park (author: Procházková Lenka)

14.2 International cooperation of the Czech Republic in the Elbe, Danube and Oder River Basins

Modern principles of water protection, based on the hydrological basins of large rivers crossing the borders of several countries, began to be applied in the Czech Republic in 1990 with the start of cooperation in protection of the Elbe River under the Agreement on the International Commission for the Protection of the Elbe River. At that time, the Agreement on the International Commission for the Protection of the Oder River against Pollution and later the Convention on Cooperation for Protection and Sustainable Use of the Danube River also began to be prepared.

Cooperation in the field of water protection at the level of the major river basins of the Czech Republic is conducted through international commissions for the protection of the Elbe, Danube and Oder Rivers and focuses primarily on:

- reducing pollution of the Elbe, Danube and Oder Rivers with hazardous substances,
- striving to achieve an ecosystem as close as possible to the natural condition with a healthy diversity of species,
- enabling the use of water, especially extraction of drinking water from bank infiltration and 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 (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) and the Floods Directive (Directive 2007/60/
 EC of the European Parliament and of the Council on the
 assessment and management of flood risks).

Agreement on the International Commission for the Protection of the Elbe River

On 8 October 1990, the Agreement on the International Commission for the Protection of the Elbe River (ICPER) was signed in Magdeburg. The



Agreement entered into force on 14 September 1992 and the Commission acquired legal subjectivity by the Protocol to the Agreement of 9 December 1991, which entered into force on 13 August 1993. The ICPER is the most important body of Czech-German cooperation in the field of water protection in the international Elbe River Basin.

The 36th meeting of the ICPER was held in Karlovy Vary in October 2023. In 2023, the implementation of the International Elbe River Basin Management Plan for 2022–2027 and the implementation of the International Elbe River Basin Flood Risk Management Plan continued, and work is underway to update these plans for 2028–2033.

Among other things, the Elbe Extraordinary International Measurement Programme for water quality monitoring in case of extreme hydrological situation was also approved and the 3rd internal report on the implementation of the ICPER Concept for Sediment Management was completed. An update of the Elbe International Warning and Alert Plan was also prepared and approved. In March 2023, a tracer experiment was carried out on the Vltava River at high flows. The data obtained from the experiments will be used to calibrate the Elbe Alarm Model (ALAMO). A Low Water Period 2014–2020 Analysis was published on the ICPER website.

On 8 and 9 June 2023, an expert conference on the 10th anniversary of the 2013 flood was held in Magdeburg, held by the German River Basin Community Elbe (FGG Elbe). The conference included a joint presentation by ICPER and FGG Elbe entitled "Flood risk management within ICPER and FGG Elbe".



Magdeburg Seminar, Karlovy Vary 2023 (source: Ohře River Board, s.e.)

On 11 and 12 October 2023, the 20th Magdeburg Seminar on Water Protection was successfully held in Karlovy Vary. The main topic was "Extreme hydrological events and their impacts on the Elbe River Basin".

Implementation of the Water Framework Directive, implementation of the Floods Directive, flood protection and emergency water pollution issues are still| the priorities of the ICPER.

Detailed information on the activities of the ICPER can be found at: www.ikse-mkol.org.

Convention on Cooperation for the Protection and Sustainable Use of the Danube River

This multilateral cooperation aimed at the Danube protection is one of the largest international activities in water



protection. The Convention on Cooperation for the Protection and Sustainable Use of the Danube River was signed on 29 June 1994 and entered into force on 22 October 1998.

The International Commission for the Protection of the Danube River (ICPDR) consists of 15 contracting parties that have committed themselves to implementing Convention on the Danube protection. The ultimate objectives are cooperation on basic water management issues with the view of ensuring that surface waters and groundwaters in the Danube River Basin are managed and used in a sustainable and equitable manner, and adoption of all appropriate legal, administrative and technical measures aimed at preserving and improving the quality of the Danube and its environment.

Two meetings were held at the level of the heads of delegations of the parties. The 21st ICPDR Steering Group meeting was held in Belgrade in June and the 25th ICPDR plenary meeting was held in Vienna in December. The June meeting included a workshop of heads of delegations and experts on drought and water scarcity. The Czech Republic hosted the workshop, given its long-standing engagement on this issue. The workshop was, among other things, a response to the severe drought in the Danube Basin in 2022. The states communicated their opinion on which aspects of drought management they consider coordination at ICPDR level necessary. The heads of delegations subsequently assigned the ICPDR secretariat with the task of elaborating a more detailed report proposing specific approaches for joint drought management. Furthermore, a strategic workshop for heads of delegation was held in November 2023, where participants reviewed the main achievements and challenges of the 30 years of cooperation in the Danube River Basin and reflected together on the main topics for the future.

Regular expert group meetings continued to take place. The Czech Republic has newly joined the expert group "Groundwater", where, for example, monitoring of transboundary groundwater bodies is coordinated, or experience with dealing with illegal abstractions are exchanged. The expert group for monitoring took charge of the

preparation of the upcoming Danube JDS 5.A successful test of the AEWS early warning system was also carried out.

Detailed information on the activities of the ICPDR can be found at: www.icpdr.org.

Agreement on the International Commission for the Protection of the Oder River against Pollution

The International Commission for the Protection of the Oder River against Pollution (ICPORaP) was established by the international Agreement on the International Commission for the



Protection of the Oder River against Pollution, concluded by governments of the Czech Republic, Poland and Germany and by the European Community on 11 April 1996. The Agreement entered into force after ratification on 26 April 1999. Following the accession of the Czech Republic and Poland to the European Union on 1 May 2004, the membership of the European Community in the ICPORaP was terminated by the Agreement on the Amendment to the Agreement on the ICPORaP adopted in Brussels on 27 November 2008.

The activity of the International Commission for the Protection of the Oder River against Pollution is focused especially on international coordination of meeting the requirements of the Water Framework Directive, flood protection and water pollution prevention. The work is carried out in working groups focused mainly on flood protection, accidental pollution, legal issues, monitoring and data management. A new ad hoc working sub-group 'Mining' was established (by resolution of the 24th Plenary Meeting of the ICPORaP on 2 December 2021) under a working group focused on implementation of the Water Framework Directive, as a new water management issue of trans-regional importance was identified, namely the need to address adverse environmental impacts of current and former lignite mining, particularly on groundwaters.

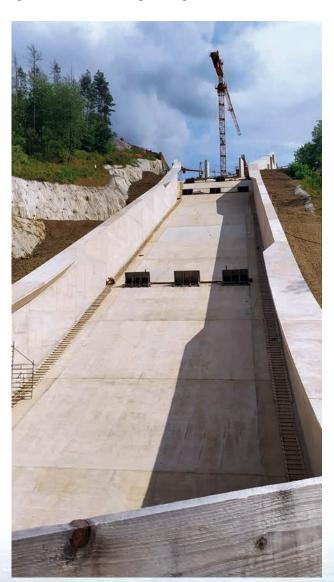
In early December 2023, the 26th Plenary Session of the ICPORaP was held in Wroclaw, the seat of the Secretariat, and was chaired by the President of the ICPORaP from the Federal Republic of Germany, who chairs the Commission from I January 2023 to 31 December 2025. In 2023, the ICPORaP focused on implementation of the Water Framework Directive, while preparations for the third update of the International Oder River Basin Management Plan (IORBMP) were initiated. In this context, a timetable and work programme were published for public consultation on 22 December 2023 for 6 months. In connection with the third cycle of implementation of the Floods Directive, the "Concept for the implementation of Directive 2007/60/EC on the assessment and management of flood risks in the MOPO – 3rd cycle from 2022 to 2027" was updated. At the 28th ICPORaP heads of delegation meeting in May 2023, an updated International Oder Warning and Alert Plan was approved and subsequently published. Other significant activities of the working group 'Emergency Pollution' include preparation of the Report on Events/Incidents Reported in the IORBMP and an update of the Oder Emergency Plan. An update of the ICPORaP Geoportal discussed at the "Data Management" working group meetings was also a major activity.

Detailed information on the activities of the ICPORaP can be found at: http://mkoo.pl/index.php?lang=CZ.

14.3 International cooperation of the Czech Republic on transboundary waters

The total length of the state border of the Czech Republic with neighbouring countries is 2,290 km. Approximately one third of the state border is referred to as the 'wet' border, which means that about 740 km of the state border are constituted by watercourses and water bodies. Within the framework of international cooperation on transboundary waters, the Czech Republic has international agreements with all neighbouring countries and implements them through the respective transboundary water commissions.

Transboundary waters are watercourses and water bodies that are crossed by the state border as well as watercourses which 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. In order to prevent any problems and disputes, the Czech Republic entered into international agreements with all its neighbouring countries.



Reconstruction of the Orlík slipway chute (author: Hubalová Petra)

The respective commissions for transboundary waters address issues such as regulation and maintenance of transboundary watercourses including construction and operation of structures on the watercourses, water supply and amelioration of border areas, protection of transboundary waters from pollution (including monitoring, joint measuring of the quality of transboundary waters, exchange of data and organising a warning service in case of emergency), hydrology and flood forecasting (including monitoring, joint measurements, exchange of data and organising a warning service in case of emergency), water management procedures regarding transboundary waters, protection of aquatic and littoral biotopes, the delimitation of national borders on transboundary watercourses, etc.

The results of the meetings of the commissions are always included in the Protocols, which are submitted to the relevant ministries for their opinion and they are subsequently approved by the Minister of the Environment.

Agreement between the Czech Republic and the Federal Republic of Germany on Cooperation on Transboundary Waters in the Field of Water Management

The Agreement was signed on 12 December 1995 and entered into force on 25 October 1997. Its implementation is carried out through the Czech-German Commission for Transboundary Waters (the Commission). With regard to the territorial division of the Federal Republic of Germany, the cooperation is conducted through the Standing Committee Bavaria and the Standing Committee Saxony under the umbrella of the Commission.

In 2023, the 25th meeting of the Bavaria Standing Committee was held in May, the 25th meeting of the Saxony Standing Committee was held in June and the 26th meeting of the Committee in October. In the framework of these meetings and the meetings of the working groups of the Standing Committees, the issue of elevated mercury concentrations in wash loads and sediments of the Czech-Bavarian transboundary watercourse Reslava (Röslau), which are subsequently deposited in Skalka Reservoir, continue to be intensively discussed, besides dozens of other intents. The measures implemented by the German party in the framework of the bilateral project, ended in 2021, were followed up in 2023 by measures implemented after their approval of the Reslava/ Röslau working group of the Bavarian Standing Committee. At the request of the Czech party, Bavarian experts arranged for implementation of an automatic sampling station, which is expected to be put into operation in spring 2024.

Within the framework of the Saxony Standing Committee, the project, AKWA-Impacts of Climate Change on Transboundary Water Bodies on the Czech-Saxon Border" was prepared by experts from both parties within the Czech-Saxon Cooperation Programme 2021–2027, which was approved at the Monitoring Committee meeting in November 2023. The main objectives of the project are to improve the status of selected border and transboundary surface water bodies and to increase resilience to climate change.

Other topics discussed included specific intents on transboundary waters concerning modifications and repairs

on transboundary waters, wastewater discharges, surface water and groundwater abstractions, small hydroelectric power plants, etc. Further joint transboundary projects aimed at improving the quality and quantity of surface waters, protection of the pearl mussel and thick shelled river mussel in transboundary waters and their river basins and implementation of the Water Framework Directive in transboundary waters were also discussed. Both parties exchanged information concerning the implementation of the Floods Directive at national levels and issues pertaining to the implementation of the Framework Directive for transboundary surface waters were discussed during the implementation of the Water Framework Directive.

Agreement between the Czechoslovak Socialist Republic and the Republic of Austria on Regulation of Water Management Issues on Border Waters

The Agreement was signed on 7 December 1967 and entered into force on 18 March 1970. The subject of the Agreement is performed through the Czech-Austrian Commission for Transboundary Waters that addresses current issues in transboundary waters of the two countries.

In 2023, all joint negotiations with the Austrian side were held in person. The usual issues concerning the maintenance of the transboundary watercourses and monitoring of their quality were discussed. One of the main topics was again the issue of the impact of the Austrian chemical plant in Pernhofen on the Thaya River and the prolonged drought affecting the conditions in Vranov Reservoir. A proposal for an update of the Directive for the warning service on the Czech-Austrian transboundary waters was also drafted, which the Commission planned to approve at its meeting in 2024.

Agreement between the Government of the Czech Republic and the Government of the Republic of Poland on Cooperation on Water Management of Transboundary Waters

The Agreement was signed on 20 April 2015 and entered into force on 5 October 2015. The Agreement is implemented through the Czech-Polish Commission for Transboundary Waters (the "Commission"). Within the Commission, five standing working groups were established, focusing on investment projects and concepts, hydrology, hydrogeology and flood protection, watercourse regulation, water supply and amelioration of lands situated on the Czech-Polish border, protection of border waters from pollution and implementation of the Water Framework Directive. Two expert groups were established: an expert group for hydrogeology of boundary waters in the area of the Inner Sudeten Basin and an expert group for addressing the impact of the Turów Coal Mine.

In 2023, the 7th regular meeting of the Commission was held in Liberec on 6–8 November. The expert group for groundwaters affected by the Turów Coal Mine was reactivated in 2022 and it informed about conclusions of its previous meeting held in July 2023. The expert group is responsible for classification and descriptive documentation of the objects of the joint groundwater level monitoring network and keeping it up-to-date, for vetting functionality of the springs and also for designing common hydrogeological sections, providing



The Provázané Dam – Vsetínsko (source: Forests of the Czech Republic, s.e.)

information on the status of the objects in the Czech Republic and in Poland, exchanging measured results and regular evaluation of the results of joint measurements.

Furthermore, the results of cooperation of all other working groups were discussed, for example, in the field of water management planning on border waters, flood control measures, exchange of hydrometeorological data and information, water management measures on border waters, assessment of the quality of border waters monitored in 2022, and cooperation with the Standing Czech–Polish committee. Additionally, information relating to drought and water scarcity management plans were exchanged for the first time.

Agreement between the Government of the Czech Republic and the Government of the Slovak Republic on Cooperation in Transboundary Waters

The Agreement was signed and entered into force on 16 December 1999 and is implemented through the Czecho-Slovak Commission for Transboundary Waters (the Commission). The Commission is divided into four working groups addressing technical issues, hydrology, water protection and the Water Framework Directive.

In May 2023, the 23rd session of the Commission was held in the Czech Republic. The meeting discussed the implementation of EU Directives (the Water Framework Directive and the Floods Directive) concerning Czech-Slovak transboundary waters. The first common transboundary groundwater body was approved - in the Czech Republic it is the "Quaternary of the Morava and the Thaya confluence area" and in Slovakia it is the "Intergranular groundwater of the Quaternary alluvial deposits of the Vienna Basin in the Danube River Basin". The meeting also addressed current issues of treatment and maintenance of borderline watercourses (e.g. repair of a boulder slide in the Morava River), assessment of water quality monitoring of border watercourses for 2022, hydrological issues and water management issues. Various projects were also discussed, such as the "Extension of the navigability of the Otrokovice-Rohatec Waterway" and a technical study for the "Completion and extension of the Skalica Wharf on the Bat'a Canal".

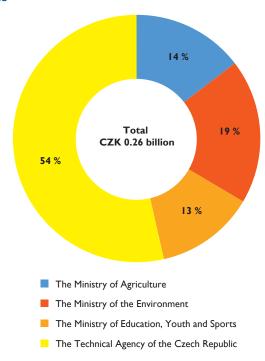


Voda pro všechny – Water for all – pupils of the second class of the Primary School of Special Needs and Kindergarten Palachova, Chomutov

15. WATER RESEARCH AND DEVELOPMENT

A number of research projects focused on water are carried out. This chapter is intended to present briefly research and development in the field of waters within the competence of the Ministry of Agriculture, the Ministry of the Environment and the Ministry of Education, Youth and Sports, which is funded by the central bodies either directly, in the form of institutional support or through the Technology Agency of the Czech Republic. Publicly accessible data on R&D projects and on institutional support provided for long-term conceptual development are available on the

Graph 15.1
Funds provided for water research and development in 2023



Source: MoA using data provided by the MoE and Ministry of Education, Youth and Sports



Ecosystem station, Lanžhot (source: CzeCOS)

website of the Information System of Research, Experimental Development and Innovation at www. rvvi.cz (Central Registry of Projects, Central Registry of Activities). The results obtained from research activities are available on the aforementioned website in the Information Registry of R&D results. In 2023, funding totalling almost to CZK 536 million was granted to research and development in the water sector. The Ministry of Agriculture contributed to the total amount with 14% (funds amounting to CZK 78.2 million), the Ministry of the Environment with 19% (funds of CZK 100.3 million), the Ministry of Education, Youth and Sports with 13% (funds amounting to CZK 69.2 million) and Technical Agency of the Czech Republic with 54% (funds for projects focused on wate and wate management amounting to CZK 287.8 million under the Environment for Life research programme under the Ministry of the Environment).

15.1 Research and development within the competence of the Ministry of Agriculture

In 2023, the Ministry of Agriculture provided specialpurpose and institutional funding aimed at implementing research and development projects and long-term conceptual development of research organisations in the field of water management in the amount of exceeding CZK 78.2 million.

In 2023, a total of CZK 57,009 thousand was spent on support of research and development projects. The R&D projects are mainly focused on soil and water conservation while adhering to sustainable development of the agricultural sector, creation, revitalisation and protection of cultural landscape, forests and water bodies, and rationalisation of water management, including addressing the impacts of climate change. An overview of current R&D projects is shown in Table 15.1.

The water research and development projects carried out in 2023 were the result of public tenders held under the departmental research programme entitled "Applied Research Programme of the Ministry of Agriculture for the period 2017–2025, EARTH" (the EARTH).

Specific objectives of the EARTH programme are defined by three key areas and nine research lines. The key area Sustainable Management of Natural Resources continues to be fulfilled, among others, by the research line 'Water'. The aim of this research direction is to achieve a good ecological and chemical status of surface waters and a good chemical and quantitative status of groundwaters, to increase retention and accumulation of surface waters and groundwaters, to reduce pollution risk and to protect water resources from pollution from point and non-point sources, to reduce contamination by micropollutants (pesticides, pharmaceuticals and others including their metabolites), to apply new technologies in the field of water

treatment and to recycle water in circulation. In addition, the Water research line is focused on optimising water management with the view of eliminating manifestations of hydrological extremes and to design a system of adaptation measures to mitigate them.

Within the framework of long-term development concepts of research organisations, some research organisations addressed, inter alia, the issue of water management. These are mainly the Research Institute for Soil and Water Conservation, p.r.i. and, to a lesser extent, the Crop Research Institute, p.r.i., the Forestry and Game Management Research Institute, p.r.i., and

the Research Institute of Agricultural Engineering, p.r.i. Institutions carrying out research in this sphere were supported with a total amount of CZK 21,219 million in 2023.

Publicly accessible data on R&D projects and on institutional support provided for long-term conceptual development are available on the website of the Research, Development and Innovation Information System https://www.isvavai.cz/ (CRP – Central Registry of Projects, CRA – Central Registry of Activities). Data on the results resulting from research activities are available in the Registry of Information on Results – RIV.

Table 15.1.1
Research and development projects in the field of water management funded by the Ministry of Agriculture in 2023

| Project No. | Project name | from-to | coordinator | funds (thousands CZK) |
|-------------|---|--------------------------|--|-----------------------------|
| QK1910086 | Reducing the burden in surface waters from areal sources of agricultural pollution when applying regulation of runoff at existing agricultural drainage structure | 01/01 2019 31/12 2023 | Research Institute for Soil and Water Conservation, p.r.i. | 2,971 |
| QK1910165 | Modern methods in irrigation of fruit trees during a water deficit | 01/01 2019 31/12 2023 | Výzkumný a šlechtitelský ústav ovocnářský Holovousy s.r.o. | 3,205 |
| QK1910282 | Options for mitigating impacts of extreme precipitation-runoff events in small catchments with respect to requirements for sustainable agricultural farming and fish production | 01/01 2019 31/12 2023 | Masaryk University | 3,465 |
| QK1910299 | Sustainable management of natural resources with emphasis on the non-productive and productive soil capacity | 01/01 2019 31/12 2023 | University of Life Sciences | 2,693 |
| QK1910334 | Innovation of environment-friendly system of maize growing using undersow crops for limiting soil degradation and improving water management during climate change | 01/01 2019 31/12 2023 | Mendel University in Brno | 3,555 |
| QK1910382 | Innovation in technologies of growing root crop and vegetables for more efficient use of rainwater and irrigation, better stability and quality of the production | 01/01 2019 31/12 2023 | Crop Research Institute, p.r.i. | 3,004 |
| QK21010189 | Implementation of ecosystem services with focus on water balance in viticulture | 01/01 2021 31/12 2025 | Crop Research Institute, p.r.i. | 3,399 |
| QK21010247 | Optimisation of management on unbalanced land by using effective mapping of soil conditions and taking into account changes in moisture conditions in order to stabilise yield levels | 01/01 2021 31/12 2024 | Research Institute for Soil and Water Conservation, p.r.i. | 2,726 |
| QK21010300 | Optimization of treatment technology of sludge from municipal wastewater treatment plants with regard to its chemical and microbial composition and water retention capacity with the aim of its safe use on agricultural and forest land | 01/01 2021 31/12 2024 | Technical University of Ostrava | 3,487 |
| QK21010310 | Evaluation of the possibility of using planned linear structures for implementing water transfers between basins and water supply systems | 01/01 2021 31/12 2024 | Research Institute for Soil and Water Conservation, p.r.i. | 2,765 |

| Project No. | Project name | from-to | coordinator | funds (thousands CZK) |
|-------------|---|------------------------------|---|-----------------------------|
| QK21010328 | Potential for the development of small water bodies in the landscape as adaptation measures to eliminate hydrometeorological extremes | 01/01 2021 31/012 2024 | Brno University of Technology | 3,057 |
| QK21010341 | Optimisation of a set of measures for agricultural catchment areas in the framework of the land consolidation process | 01/01 2021 31/12 2025 | Research Institute for Soil and Water Conservation, p.r.i. | 3,383 |
| QK21020022 | Comprehensive assessment of the application of treated sewage sludge in agriculture in terms of micropollutants | 01/01 2021 31/12 2023 | University of Life Sciences | 3,915 |
| QK21020080 | Fate of selected micropollutants present in treated water and sewage sludge in soil | 01/01 2021 31/12 2023 | University of Life Sciences | 4,028 |
| QK21020386 | Categorization and optimization of management of reclamation districts for increasing the retention function of forests | 01/01 2021 31/12 2023 | Forestry and Game Management Research Institute, p.r.i. | 1,225 |
| QK22010142 | Conservation of black poplar population and its use in water management and forestry | 01/2022 12/2025 | Silva Tarouca Research Institute for Landscape and Ornamental Gardening, p.r.i. | 3 229 |
| QK22010189 | Impact of deforestation on the water regime in small catchments | 01/2022 12/2025 | Forestry and Game Management Research Institute, p.r.i. | 2,974 |
| QK22020146 | Technical recommendations for water management within the forest transport network | 01/2022 12/2024 | University of Life Sciences Prague | 3,928 |
| Total | | | | 57,009 |

Source: MoA

15.2 Research and development within the competence of the Ministry of the Environment

In 2023, the Ministry of the Environment provided institutional support in a total amount of CZK 100,329,488 to its two research organisations in the field of water: the T. G. Masaryk Water Research Institute, p.r.i., and the Czech Hydrometeorological Institute with CZK 78,119,945 and CZK 22,209,543, respectively.

15.3 Research and development within the competence of the Ministry of Education, Youth and Sports

The Ministry of Education, Youth and Sports supports research and development in areas related to water management through the Joint Programming Initiative «Water for a Changing World» and the large research infrastructure projects CzeCOS and CENAKVA and related international cooperation projects of the Czech Republic in research and development. In 2023, funds amounting to more than CZK 69 million were provided.

Water JPI

In 2023, the Czech Republic continued to participate in activities of the "Water for a Changing World" Joint Programming Initiative (Water JPI), focused on wide research in the field of water and hydrological sciences. The Czech Republic has been its member through the Ministry of Education, Youth and Sports (the MoEYS) since 2018.

Large Research Infrastructure CzeCOS – Czech Carbon Observation Infrastructure

In 2023, 8 ecosystem stations were upgraded within the large research infrastructure CzeCOS (LRI CzeCOS) in order to standardize the accuracy of measurements according to the European Research Infrastructure Consortium ICOS ERIC criteria. Within this infrastructure, new sensors were installed, among others, to measure leaf moisture and groundwater depth, used for investigating the water regime in ecosystems. GEOMON, a small forest catchment monitoring network, consisting of 14 sites, was also equipped with new innovative elements. For example, the Slavkovský les site was enhanced with new lysimeters for soil water sampling. Targeted soil sampling took place in 10 river basins in 2023, with special attention paid to repeated sampling of forest soils in areas affected by bark beetle calamity, which also has a strong impact on the water regime of the forest. At the Domanínek site, so-called open chambers were renovated in 2023 and new types of soil moisture sensors and a new automatic irrigation control system were installed. The LRI also continued to share

its know-how in the field of water research with areas of the Global South. 2023 was also a successful year in terms of scientific texts produced in connection with LRI CzeCOS. Their total number reached 172 user and 8 operator texts, aimed at the development of the LRI CzeCOS.

Large research infrastructure CENAKVA – South Bohemian Research Centre for Aquaculture and Biodiversity of Hydrocenoses

2023 was a year of improvement of the CENAKVA's existing services, despite a smaller budget compared to 2022. In 2023, the CENAKVA Large Research Infrastructure (LRI CENAKVA) streamlined its capabilities in terms of access to open access infrastructure services. The nature of the services is mainly determined by the research, which is primarily focused on fish/crayfish farming, water sampling and optimisation of fish feeding and farming. The LRI CENAKVA was used for 48 such projects in 2023. Besides Czech researchers, they were also carried out by experts from 13 other countries, resulting in 39 expert technical articles for users 4 focused on the development of the LRI CENAKVA.

Czech participation in European research infrastructures

The Czech Republic, through the Ministry of Education, Youth and Sports, LRI CzeCOS and LRI CENAKVA, participates in several consortia of European research infrastructures such as AnaEE ERIC, ACTRIS ERIC, and ICOS ERIC. Furthermore, being a founding member state, the Czech Republic is also involved in preparation of consortia intended to manage the European research infrastructures DANUBIUS-RI and eLTER-RI. The Czech Republic's strategic location as a spring resource for several European river systems makes it a vital participator in sustainable water management on a global scale. In 2023, the European consortium DANUBIUS-RI incorporated a new component called "Hydrological Hub of Central Europe" located in the Czech Republic. The new component is built on the infrastructure provided by the CENAKVA and CzechGlobe research centres and aims at comprehensive research on freshwater ecosystem processes, with an emphasis on biodiversity conservation and protection of the aquatic environment. The unique services provided by the Czech component will contribute to research on the sustainability of water resource use at a pan-European scale.

Table 15.3.1
Research and development projects in water management funded by the Ministry of Education, Youth and Sports in 2023

| Project No./ designation | Acronym | Implementor, name | Funds (thousands CZK) |
|--------------------------------|------------|---|-----------------------------|
| | AnaEE-ERIC | AnaEE European Research Infrastructure Consortium | 2,476,522 |
| | ICOS ERIC | ICOS RI European Research Infrastructure Consortium | 1,610,699 |
| LM2023038 | CENAKVA | South Bohemian Research Centre for Aquaculture and Biodiversity of Hydrocenoses – large research infrastructure CENAKVA | 16,469,000 |
| LM2023048 | CzeCOS | Czech Carbon Observation System – CzeCOS Large Research Infrastructure | 48,634,000 |
| Total | | | 69,190,221 |

Source: MoEYS



The Elbe Stream (source: CENAKVA)

15.4 Research and development within the competence of the Technology Agency of the Czech Republic

In addition to institutional support, the Ministry of the Environment has administered a research programme called «Environment for Life» since 2019. The programme is aimed at supporting applied research, experimental development and innovation in the environment. The provider and implementor of the programme is the Technology Agency of the Czech Republic. The duration of the programme, with a total allocation of CZK 4.46 billion, is seven years, i.e., until 2026. Half of the expenditures of the programme is



Rescue Transfer of Animals (source: Elbe River Board, s.e.)

intended for research related to climate change. In 2023 the support granted to projects amounted to CZK 287.8 million.

Table 15.4.1
Research and development projects in water management supported by the Ministry of the Environment in 2023 under the seventh call of tenders of the Environment for Life Programme in SPI

| Project No. | Project name | Main implementor | Funds (thousands CZK) |
|----------------|---|--|-----------------------------|
| SS07010095 | Efficient and sustainable handling of food waste in municipalities | T. G. Masaryk Water Research Institute, p.r.i. | 9,245 |
| SS07010401 | Water management analysis of restoring natural floodplains and increasing the transformation effect of valley floodplains | Global Change Research Institute CAS, p.r.i. | 11,316 |
| SS07010336 | Assessment of environmental contamination by ski waxes with per- and polyfluorinated substances and their impact on adjacent drinking water sources in protected areas | Charles University | 10,369 |
| SS07010087 | Optimisation of extensive wastewater treatment technologies in the light of increasing demands on the quality of wastewater discharged | Brno University of Technology | 9081 |
| SS07010295 | Microplastics in surface waters – identification, quantification and analysis of input pathways | T. G. Masaryk Water Research Institute, p.r.i. | 8,490 |
| SS07010347 | Use of different types of restoration measures and management practice modifications to promote water retention and biodiversity in forests in the context of ongoing climate change | Ekologické služby, s.r.o. | 14,999 |
| SS07010037 | Restoration of springs – retention of water in the landscape at the source | University of South Bohemia in České Budějovice | 7,441 |
| SS07010080 | Incorporating the concept of ecosystem services assessment into future river basin management plans | Mendel University in Brno | 14,241 |
| SS07010182 | Assessing the significance of the impact of health care facilities on micropollutant loads at municipal wastewater treatment plants | Ekologické služby, s.r.o. | 14,253 |
| SS07010132 | New risks come, but old risks remain: Assessment of contamination of aquatic biota by pollutants with possible impact on human health, including detection of input pathways from former and current sources. Model example of the Ohře River Basin | Biology Centre CAS, p.r.i. | 10,805 |
| SS07010208 | Research on identification and quantification of selected PFAS in surface waters | T. G. Masaryk Water Research Institute, p.r.i. | 11,853 |
| Total | | | 122,093 |

Source: Technology Agency of the Czech Republic

Table 15.4.2
Research and development projects in the field of water management supported by the Ministry of the Environment under the seventh public tender of the Environment for Life programme in 2023 in SP2

| Project No. | Project name | Main implementor | Funds (thousands CZK) |
|-------------|--|--|-----------------------------|
| SS07020013 | Innovative technology for quaternary treatment of municipal wastewaters | ASIO TECH, spol. s r.o. | 9,105 |
| SS07020146 | Long-term reliable production of quality drinking water using activated carbon while respecting the concept of circular economy | DEKONTA, a.s. | 7,167 |
| SS07020469 | Updating the numbers of runoff curves as prevention of floods and droughts in the Czech Republic | Research Institute for Soil, p.r.i. | 11,337 |
| SS07020223 | New generation methods for highly sensitive and rapid detection of faecal pollution and antibiotic resistance for support of circular water management | University of Chemistry and Technology, Prague | 12,079 |
| SS07020258 | Recycling phosphorus from sludge water in a form suitable for agricultural use | KUNST, spol. s r.o. | 10,098 |
| SS07020226 | Increasing water retention in grassland in tramway tracks with the aim of reducing the need for irrigation | Research Institute of Agricultural Engineering, p.r.i. | 7,610 |
| SS07020159 | Optimisation of the operating parameters of urban wastewater treatment plants with the aim of intensifying micropollutant removal in the quaternary stage | Technical University of Liberec | 9,442 |
| SS07020008 | Development of non-selective ecological preparations intended for protection of wastewater treatment plant infrastructure against microbial activity | Czech Technical University in Prague | 6,462 |
| SS07020145 | Pilot application of iron nitride nanoparticles for reductive dechlorination of groundwater contaminated with chlorinated ethylenes | Palacký University Olomouc | 12,639 |
| SS07020009 | Design of paved surfaces for capturing and subsequently using rainwater for its surface cooling and microclimate improvement | Prefa Brno a.s. | 10,079 |
| SS07020018 | Algal meadows: bioremediation technology for ecological restoration of aquatic habitats | Biology Centre CAS, p.r.i. | 10,515 |
| SS07020460 | Innovative technologies for more efficient infiltration of rainwater and support of year-round greening of areas on agricultural land | Research Institute of Agricultural Engineering, p.r.i. | 10,217 |
| SS07020166 | Increasing the efficiency of drinking water production using artificial intelligence | Želivská provozní a.s. | 8,716 |
| SS07020024 | Use of biologging tools and freely available data sources to assess habitat quality, existential risks and effective conservation planning for birds threatened by water loss in the landscape | University of Life Sciences | 9,468 |
| SS07020356 | Aerator with ring-jump to eliminate the adverse effects of anoxic water for life in the aquatic environment | Czech Technical University in Prague | 6,540 |
| SS07020091 | Artificial floating islands to provide alternative nesting sites for threatened and declining waterbird species | University of Life Sciences | 9,352 |
| SS07020436 | Identification and management of point sources of PFAA input to the anthropogenic water cycle | University of Chemistry and Technology, Prague | 11,714 |
| Total | | | 162,540 |

Source:Technology Agency of the Czech Republic

The programme is divided into three sub-programmes:

- Support for projects in public interest (SPI)
- New procedures, environmental technologies, ecoinnovation (SP2)
- Long-term research (SP3)

In 2023 (on 13 July 2023), the seventh call for tenders was announced with the receipt of applications by 13 September 2023. A total sum of CZK 523 million was allocated to SPI and CZK 450 million to SP2. A total of 38 Priority Research Objectives (PROs) were set for SP1, 26 PROs for SP2. A total of 308 project proposals were submitted to the call for

tenders, of which 99 project proposals (45 in SPI and 54 in SP2 were supported), which means a success rate of 32%. The supported water projects are listed in Table 15.4.1 and Table 15.4.2.

In the field of research, the MoE also uses the "Public Procurement Programme in Applied Research and Innovation for the Needs of the State Administration BETA2 (2017–2024)". No new projects were supported in 2023 as this programme is coming to an end. Table 13.4.3 shows an overview of the currently running research projects commissioned on the basis of the needs of the MoE.

Table 15.4.3
Research and development projects in the field of water management funded by the Technology Agency of the Czech Republic (BETA2) for the Ministry of the Environment in 2023

| Project No. | Project name | from-to | Main implementor | Funds (thousands CZK) |
|-------------|--|------------------------------|---|-----------------------------|
| TITSMZP945 | Analysis of water regime change of land and streams in the Krkonoše National Park caused by the road network | 9. 12. 2021 - 31. 5. 2024 | T. G. Masaryk Water Research Institute, p.r.i. | 3,149 |
| Total | | | | 3,149 |

Source: Technology Agency of the Czech Republic



Ecosystem station, Třeboň (source: CzeCOS)

Selected interesting data for 2023

- Basic hydrological network 99,147 km of watercourses
- · Funds expended on watercourse management (the River Boards, Forests of the Czech Republic, s.e.): CZK 3.6 billion
- River Boards:
 - Revenues: CZK 6.431 billion (9% increase)
 - Costs: CZK 6.136 billion (9.3% increase)
 - Investment: CZK 2.785 billion 6% increase) of which 1.905 billion from own resources (68%)
 - Grants: CZK 1.660 billion
 - Number of small hydroelectric power plants: 106
- Land consolidation implementation in the amount of CZK 1.7 billion, of which CZK 358 million for water management measures, CZK 116 million for anti-erosion measures
- Water supply and sewerage:
 - Population supplied with drinking water: 10.3 million (94.5%), connected to sewerage system: 9.4 million (86.7%)
 - Water consumption water invoiced to households 86.7 l/person/day (year-on-year decrease of 2.7 l/person/day)
 - Length of the water supply network 81,426 km (extended by 421 km compared to the previous year)
 - Length of the sewerage network 52,367 km (extended by 799 km compared to the previous year)
 - Number of wastewater treatment plants: 2,959 (year-on-year increase of 44)
 - Water charges: average price 53.10 CZK/m³
 - Sewerage: average price 48.40 CZK/m³
- State financial support in the field of water management: CZK 11,168 million (year-on-year decrease of 1.75%)
 - Programmes of the Ministry of Agriculture: CZK 3,466 million
 - o 13 national programmes (CZK 3,262 million) + 3 transnational programmes (CZK 204 million)
 - Programmes of the Ministry of the Environment: CZK 6,985 million
 - o Operational Programme Environment 2014–2020, water management (CZK 4,168 million), State Environmental Fund (CZK 2,817 million)
 - Support from the Ministry of Transport: CZK 521 million
 - o State Transport Infrastructure Fund (CZK 521 million)
- Science and research in water management: CZK 535 million
 - MoA: CZK 78 million
 - MoE: CZK 100 million
 - MoEYS: CZK 69 million
 - Technology Agency of the Czech Republic: CZK 288 million

Acronyms

| AOX | adsorbable organically bound halogenated compounds (halogens) |
|------------------|--|
| APSFR | Areas of Potential Significant Flood Risk |
| Bq | Becquerel |
| BOD _s | biochemical five-day oxygen demand |
| BPR | biological phosphorus removal |
| CAS | Czech Academy of Sciences |
| CEB | Council of Europe Development Bank |
| CEF | Connecting Europe Facility |
| CEI | Czech Environmental Inspection |
| CENAKVA | South Bohemian Research Centre for Aquaculture and Biodiversity of Hydrocenoses |
| CHMI | Czech Hydrometeorological Institute |
| COD | chemical oxygen demand |
| CPR | chemical phosphorus removal |
| CRA | Central Registry of Activities |
| CRF | Compulsory Requirements for Farming |
| CRP | Central Registry of Projects |
| CRW | Central Register of Watercourses |
| CSNF | Cultural and Social Needs Fund |
| CSO | Czech Statistical Office |
| CZ-NACE | Classification of economic activities according to the CSO (in accordance with Eurostat standards) |
| CzeCOS | Czech Carbon Observation Structure |
| ČSN | Czech State Standard |
| DDT | Dichlorodiphenyltrichloroethane |
| DEHP | di(2-ethylhexyl)phthalate |
| DIS | dissolved inorganic salts |
| DN | denitrification |
| eAgri | website of the Ministry of Agriculture |
| EAFRD | European Agricultural Fund for Rural Development |
| EC | European Commission |
| ECB | European Central Bank |
| EC _m | monthly exceedance curve |
| EIA | Environmental Impact Assessment |
| EP | equivalent population |
| EQS | Environmental Quality Standard |
| ERDF | European Regional Development Fund |
| ESA | ethane sulfonic acid |
| | |

| EU | European Union | |
|--------------------|---|--|
| FAD | flood activity degree | |
| FAO | Food and Agriculture Organization of the United Nations | |
| HGR | hydrogeological region | |
| HS | hydraulic structure | |
| ICPDR | International Commission for the Protection of the Danube River | |
| ICPER | International Commission for the Protection of the Elbe River | |
| ICPORaP | International Commission for the Protection of the Oder River against Pollution | |
| i.o. | interest organization | |
| ISVS | Information System for Public Administration | |
| JPI | Joint Programming Initiative | |
| LC | lock chamber | |
| LRI | large research infrastructure | |
| MoA | Ministry of Agriculture | |
| MoE | Ministry of the Environment | |
| МоН | Ministry of Health | |
| N | nitrification | |
| N _{inorg} | inorganic nitrogen | |
| NM | non-dissolved matters | |
| N-NH ₄ | ammoniacal nitrogen | |
| N-NO ₃ | nitrate nitrogen | |
| NRP | National Recovery Plan | |
| NVA | nitrate vulnerable areas | |
| OA | Oxamic acid | |
| OPE | Operational Programme Environment | |
| PAH | polyaromatic hydrocarbons | |
| PBDE | polybrominated diphenyl ethers | |
| PCB | polychlorinated biphenyls | |
| PFOS | perfluorooctane sulfonic | |
| p.r.i. | public research institution | |
| PRO | priority research objective | |
| P _{total} | total phosphorus | |
| Q _m | average monthly flow rate | |
| Q _{355d} | flow that was reached or exceeded on average 355 days per year in a given profile and whose exceedance is indicative of hydrological drought | |

| Q _{364d} | flow that was reached or exceeded in the profile throughout the year |
|-------------------|--|
| RDP | Rural Development Programme |
| RIV | Registry of Information on Results |
| RWSSDP | Regional Water Supply and Sewerage Development Plans |
| s.e. | state enterprise |
| s.r.o. | limited company established under Czech law |
| SEA | Strategic environmental assessment |
| SEF | State Environmental Fund of the Czech Republic |
| SLO | State Land Office |
| SPI | Support for projects in public interest |
| SP2 | New procedures, eco-innovation |
| SP3 | Long-term research |
| STIF | State Transport Infrastructure Fund |

| TOC | total organic carbon |
|---------|---|
| UNECE | United Nations Economic Commission for Europe |
| VAT | value added tax |
| VÚME | Selected data from Public Water Supply and Sewerage Systems Assets Registry |
| VÚPE | Selected data from Public Water Supply and Sewerage Systems Operational Registry |
| WSS | Water supply and sewerage for public use |
| WSS Act | Act No. 274/2001 Coll., on water supply and sewerage for public use and on amendments to certain related acts, as amended |
| WSSDP | Water Supply and Sewerage Development Plans in the Czech Republic |
| WWTP | wastewater treatment |



Dead-End Branch Opočínek after Revitalization (source: Elbe River Board, s.e.)

Important contacts in water management

Ministry of Agriculture

Těšnov 65/17, Prague I, IIO 00, www.mze.gov.cz

Ministry of the Environment

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

VItava River Board, state enterprise

Holečkova 3178/8, Prague 5, 150 00, 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, 602 00, www.pmo.cz

Forests of the Czech Republic, s.e.

Přemyslova 1106/19, Hradec Králové, 500 08, www.lesycr.cz

Czech Hydrometeorological Institute

Na Šabatce 2050/17, Prague 412 – Komořany, 143 06, www.chmi.cz

T. G. Masaryk Water Research Institute, p.r.i.

Podbabská 2582/30, Prague 6, 160 00, www.vuv.cz

State Land Office

Husinecká 1024/11a, Prague 3 – Žižkov, 130 00, www.spucr.cz

Research Institute of Melioration and Soil Conservation, p.r.i.

Žabovřeská 250, Prague 5 – Zbraslav, 156 27, www.vumop.cz



Geodetic round prism on Orlík (author: Hubalová Petra)



The Ohře Stream below the Nechranice Reservoir (source: Ohře River Board, s.e.)

Report on Water Management in the Czech Republic in 2023

As of 31 December 2023

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

A team of authors: Ing. Petra Hubalová, Ing. Tereza Slámová

Editor-in-Chief: Ing. Daniel Pokorný Ing. Jan Kocián Ing. Petra Hubalová

Production: KLEINWÄCHTER holding s.r.o., Frýdek-Místek

Not for sale

ISBN 978-80-7434-773-3

Photos by:

Cover photo – The Hučák Weir with the Hydroelectric Power Plant on the Elbe Stream (source: Elbe River Board, s.e.)

Published by the Ministry of Agriculture of the Czech Republic Těšnov 17, 110 00 Prague 1, Czech Republic Website: www.mze.gov.cz, e-mail: info@mze.gov.cz

