PILOT ACTION 9: PODYJI NATIONAL PARK IN THE DYJE RIVER BASIN, CZECH REPUBLIC

OUTPUT O.T3.11

WORK PACKAGE T3 - IMPLEMENTATION AND FEEDBACK - TOOLBOX VERIFICATION

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Table of Contents

1. Introduction

Testing of the Toolbox beta version by project partners (PPs) in pilot actions (PAs) will provide:

- documented learning experience, where PPs from different countries and disciplines will verify the Toolbox applicability and
- an important communication tool where project results will enable important outreach and key post-project capitalization leverage supporting bottom-up participatory principles in water management planning processes, generally drafted by the Common Implementation Strategy for the Water Framework Directive (WFD CIS No.11).

The Toolbox will also be tested by stakeholders during training workshops and in the post-training implementation phase, when strategies will be discussed. These stakeholder interactions will enable clarification of needs and provide recommendations for Toolbox improvements (bottom-up approach) and for direct local and regional implementation of the Toolbox.

2. Basic data about pilot action

The following text is a synopsis of publicly available documents and maps. Maps were formatted in the ArcGIS platform and exported as image files. Links to the source online map repositories are provided in the capture of the respective figures.

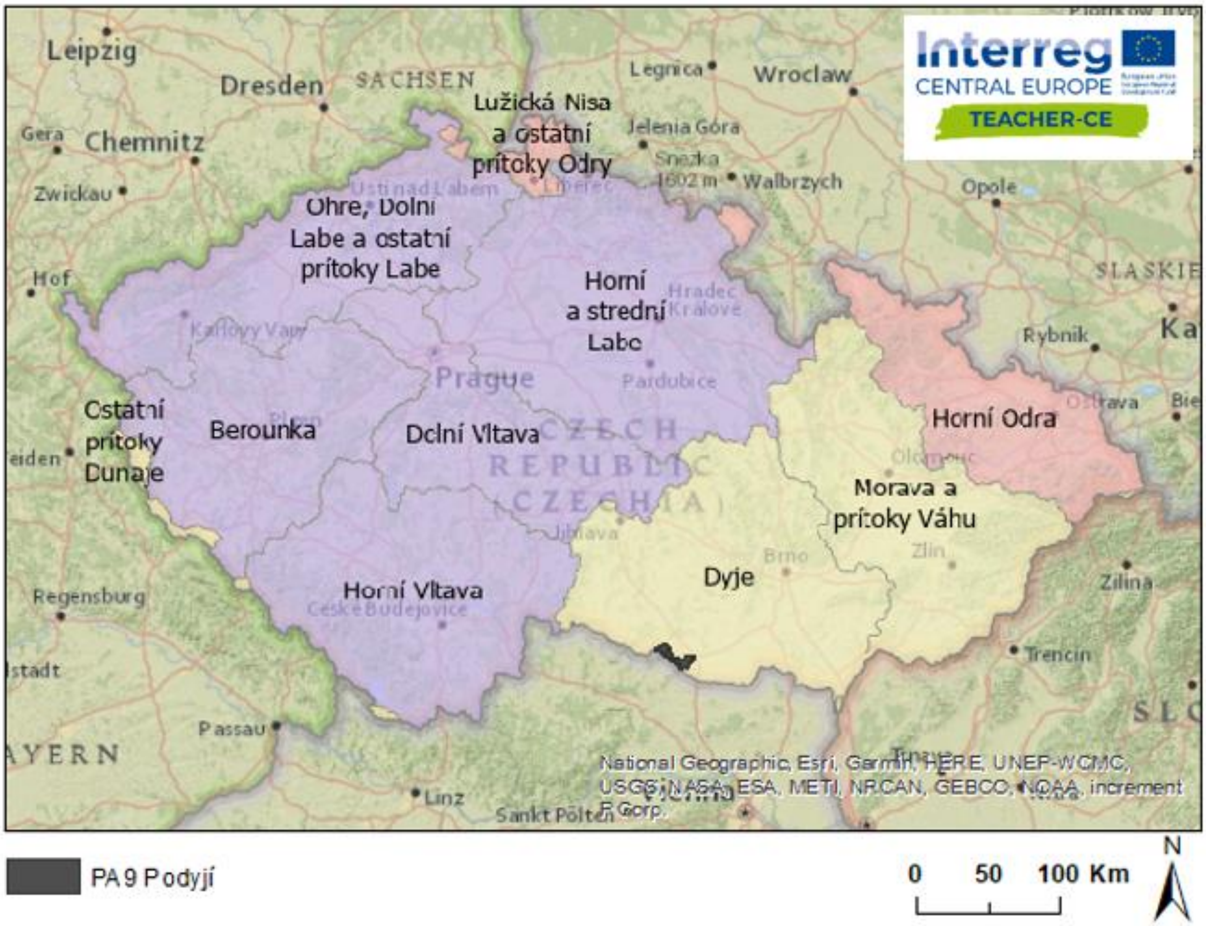
Primary sources (in Czech):

- Plán oblasti povodí Dyje. Part A. Popis oblasti povodí. Anonymous. Povodí Moravy, 2009, 159 p.
- Návrh Plánu dílčího povodí Dyje. Comprehensive document, 3rd period, 2021 – 2027, available at http://pop.pmo.cz/cz/stranka/plany/
- Plán péče o národní park Podyjí a jeho ochranné pásmo 2012–2020. Lenka Reiterová and Martin Škorpík (editors). Správa národního parku Podyjí, Znojmo, 2012, 316 p.

2.1. Geographical description

The Dyje river basin district is the second largest of the eight river basin districts in the Czech Republic, the administrator of the Dyje river basin district is Povodí Moravy, s.p. The Dyje river basin district is a hydrological sub-basin of Morava river; it forms the Czech part of the international area of the Danube basin. Its geographical location is provided in the map 2.1.a.

MAP 2.1.a. Geographical location of the Dyje river basin.



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The river basin is fan-shaped, asymmetrically developed in relation to the river Dyje. It borders the Morava riven basis on the Northeast and the East site. In the North and Norwest parts, it is adjacent to the areas of the Upper and Middle Laber, the Lower Vltava and the Upper Vltava along the North and Black Sea junction. On Southwest, the Dyje river basin borders the respective district in the territory of the Republic of Austria.

The largest distance in the North - South direction of the river basin is 134 km, and 150 km in the East - West direction 150 km. The river basin consists of 11 basic river basins of the 3rd order; it does not contain partial parts of the river basin Danube situated in Bohemia.

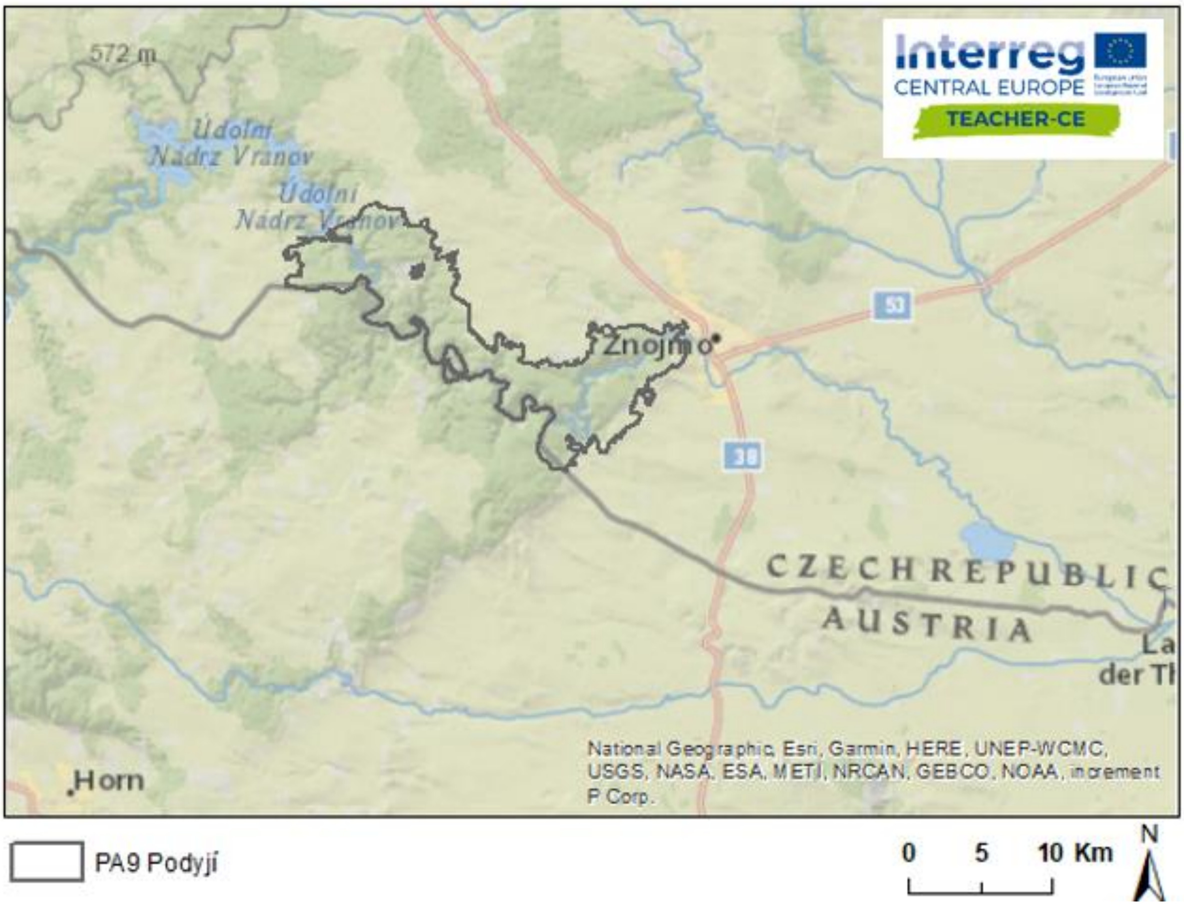
The area of the Dyje river basin in the Czech Republic covers a total of six regions - South Moravia (approx. 55.2%, 20 municipalities), Vysočina (approx. 34.3%, 12 municipalities), South Bohemia (approx. 4.5%, 2 municipalities), Pardubice (approx. 4.4%, 6 municipalities), Zlín (approx. 1.1%, 2 municipalities), and Olomouc (approx. 0.5%, 2 municipalities).

The area of the Dyje river basin is not very rugged. This is due to the fact that its highest positions are situated in the Bohemian-Moravian Highlands. The highest point of the Dyje catchment area lies on its western border of the main European watershed of the Danube and the Elbe (peak Javořice 837 m above sea level). At the mouth of the Dyje to Morava, the elevation of the terrain is about 150 m above sea level, which is the lowest point of the Dyje river basin. As much as 90% of the catchment area reaches altitudes between about 150 and 600 m above sea level; less than 1% of the territory then exceeds the terrain height of 800 m above sea level.

Podyjí National Park is located on the southwestern edge of the South Moravian Region and belongs to the district of Znojmo. The territory of the Park follows the flow of the river Dyje between Vranov nad Dyjí and Znojmo in the length of 42 km. On the western and eastern edges, the territory consists of areas surrounded by the respective banks of the river. In most of the territory (34 km of the river), the Dyje forms the state border between the Czech Republic and Austria; the territory of the Podyjí National Park lies only on its left bank. Total area of the Podyjí National Park is 6276 ha, the area of the protection zone is 2822 ha (I. zone: 2201 ha, 35%, II. zone 2282 ha, 36%, and III. zone 1793 ha, 29%.

Podyjí National Park is located in the South Moravian Region, in the Znojmo District. It is spread over 16 cadastral territories, which belong to 12 administrative municipalities: Hnanice, Havraníky, Popice u Znojma, Konice u Znojma, Sedlešovice, Znojmo-město, Znojmo-Hradiště, Mašovice u Znojma, Podmolí, Lukov nad Dyjí, Čížov, Horní Břečkov, Lesná u Znojma, Onšov na Moravě, Vranov nad Dyjí, and Podmyče.

<u>MAP 2.1.b.</u> Geographical location of the Podyjí National Park.



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2.2. Climate characteristics

The Podyjí area's climatic conditions are given by its location in the temperate zone with regular alternating four seasons and combining oceanic and continental climates. The Dyje river basin's whole area consists of warm, moderately warm, and marginally climatic regions. Slightly warm areas occur in about the northwestern half of the basin. The average long-term total precipitation of the Dyje river basin is 590 mm. The month of June is the richest in rainfall with total rainfall of 77 mm (long term average), followed by May and July with the same total of 70 mm. The most deficient months are February and March, with long-term total precipitation of 33 mm. Only slightly higher rainfall occurs in October when it reaches the average total of 36 mm.

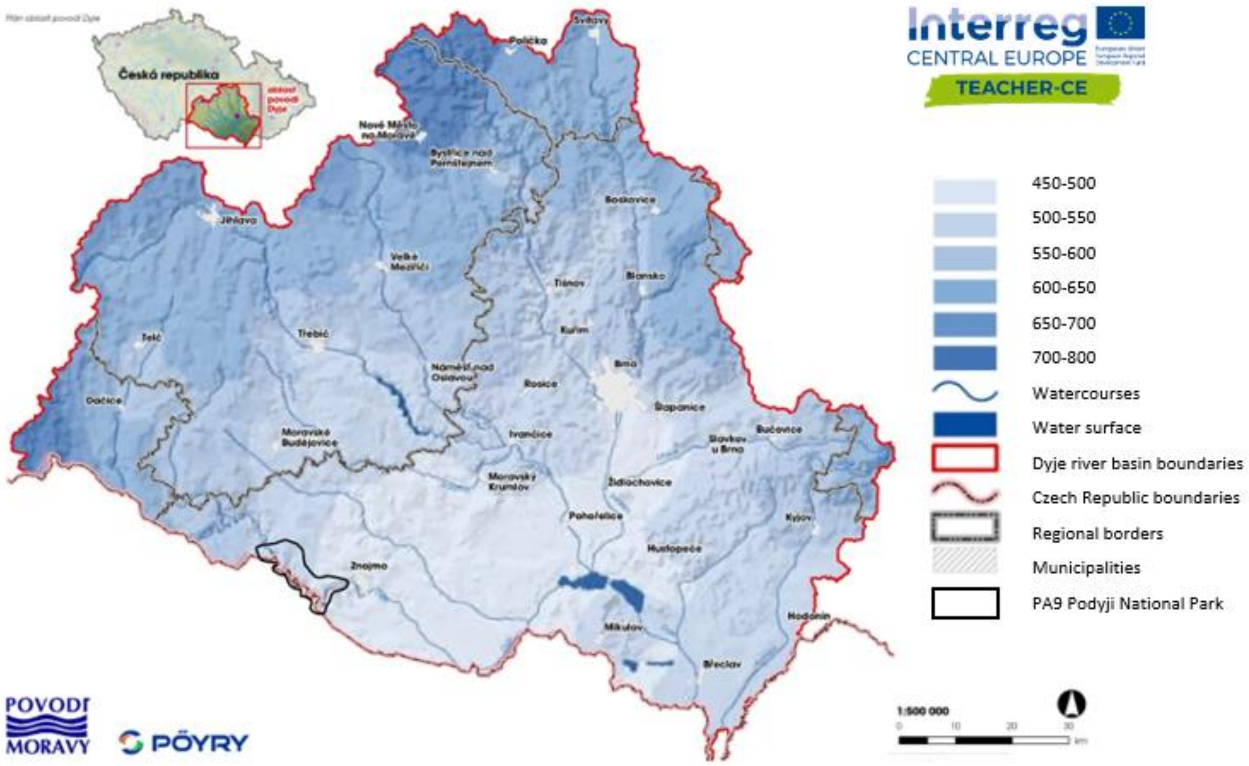
The average long-term annual air temperature in the Dyje river basin is 7.8°C, the coldest month is January, with an average long - term air temperature of 2.8°C. The warmest month is July, with an average long-term air temperature of 17.5°C.

Climatically, the Podyjí National Park territory falls into moderately warm (MT) and warm (T) areas. The northwestern part belongs to the district of MT 9 with long warm, dry to slightly dry summers, a short transition period, and short, mild, dry winters with a brief snow cover duration. The middle part is arranged in the district MT 11 with a long warm and dry summer, a short transition period, a short, moderately warm, and arid winter with a short snow cover duration. The NP's southeastern part falls into the district T2 with a long warm and dry summer, a brief transition period, and a short, moderately warm, dry to arid winter with short snow cover duration.

The climatic gradient between the western and eastern edges of the park increases the material influence in the Bohemian-Moravian Highlands' west mountains (reduced average annual temperature and the total precipitation due to the rain shadow of mountains). In the east, the territory is opening to eastern Znojmo's plain with a significant continental trend of the climate (more pronounced upper and lower temperature extremes and a small amount of precipitation).

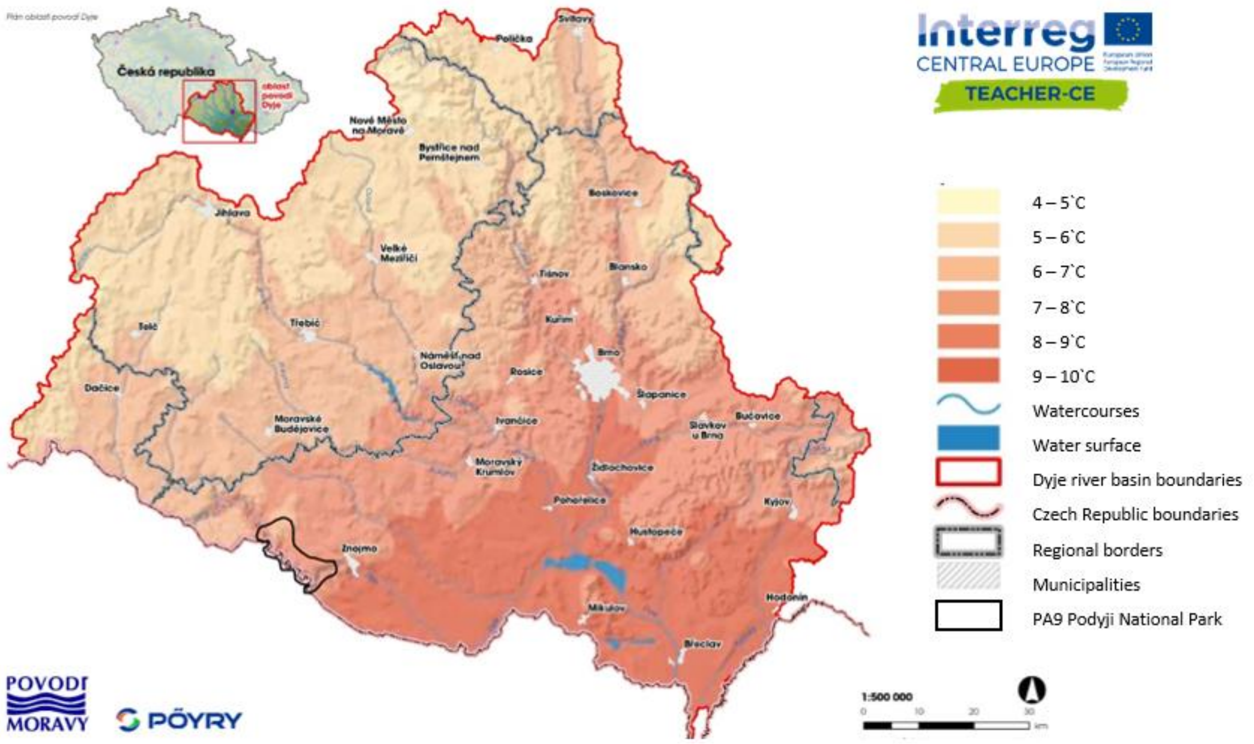
The NP's average annual temperature is around 8-9°C in the western and eastern parts. Total precipitation in the Vranov region is close to 600 mm, and 530 mm in Znojmo. Mesoclimatically significant is the existence of a deep inverse valley of the river Dyje. Temperatures at the bottom of the valley can be up to 1–3°C lower than its upper edge.

MAP 2.2.a. Annual precipitation in the Dyje river basin.



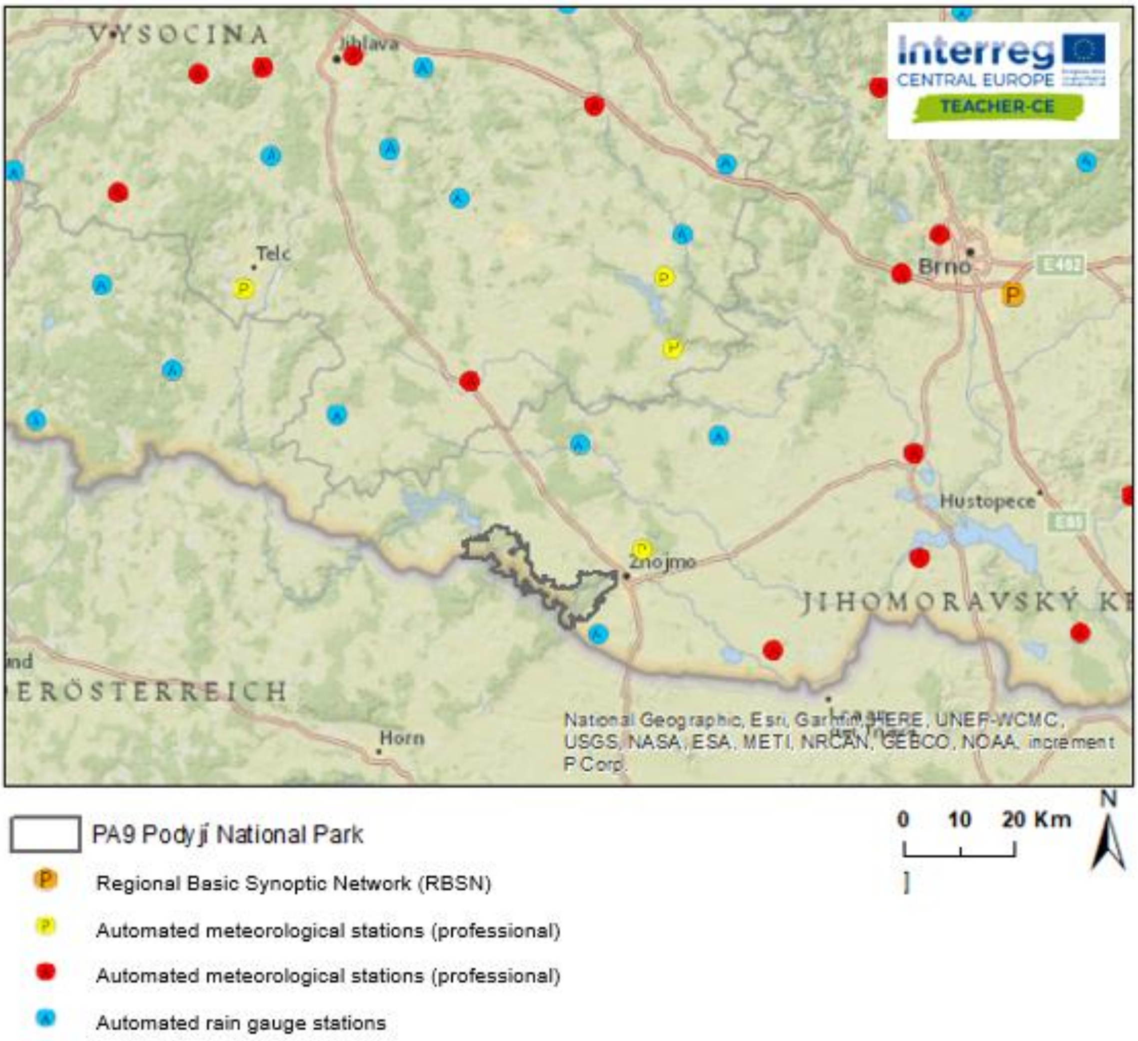
http://www.pmo.cz/pop/2009/Dyje/end/a-popis/mapy/ma_1_8a.jpg

MAP 2.2.b. Mean annual temperature in the Dyje river basin.



http://www.pmo.cz/pop/2009/Dyje/end/a-popis/mapy/ma_1_8f.jpg

MAP 2.2.c. The location of meteorological measuring points near Podyjí National Park.



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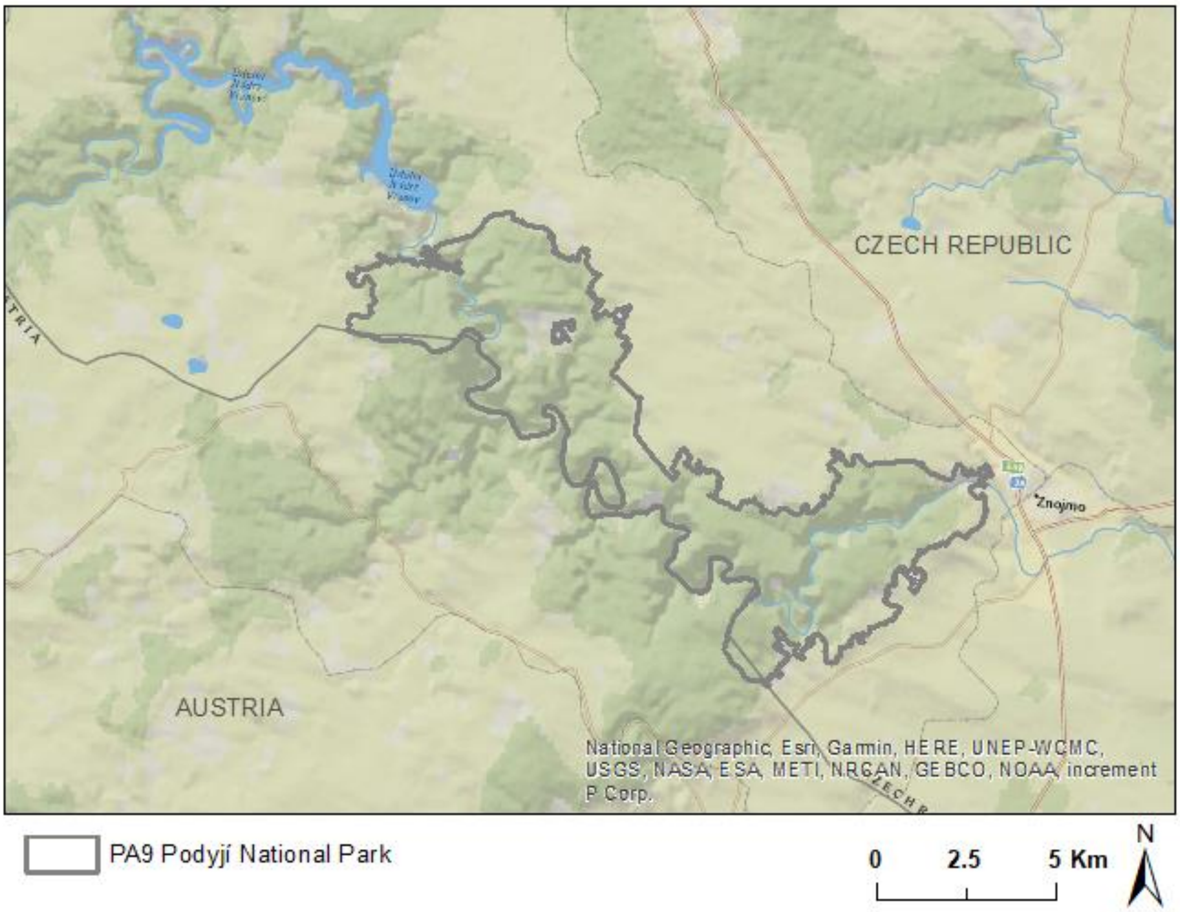
2.3. Hydrology

2.3.1. Surface waters

From the hydrological point of view, the Dyje and Morava river basin areas belong to the Black Sea basin. The water drains through the river Dyje to Morava and further to the Danube. The spring area is the eastern and southern part of the Bohemian-Moravian Highlands. The river network density in the western part of the Dyjsko-svratecký úval is one of the lowest in the whole Czech Republic.

Due to the melting of snow, watercourses reach maximum flows, mainly in March, minimum flows depend on the nature of the flow from June to October. Peat bogs and peat meadows have an essential role in dozens of locations along the main European watershed apex. Their total area is about 850 ha. Water reservoirs built on most rivers flowing from Bohemian-Moravian Highlands serve retention purposes, i.e., water reservoirs near Nové Mlýny on the Dyje and near Dalešice in Jihlava. Ponds in southern Moravia, which are also of considerable hydrological and climatic importance, are maintained mainly in the broader vicinity of Lednice (the largest Nesyt, 307 ha).

<u>MAP 2.3.a.</u> Map of the surface waters in Podyjí river basin.



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Two surface water objects are fundamental to the national park Podyjí: the river Dyje with its water reservoir Vranov in the river's upper flow in the national park's northwestern direction. The capacity of reservoir Vranov (est. 1934) is 132,696 mil. m^3, area: 762,5 ha.

Dyje has been most altered by human activity, and some changes are, unfortunately, irreversible. The intention was to minimize by all appropriate means the influence of the Vranov dam and the power plant regime on the biota of the river Dyje, which will eventually be left to natural development. The total length of the river Dyje in Podyjí National Park territory and its protection zone is 43.95 km, of which the common border with Austria is 23.4 km. The average slope of the river is about 4°. Average flow in the profile Vranov – Hamry Qa = 9.73 m^3/s, in profile Znojmo Qa = 9.79 m^3/s. The river Dyje (length in NP 42.72 km) is closed between two waterworks - Vranovská and Znojmo dam. The most significant influencing factor for the aquatic ecosystem is the existence of Vranovská dams, particularly the operation of a hydroelectric power plant operating in peak mode (18.9 MW).

2.3.2. Flooding

In general, natural floods can be divided into three groups according to the causes of their occurrence. They are (1) winter and spring floods caused by melting snow or heavy drifts; (2) summer floods caused by short heavy rains - they are most pronounced in small river basins and are therefore mostly local; (3) summer floods caused by permanent heavy rains - they occur mainly in large river basins and are consequently regional.

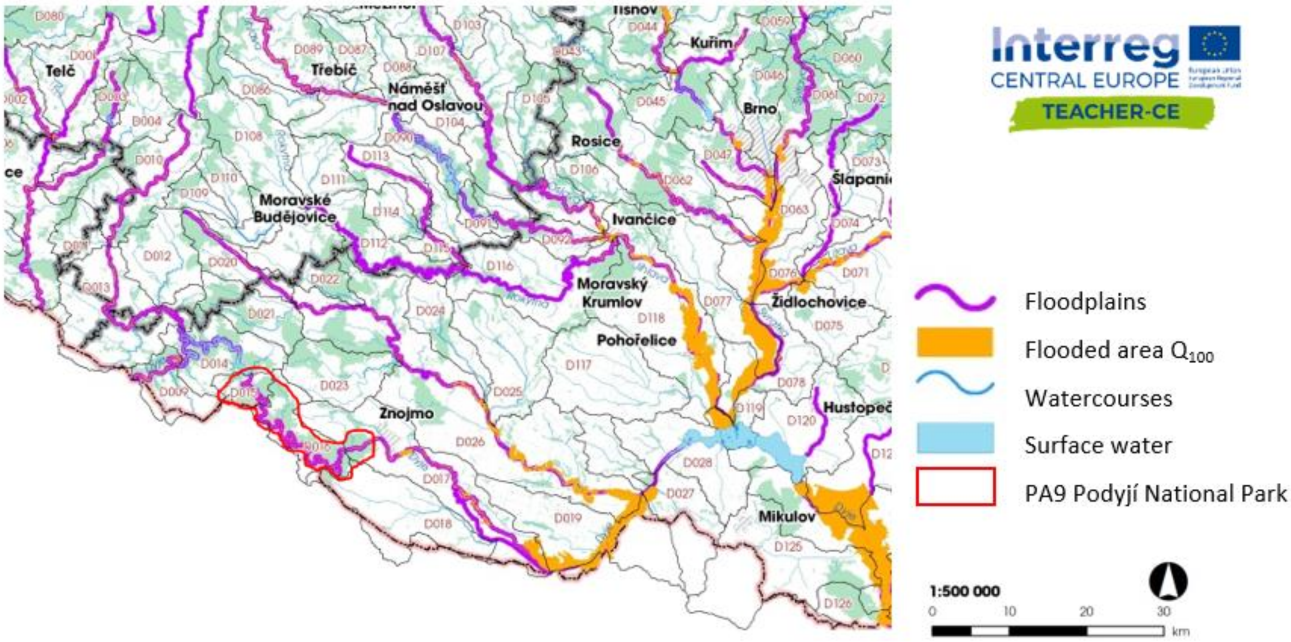
The winter flood regime dominates the Dyje and its tributaries, mainly caused by melting snow in the Bohemian-Moravian Highlands and parts of the Dyje river basin in Austria (e.g., spring flood 2006). The summer flood of the regional type in August 2002 and the flood from torrential rains in June 2006 can be considered less frequent. The Vranov and Nové Mlýny reservoirs significantly contribute to the transformation of flood waves on the Dyje.
The river basin district's hydrological regime's main features are characterized by the seven measuring stations on the river basin district's main streams, where regular flow measurements started in 1918 - 1946.
Examples of the recent flood phenomena in the Podyjí National Park of recent times are provided in Table 1.

Table 1. Recent floods near or at Podyjí National Park

Year	Location	Event description
2001 (May)	Vranov and Čížov, Dyje tributaries	Notable local flood, damage at the mouth of streams in Vranov nad Dyjí, deterioration of many pond dikes.
2002 (August)	Dyje Valley	380 m^3/s flow in Dyje. In the Znojmo dam, the maximum level was only 0.16 m below the bridge deck's lower edge. Three footbridges in the Podyjí National Park were destroyed.
2004 (May)	Cadastral areas Horní Břečkov and Čížov	Local flood, significant erosion on agricultural land, and the Březinka pond was damaged.
2006 (March)	Podyjí National Park	Rapid melting of snow, the flow culminated at 305 m^3/s.

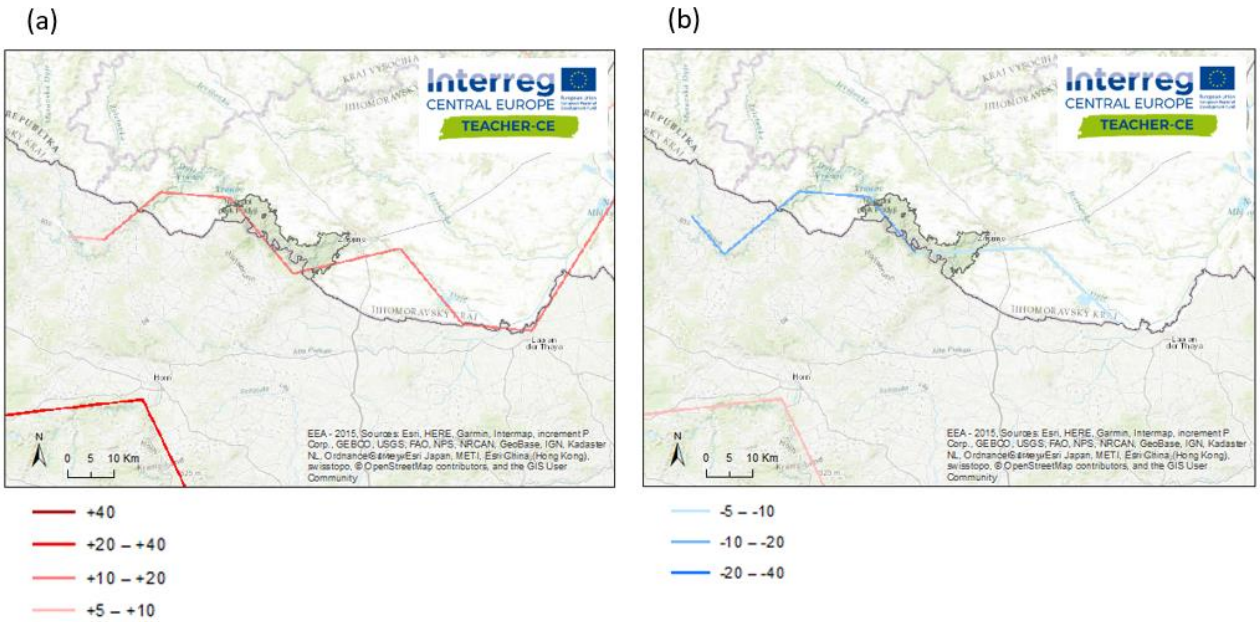
The occurrence of floods cannot be affected by any measures taken in the national park territory. However, the floods do not harm the national park itself. In the built-up areas of Vranov nad Dyjí, it is necessary to create such measures that the damage to property of existing buildings is minimized. No new buildings will be located in the floodplain of Vranov nad Dyjí.

<u>MAP 2.3.2.a.</u> Floodplains and flooded area Q_{100} near Podyjí National Park.



http://www.pmo.cz/pop/2009/Dyje/end/d-povodne/mapy/md_4_2.jpg

<u>MAP 2.3.2.b</u> Predicted mean summer river flow change (a) and mean annual river flow change (b), in percentages, for 2100, using the IPCC SRES A2 scenario.



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2.3.3. Heavy rain

Winter extremes were recorded in December 1974 (104 mm, 225% of the 1961-2016 average), January 1976 (104 mm, 246%) and February 1970 (87 mm, 237%). The spring period does not have higher total precipitation - the extremes were in March 2000 (117 mm, 273%) and in April 1965 (80 mm, 187%). Extreme totals followed during the growing season: in May 1965 (141 mm, 196%) and 2010 (133 mm, 185%), in June 2013 (146 mm, 178%), in July 1997 (204 mm, 240%), in August 2002 (177 mm, 227%), then in September 2007 (117 mm, 214%), in October 1998 (113 mm, 256%). Only little extremes were recorded in November. Overall, winter extremes (December to February) occurred in the 1970s. Very high precipitation totals have been observed since spring and summer (March to August) since 1997. Balanced or lower precipitation totals characterized the 1980s and mid-1990s. The occurrence of extreme precipitation should also be related to the occurrence of floods (K. Matějka, Vývoj teplot a srážek v ČR od roku 1961, Information and Data Systems 2017).

2.4. Hydrologeology

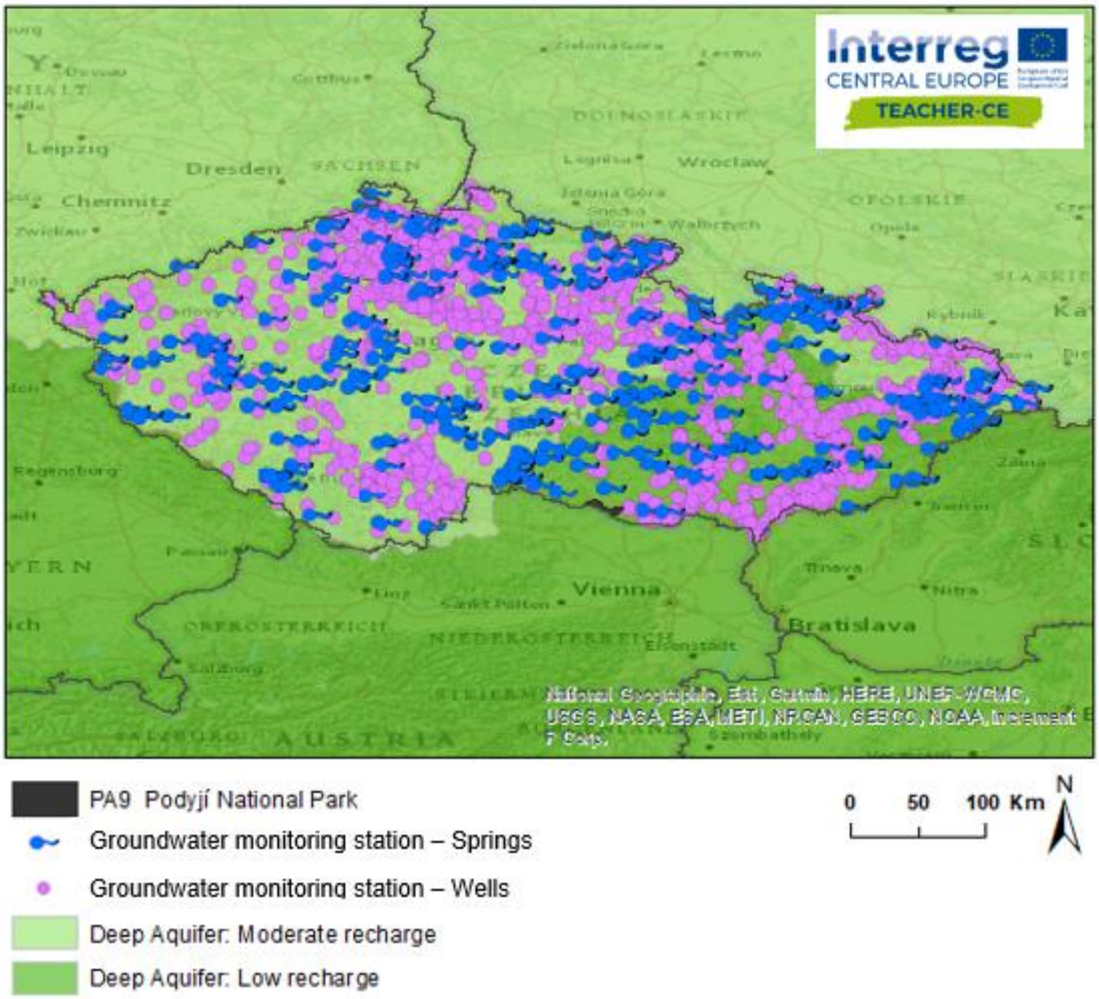
Most of the territory of the Dyje river basin district belongs to areas low in groundwater. The Bohemian-Moravian Highlands location is mainly formed by crystalline rocks, which are extremely unfavorable for the formation of groundwater reserves. Annual precipitation totals in this area exceed 700 mm only in the peak parts. The groundwater circulation is very shallow, bound to a not too deep fissure zone, weathering mantle and rubble. The specific runoff values range from 3 to 5 l.s-1.km-2 and, in some places, fall below three l.s-1.km-2.

In the Devonian limestones of the Moravian Karst, there are characteristic accumulations of karst waters in the lower floors of caves; often, there are collectible accumulations of large yields, rarely over 15 l.s-1. No significant aquifers have been developed in the permocarbon filling of the Boskovice furrow due to numerous impermeable inserts. In the Třebov-Svitavy furrow, artesian groundwater horizons are formed in the Cretaceous collector (the area of the Březov aqueduct resources), which are protected as part of the CHOPAV Východočeská křída.

The Outer Carpathians' rocks have permeability limited by the flysch character of the formation - the continuous occurrence of pelitic inserts - and do not represent the possibility of significant groundwater accumulations. Therefore, the specific runoff values are unbalanced and fluctuate depending on the morphology and distribution of precipitation (minimum annual total rain even below 300 mm) from 20 l.s-1.km2 to below 3 l. S-1. km-2.

The Dyje region's specifics include its unique geomorphological phenomenon - a deeply cut valley canyon - type, which allows the transport of undesirable substances (either by wind or water) up to the core area of the park. In this way, a permanent harmful threat is influencing the subject of protection. Conventionally managed land of the protection zone, of which the area is to secure the national park territory from disturbing influences from the surroundings, cannot sufficiently balance external effects from the environment, whether they relate to ecological stability or biodiversity.

MAP 2.4. Hydrogeological map and groundwater monitoring stations in Czech Republic.



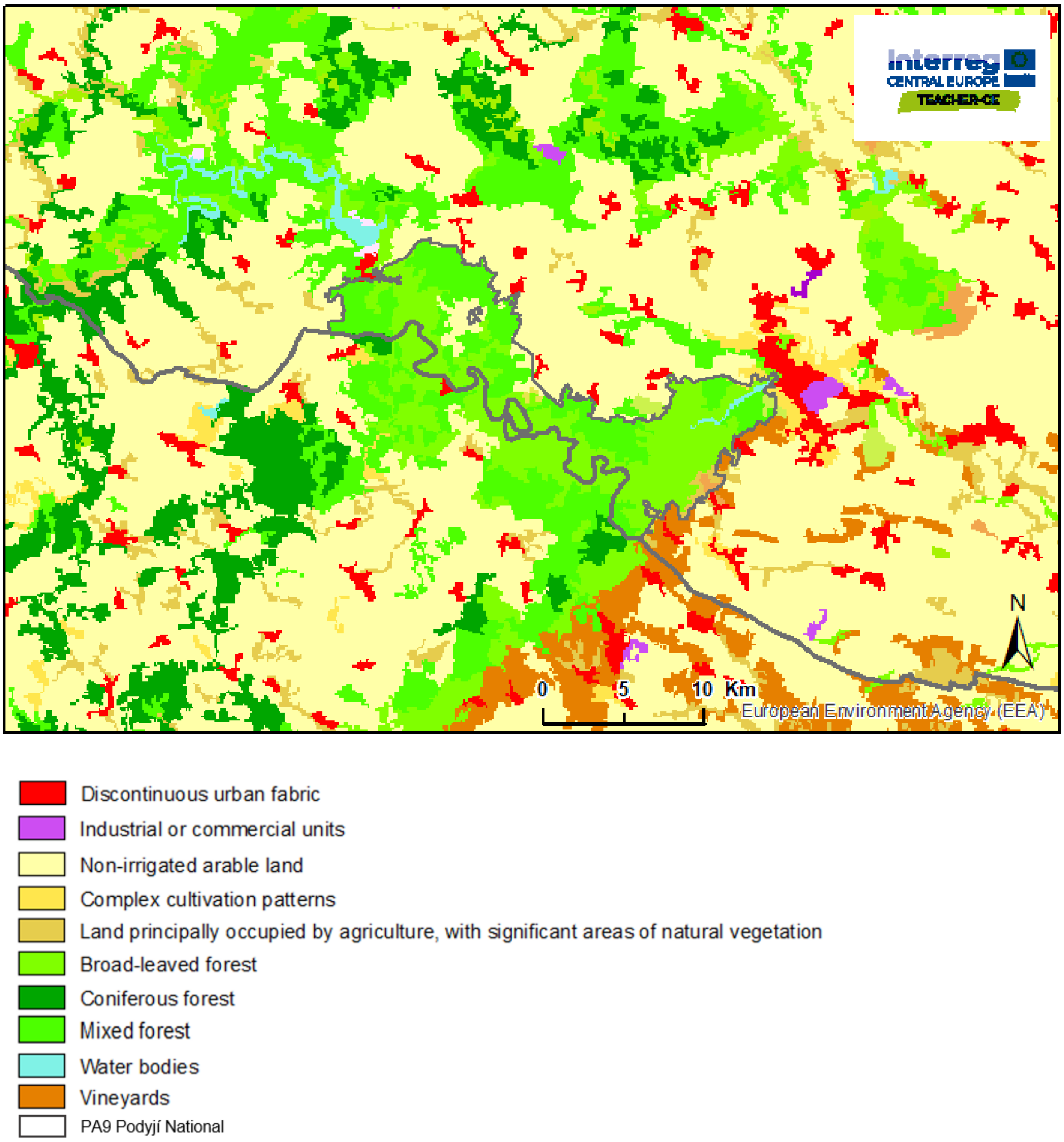
https://www.arcgis.com/home/search.html?q=hydrogeological%20map%20world&start=41&num=20

https://www.arcgis.com/home/item.html?id=285b080e465c4cd1858fbc23be257309

2.5. Land use

The total area of the Dyje catchment area is 11,164.7 km2. Artificial surfaces, including urban development, industrial and commercial zones, areas for transport, areas of urban greenery and recreational and sports areas, cover a total area of 624.73 km2, representing 5.60% of the total catchment area Dyje. Mines, landfills, and construction sites cover 10.77 km2, i.e., 0.10% of the Dyje river basin's size. The predominant part of the Dyje catchment area consists of agricultural land and forests. The size of agricultural land in the Dyje river basin is 7,174.12 km2, i.e., 64.28% of the total catchment area. There are a total of 192.17 km2 of permanent grasslands, which include meadows and pastures.
The area of forests and semi-natural vegetation is a total of 3,264.82 km2, which is 29.25% of the total catchment area. Coniferous forests predominate, occupying 1,761.73 km2 of land, i.e., 53.96% of the total forest area. Mixed forests that are desirable cover a total of 839.05 km2 (including alternating forests and shrubs), i.e., 25.70% of the total forest area.
Wetlands cover an area of 1.85 km2, i.e., 0.02% of the Dyje river basin area. Wetlands of international importance include Lednice Ponds and Wetlands of the Lower Dyje.
Water areas occupy 83.37 km2, i.e., 0.75% of the catchment area.

MAP 2.5. Land use near Podyjí National Park.



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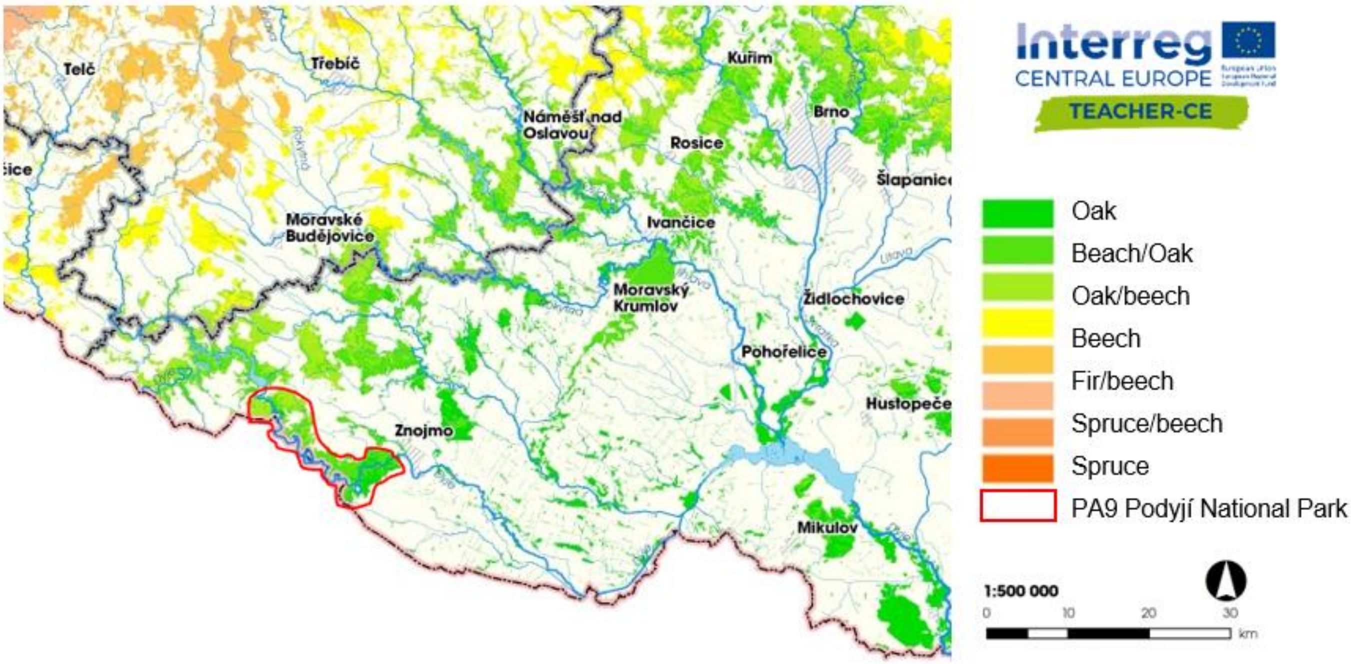
2.5.1. Forestry

With 29% of the forest area, the Dyje catchment area's forest cover is slightly below the national average. Spatially, forest fragmentation is unbalanced to the detriment of the southeastern part of the river basin district, where it is estimated to fall to half the average. Here, it can be recommended, for example, to increase the share of forest area within the afforestation of agricultural land. Specifically, it would be appropriate to apply the local, territorial system of ecological stability. In particular, the use of protective forest belts to reduce wind erosion is recommended.
The degree of ecological stability of forest ecosystems is limiting for the fulfillment of forest functions. Based on analyses of the degree of naturalness, age structure, and health status of stands, ecological stability is not favorable. It can be stated that the ability of stands to cope with extreme situations is low.
Significant area damage to forest game is also a warning (9%). The gradual proposed change in the species composition will not be possible without a consistent reduction of ungulates. The age (height)

differentiation of forest stands also contributes to improving the level of ecological stability of the forest. It can be directed to undergrowth and small-scale farming. The ideal state is a richly structured forest, for which the spatial structure of the forest stands is typical.
The period before the delimitation of forests under the Administration of the Podyjí National Park (1. July 1991– 31. December 1993) was characteristic in particular by finding a new model of forest management concerning the mission of the national park. This involved the renewal procedures, which until then had been limited to clear-cut elements of larger dimensions with subsequent restoration of pine, spruce, and larch. With this change, there were fundamental problems related to the initial period of the NP administration's activities - lack of planting material of local origin and methodological ambiguities caused by NP management's emerging concept. The general idea was incorporated into the Podyjí National Park Care Plan and its protection zone, which was approved by the Ministry of the Environment.

MAP 2.5.1. Forest composition near Podyjí National Park.



http://www.pmo.cz/pop/2009/Dyje/end/a-popis/mapy/ma_1_7a.jpg

2.6. Protected areas

The zoning of the Podyjí National Park was delimited on 22. November 1995 by the Ministry of the Environment Act No. 114/1992 Coll., on nature and landscape protection. The characteristics of individual zones and the goal of their protection are described in § 4 of the Czech Government Regulation No. 164/1991, which established the Podyjí National Park. After a revision carried out in 1996, zoning NP Podyjí meets nature protection and land care requirements. In the previous care plan, one of the main strategic goals of nature protection was to gradually leave up to 80% of the national park territory to their autonomous development. However, from scientific research, it subsequently turned out that leaving such a large share, especially of forest stands, to spontaneous development can, at a particular stage of vegetation development, lead to the extinction of some conservation populations of important species. The concept of a new so-called "management categorization" divides the territory of the national park into two categories, each of which is a priority.
The distribution of zones in NP Podyjí is as follows: (a) strictly natural 2328 ha, (b) close to natural 1430 ha, sustainable management 2517 ha, cultural landscape 5 ha.

In the Podyjí National Park territory and its protection zone, there are localities included in NATURA 2000. These are the following localities: Bird area Podyjí (locality code CZ 0621032), Podyjí site of European importance (locality code CZ 0624096), European important locality Podmolí - strouha (locality code CZ 0623360), European important locality Fládnitzské vřesoviště (locality code CZ 0620004), European important locality Vranov nad Dyjí – základní škola (locality code CZ 0623719), European important locality Popice – fara (kód lokality CZ 0623788), European important locality Mašovická střelnice (locality code CZ 0620020).

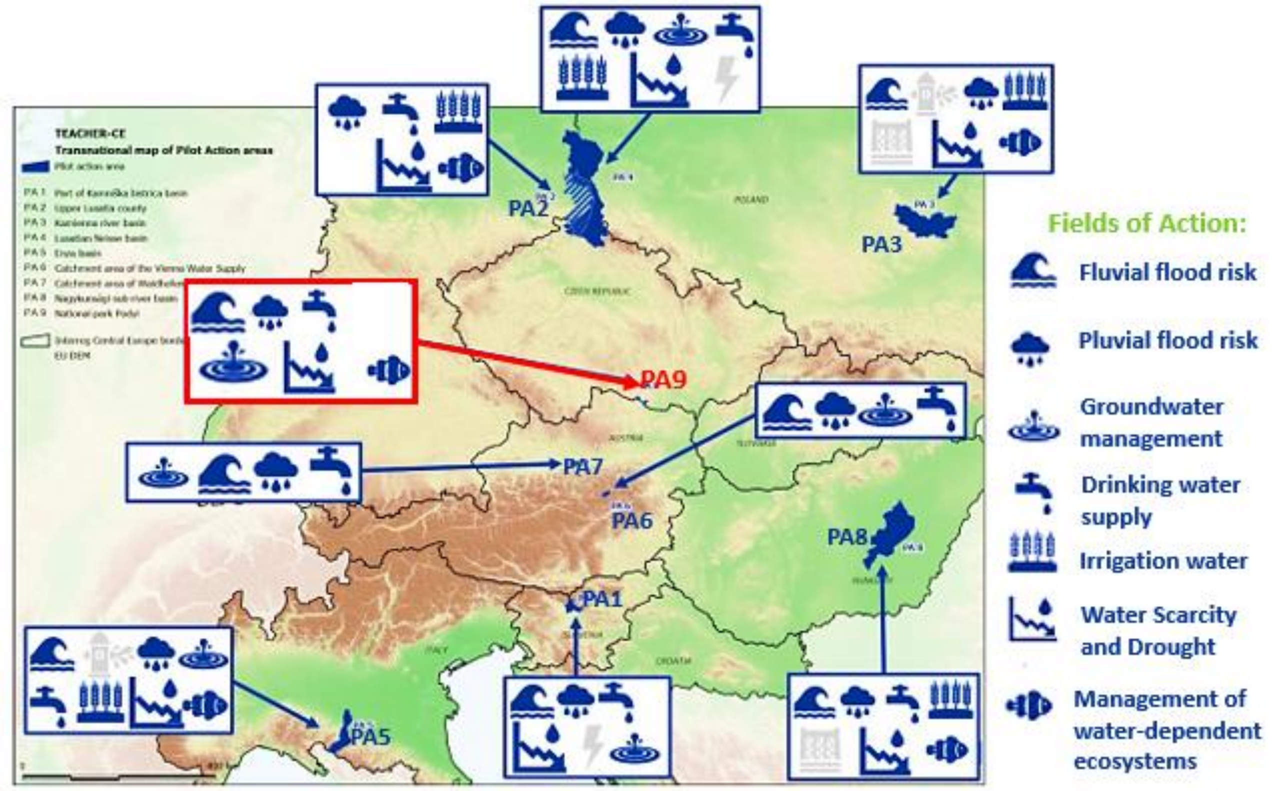
2.7. Drinking water sources and protection

Approximately 40 springs and wells were found in the Podyjí National Park. Some springs near the hiking trails have been adapted for use by visitors to the park. Water quality is regularly monitored here. Unfortunately, it is necessary to state that only one out of five is meeting regularly the limits for drinking water.

3. PA issues concerning TEACHER-CE topics

In the Podyji National Park, the primary PA issues are:

- Fluvial flood risk: naturally occuring flood of the tributaries of the rive Dyje, local erosion and deterioration of landscape features. From the PA’s perspective, these are naturally occuring events that are not subject to management in national parks.
- Pluvial flood risk: erosion on agricultural and forestry land with remedial measures needed.
- Ground water management: unfavorable geology and inappropriate water management.
- Drinking water supply: antropogenic pollution.
- Water scarcity and drought: lower water retention, threatened forest adaptation.
- Management of water-dependent ecosystems: drought induced by climate change, threatened habitat of target species, antropogenic disruption due to the Vranov dam.



3.1. Heavy rain

The distinctive geo-relief determines the character of the landscape in the Dyje Valley. The agricultural landscape in the protection zone has been suffering for a long time by insufficient diversity of landscape structures, which endangers its migratory permeability and preservation of the natural cycle of matter and energy. Erosion under heavy rain events is a significant threatening factor. It is desirable, as part of the ground water management, to supplement the landscape mosaic with elements of different vegetation types and create a functional network of small migration routes. Furthermore, the emergence of new permanent grasslands in selected fields across the national park territory prevents soil erosion, primarily where the impact of rainwater flushing is high. Unsuitable farming methods, especially those with a high percentage of plowing, pose an increased risk of soil erosion and directly endangers small landscape mosaic scale and migration permeability.

3.2. Floods

The occurrence of pluvial and fluvial floods cannot be affected by any measures taken in the national park territory. However, the floods do not have a negative effect on the national park itself. In the built-up areas of Vranov nad Dyjí, it is necessary to create such measures that the damage to property of existing buildings is minimized. No new buildings can be constructed in the floodplain of Vranov nad Dyjí.

3.3. Drought

The goal is to achieve the most natural state of all watercourses in the area, achieve a balanced and natural water regime in the landscape, maintain water types' diversity, and maximize their natural or semi-natural character. These measures will alleviate the negative impacts of drought events in the national park.
It is necessary to conduct technical and organizational measures in the river that are as close as possible to natural conditions, achieve an autonomous community in the wild population structure under changed conditions, and focus on further research on the Dyje river ecosystem.
These are some specific measures.
1. Small water bodies, reservoirs, ponds and wetlands should be preserved in a whole range of types (field wetlands, forest ponds, ruptured ponds, etc.) as a habitat of target species (e.g., maintenance of vegetation, removal of sediments, etc.), which is also the focus of the management of water-dependent ecosystems.
2. In line with the previous point, new ponds should be created in suitable places, ensuring legal and additional necessary care for ponds, which are managed by the National Park Administration.
3. High retention capacity of the landscape should be restored, building missing and maintain existing landscape structures to alleviate water scarcity and drought.
4. Care for field wetlands will be specified according to the development of localities, maintaining the current field management regime, the gradual elimination of the existing technical drainage as a part of the water-scarcity management. On agricultural land in the national park, it is not desirable to change the water regime by artificial interventions.

3.4. Forest management

Forest cover in the Podyji NP is threatened primarily by rising temperature, water scarcity and drought periods occurring more frequently in Central Europe. Water scarcity under climate change has been one of the focus of the SUSTREE Interreg Central Europe project, a pilot action was carried out in Podyjí to propose alternative species composition and adequate seed sources of the forest reproductive material under climate change conditions. Along with the delineation of the best adapted genetic sources, there are suitable management measures that can mitigate climate change's impact on forest ecosystem integrity.
In the Podyjí National Park, 336 ha of forest across 10 locations are considered natural. It is critical to leave these to spontaneous development, continuously monitor the condition of communities, and, if necessary, carry out justified interventions, protect and promote important habitats and species in selected forest stands (or their parts), implement particular interventions to benefit habitats, and species.
In total, 1562 ha of forests across 39 locations are characterized as "close to nature." Measures in these forests are similar to those in the natural category, but human intervention is more common.
Cultural forests 2203 ha are regularly managed. The idea is to transform stands through the so-called restoration management towards a state close to nature so that they can then be left to their development. Non-native habitats are being removed.

3.5. Drinking water sources protection

The quality of water resources is threatened by transporting anthropogenic nitrogenous substances and biocidal preparations, substances used in households, medicine, and industry. Residues of these agents applied in the region for protection are transported directly to watercourses or indirectly by horizontal precipitation (fertilizers) and cause contamination of water and soil profile. Nitrogenous background substances transported by rainfall caused widespread contamination of the environment; they support undesirable components of vegetation and destroy edaphon and soil structure. These risks threaten approximately 40 springs and wells in the Podyjí National Park. All these issues should be addressed by appropriate measures in the drinking water supply management.

4. Testing of the TEACHER-CE toolbox CC-ARP-CE

During the testing of the toolbox we added several issues on the map and tried the different functions of the toolbox.

At the beginning, to add new issues, we noticed that it was a long process. There were many bugs. It required a lot of actualisation that brought us back “to Slovenia”. Some issues couldn’t be deleted. When you added an issue, you had to first save it before selecting measures, or you had to do it all over again. When you were clicking on the issue report, you could only see the description and the voted measures. You couldn’t see the general information about land use, reporter type, FoA etc… In the later versions of the toolbox, many of these issues were resolved.

Regarding the catalogue of measures, we noticed that when selecting a specific land-use, the quantity of proposed measures drops significantly and even reaches zero in some cases. We wonder if the catalogue contains suitable measures that are not properly assigned. Additionally, to have only the title of the measures for the voting is quite complicated as some titles are not necessarily self-explanatory. Regarding the ranking of the measures, the CULS partner does not feel like they have the expertise to comment on it.

Regarding the climatic indicators, there are many, and perhaps it would be nice to sort them (e.g. precipitation, temperature…). Also, the opaque layer of climatic indicators was a confusing in terms of geo-localisation. It is now corrected.

Finally, we found the toolbox generally complicated to use. It will most likely require the user to read the toolbox tutorial and get used to the different functionalities. This will require a certain level of commitment from the user. Also, if user makes a mistake or if the information entered is incorrect, it will require regular monitoring from an expert.

5. Synthesis of the National Stakeholder Workshop

We received a generally positive feedback: “interesting and important tool and project”; “Very robust tool”; “this tool is very nice and useful” … They liked the idea of the toolbox being an interactive platform.

Throughout the workshop, a few issues and questions were raised concerning both the usability and the functionality of the toolbox. For example, they asked if the tool considers the possible interactions between FoAs and between localities: “How a measure in one sector affects other sectors? Did you take into account the possibility that one measure in one FoA (or locality) can have a negative impact on other FoAs (or localities)? People should use measures with caution”. They also raised the issue of: “who can post something and who will have access to the tool? Will there be different levels of access? Can people propose new measures? What will be the professional level of the platform?”. Someone else asked if there is or if it would be possible to add an interaction between climatic scenarios and measures proposed. And finally, they wondered if the toolbox can also be used privately among one or a few institutions.

On the downside, we had difficulties engaging with the stakeholders. Our lack of understanding of the topic made it hard for us to have proper discussions.

6. Conclusions

Our pilot action in Podyjí National Park revealed several issues related to the seven fields of action that the TEACHER-CE project focuses on. Fluvial flood risk, groundwater management and drinking water supply were the most prominent ones. Using the toolbox, we were able to add the issues on the map. Afterwards, we were able to do a selection of several possible measures in order to improve the current status of the issues while also taking into account the ongoing and predicted climate change.

After several stakeholders workshops and several partners meetings, we believe that the CC-ARP-CE toolbox was refined into a robust and effective toolbox. It can be used by professionals and other interested parties to map issues in Central Europe, to find sets of possible measures for each issue, and it can also be used as an intereactive platform among stakeholders.