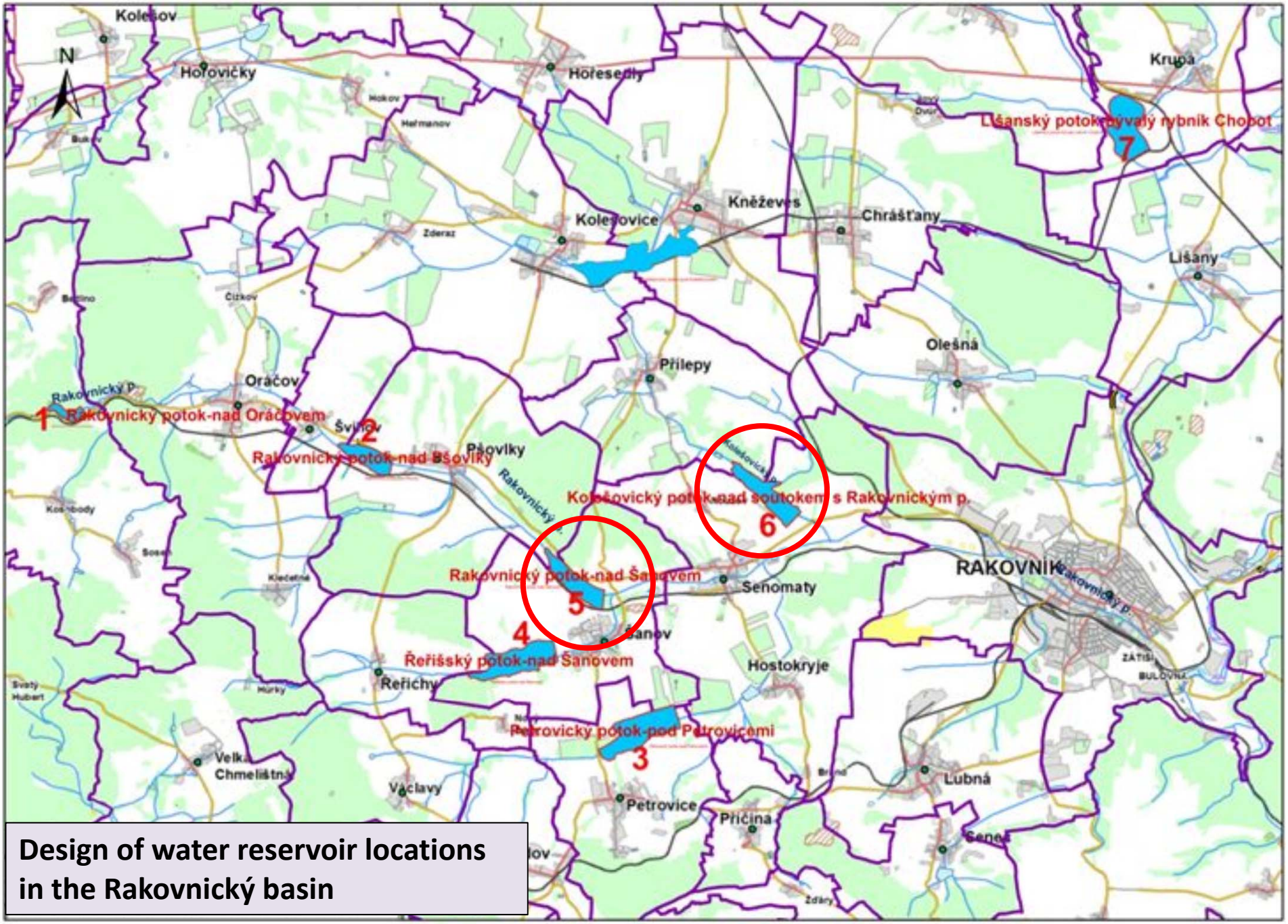
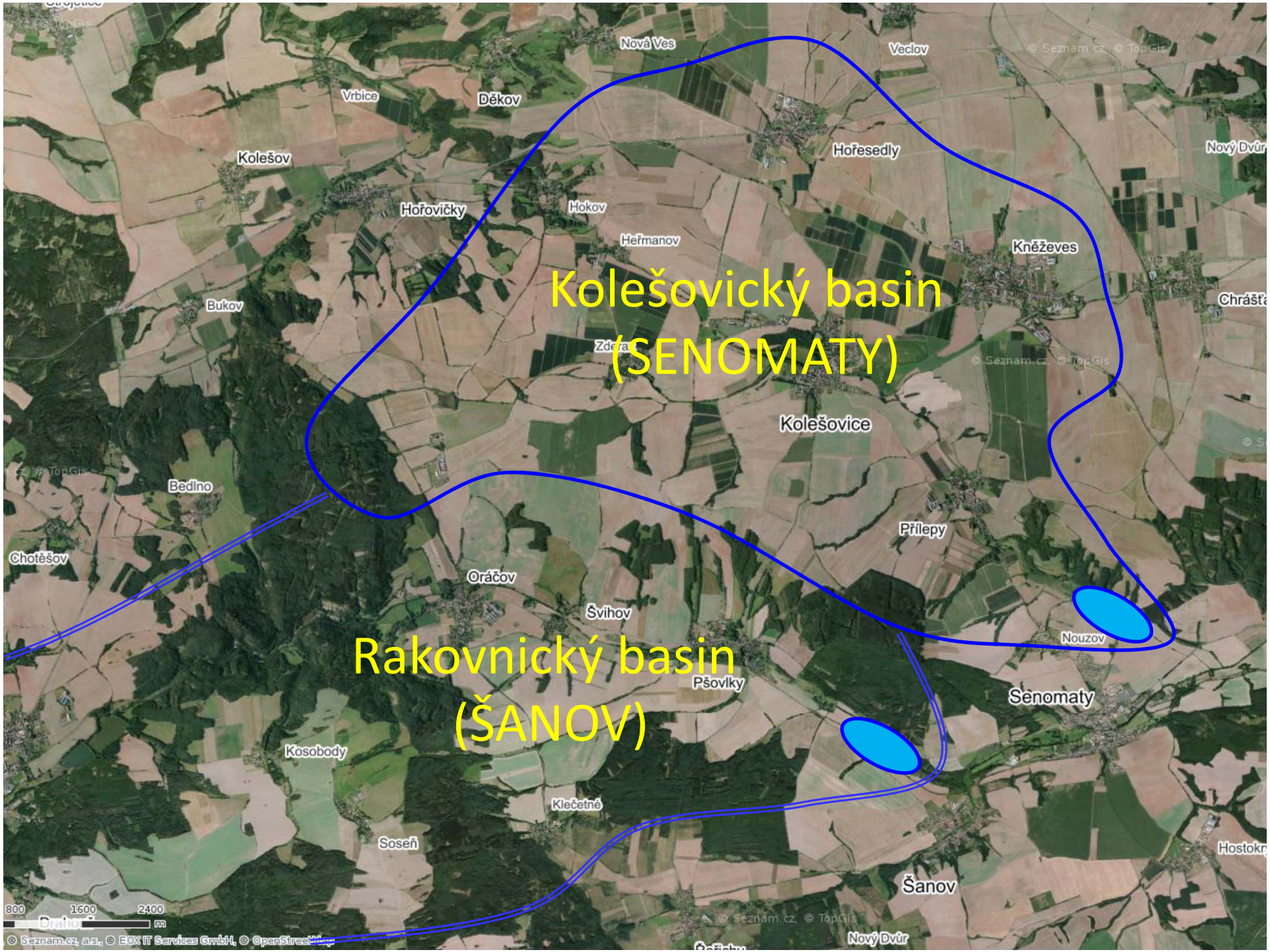
Small reservoirs in a dry landscape: what benefits can they provide?

Mgr. Luboš Zelený, RNDr. Jindřich Duras, Ph.D., Ing. Michal Marcel

MGS 2018, 18.10. 2018, Praha



Design of water reservoir locations in the Rakovnický basin


Kolešovický basin
(SENOMATY)
Rakovnický basin
(ŠANOV)
Nová Ves
Veclov
Vrbice
Děkov
Kolešov
Hořesedly
Nový Dvůr
Hořovičky
Hokov
Heřmanov
Kněževes
Bukov
Chrášťa
Zdeňa
Kolešovice
Bedlno
Přílepy
Chotěšov
Oráčov
Švihov
Nouzov
Pšovlky
Senomaty
Kosobody
Klečetné
Soseň
Hostokr
Šanov
Nový Dvůr
800
1600
2400
m
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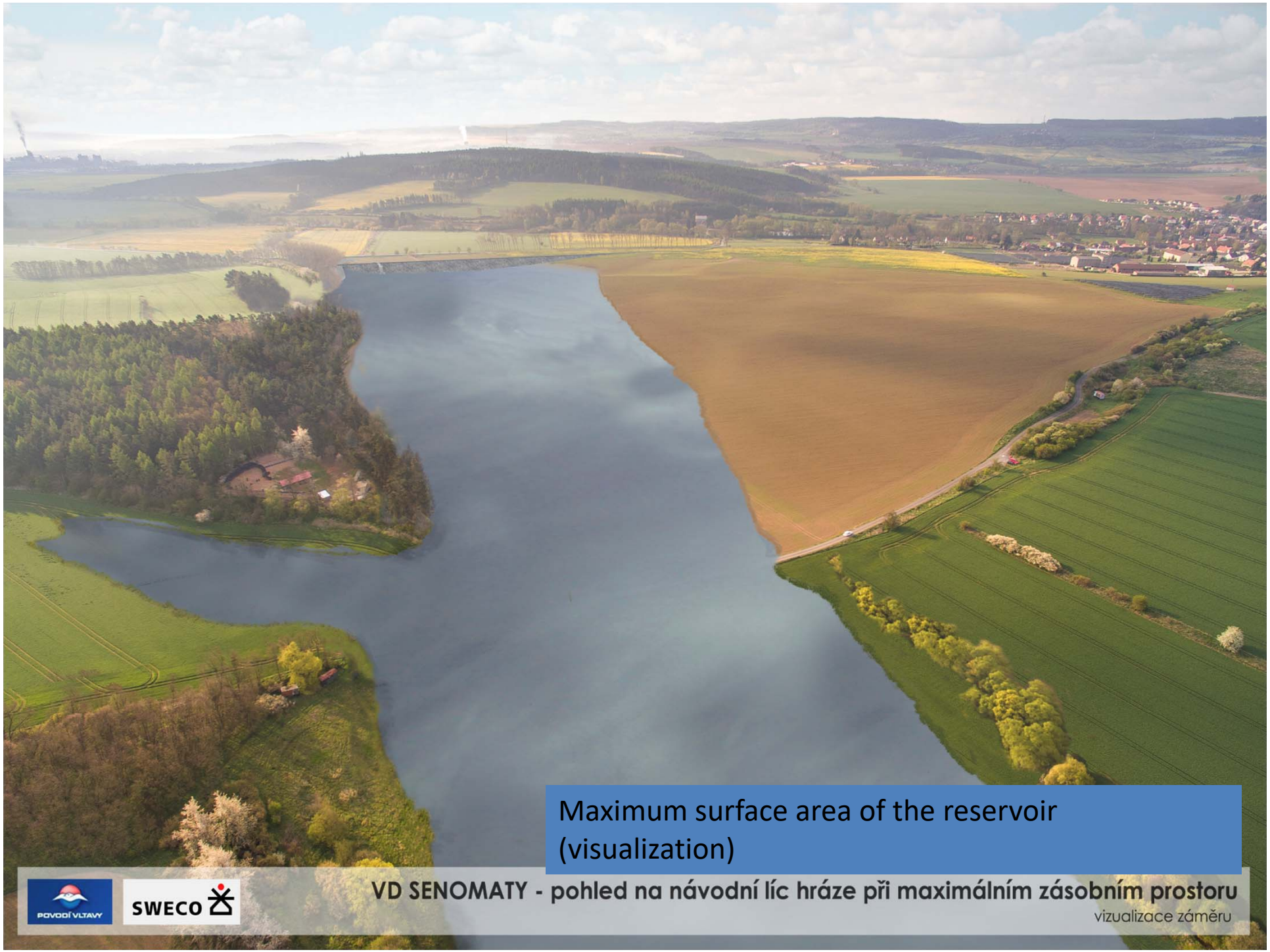
BASIC INFORMATION

Šanov water reservoir

Valley nive of Rakovnický Stream above the village Šanov
River basin area: 50,5 km^2
Total volume: 544 tis. m^3
Maximum area: 222 tis. m^2

Senomaty water reservoir

Shallow valley of Kolešovický Stream
River basin area: 51,8 km^2
Total volume: 671 tis. m^3
Maximum area: 256 tis. m^2


Maximum surface area of the reservoir
(visualization)
POVODÍ VLTAVY
SWECO
VD SENOMATY - pohled na návodní líc hráze při maximálním zásobním prostoru
vizualizace záměru


Minimum surface area of the reservoir
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POVODÍ VLTAVY
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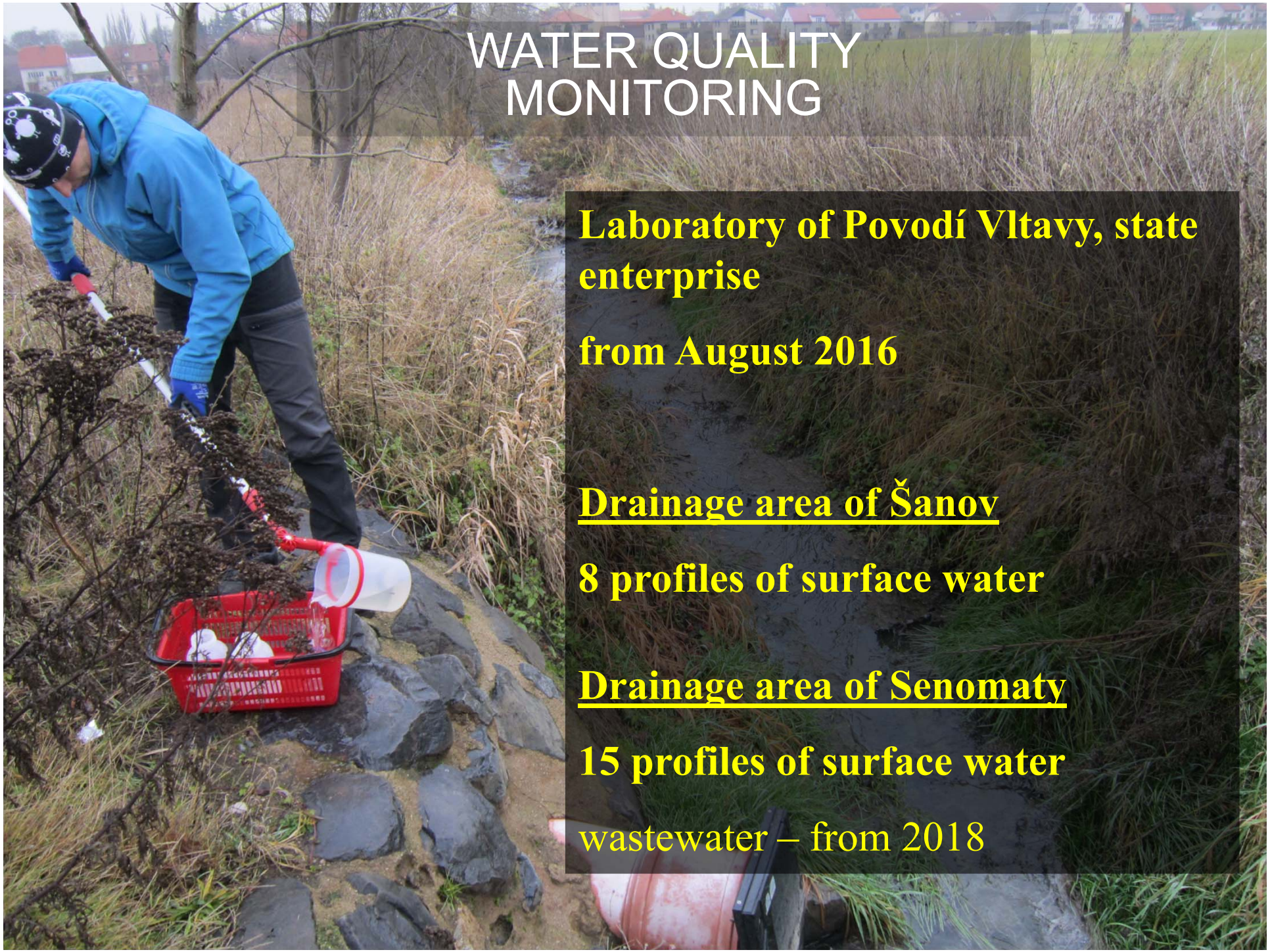
vizualizace záměru



WATER QUALITY MONITORING

Laboratory of Povodí Vltavy, state enterprise

from August 2016

<u>Drainage area of Šanov</u>

8 profiles of surface water

<u>Drainage area of Senomaty</u>

15 profiles of surface water

wastewater – from 2018

FLOW MEASUREMENT

1:65 000

Šanov

Švihov

Olešná

Drahouš

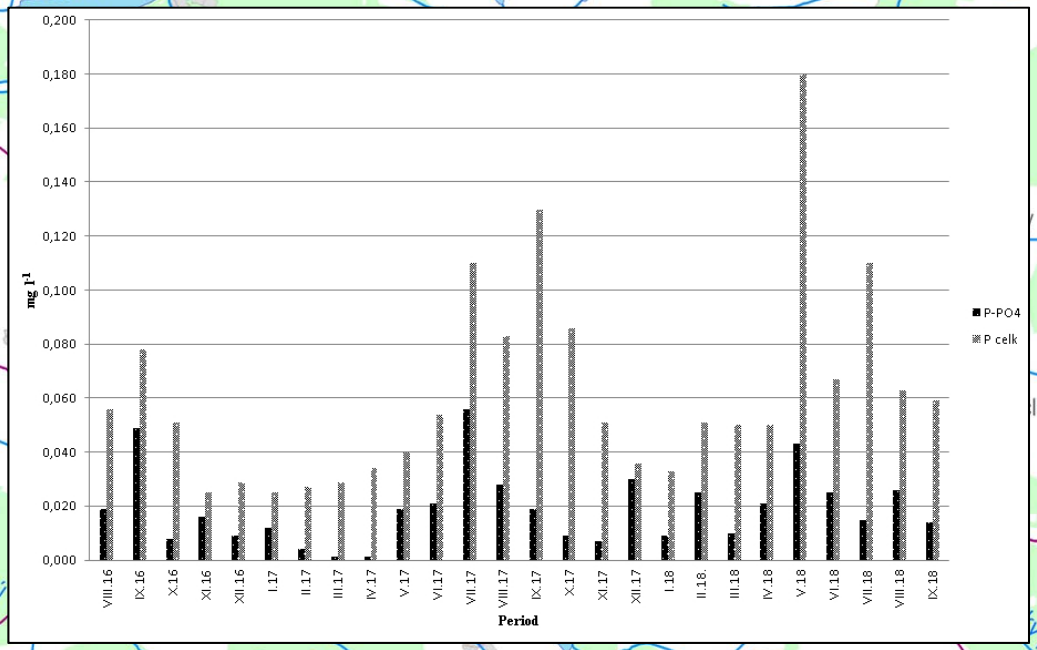
Senomaty

Šanov

Ø conc. P_{total} 0,062 mg l^{-1} a $P\text{-}PO_4$ 0,02 mg l^{-1} (2016-2018)

specific phosphorus load: ~122 kg per year => only 0,5 g m^{-2} $year^{-1}$ - flow ~0,069 m^{-3} s^{-1}

water retention time 2017 ~95 days

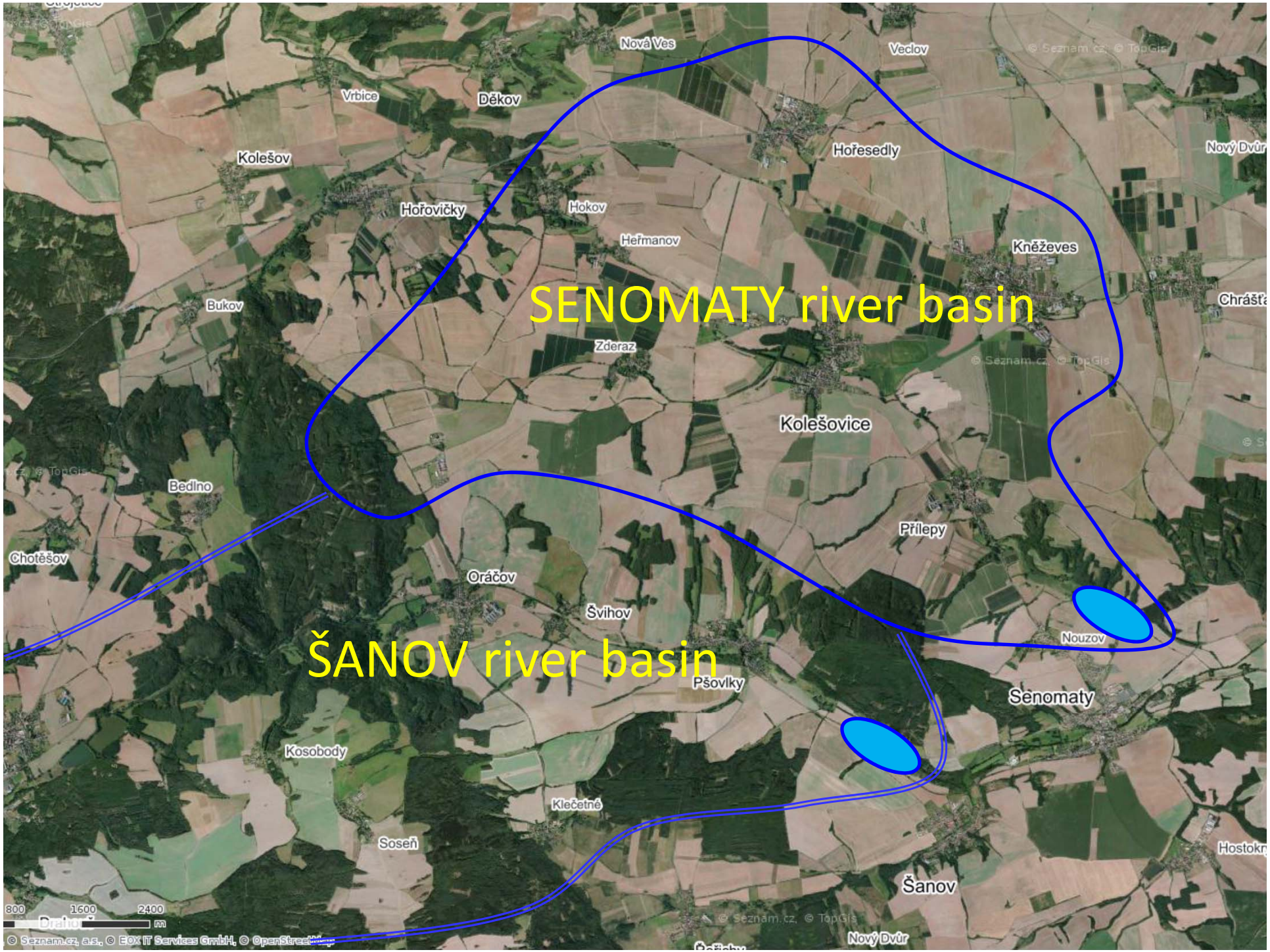


light eutrophy

↓

less probability of cyanobacterial water blooms


Natural morfology of watercourses
Minimum proportion of river regulations
River niva
Well disposed for self-purification processes
Two large ponds
Low tendency to erosion
High share of forestation
Better treatment of waste waters


SENOMATY river basin
ŠANOV river basin
Nová Ves
Veclov
Vrbice
Děkov
Kolešov
Hořesedly
Nový Dvůr
Hořovičky
Hokov
Heřmanov
Kněževes
Bukov
Zderaz
Kolešovice
Bedlno
Přílepy
Chotěšov
Oráčov
Švihov
Nouzov
Pšovlky
Senomaty
Kosobody
Klečetné
Soseň
Šanov
Hostokr
Nový Dvůr
800
1600
2400
m
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1:50 000

Senomaty

Hořesedly

Hořesedly

edly pod

Zderaz nad

Zderaz pod

rybník Čížkov pod

Kolešovice nad

Kolešovice nad

Kněževes

Kněževes nad

Kněževes pod

Chrášťany

Chrášťany

Kolešovice

Kolešovice

Senomaty

Rakovník

da

dování

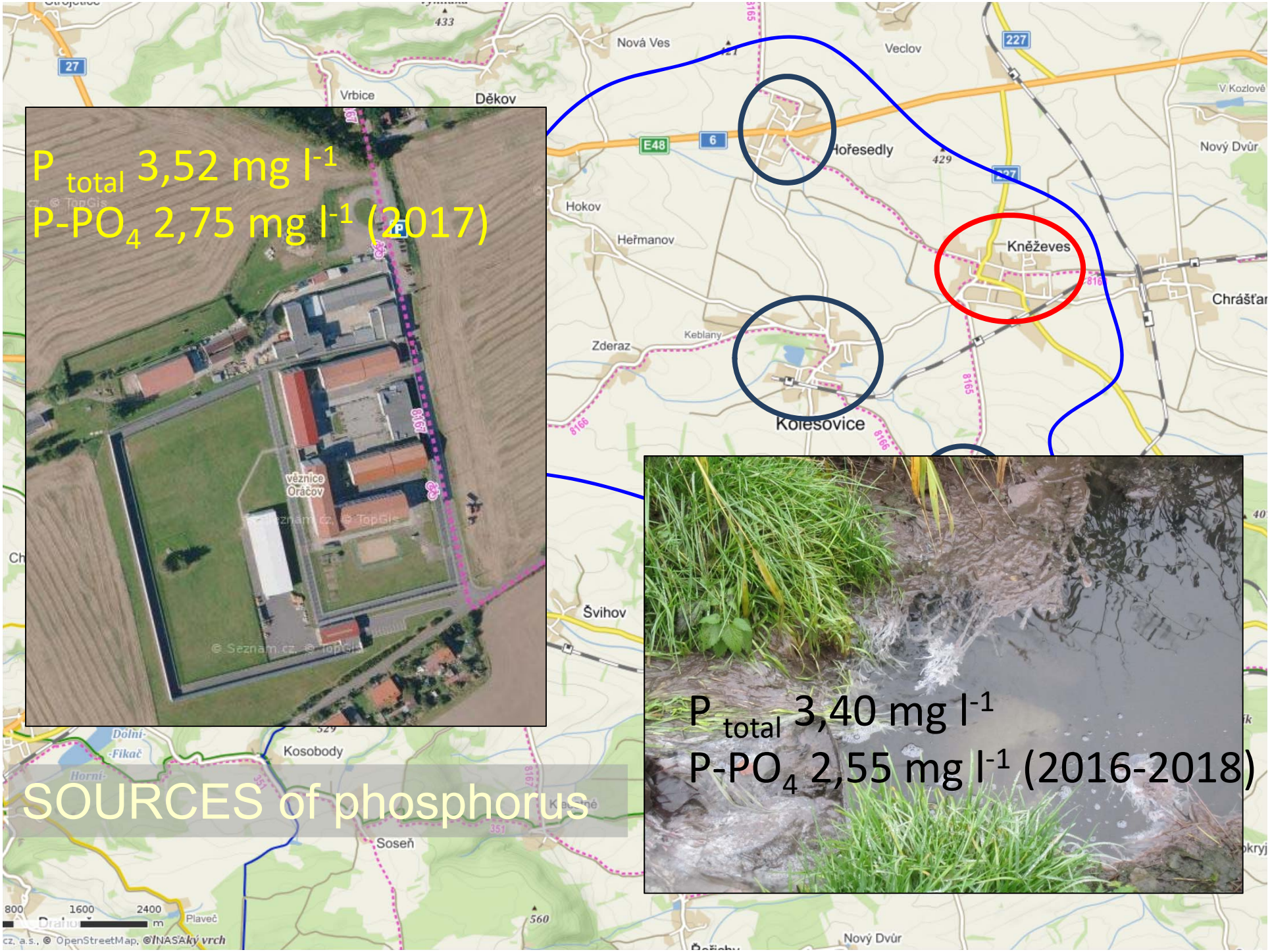
016-2018

016

017

018

U


P total 3,52 mg l-1
P-PO4 2,75 mg l-1 (2017)
P total 3,40 mg l-1
P-PO4 2,55 mg l-1 (2016-2018)
SOURCES of phosphorus
Nová Ves
Veclov
Vrbice
Děkov
Hořesedly
Hokov
Heřmanov
Kněževes
Zderaz
Keblany
Kolešovice
Švihov
Kosobody
Soseň
Nový Dvůr
Chrášťan
věznice Oráčov
Dolní-Fikač
Horní-Fikač
Plaveč
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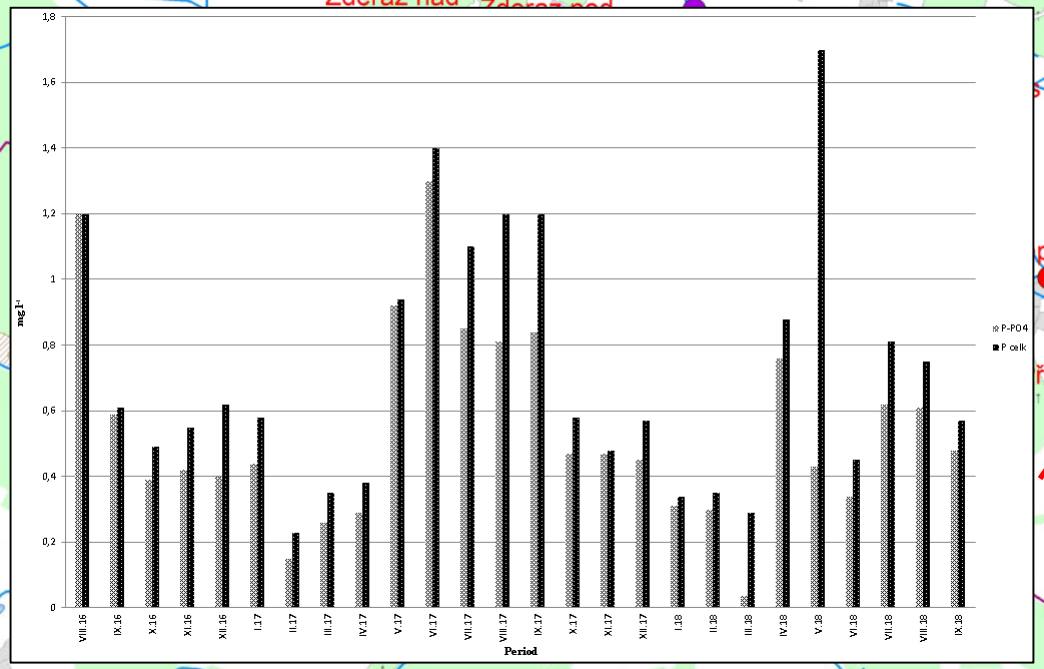
© OpenStreetMap, ©INASAlký vrch

Ø conc. P_{total} 0,72 mg l^{-1} a $P\text{-}PO_4$ 0,54 mg l^{-1} (2016-2018)

specific phosphorus load: ~665 kg per year => only 2,6 g m^{-2} $year^{-1}$

during flow ~0,03 m^{-3} s^{-1}

water retention time 2017 => ~260 days



hypertrophy

↓

high probability of massive occurence of cyanobacterial water bloom and oxygen deficiency

Legenda
rok sledování
2016-201
2016
2017
2018
VU

„LINEAR“ LANDSCAPE

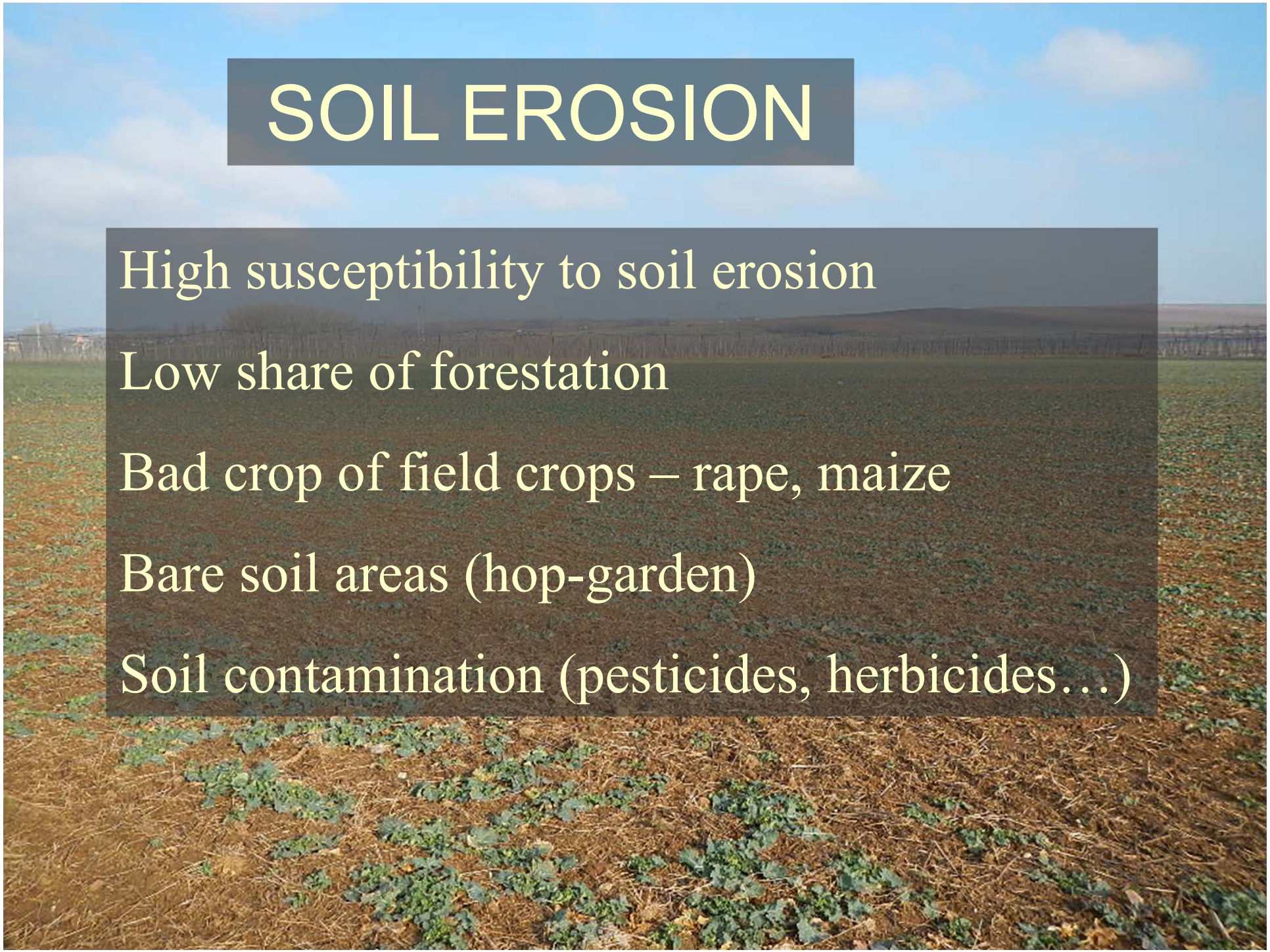
Degradation of watercourses due to „hard“ alterations: straightening – paving - deepening

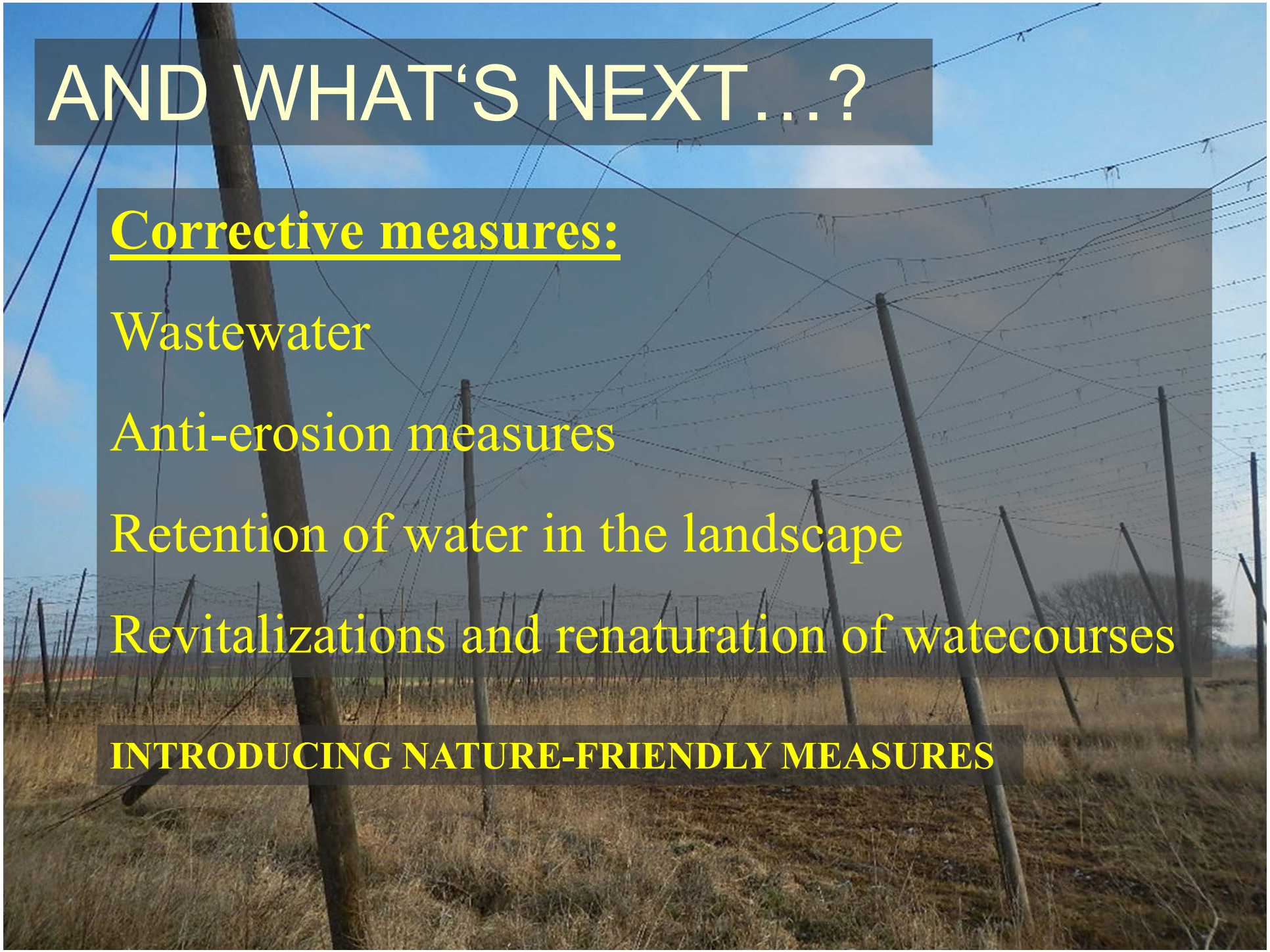
Drainaged arable lands

Almost no river niva

Low self-purification effect

No ponds


SOIL EROSION
High susceptibility to soil erosion
Low share of forestation
Bad crop of field crops – rape, maize
Bare soil areas (hop-garden)
Soil contamination (pesticides, herbicides…)


AND WHAT‘S NEXT…?
Corrective measures:
Wastewater
Anti-erosion measures
Retention of water in the landscape
Revitalizations and renaturation of watecourses
INTRODUCING NATURE-FRIENDLY MEASURES


Thanks for your attention ☺