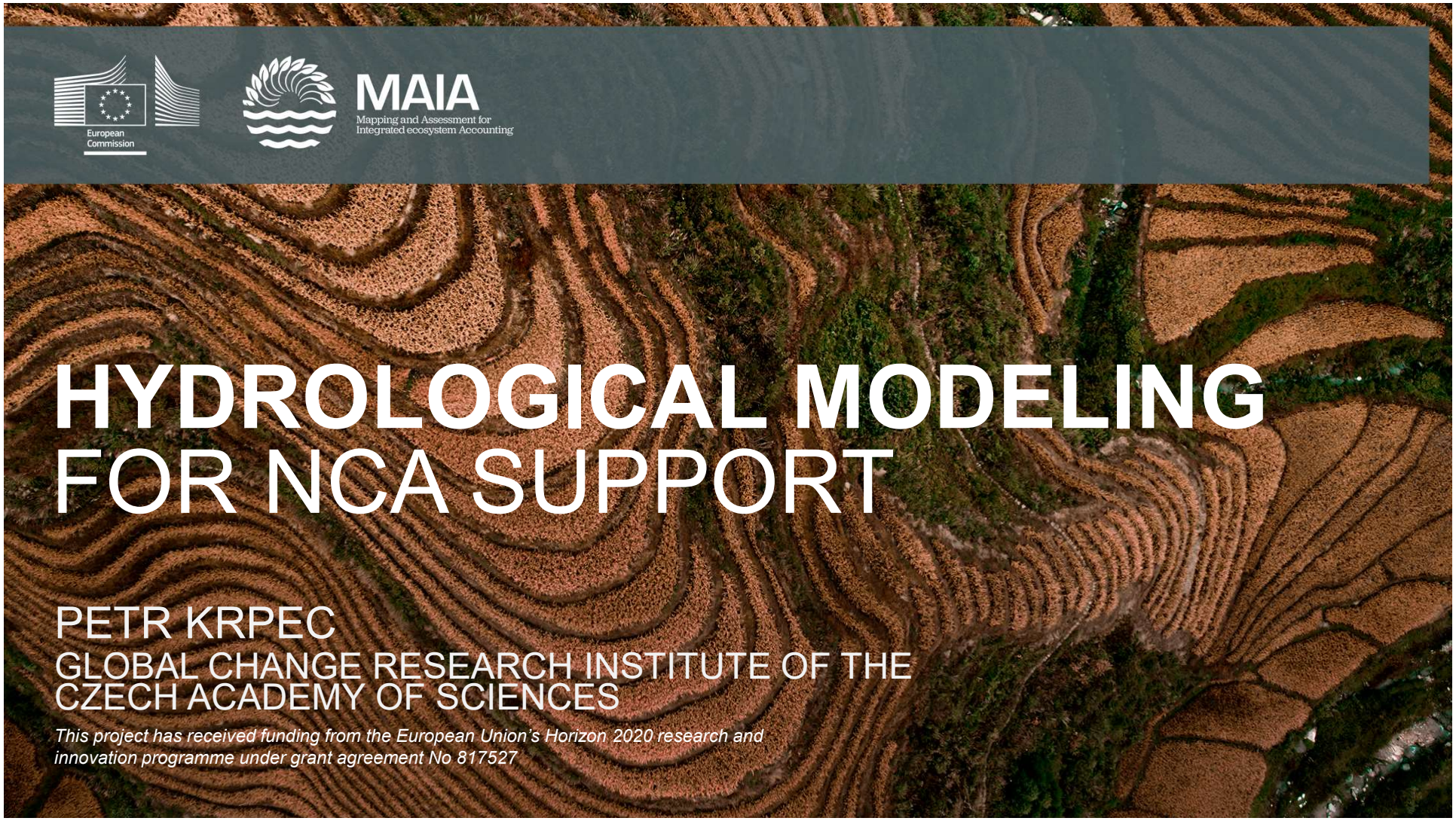


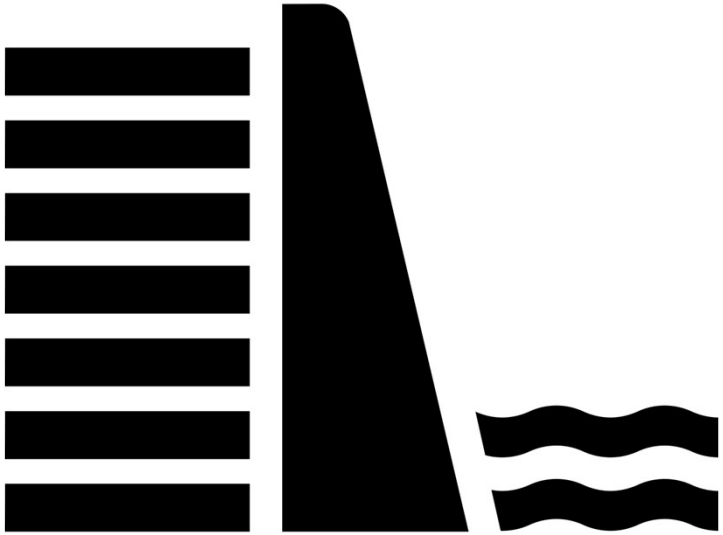
HYDROLOGICAL MODELING FOR NCA SUPPORT

PETR KRPEC
GLOBAL CHANGE RESEARCH INSTITUTE OF THE CZECH ACADEMY OF SCIENCES

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 817527

Water flow regulation ecosystem services

- Base flow maintenance
- High flow reduction



Support of modeling needed

Ecosystem Services 56 (2022) 101458

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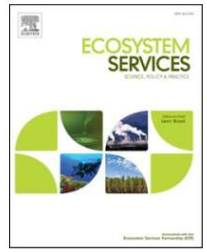
journal homepage: www.elsevier.com/locate/ecoser



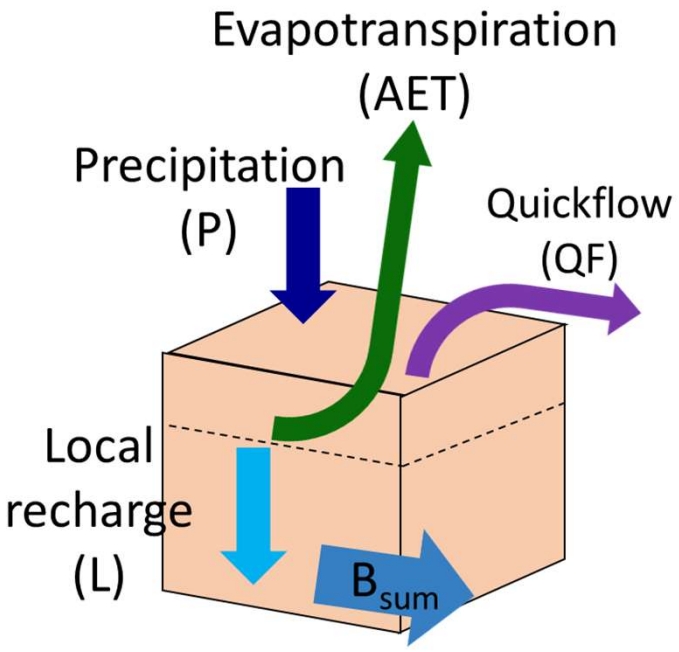
Review Paper

Modeling water regulation ecosystem services: A review in the context of ecosystem accounting

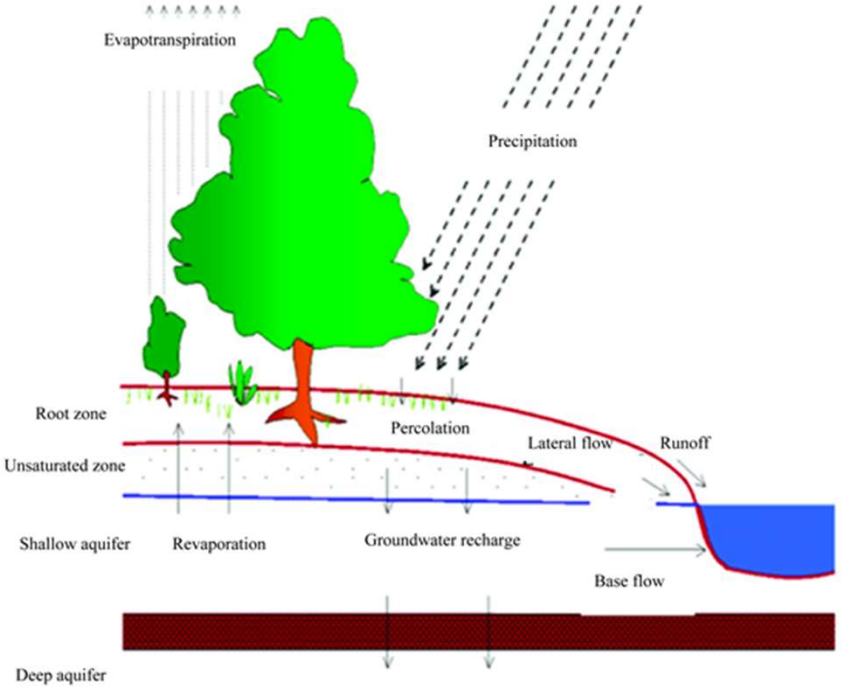
Stoyan Nedkov [a,*], Sylvie Campagne [b,c], Bilyana Borisova [d], Petr Krpec [e], Hristina Prodanova [a], Ioannis P. Kokkoris [f], Desislava Hristova [a], Solen Le Clec'h [g], Fernando Santos-Martin [h], Benjamin Burkhard [b], Eleni S. Bekri [i], Vanya Stoycheva [a], Adrián G. Bruzón [h], Panayotis Dimopoulos [f]

Hydrological models

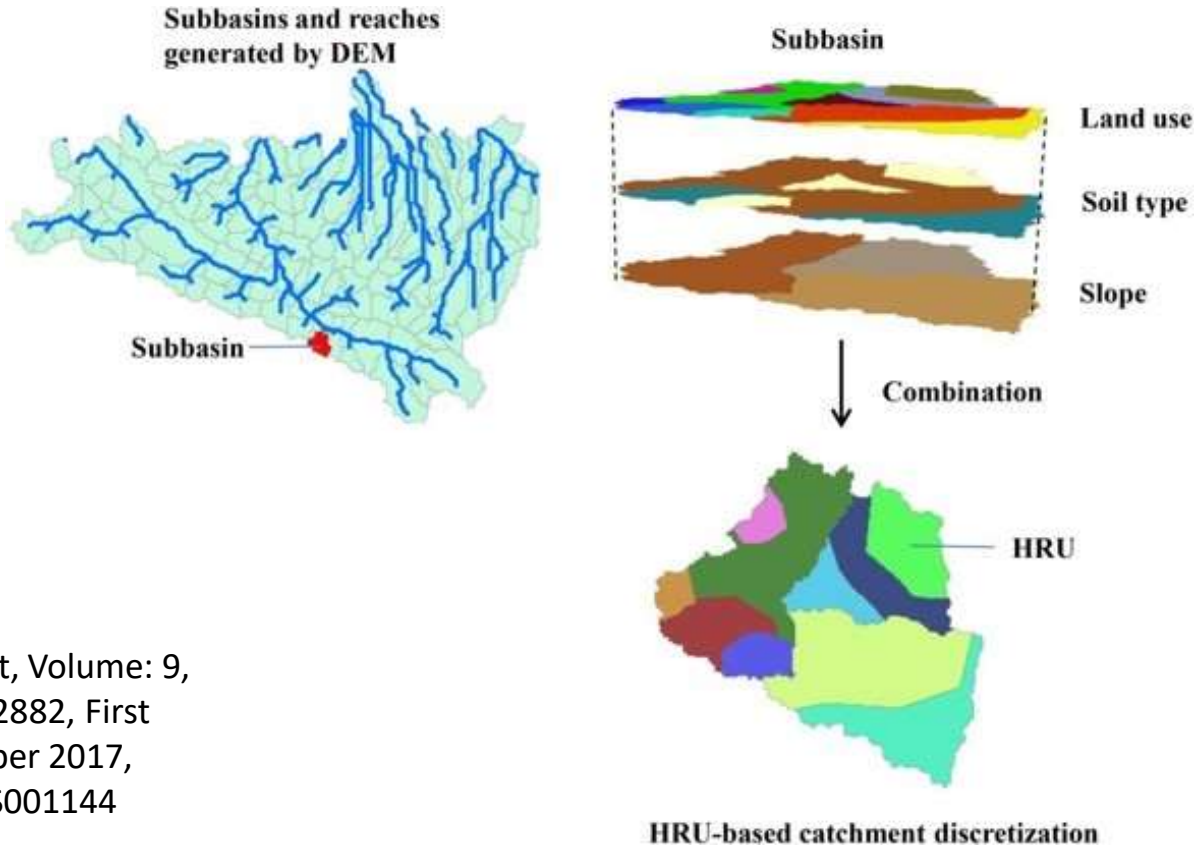
InVEST



SWAT



Soil and water assessment tool



J Adv Model Earth Syst, Volume: 9, Issue: 8, Pages: 2863-2882, First published: 22 November 2017, DOI: 10.1002/2017MS001144

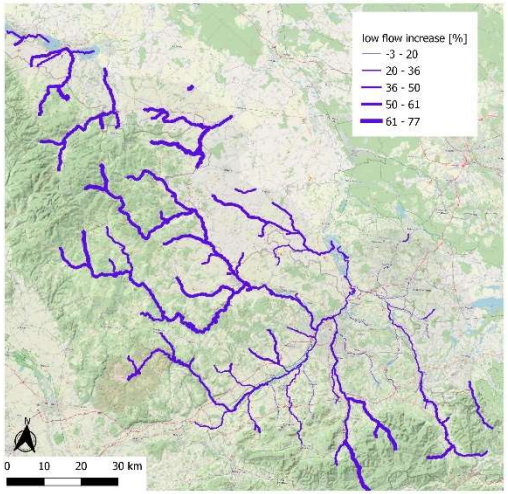
The services quantification

Removing the effect of hydrological transformation

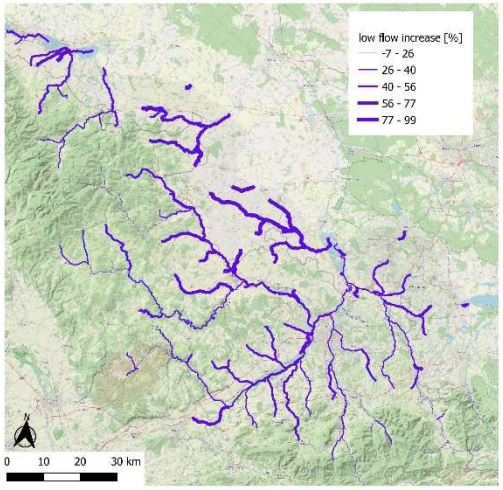
- Curve numbers to 100
- Surface roughness to 0
- Canopy storage to 0

Increase of low flows

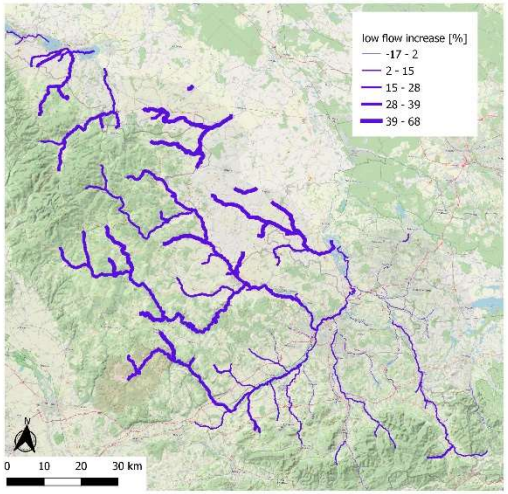
Forests



Grassland



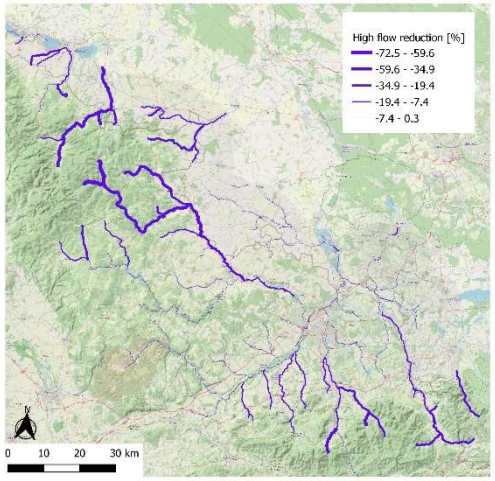
Cropland



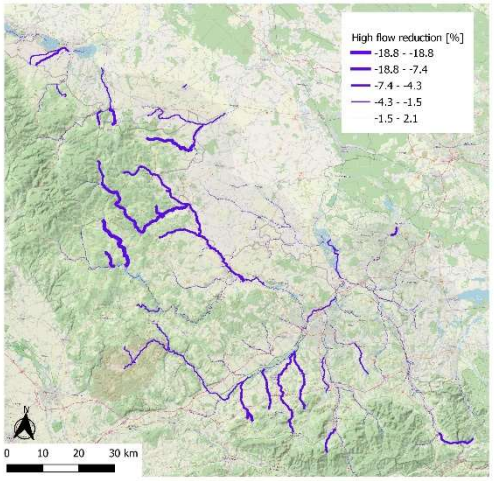
- Water supply for abstraction over environmental flow
- Amount of electricity produced
- Number of days siutable for boats

Decrease of high flows

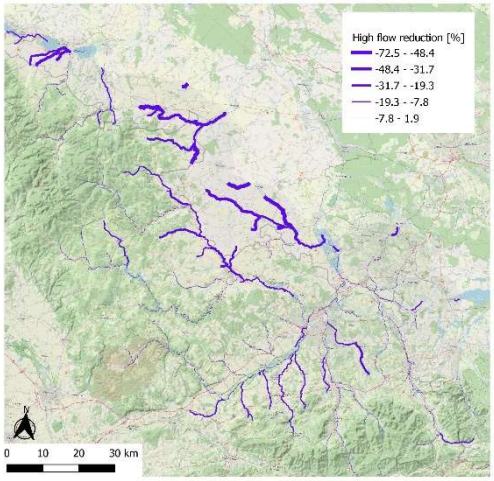
Forests



Grassland

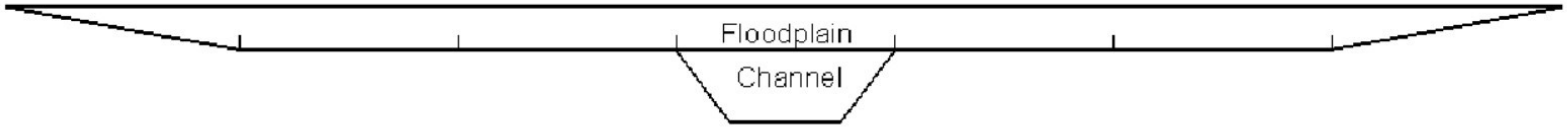


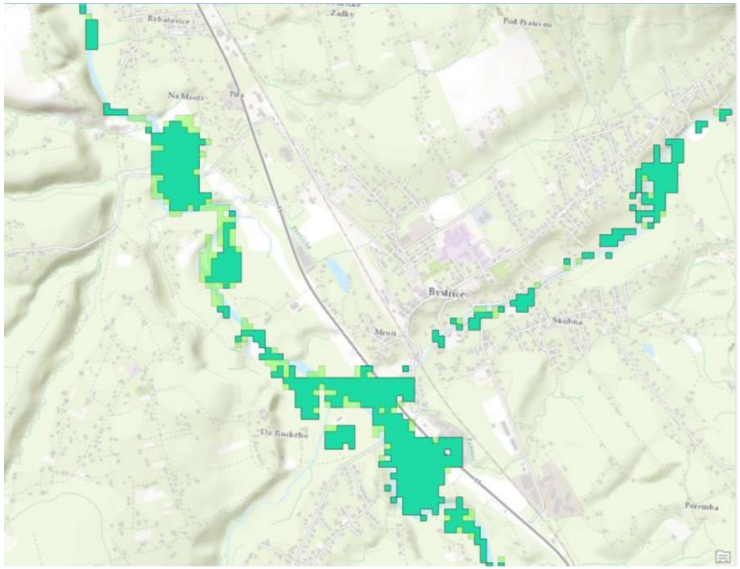
Cropland



- Avoided flooded area

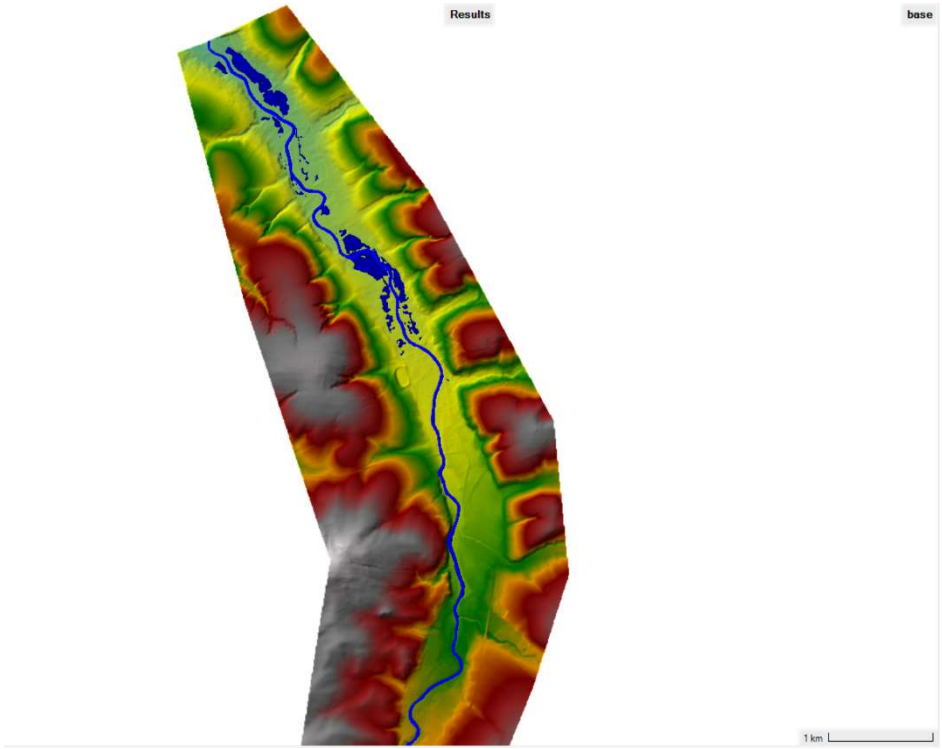
Avoided flooded area

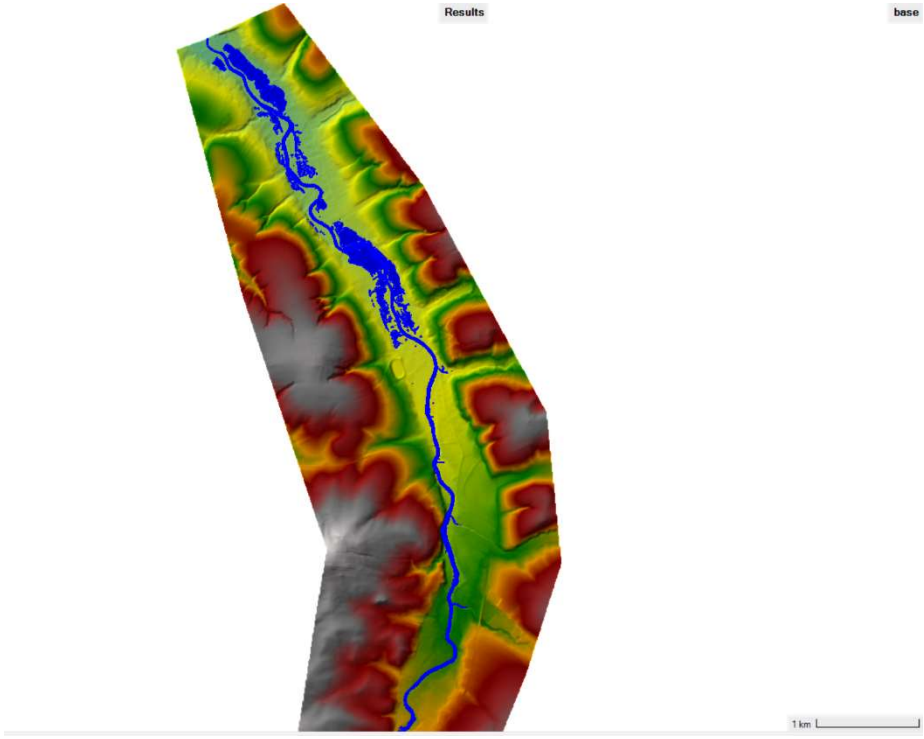




- Depth output directly from is not the way
- Hydraulic model needed

Hydraulic modeling





Example result – supply table

Ecosystems	Avoided flooded area [ha]
Forests	796,9
Cropland	488,8
Grassland	122,6
Heathland and shrubland	90,2
Sparsely vegetated areas	7,8
Wetlands	7,7
Urban	59,3

Example result – use table

Economical unit	Avoided flooded area [ha]
Agriculture	1179,8
Construction	6,9
Manufacturing and mining	83,11
Other tertiery and households	290,3
Transportation	3,1
Waste management	10,2

Tracking changes

Ecosystems extent

- **Land cover maps (e.g. Corine Land Cover)**

Soils condition

- **Soil properties condition from Dynamic soil information at farm scale based on Machine Learning**

Vegetation condition

- **LAI from satellite - canopy storage**

Conclusions

- **Hydrological models as important tools for NC accounting**
- **Connecting outputs to particular economical units is still challenging**

Subsequent projects