

Ecological flows regulation within the European Union

Presentation of preliminary results of a study on ecological flows

Banja Luka, 6 June 2018

Zuzana Vachůnová/Arnika – Citizens' Support Centre



TRANSITION
Ministry of Foreign Affairs of the Czech Republic



Arnika – Centre for Citizens Support

***Our mission** is to assist people in participating in public decision-making processes influencing the environment they live in. We provide free support to individuals, civil organizations, and municipalities. We focus, in particular, on the issues of green areas and environment in cities, protection of water and watercourses, toxic substances and waste. We promote the civil right to information and participation of the public in decision-making.*

Why we have been working in BiH?

- Transition experience*
- Wild and unique watercourses*
- The hydropower boom*

What do we do?

Enforcement of systemic changes

Promotion of public participation in decision-making processes

- Support for the Coalition for the Rivers Protection in BiH*

WHAT DOES THE STUDY COVER ?

(and what not)

- 6 European countries

The Czech Republic, Austria, Germany, Netherland, Finland, France

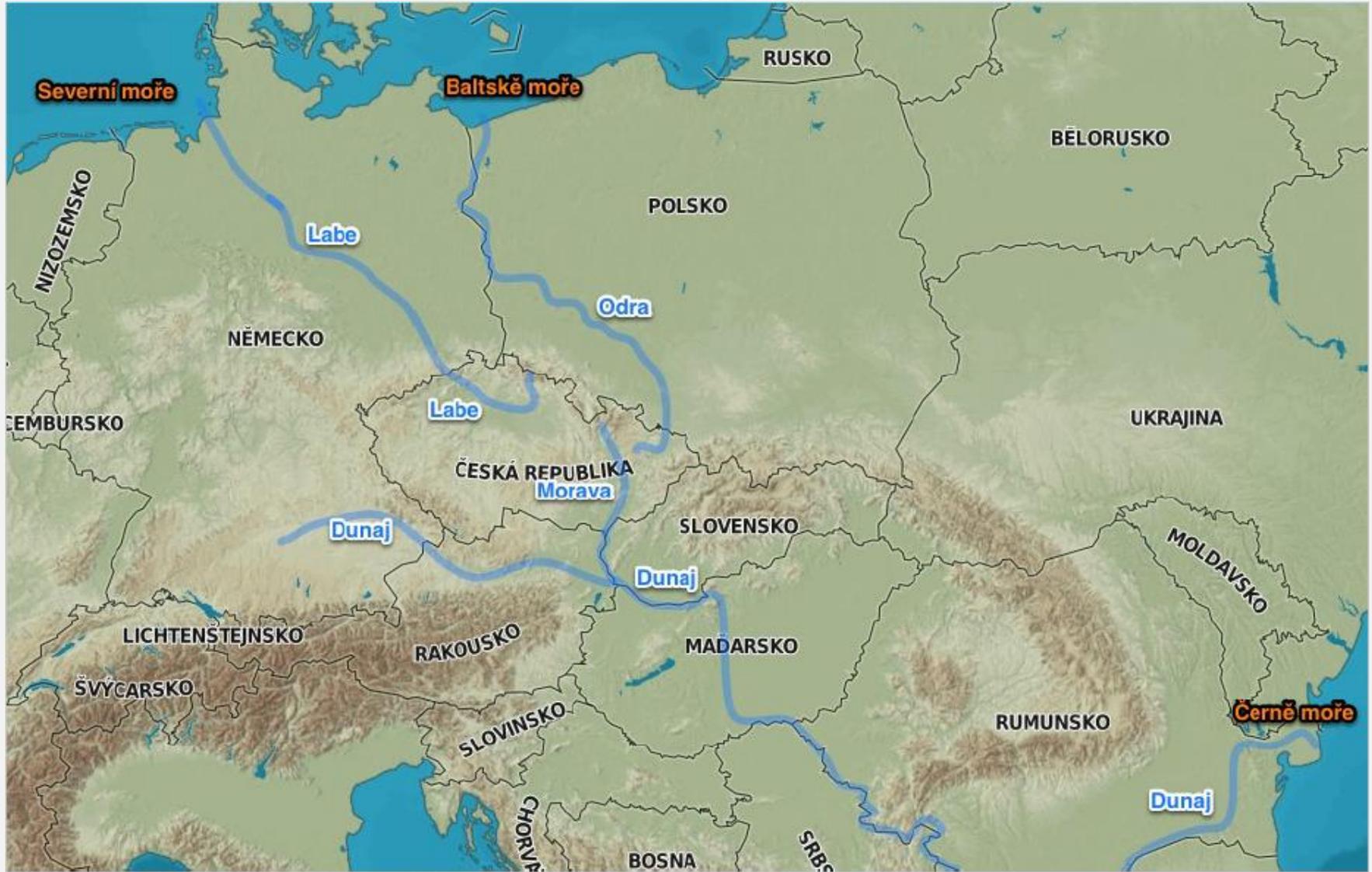
- Terminology and definition(s)

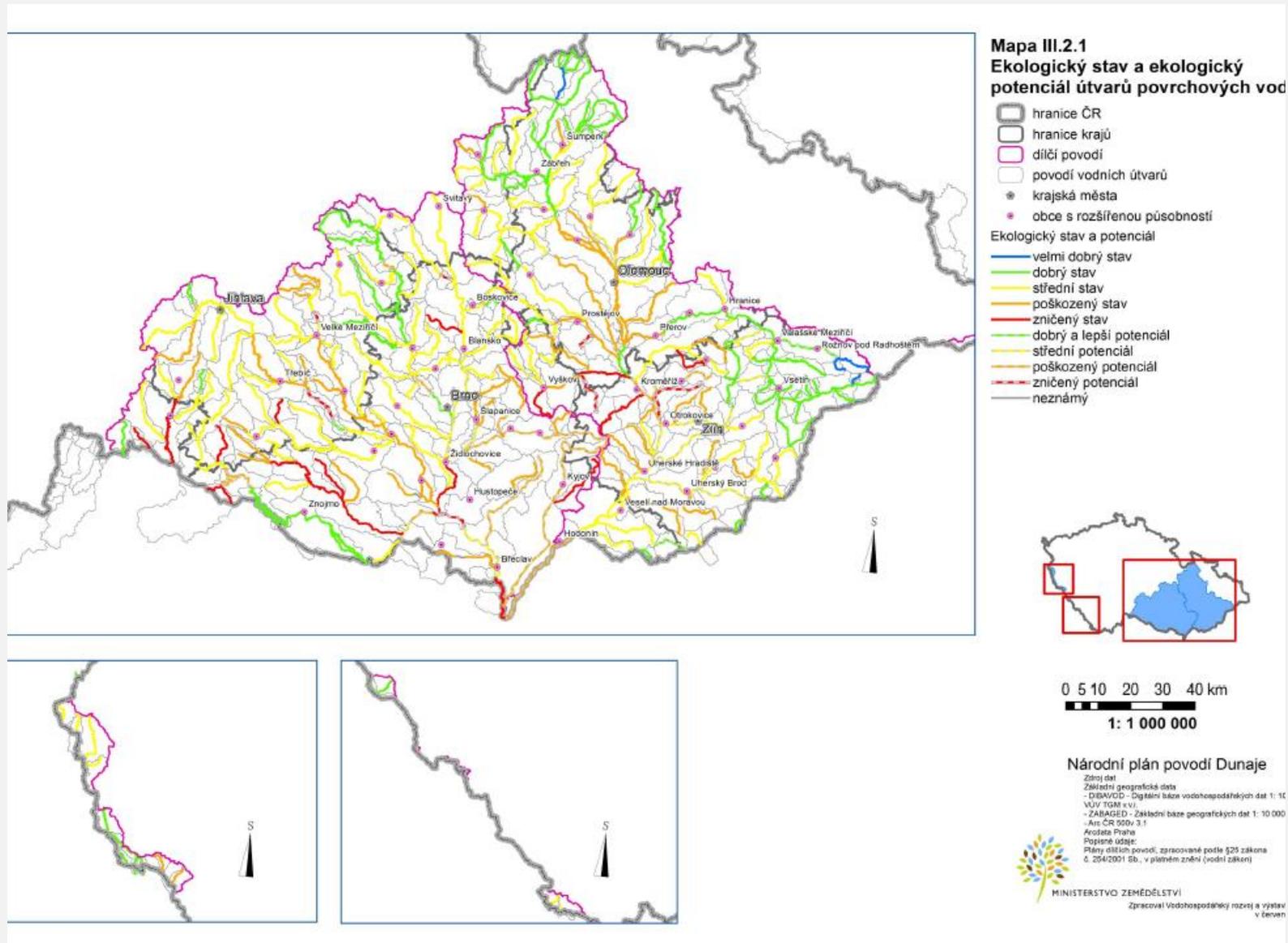
- Legal regulation

- Methods of determination and calculation

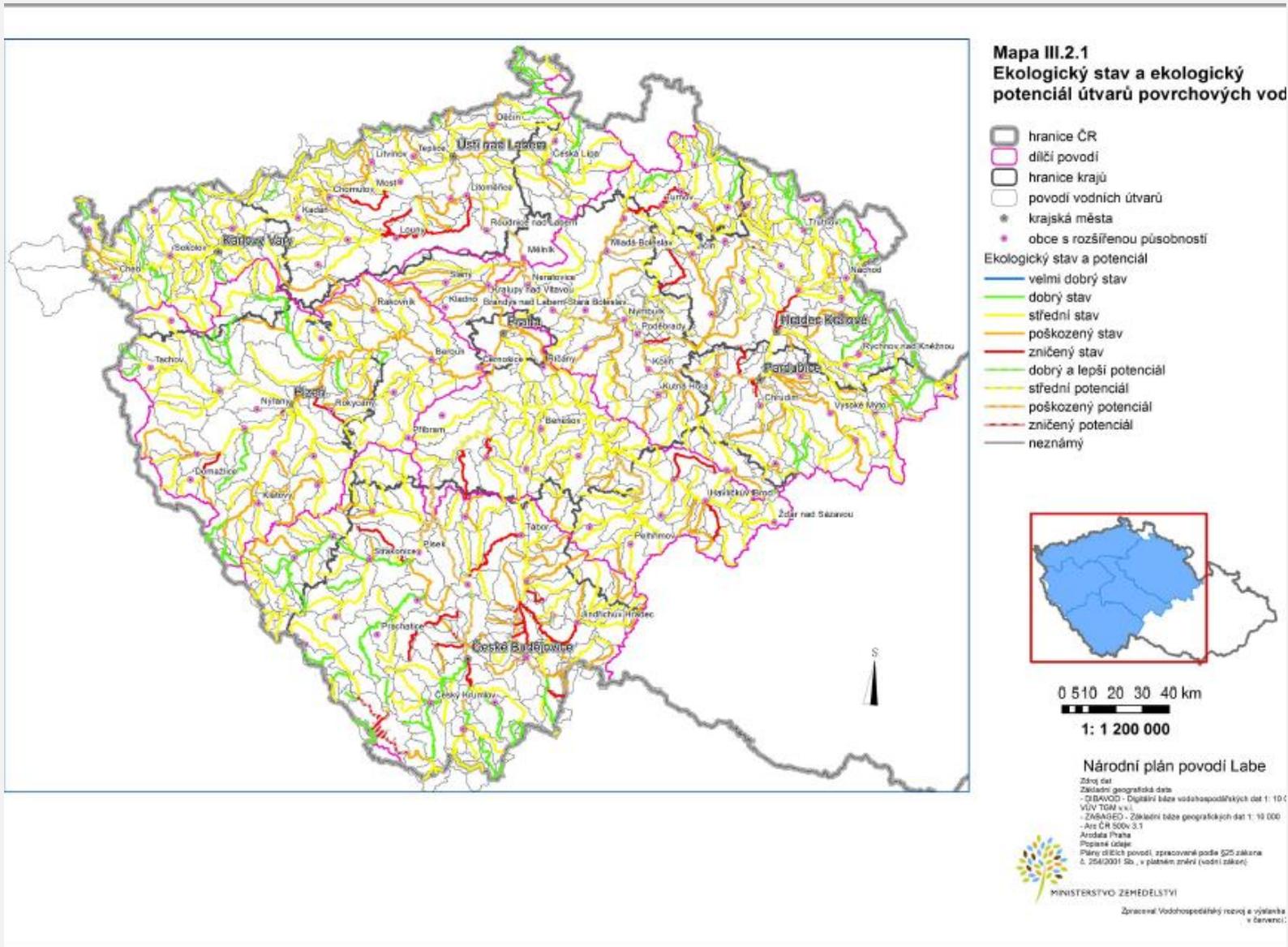
- Control of compliance

THE CZECH REPUBLIC – ROOF OF EUROPE

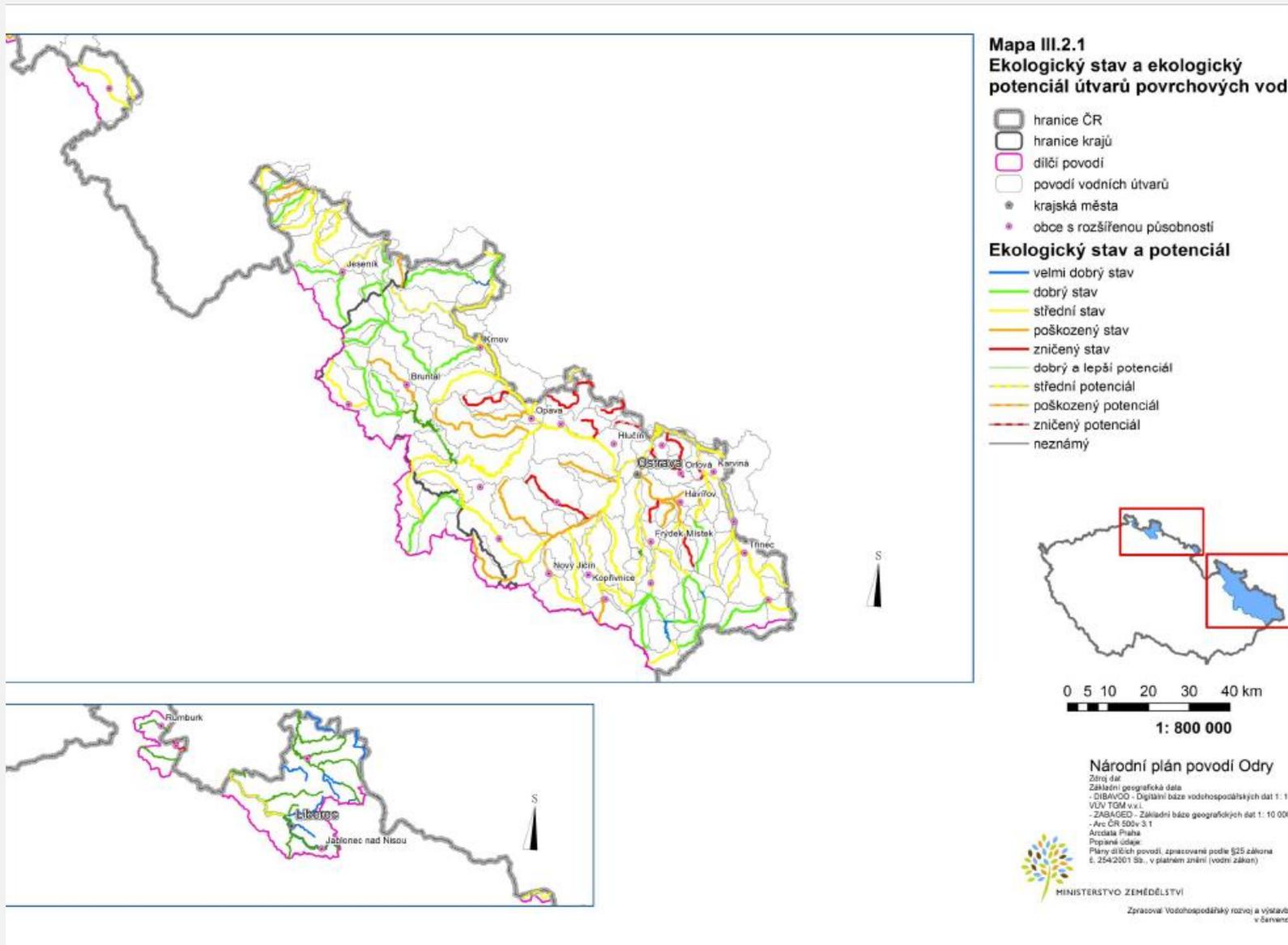




The Danube river basin



The Elbe river basin



The Oder river basin

TERMINOLOGY AND DEFINITION

- Minimum residual flow (MRF) is the flow of surface water, which still allows general surface water management and ecological functions of water flow.

LEGAL REGULATION

- The minimum residual flow is regulated by The Water Act (No. 254/2001; Article 36) and by the Methodological instruction of Water Protection Department of the Ministry of the Environment to determine the values of minimum residual flow in watercourses

METHODS OF DETERMINATION

- The values of MRF, the way of monitoring its compliance and other measures necessary for the protection of the water shall be determined by the water authority in the new permit or in the modifications of the currently valid permits.
- Flow rate Q_{364d} , Q_{355d} , Q_{330d} is the flow rate in a given water flow profile that was reached or exceeded on average 364, 355 or 330 days per year, calculated from a series of average daily unaffected flows from 1931 to 1980. If these unaffected flows are not available, a range of average daily flows from 1931 to 1960 will be used. The MRF value, which corresponds to the Q_{364d} flow rate, is considered as “never to exceed” the limit.

- The MRF should preferably be set for appropriate periods of time (seasonally, monthly, etc.) at varying levels, especially in longer sections of watercourse with impoverished water flows
- Particular attention shall be paid to the assessment of cases where more than half of average flow is drained by water abstraction or other use of surface water, water courses with low water level and cases of significant losses of flow rate in watercourse caused by groundwater abstraction.

Higher MRF	Lower MRF
Maintaining or improving the quality of surface waters	If it is necessary to safeguard public interests, in particular to ensure the supply of drinking water. In such cases, the water management authority may impose appropriate compensatory measures, i.e. to ensure the necessary depth of water and to stabilise the water level in the watercourse
Maintaining favourable living conditions in water, the most important indicator of which are fish and zoobenthos	
Protection and conservation of endangered species and valuable ecosystems or their components which depend on the quantity and quality of the water, in particular in protected areas	
Maintenance of a balanced groundwater regime	If, in periods of drought, the public interest in water supply, especially drinking water, is threatened by a temporary lack of it, the water management authority may, after assessing the overall situation, reduce the value of MRF for the time necessary to overcome the emergency situation.
Prevention of intensive deposition of sediments	
When it is necessary for the ecological state of the landscape (i.e. maintaining the balance between the flowing water ecosystem and the surrounding environment)	
Protection of the watercourse as an aesthetic factor in the landscape	
Maintenance or improvement of conditions for recreation in the water	

WHAT MUST BE TAKEN INTO ACCOUNT

Specific
conditions and
usage

- Each watercourse has specific conditions and therefore the setting of the MRF requires a separate assessment of the local situation, the assessment of the natural conditions, the nature of the water management and all the interests connected with the watercourse.

Hydrological,
hydraulic and
morphological
characteristics

- When determining the values of the MRF, it is necessary first to evaluate the hydrological, hydraulic and morphological characteristics of the watercourse, especially the minimum flow rate, the fluctuation of the flows during the year, the shape of the riverbed, the length of the impoverished flow section, etc.

CONTROL OF COMPLIANCE

- The operator is obliged to establish a water mark or profile, or to install a suitable measuring device
- If necessary, the operator elaborates a draft of the handling and operating rules of the water work

VÝSTRAHY PVI_45/18

Je v platnosti Předpovědní výstražná informace na jevy: Silné bouřky

Pro oblast: Královéhradecký kraj, Liberecký kraj, Moravskoslezský kraj, Olomoucký kraj, Pardubický kraj, Zlínský kraj

Platnost: od 04.06.2018 08:00 do 04.06.2018 21:00

[>>Podrobnosti – předpovědní výstražná informa](#)

[>>Podrobnosti – informace o výskytu nebezpečných je](#)

[>>Podrobnosti – stav ovzdu](#)

HYDROLOGICKÁ SITUACE

Hydrologická situace

Stručný přehled hlavních
údajů

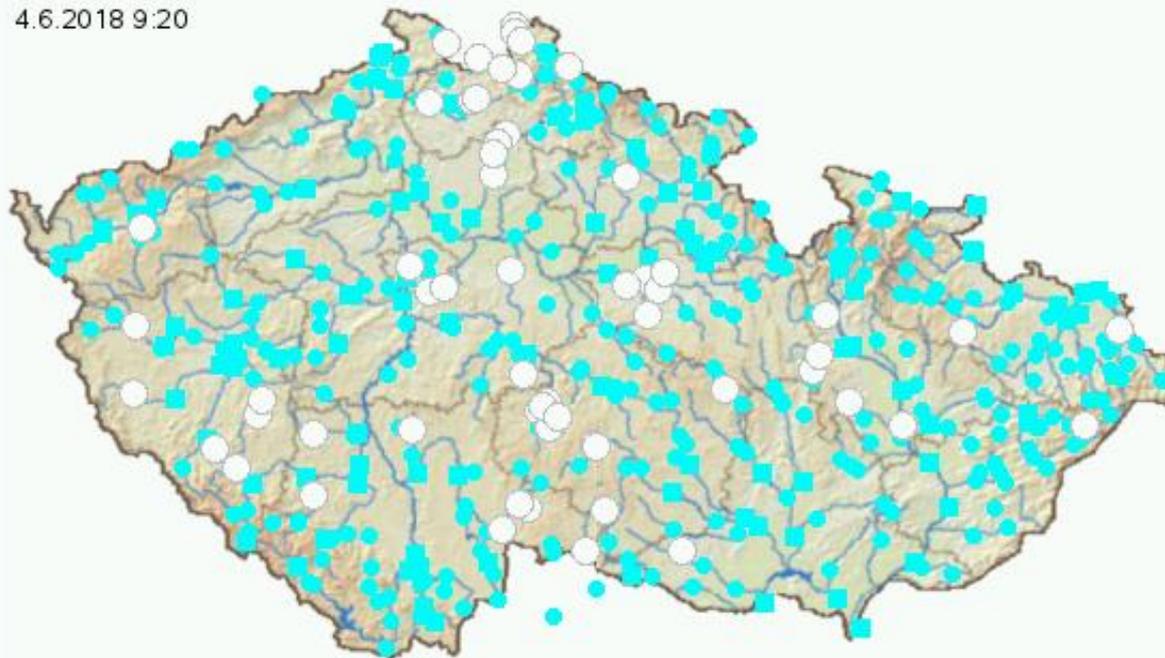
Riziko přívalových povodní

Stav podzemních vod

Informace, zajímavosti
aktuality

VODA

4.6.2018 9:20



Vysvětlivky

- Měrný profil
- Předpovědní profil
- Sucho
- 1.SPA - bdělost
- 2.SPA - pohotovost
- 3.SPA - ohrožení
- 3.SPA - extrémní ohrožení
- ▼ Ledové jevy

[>>Aktuální informace](#)
[>>Hydrologické předpovědi](#)
[>>Hydrologická předpověď textová](#)
[>>Prezentace hydrologických a klimatologických dat](#)

[>>Stav podzemních vod](#)
[>>Jakost vody: IS Arrow](#)
[>>Dlouhodobé změny biodiverzity: RIVERCHANGE](#)
[>>Hlášené profily](#)
[>>Měřicí sítě](#)
[>>Evidence rozvodnic](#)
[>>Evidence hg rajonů](#)

[>>Hydrologické ročenky](#)
[>>Hydrologické bilance](#)
[>>Vyhodnocení vodností](#)
[>>Významné povodně](#)

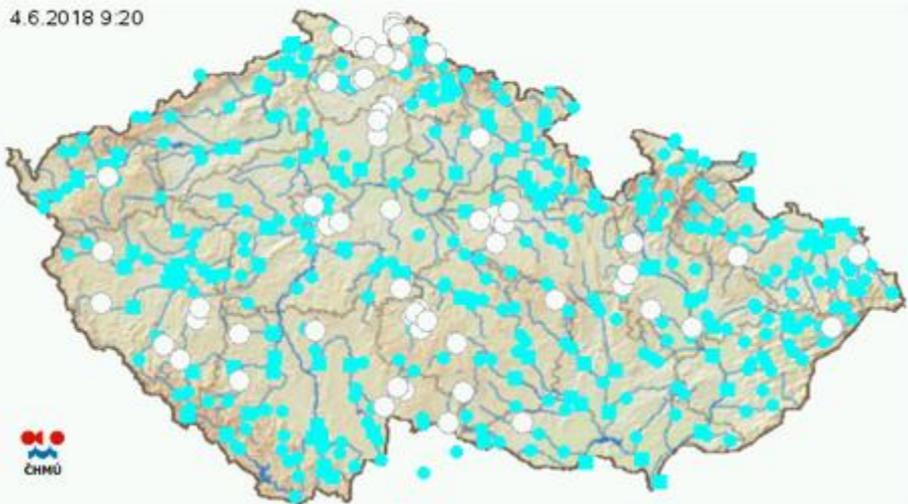
[>>Aktuální radarová data](#)
[>>Radarové odhady srážek](#)
[>>Monitoring sucha](#)
[>>Numerický model Aladin](#)
[>>Množství vody ve sněhu](#)

[>> Informace po telefonu: 900 300 900, 900 309 045.](#) [Informace o ceně hovoru naleznete zde.](#)

Hydrologické sucho

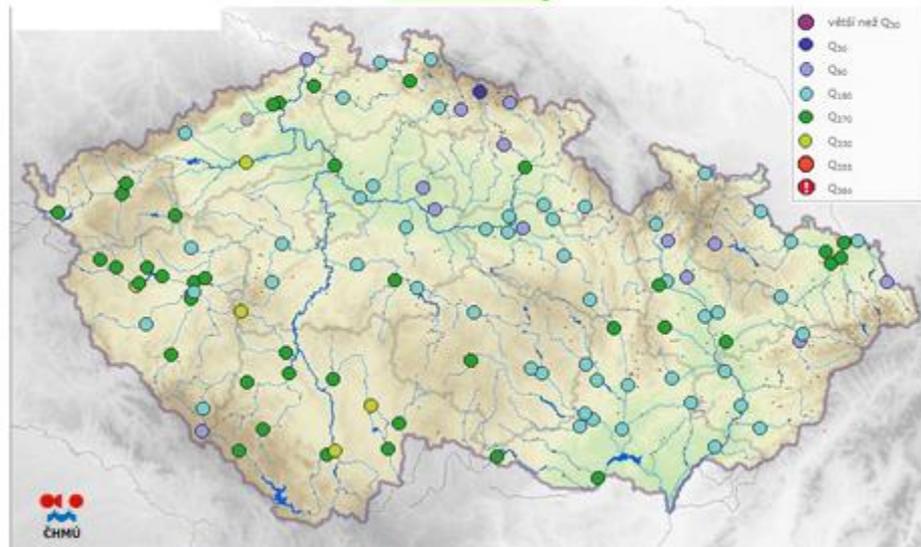
Průtoky - aktuální stav (current streamflow)

4.6.2018 9:20



V případě vodních toků je za sucho považována situace, kdy průtok poklesne pod kritickou mez, kterou je hodnota tzv. 355denního průtoku Q_{355} . Jedná se o průtok, který je v dlouhodobém průměru dosažen či překročen po 355 dní v roce. Za stav sucha jsou tedy označena přibližně 3 % nejméně vodných dní.

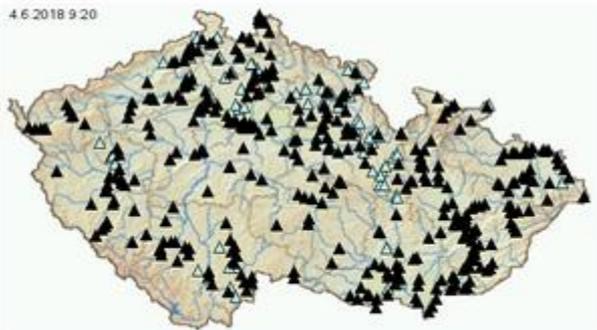
Průtoky - vyhodnocení vodnosti (streamflow long-term evaluation)



Podrobnější hodnocení průtoků s využitím charakteristik M-denní vody, měsíčních průměrů a křivky překročení.

Podzemní vody (groundwater - measured data)

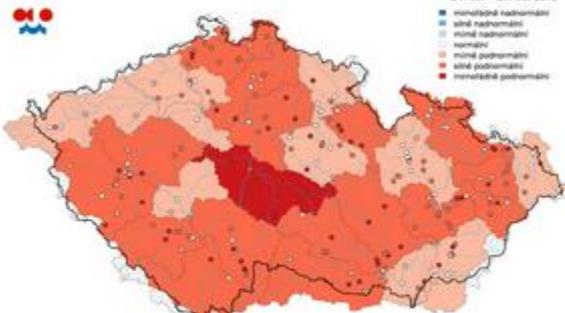
4.6.2018 9:20



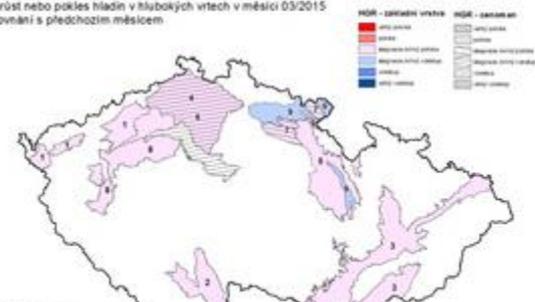
Mělké vrty - týdenní hodnocení (shallow boreholes - weekly evaluation)

Stav hladiny podzemní vody v mělkých vrtech

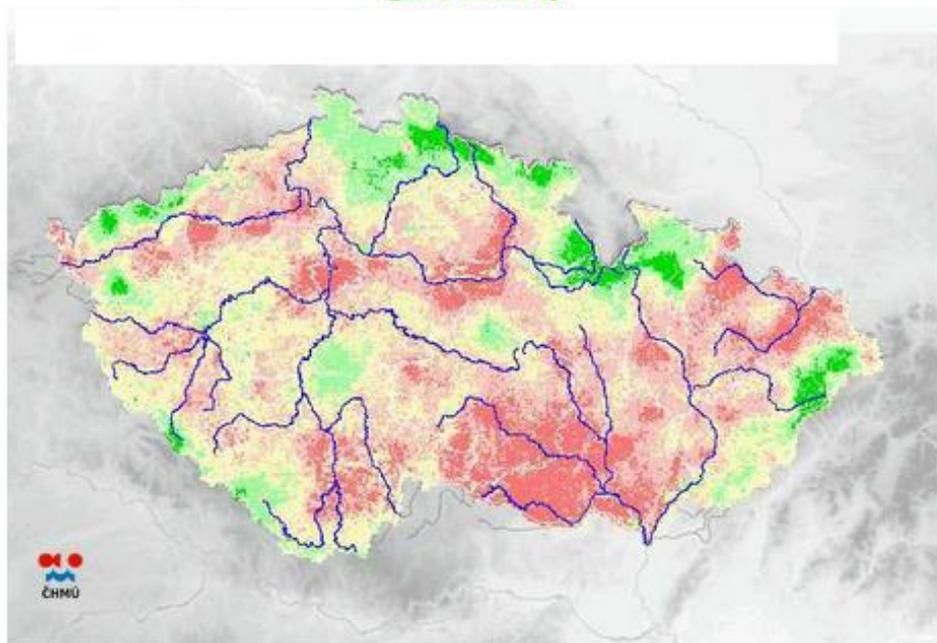
21. 05. - 27. 05. 2018



Vrty a prameny - měsíční hodnocení (boreholes and springs - monthly evaluation)

Nárůst nebo pokles hladin v hlubokých vrtech v měsíci 03/2015
Srovnání s předchozím měsícem

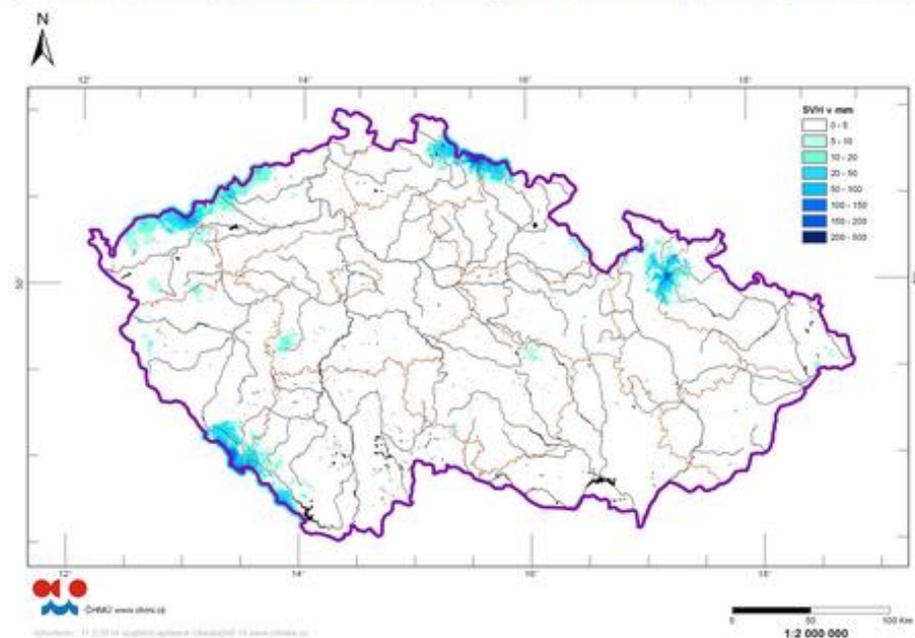
Nasycení půdy (soil saturation as a factor of direct runoff generation)



Hodnocení nasycení půdy z hlediska rizika vzniku potenciálního rychlého odtoku z krajiny. Účelem hodnocení není identifikace stavu sucha v půdě, ale spíše vyhodnocení aktuálního zaplnění retenční kapacity půdy z pohledu jeho vlivu na odtokový proces při následujících srážkách.

Aplikace je provozována pouze v konvektivní sezóně (duben–říjen).

Množství vody ve sněhové pokrývce (snow water equivalent)



Stav sucha pro množství sněhových zásob není definován. Tání sněhu je však v našich podmínkách hlavním zdrojem doplňování zásob vody v půdě a zásob podzemních vod. Při nedostatku sněhu nejsou tyto zásoby dostatečně doplněny a v závislosti na průběhu srážek v jarním a letním období může tento negativní efekt přetrvat v průběhu celé letní poloviny roku.

Hodnocení probíhá při výskytu sněhové pokrývky v období listopad–duben.

Aktuální informace - Stavů a průtoků na tocích

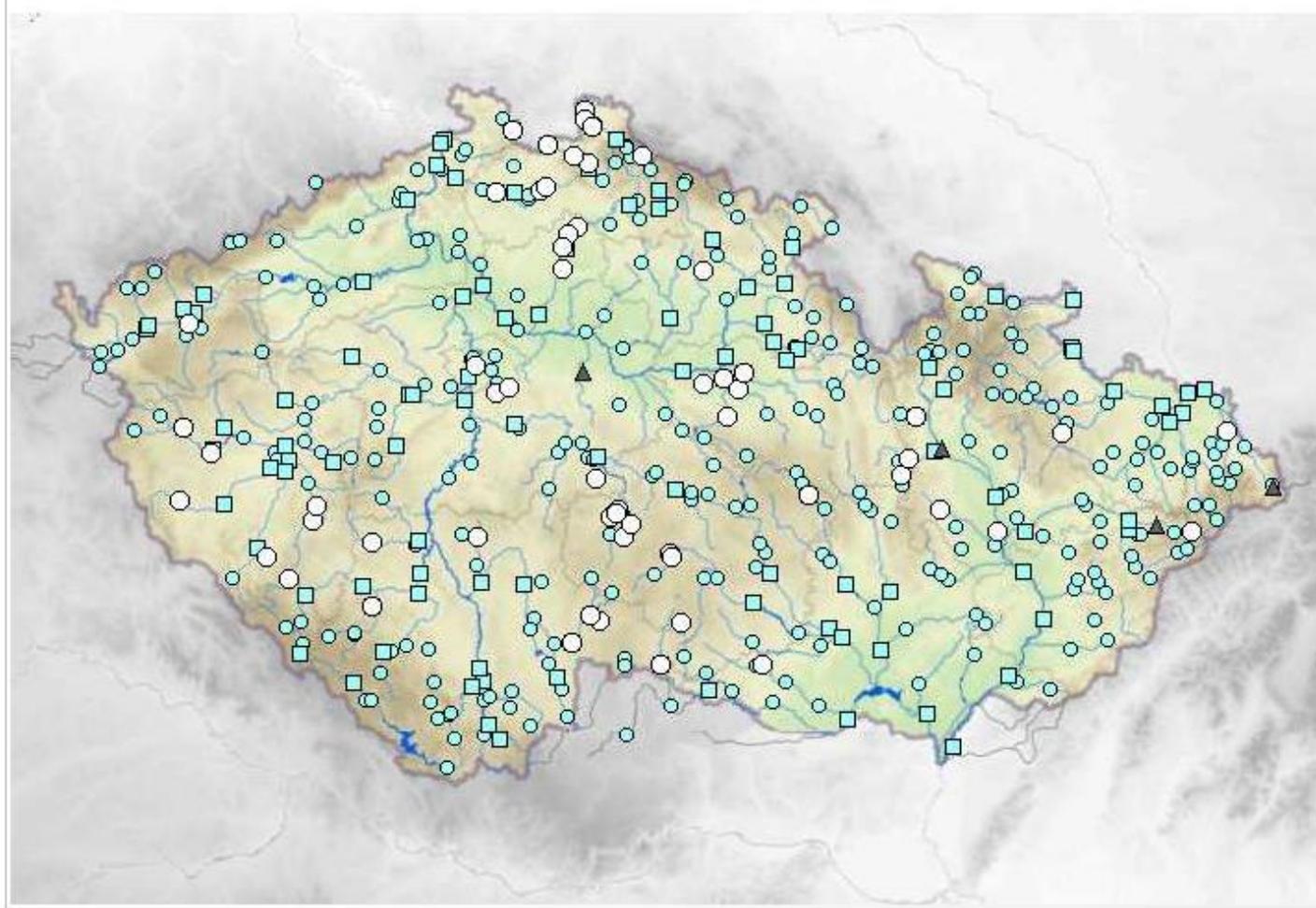
Legenda

-  Měrný profil
-  Předpovědní profil

-  Sucho
-  Normální stav
-  1.SPA (bdělost)
-  2.SPA (pohotovost)
-  3.SPA (ohrožení)
-  3.SPA (extrémní povodeň)
-  Údaje nejsou k dispozici

-  Měření je ovlivněno

Celá ČR | Zobrazit kraj : | Zobrazit povodí : | Zobrazit pobočku : | Tabulkový přehled



Aktuální informace - vodnosti na tocích

Kategorie vodnosti toků

Pravděpodobnost překročení

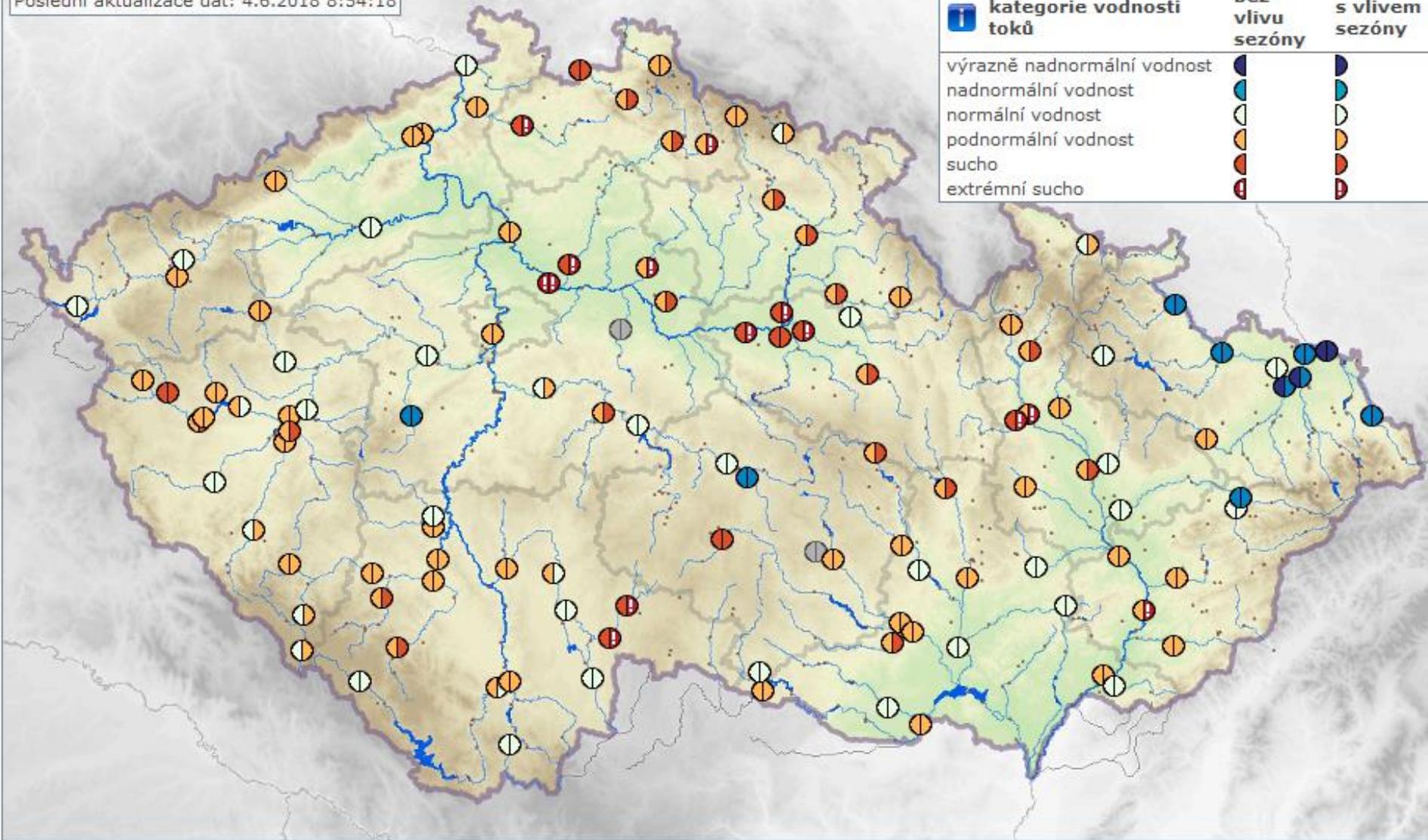
Poměr k dlouhodobému měsíčnímu průměru

M - denní průtok

Popis mapy: Levá část symbolu ukazuje vodnost toků, která byla stanovena na základě srovnání aktuálního průměrného průtoku za posledních 24 hodin s dlouhodobými celoročními statistikami (M-denní vody). Pravá část zohledňuje pouze statistiku pozorovaných průtoků ke stejnému kalendářnímu dni.

Poslední aktualizace dat: 4.6.2018 8:54:18

kategorie vodnosti toků	bez vlivu sezóny	s vlivem sezóny
výrazně nadnormální vodnost		
nadnormální vodnost		
normální vodnost		
podnormální vodnost		
sucho		
extrémní sucho		



Germany

TERMINOLOGY AND DEFINITION

- The minimum water flow (*Mindestwasserführung*) is defined as a discharge required for specific surface water and other connected waters in order to comply with the general principles of water management and with the objectives for the surface water management. In addition to the concept of minimal water flow set by law, the minimum water discharge (*Mindestwasserabfluss*) or minimal amount of water (*Mindestwasser(menge)*) is used in the literature.

LEGAL REGULATION

- The minimum water flow is regulated by The Act on Water Management from 2009 (Article 33)

METHODS OF DETERMINATION

- The determined uses of water (i.e. damming or drainage) are permissible only if the minimum water flow is maintained. The competent water authority must take into account the requirements when granting water management permits and may approve the permit application only if the minimum water flow is guaranteed.
- The determination always depends on local hydrological conditions and specific ecological requirements and is therefore always dependent on a particular case – for example it may be necessary not to set static values of minimum water flow, but to change it according to the season.

CONTROL OF COMPLIANCE

- The water authority is required to carry out an inspection in respect of the permit granted, which may be followed by official control measurements. If the minimum flow is not maintained, the authority may impose a fine or cancel the water permit.
- Monitoring is carried out by the provincial governments in cooperation with the Federal Ministry of the Environment.

Austria

TERMINOLOGY AND DEFINITION

- The term used is ecologically necessary minimum flow (*der ökologisch notwendige Mindestabfluss*)

LEGAL REGULATION

- Regulated in the Water Act of (1959), the 2009 National River Basin Management Plan and the 2010 Environmental Quality Objectives for Surface Waters

METHODS OF DETERMINATION

- At first the hydrological state must be assessed. Individual components of water balance, river continuity and morphology of the surface water body are used to assess hydromorphological state.

- There are many parameters that need to be taken into account when determining the ecological flow. Diversity of species is crucial for biological components. In addition, river processes, habitat conditions, etc. are included.
- Water management, river continuity and morphology of the surface water body are in good condition when specified criteria are met, including minimal water flow: maximum 20% of the annual water level.
- If the flow is smaller than the average winter flow between October and March and the flow rate is lower than the average annual flow rate between April and September, the threshold value of water abstraction is set to less than 10% of the lowest natural discharge per day.

CONTROL OF COMPLIANCE

- Monitoring is carried out by the provincial governments in cooperation with the Federal Ministry of the Environment.

The Netherlands

TERMINOLOGY AND DEFINITION

- There is no formal definition of minimal ecological flow in the Netherlands.

LEGAL REGULATION

- There are different policies that regulate water levels: so-called water agreements. These agreements are detailed and contain flow rate (in m^3/s) for different conditions in the given locations and under the circumstances. These agreements ensure a sufficient flow of water for all users. Usually these agreements are applied without any restrictions because there is usually enough water.

SPECIAL STATE

When drought occurs, and in this case a special rule is applied. This state is called „*water shortage ranking*“ and certain uses take preference:

1. Security (waterfront stability, oxidation prevention, nature protection)
2. Drinking water and energy
3. Agricultural valuable crops and water for industrial processes
4. Shipping, agriculture, natural values that can easily be restored

When there is the state of „*water shortage ranking*“, national team coordinates and provides practical advice on behalf of the Minister for Infrastructure and Water. Large streams are run by the special operators of the Ministry and they are on the field (sometimes at a distance) 24 hours a day, even under normal conditions.

Finland

LEGAL REGULATION

- The Finland legislation does not consider any term related to minimal flow and there is no legal requirement related to minimum flow.
- Instead, in accordance with the Water Act (587/2011), when deciding whether to grant a project permit, a rule or conditions determining the minimum and/or maximum water flow may be part of the permit if necessary.
- In addition to the aforementioned law, there are no other official instructions or recommendations. But the legal practice may also be taken into account.
- Different conditions may apply depending on whether the project is considered to be:
 1. Requiring a permit in addition
 2. Considered to be a project regulated separately in a specific chapter of the Water Act (hydro energy, regulation of water bodies, permanent change in average water level)

METHODS OF DETERMINATION

- When preparing a request for authorisation, the applicant must include relevant calculations: for example, about the effect on water flow. The applicant can freely hire consultants, engineers and other experts.
- In the assessment of the effects, current circumstances should be compared with potential future effects. Available information about similar water bodies can be used as a reference.
- An authorising officer then assesses whether the requirements for authorisation are met.
- The licensing authority may request the assessment of other public authorities or ask an expert opinions from external sources and collect other additional materials or carry out an inspection or review
- No universal calculation or determination method is specified. The determination and calculation of any minimum / maximum water flow occurs on the basis of an individual permit application.

- It is possible to determine that the minimum flow will be measured differently depending on the season or time of the year. Depending on the permit, it may also be required, for example, to measure the water flow and to monitor it at a certain time.

CONTROL OF COMPLIANCE

- The measurement control depends on the specific restrictions in the given permit. In any case, the operator is authorised to operate only within the limits set by the permit.
- Any requirements regarding calculation, supervision, etc. may be content of the permit.
- In case of non-compliance, the matter may be further discussed in an administrative or even a criminal proceeding.

France

TERMINOLOGY AND DEFINITION

- The terms used in France are minimal biological flow (*débit minimum biologique*) or sometimes minimal residual flow (*débit minimum résiduel*). The Environmental Act defines it as a minimum flow rate guaranteeing the permanent life, circulation and reproduction of species living in the given waters at the time the waterworks are installed.

LEGAL REGULATION

- Provisions related to the minimal biological flow are contained in the Act on Water and Aquatic Environment (Act No. 2006 of 30 December 2006). It is also codified in the Environmental Code (in Article 214-8)

METHODS OF DETERMINATION

- Calculation of the minimum biological flow is performed by an expert at the expense of the future operator and it represents one of the documents of the application for a permit.
- The minimum flow rate must not be less than 1/10 module, i.e. the average multi-annual flow of watercourse. The reference module is calculated for river basins from surveys conducted at different locations in water flow measurement stations. A future operator may propose variable minimum flow rates according to the season.

CONTROL OF COMPLIANCE

- The Environmental Code provides a list of experts authorised to carry out inspections. These are done randomly.
- Failure to comply with a minimum biological flow constitutes an offense for which a fine of up to EUR 75,000 may be imposed. Additionally, administrative measures can be imposed, starting with a simple warning (notification) to carry out the necessary work (modifications) until the closure of the facility.

What would be the best approach for Bosnia and Hercegovina



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More information on www.english.arnika.org and
www.eko.ba