Rivers are more than they seem to be

Presentation for Summer School, Moldova, 2021

What is the river?

Water flowing between banks and river bed?

Not really.

Natural river changes its shape, especially during floods. So banks are not fixed, impenetrable borders.

In natural river, water in floodpain constantly communicate with water in the river channel.

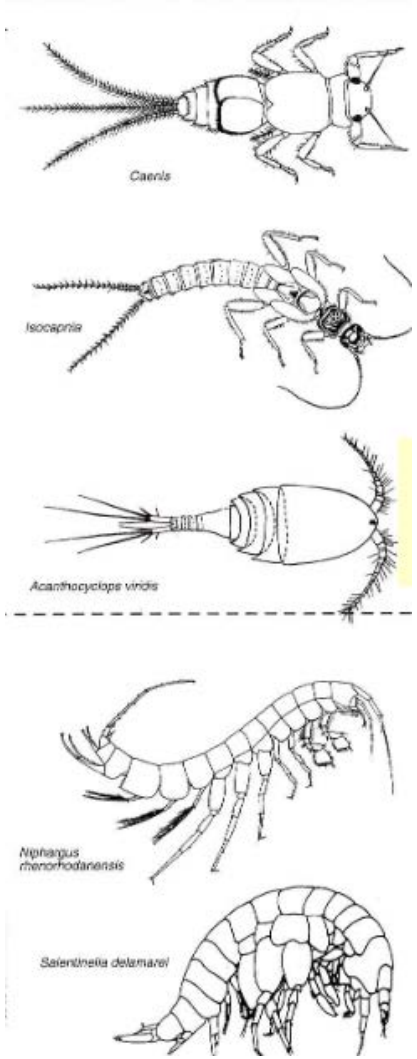
What is the river?

There is a river under the river!

In gravel layers under the river bed, the dark waters flows (hyporeal). It sometime mixes its water wuth the waters of the surface river.

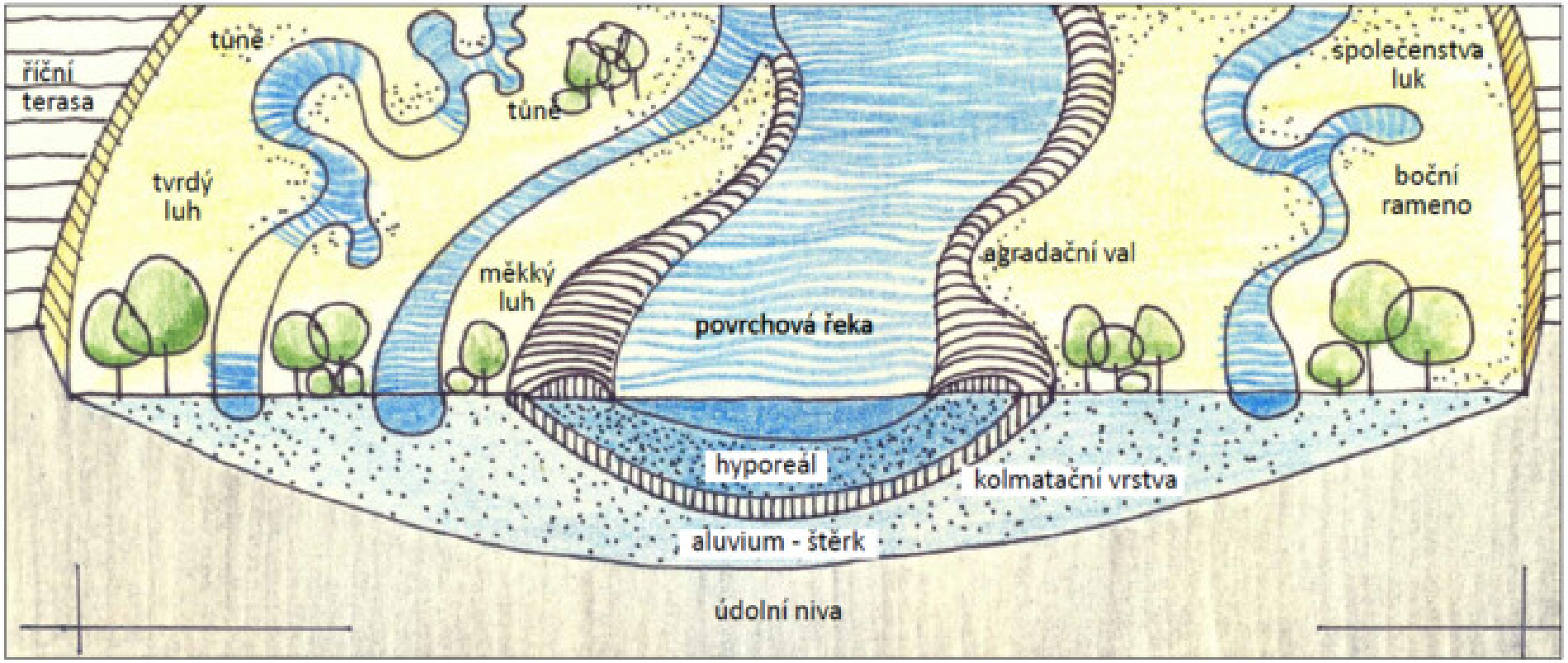
When surface river dries out, the „river under the river“ can be a refuge for water organisms.

Even if in hyporeal waters are dark and the concentration of oxygen is quite low, it is also a habitat for specifically adapted species.



What is the river?

Natural river and the surrounding landscape are interconnected. They create a whole - RIVER LANDSCAPE.



Rivers flying in the air?

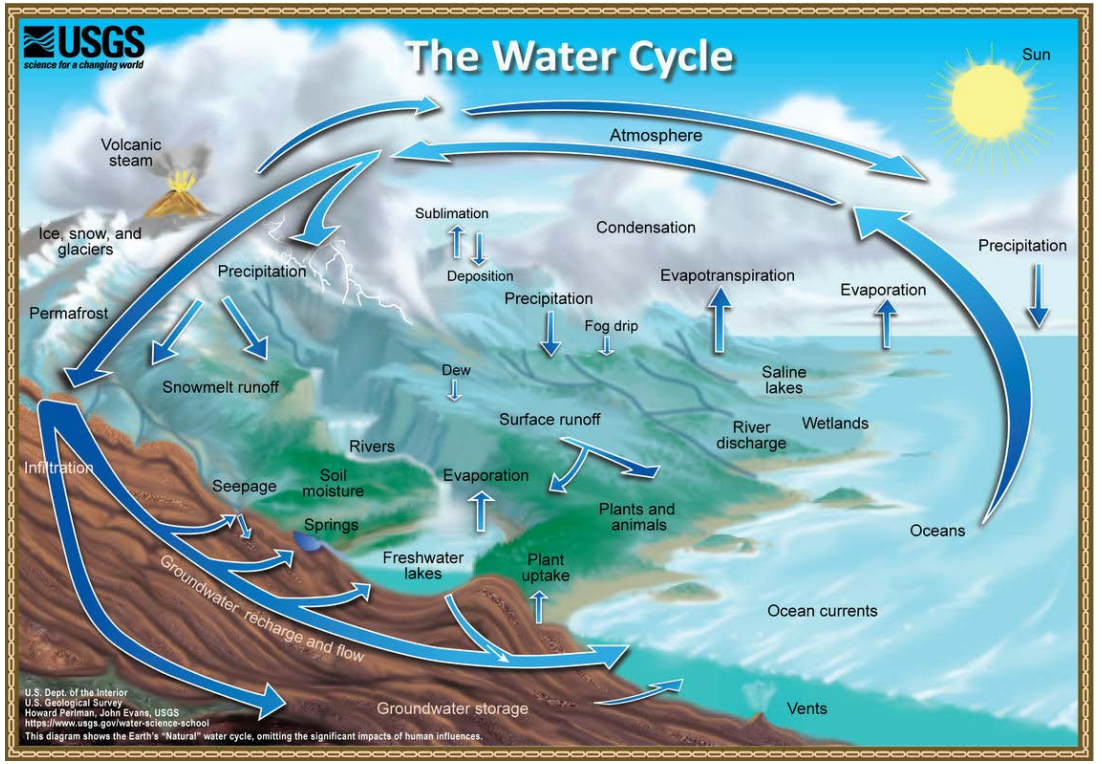
Long water cycle (between continents and oceans):

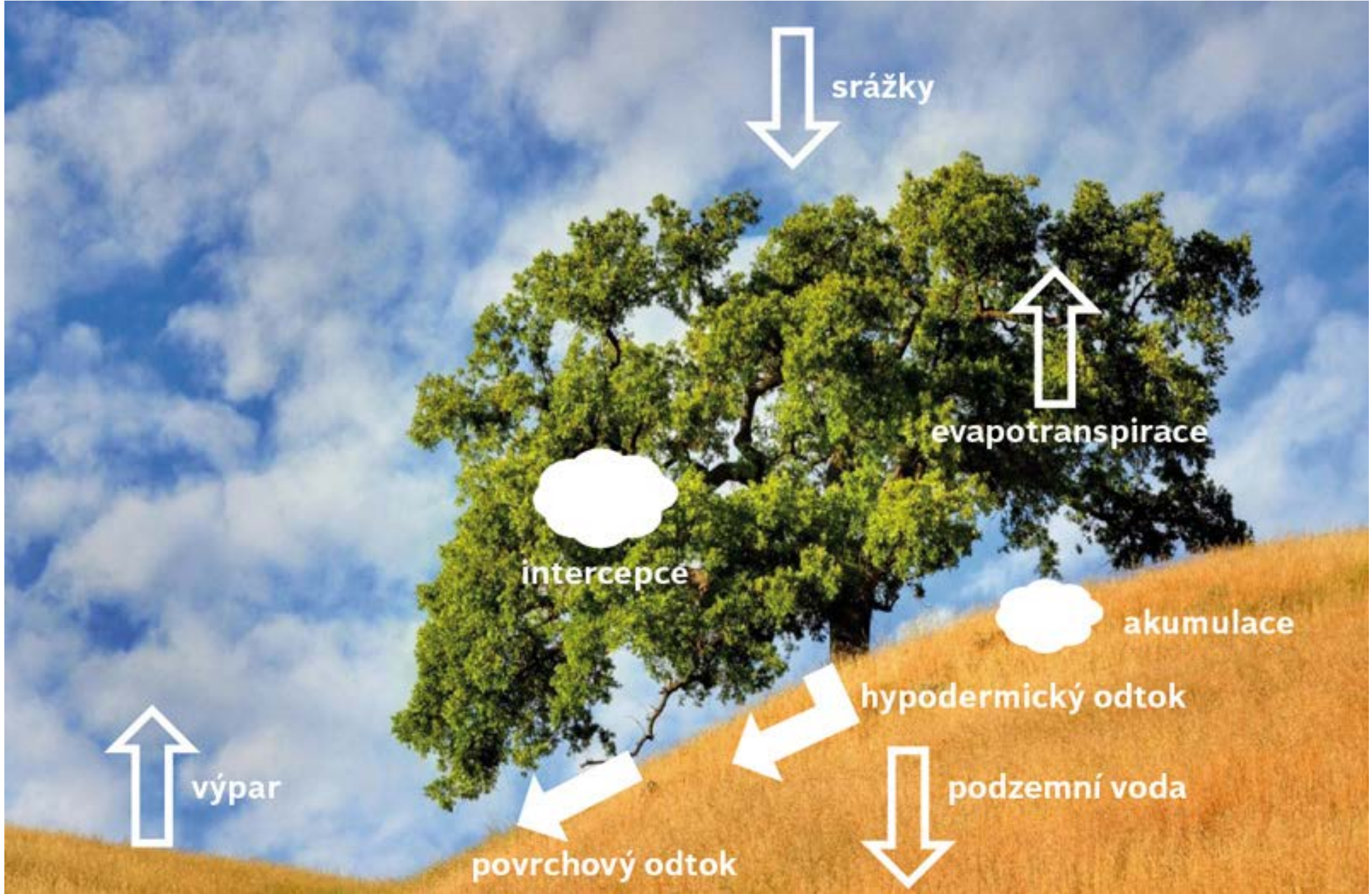
Freshwater – surface and groundwater flow

Evaporation and precipitation

Short water cycle (local):

Evaporation, evapotranspiration and precipitation

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evapotranspirace
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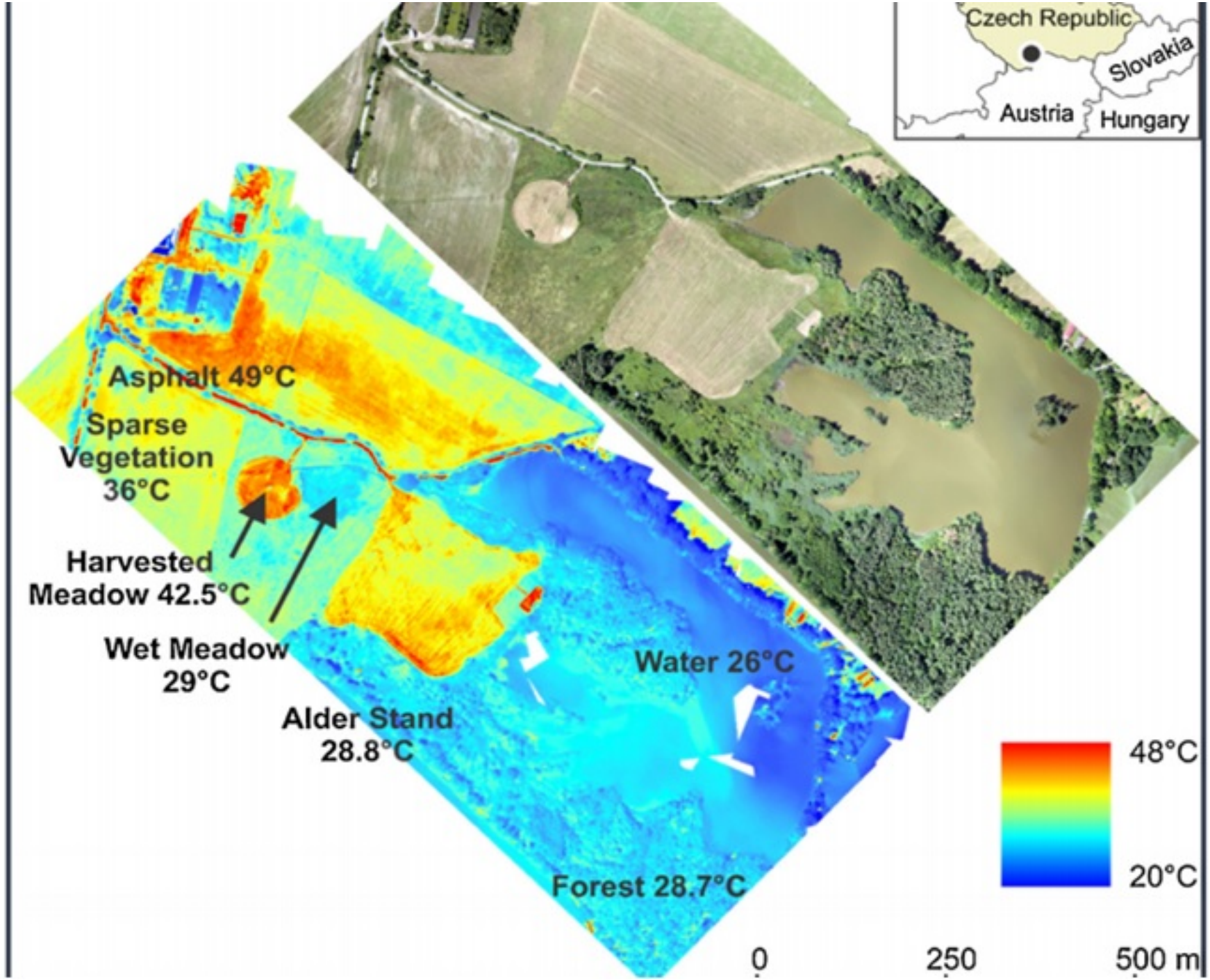

Czech Republic
Slovakia
Austria
Hungary
Asphalt 49°C
Sparse Vegetation 36°C
Harvested Meadow 42.5°C
Wet Meadow 29°C
Alder Stand 28.8°C
Water 26°C
Forest 28.7°C
48°C
20°C
0
250
500 m

Characteristics of natural rivers

Complexity, development, communication between river and floodplain.

Natural rivers have diverse river channel (meanders, branches, islands, pools and rifles;

Natural rivers naturaly changes their channel, especially after floods;

Natural rivers are usually shallow, the level of water in soil corresponds with level of water in the river;

River influences the landscape around; landscape around influences the river

No transversal obstacles – allows migration of fish.

Ecological functions of natural river landscape?

Biodiversity:

Morphological diversity = diversity of habitats

Habitats dynamically originate and vanish.

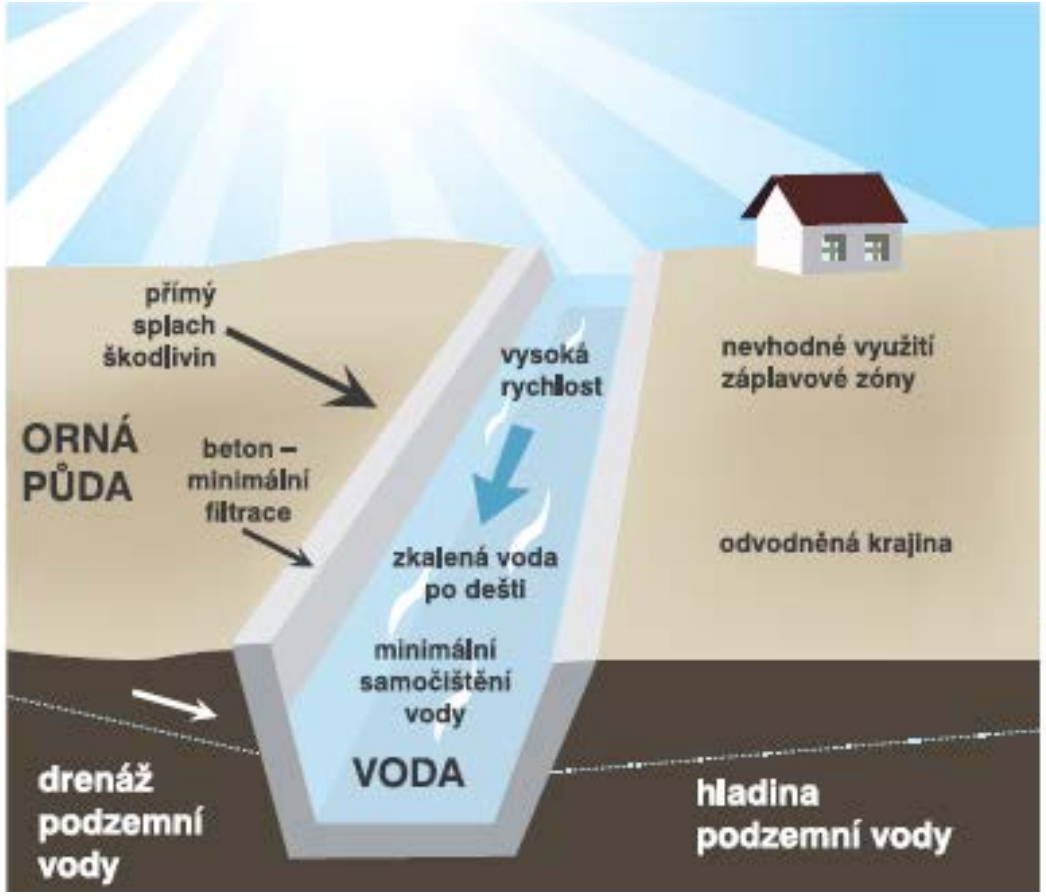
No migration obstacles (salmon, sturgeon, seal)

Self-cleaning, management of nutrients

Water retention – prevention of floods and droughts

Regulation of micro-climate

Comparison of natural and modified rivers



Why did we modified the rivers and streams?

To get land for agriculture or settlement;

To drain fields;

To protect from floods;

To make rivers navigable;

Building reservoirs for power stations, source of drinking water, recreation, flood protection, etc.;

Just for the heck of it!

Basic morphological types of rivers

High-mountain rivers

High slope, erosion over sedimentation, coarse sediment, mostly „straight“ or braided channels

Surrounding lanscape – rocks, canyons, forests

Basic morphological types of rivers

Rivers of highlands and foothills

High-middle slope, coarse sediments (gravel), mostly braided or meandering channels

Surrounding landscape: mosaic of forests, grassland.

Basic morphological types of rivers

Lowland rivers

Mild slope, fine sediments, more sedimentation than erosion, mostly meandering channels

Surrounding landscape: meadows, floodplain forest, wetlands

River deltas

Deltas are formed where river enters slow moving or stagnant water – typically lake or sea.

Usually, deltas are characterized by many river arms and extensive sedimentation.

River deltas belong to the richest ecosystems with the highest biodiversity.

Most of them are protected as national parks and belongs to important area for birds.

River restoration

River restoration = attempt to change modified rivers and river landscapes back to more natural state.

Limits: interests of landowners and land users;

Costs;

Conservation management of restored areas;

Still, in new EU Biodiversity Strategy, 25 000 km of rivers shall be restored to free flowing rivers until 2030.