



POVODÍ VLTAVY

DROUGHT AND WATER QUALITY IN RESERVOIRS

JINDŘICH DURAS, MICHAL MARCEL



RESERVOIR ↔ WATERSHED

A photograph of a stream flowing through a wooded area. The water is brownish and reflects the surrounding greenery. The banks are covered in dirt, rocks, and fallen branches. The background is filled with dense trees and foliage. The overall scene is a natural, somewhat overgrown waterway.

↓ influence non-point sources

↑ influence of waste waters

↑ effectiveness of self-purification processes

STREAMS



Slower flow, decreased depth => more time
for self-purification and pronounced
relevance of biofilms + hyporheic biotopes
=> ↑ role of hydromorfology

HYPORHEAL

A photograph of a rocky stream bed with a small pool of water, surrounded by dense green vegetation and trees. A wooden bridge is visible in the background.

Water ofte flows in hyporheal only during dry summers => intensive self-purification processes

PASSIVE FILTRATORS

An underwater photograph showing a clam's siphon and gills. The siphon is a long, dark, cylindrical structure extending from the clam's body. The gills are visible as a series of dark, feathery structures. The water is very turbid and brown, likely due to suspended particles. A small, bright green object is visible near the base of the siphon. The clam's body is partially visible on the right side of the frame.

Clams, insect larvae

(e.g. Trichoptera – Hydropsychidae)



intensive decay

esp. below point sources

MACROPHYTES

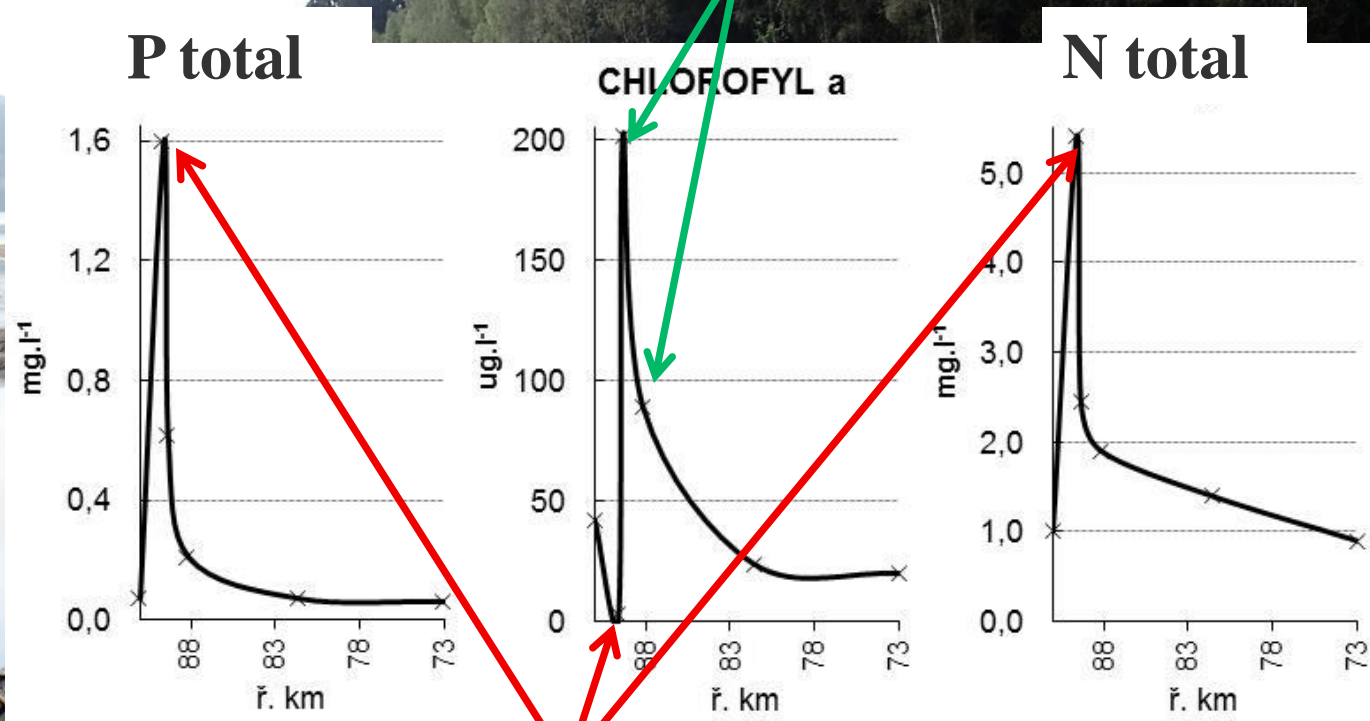


Very important role for self-purification processes: excavate and „clean“ such parts would be a big mistake

SELF-PURIFICATION

Longitudinal profile of a small stream Štřela:
an inflow of Žlutice drinking water reservoir

2 fishponds

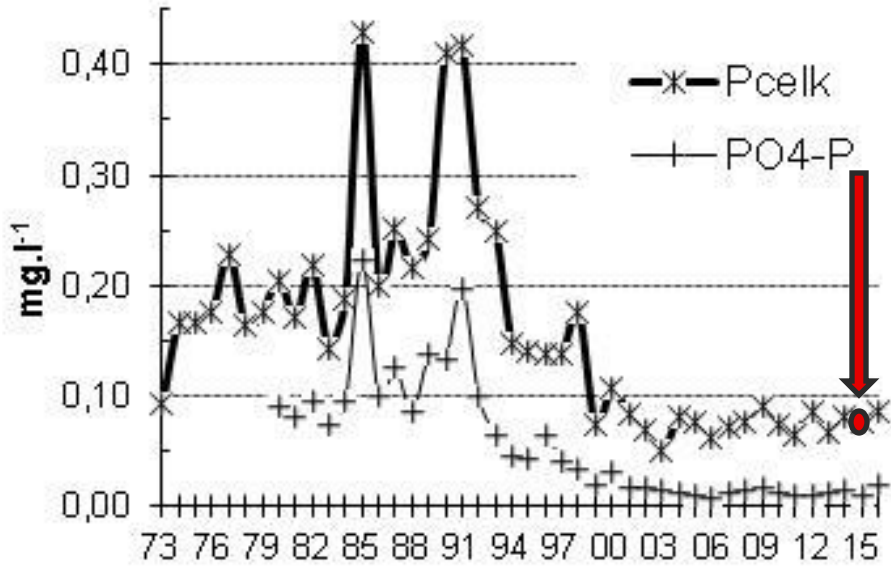


WWTP input

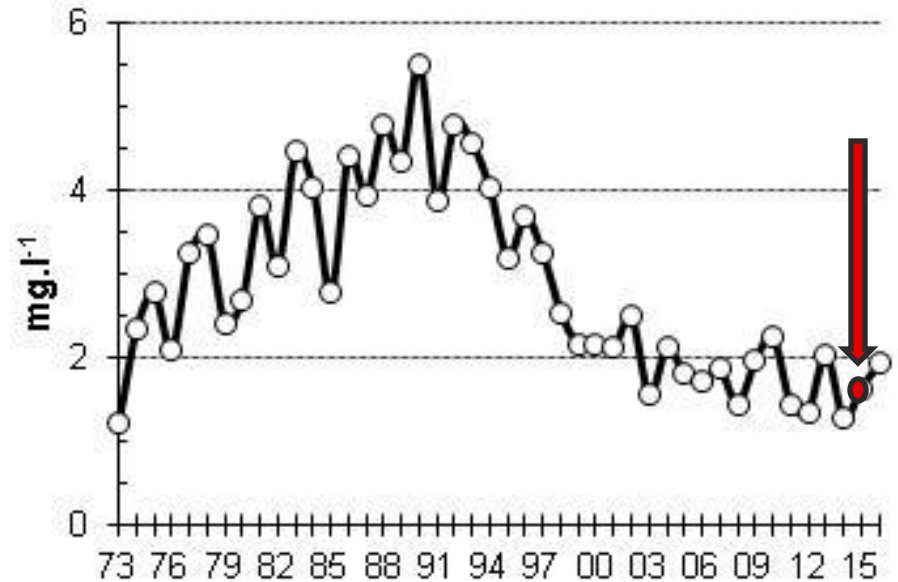
fast degradation of pollution, nutrient retention

INFLOW I.

STŘELA - P celk. a PO₄-P

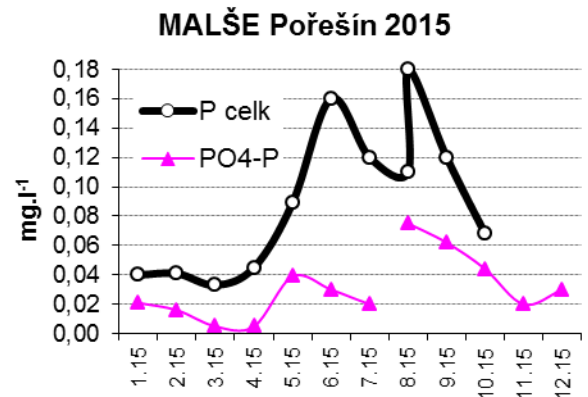
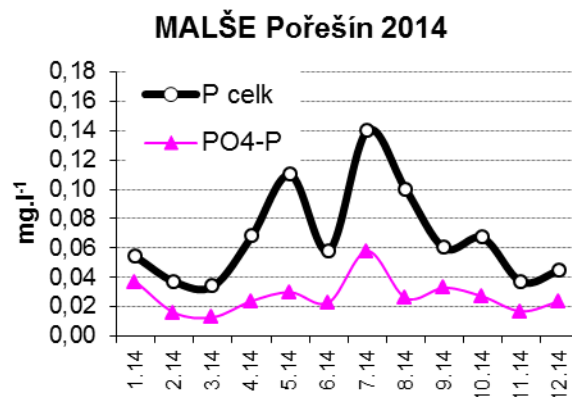
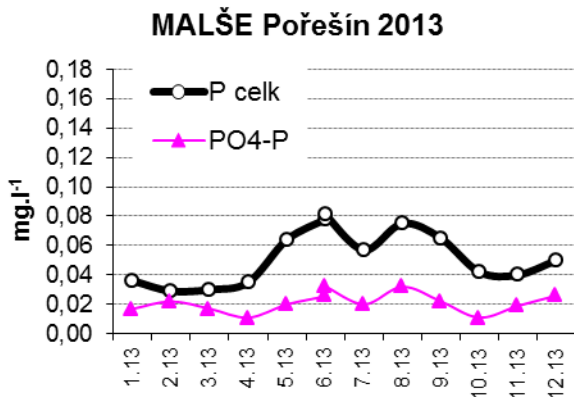
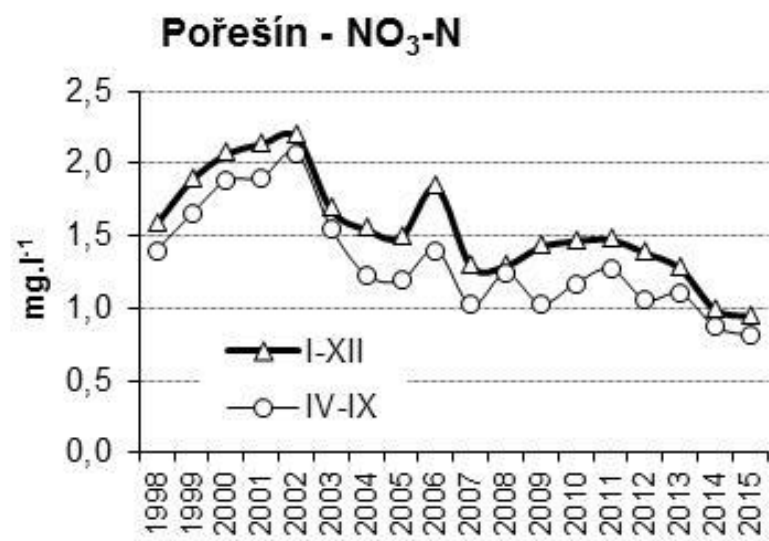
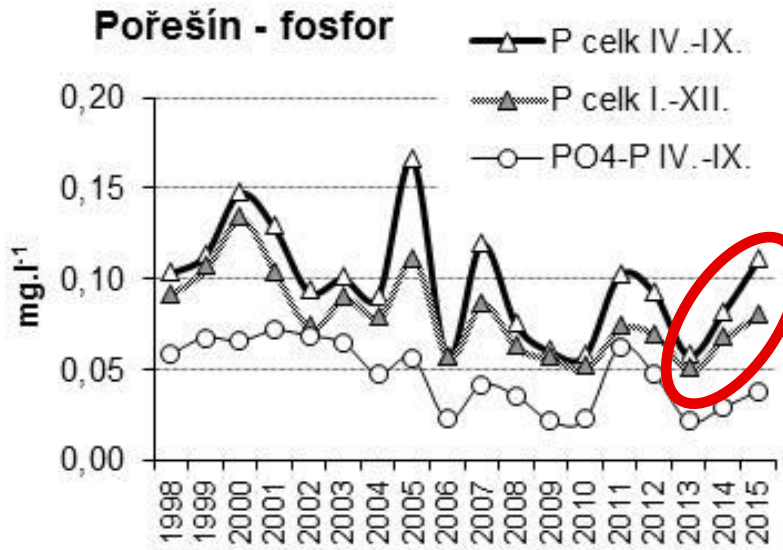


STŘELA - NO₃ - N



THE SAME OR BETTER WATER QUALITY IF POINT SOURCES ARE FAR FROM THE RESERVOIR

INFLOW II.



WORSE WHEN SOURCES ARE NEAR THE RESERVOIR

RECOMMENDATION

A photograph of a stream flowing over dark, wet rocks in a lush green forest. The water is clear and reflects the surrounding foliage. The rocks are of various sizes and are scattered throughout the stream bed. The background is filled with dense green vegetation, including trees and bushes.

**Encourage self-purification -
REVITALISATION**

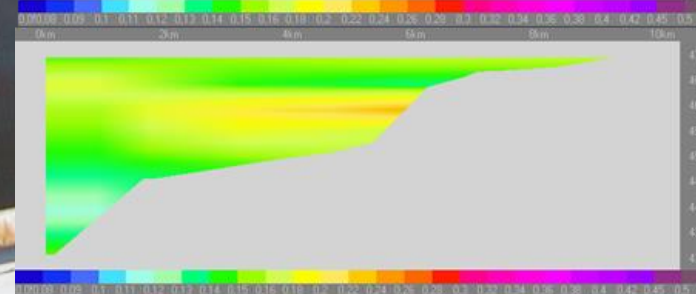
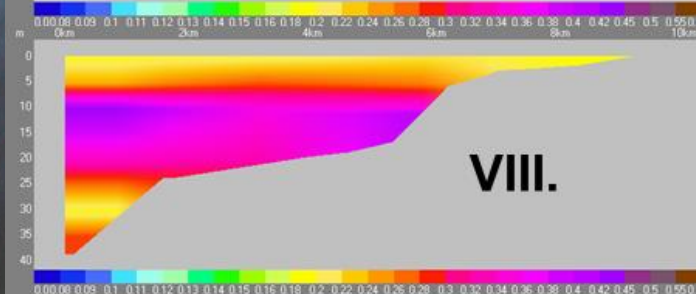
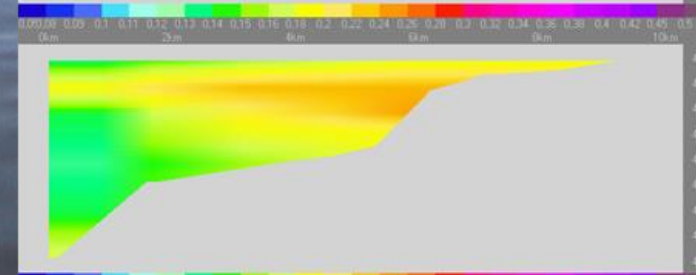
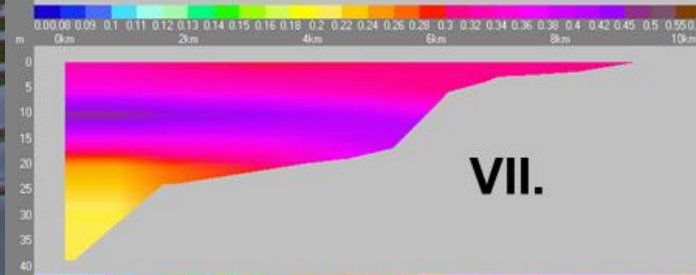
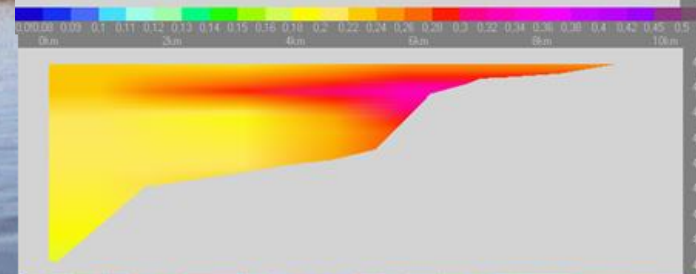
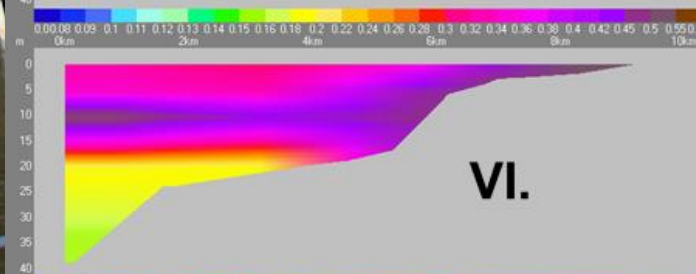
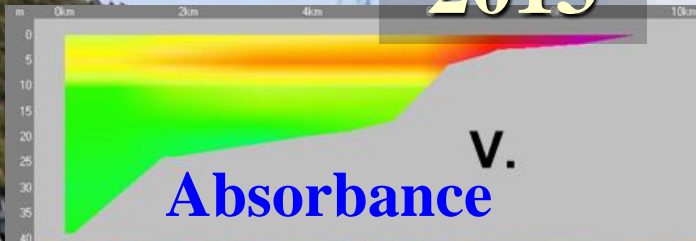
**Point sources near the reservoir
should be treated more strictly**

RESERVOIRS

↓ loads of humic substances

2013

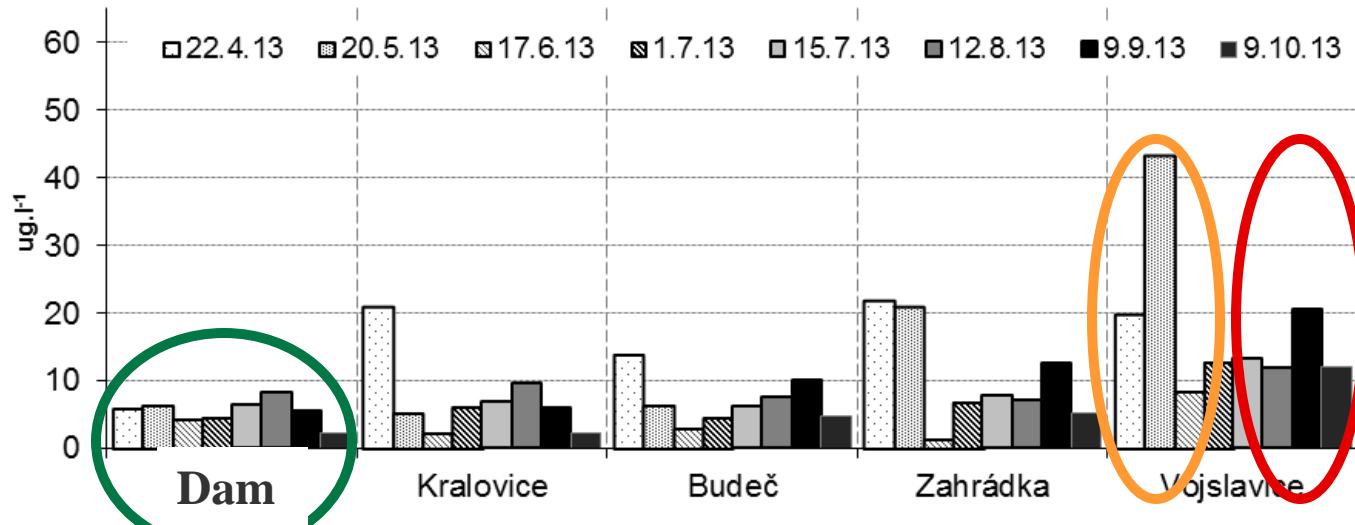
2015 dry



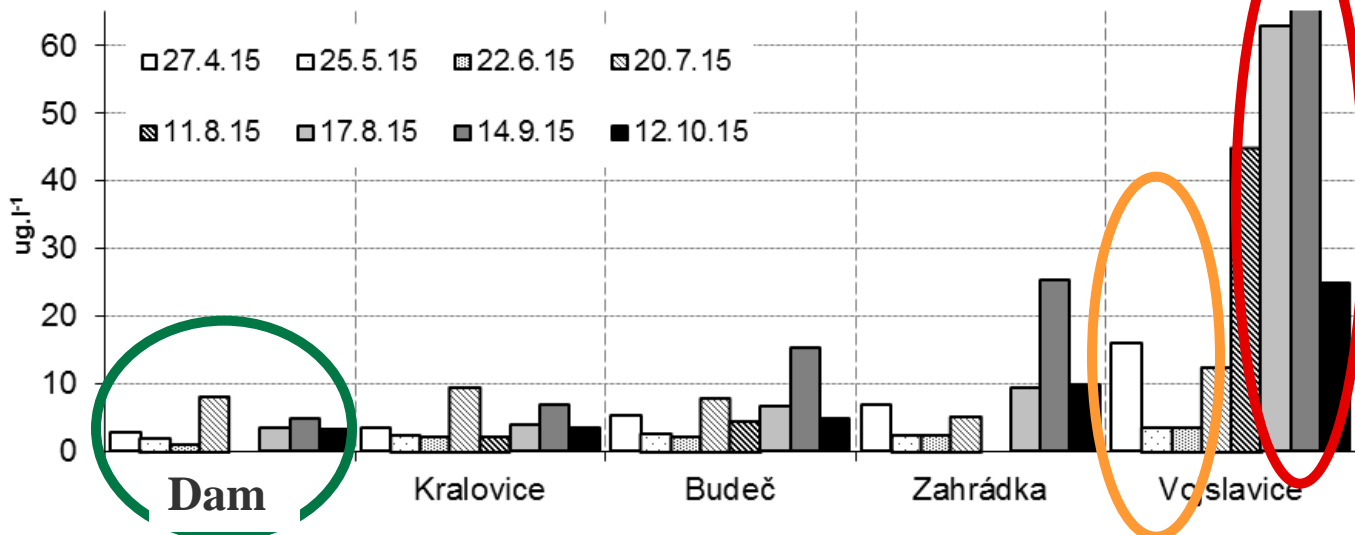
Lower P loads

long, canyon shaped reservoir (Švihov, drinking water res.)

LONGITUDINAL PROFILE: EPILIMNION 2013 wet



LONGITUDINAL PROFILE: EPILIMNION 2015 dry



More pronounced eutrophication effects in upper parts, better situation near the dam

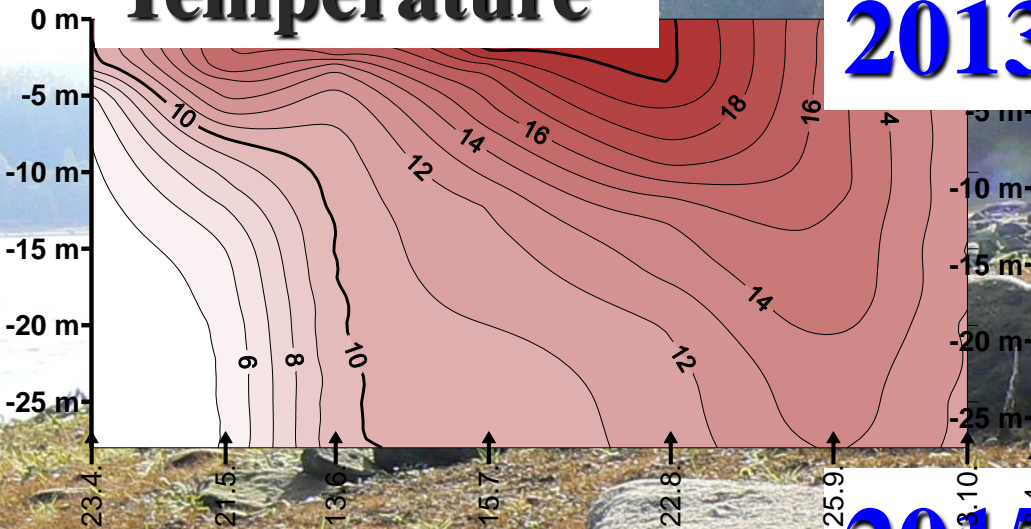
to: V. Boháček

STRATIFICATION

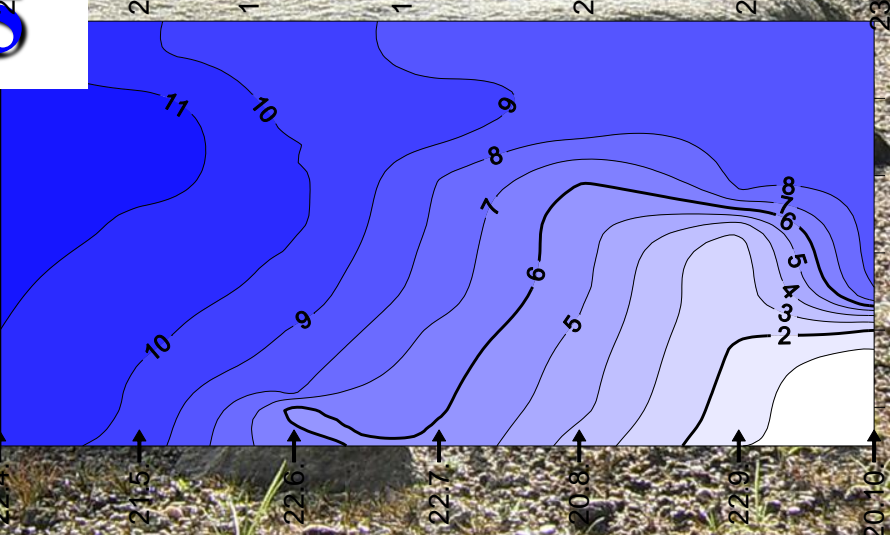
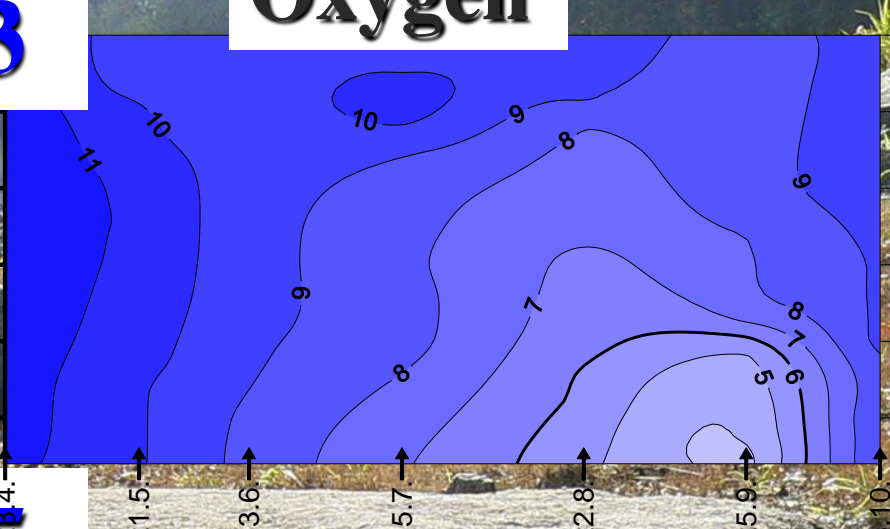
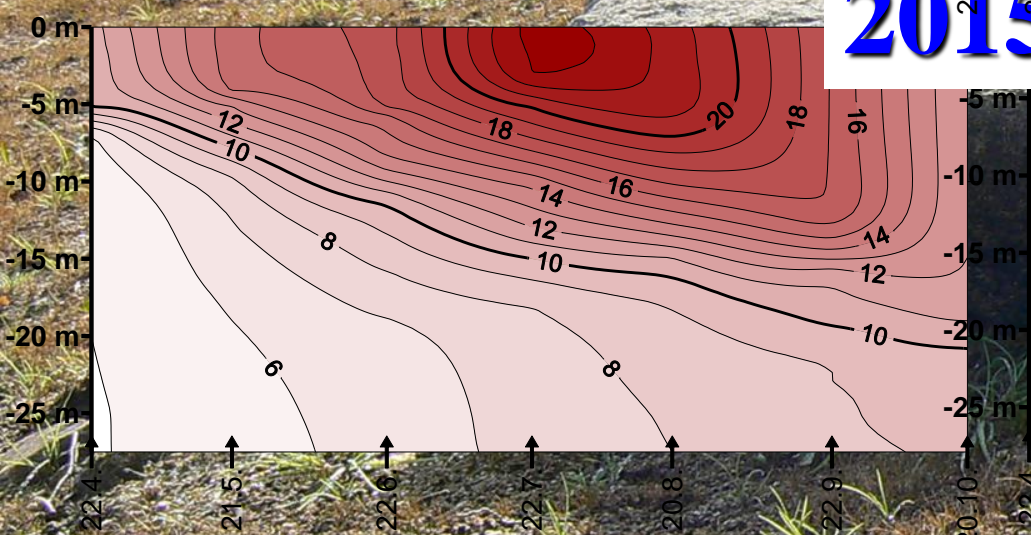
Temperature

2013

Oxygen



2015



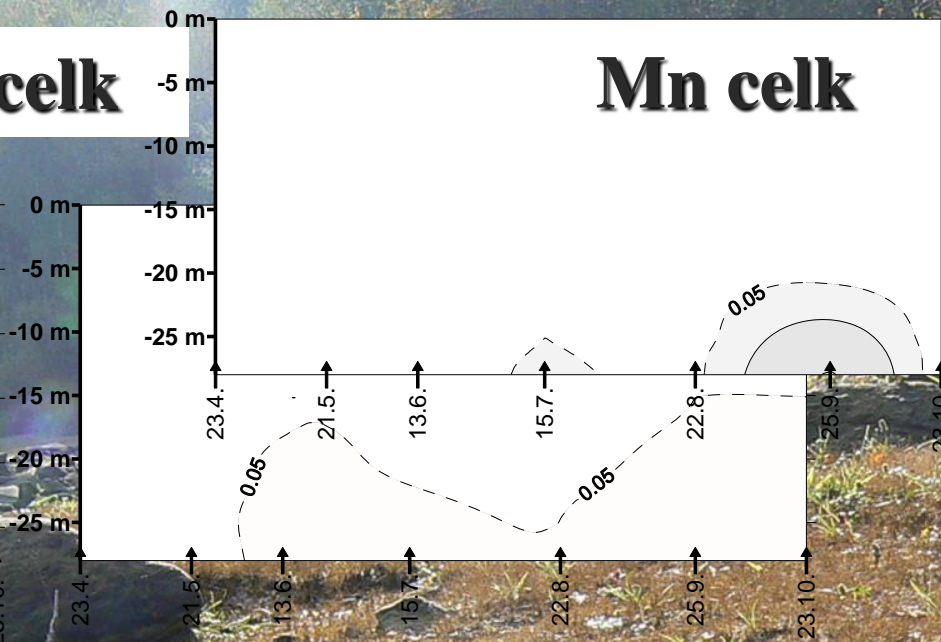
NO₃-N

2013

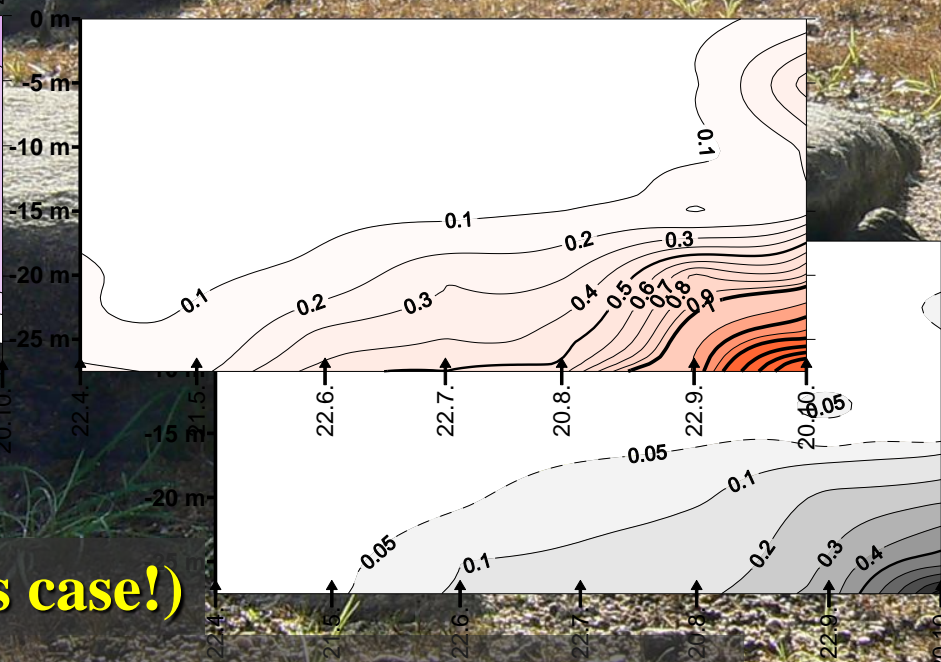
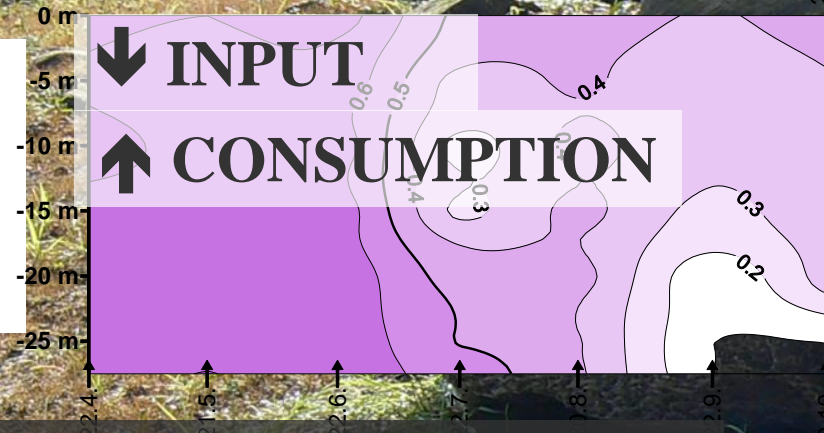


Fe celk

Mn celk



2015



2015: potential risk of Fe + Mn, but not P (in this case!)

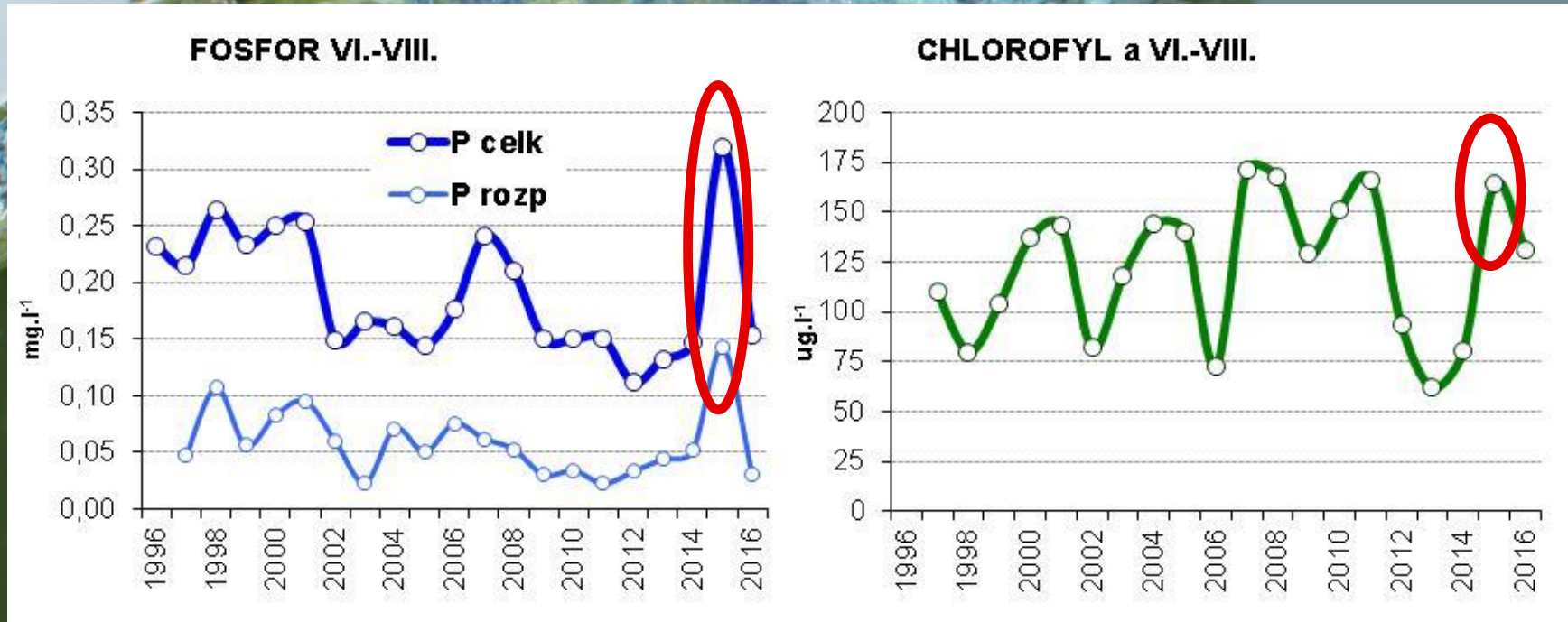
P was bound with Al and organic matter

SEDIMENTS OF SHALLOW PARTS

Risk of internal loading



SHALLOW HYPERTROPHIC

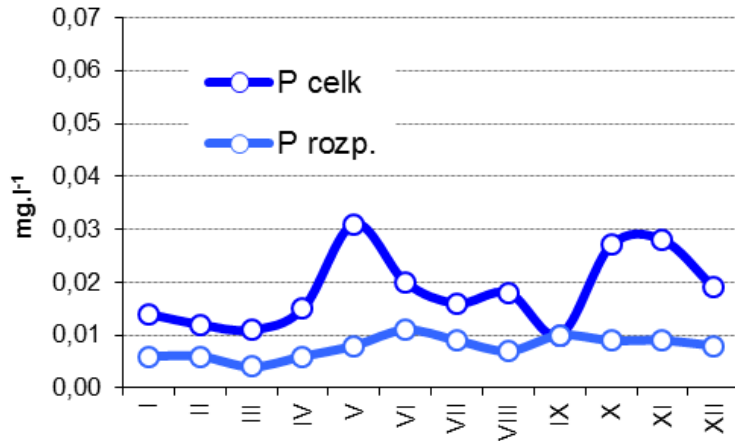


**2015: Considerable internal P loading =>
WORSE SITUATION THEN USUALLY**

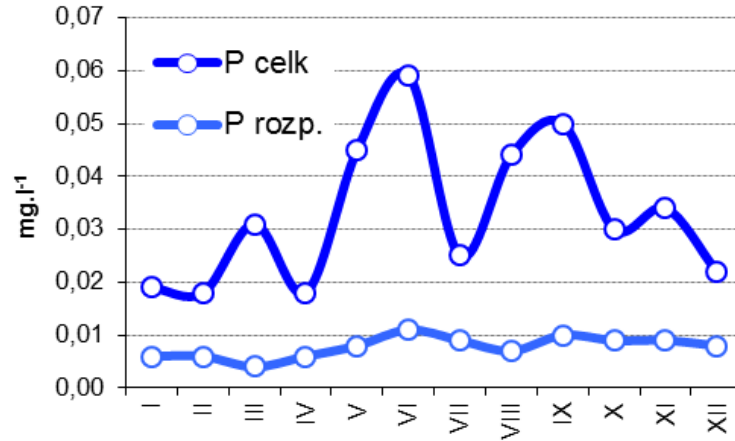
Extra high P concentrations, but not chlorophyll because phytoplankton biomass was limited by light, not by P

SHALLOW EUTROPHIC „brown“ water

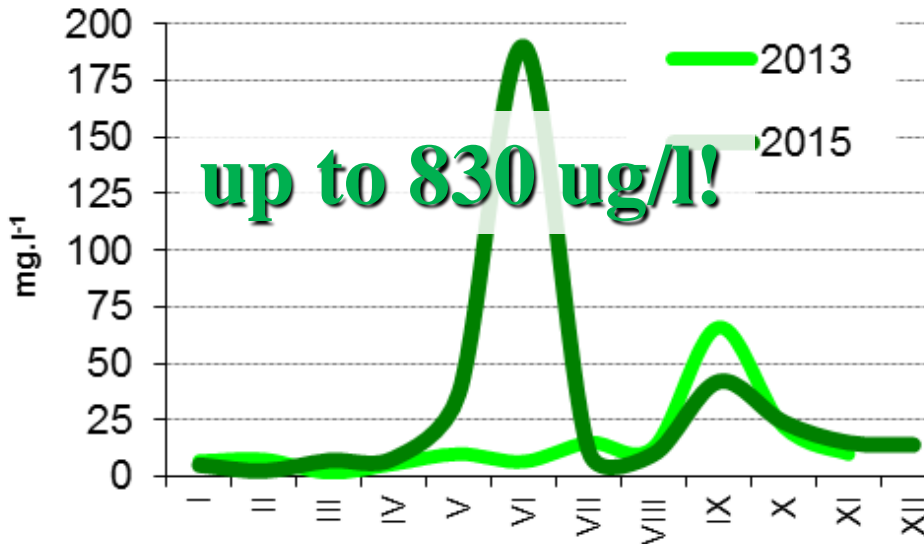
2013: Fosfor



2015: Fosfor



Chlorofyl a 2013/2015, směsné



2015: more stable stratification
 => worse O₂ conditions =>
 internal P loading => MUCH
 WORSE SITUATION!

Development of *Vacuolaria*
 bloom => disaster for
 waterworks

thanks for your attention

