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# Country-scale predictive mapping of peat-soils in agricultural lands in Latvia

(LV-CLIMATE-0002) E2SOILAGRI

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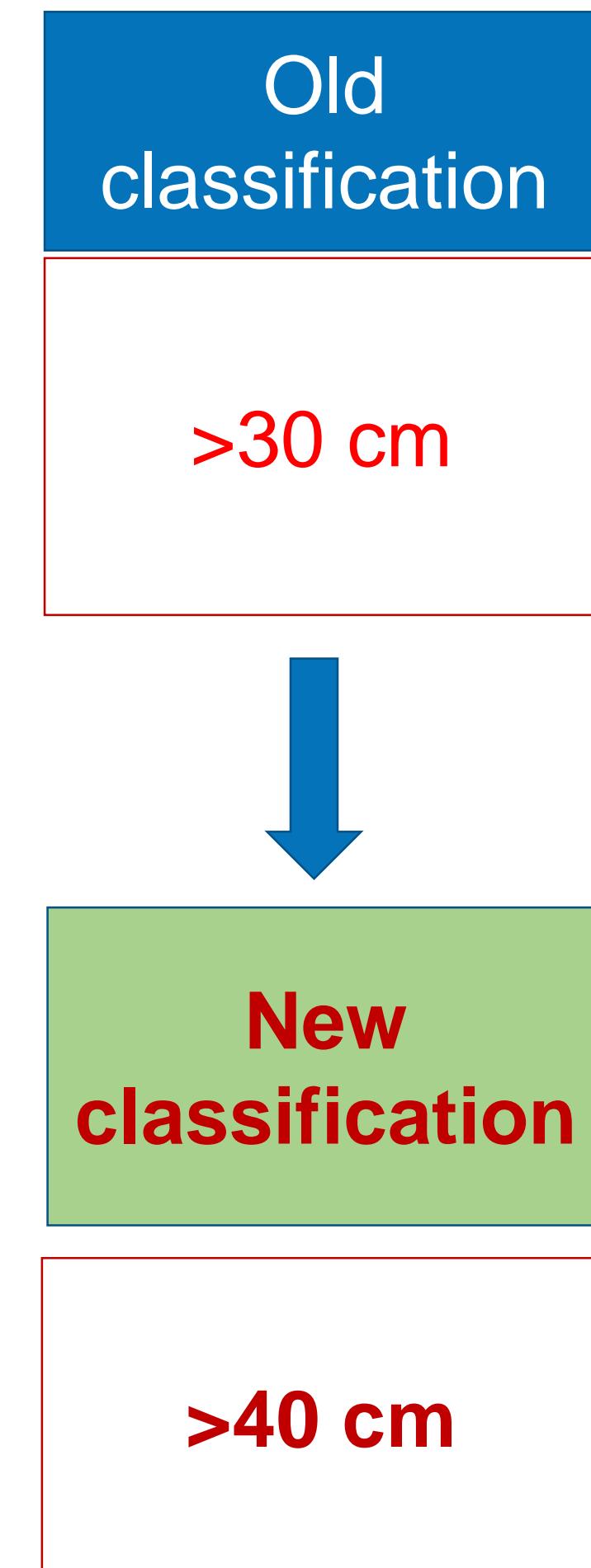
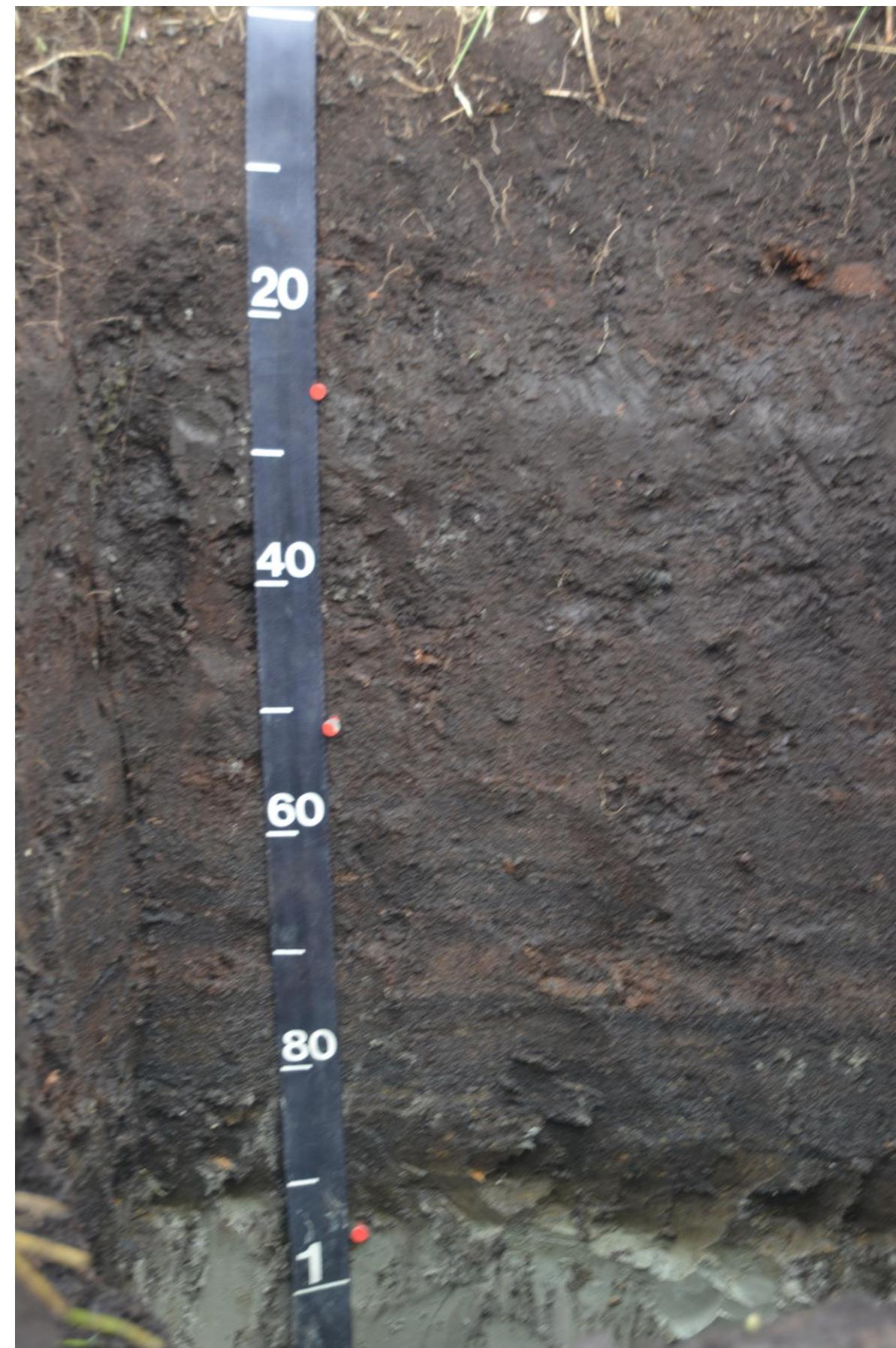


UNIVERSITY  
OF LATVIA

# Implementation of international peatsoil criteria in national classification

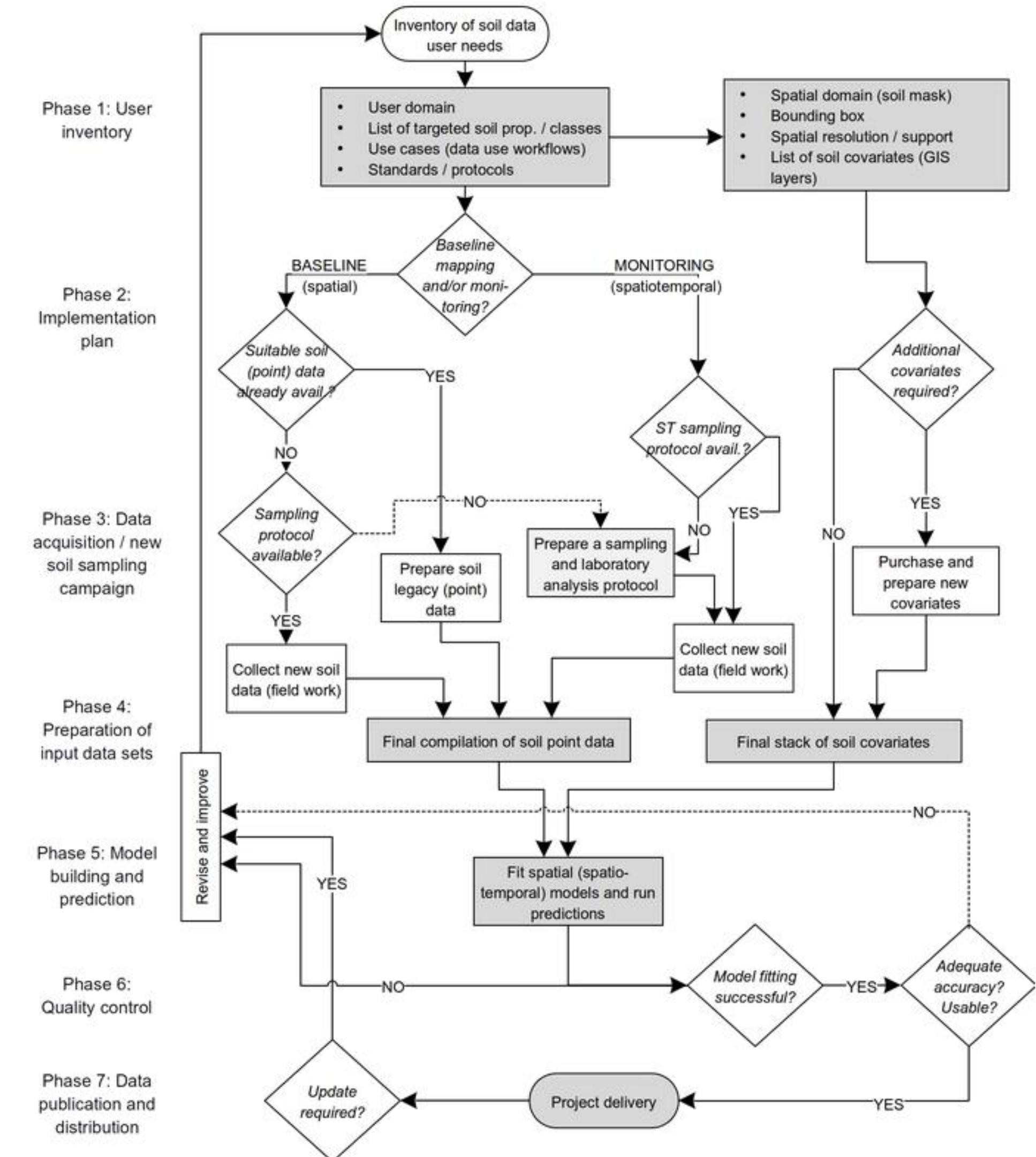
- Peatsoils

- Soils containing organic material ( $\geq 35\%$  OC) cumulatively in the 0-100 cm soil layer: (1)  $\geq 60$  cm (if the material contains 75% or more of moss fibres); (2) or  $\geq 40$  cm (if composed of other types of material); in both cases starting shallower than 40 cm from the top of the soil.



# Workflow

- Preparation of point data (training data).
- Preparation of covariate data (the explanatory variables).
- Model fitting and validation (building rules by overlay, model fitting and cross-validation).
- Prediction and generation of (currently best-possible) final maps (applying the rules).
- Archiving and distribution
- Updates and upgrades.



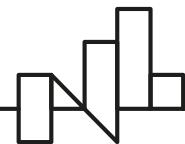
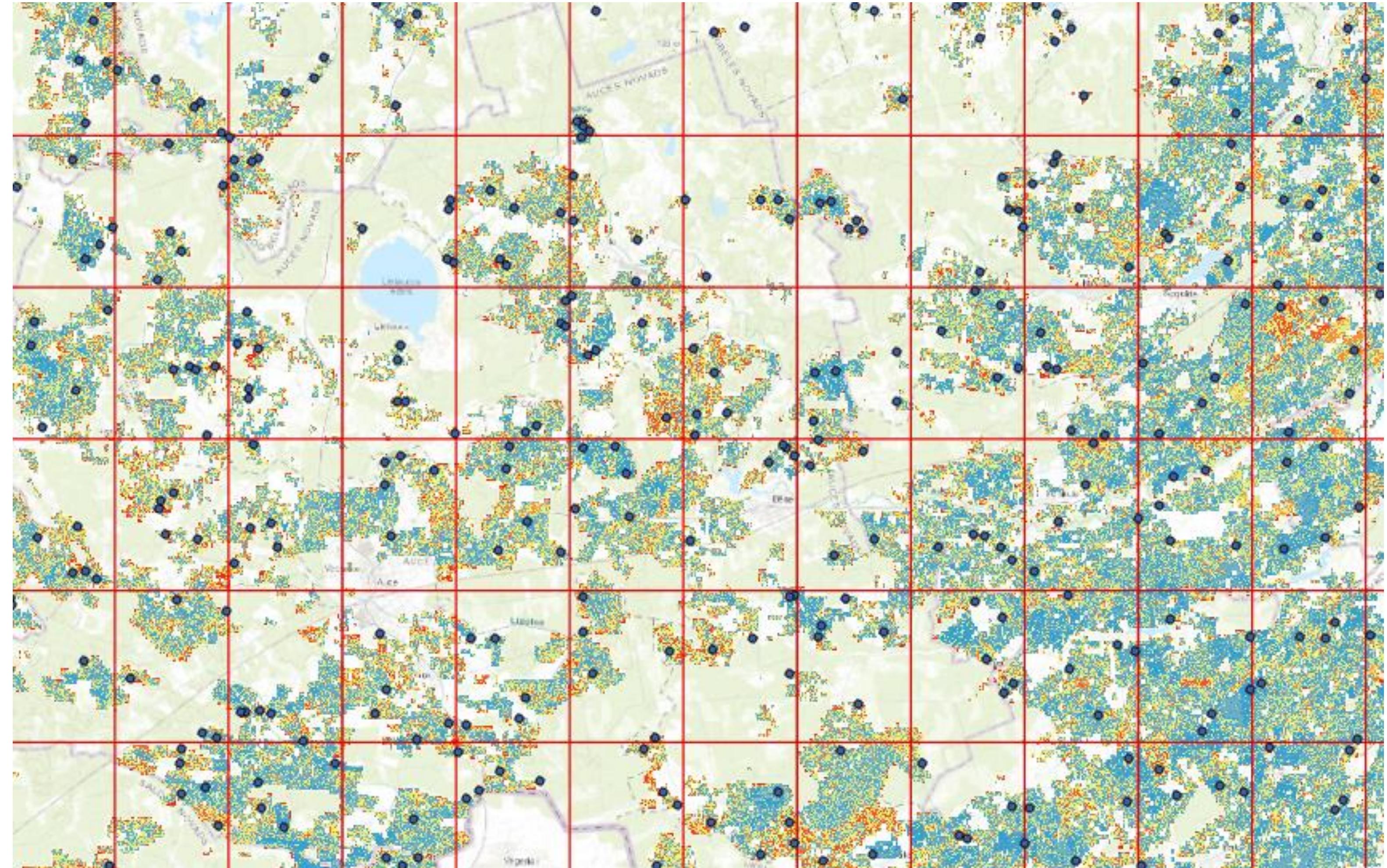
Hengl, T., & MacMillan, R. A. (2019). *Predictive soil mapping with R*.



# Study area

2.366 millions ha

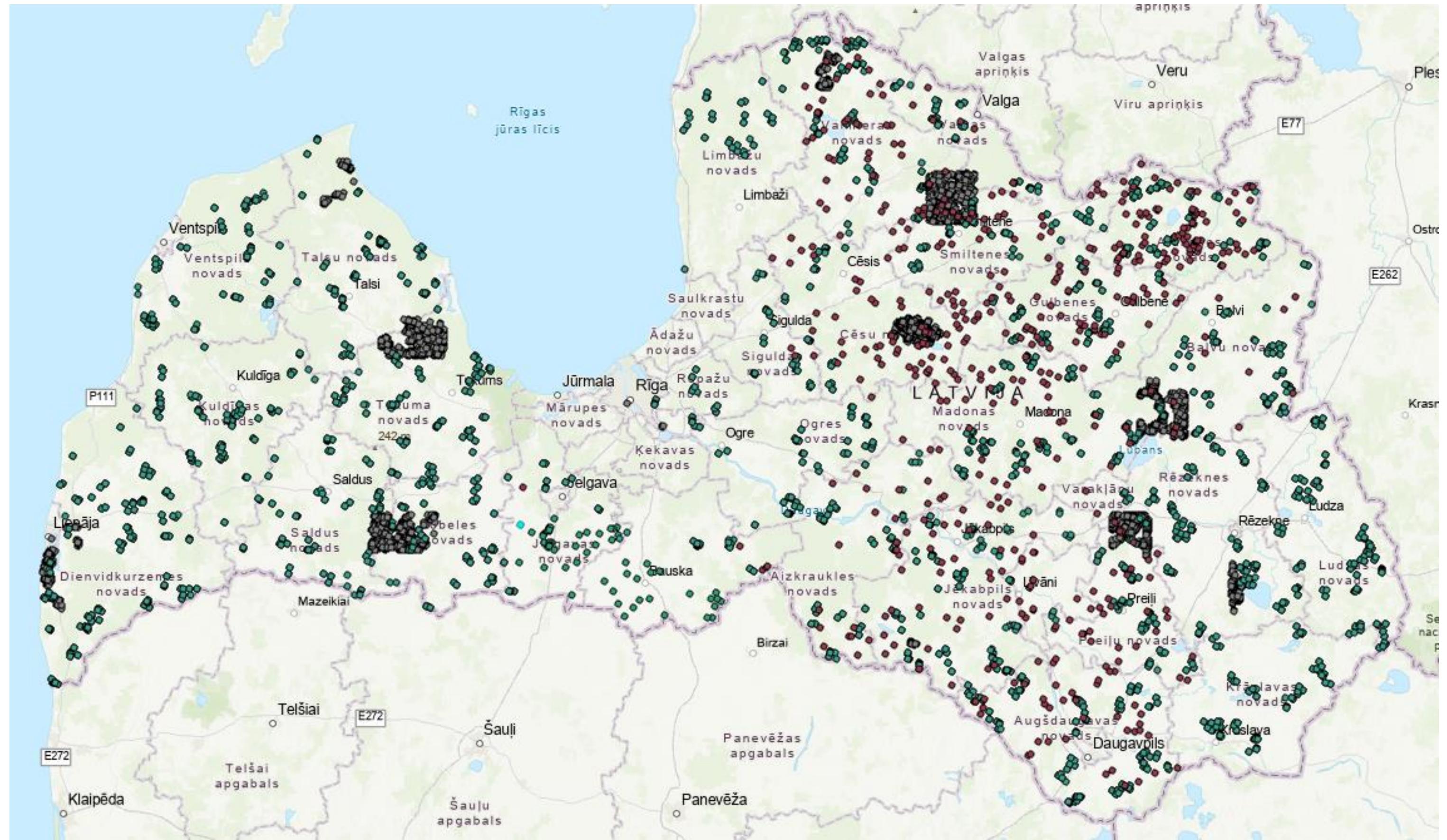
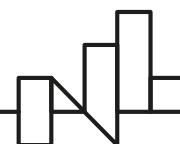
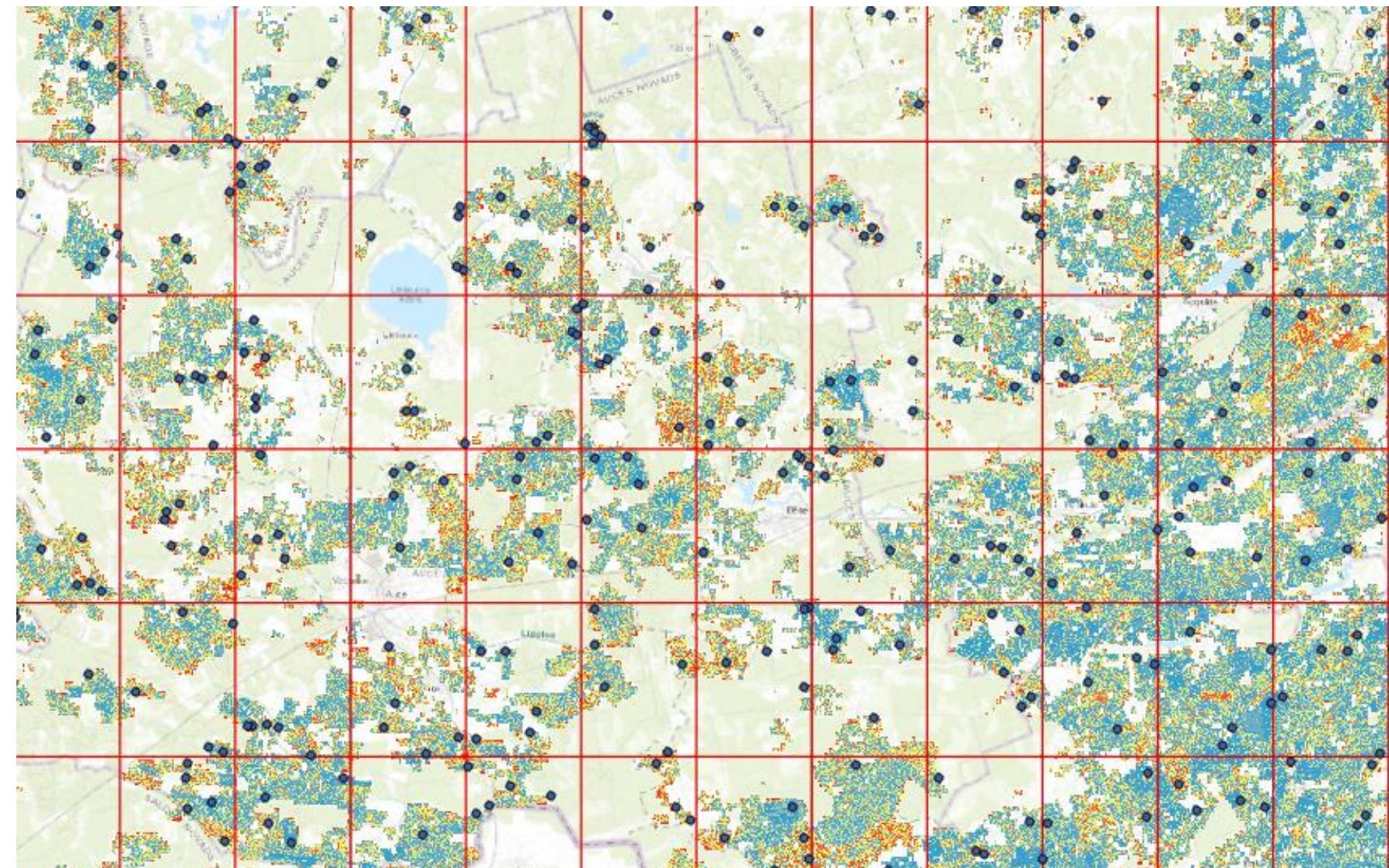
- Declared farmland
- Potential farmland



# Training data

>10000 points

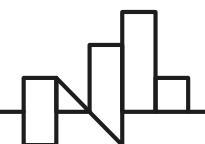
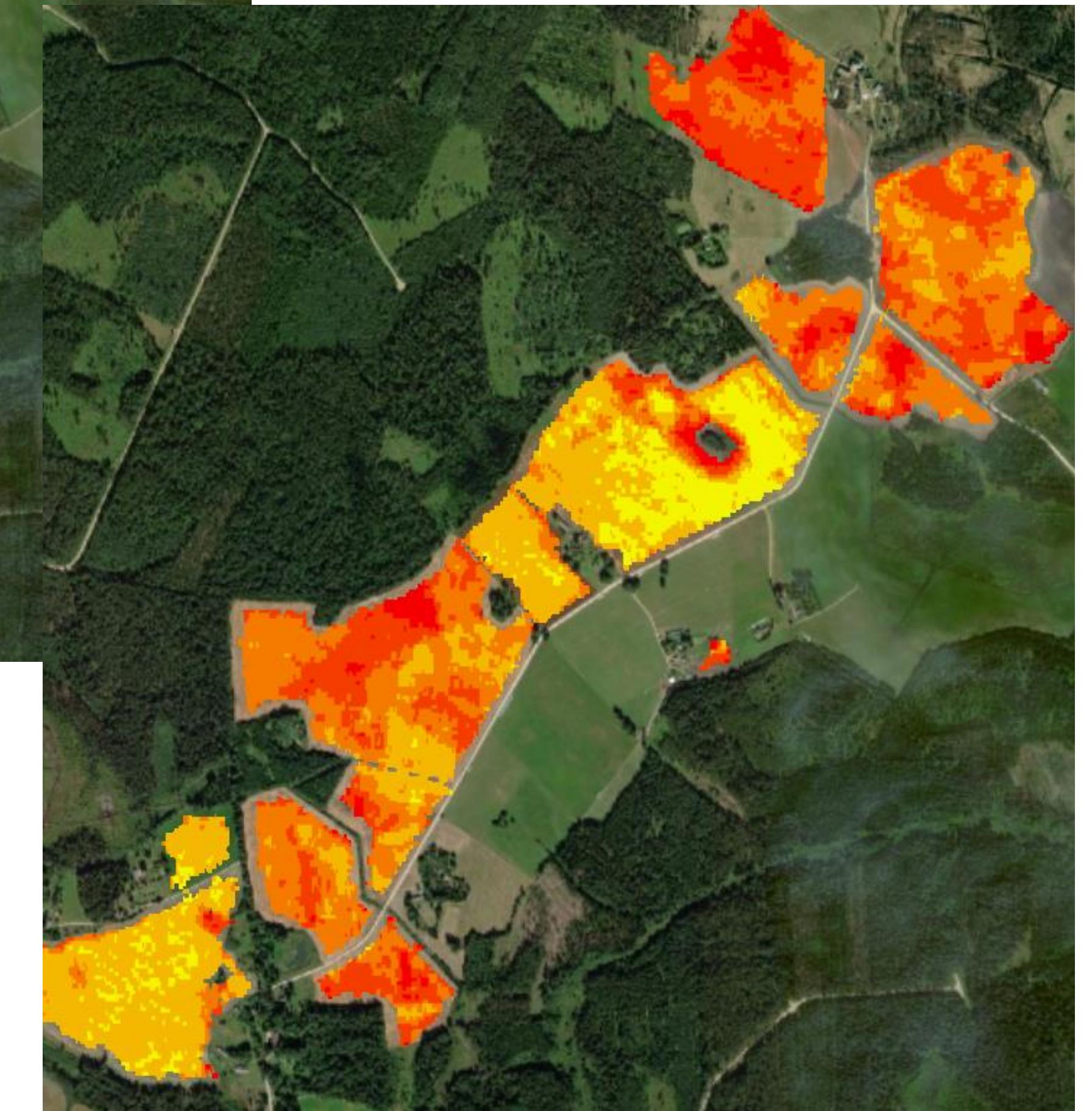
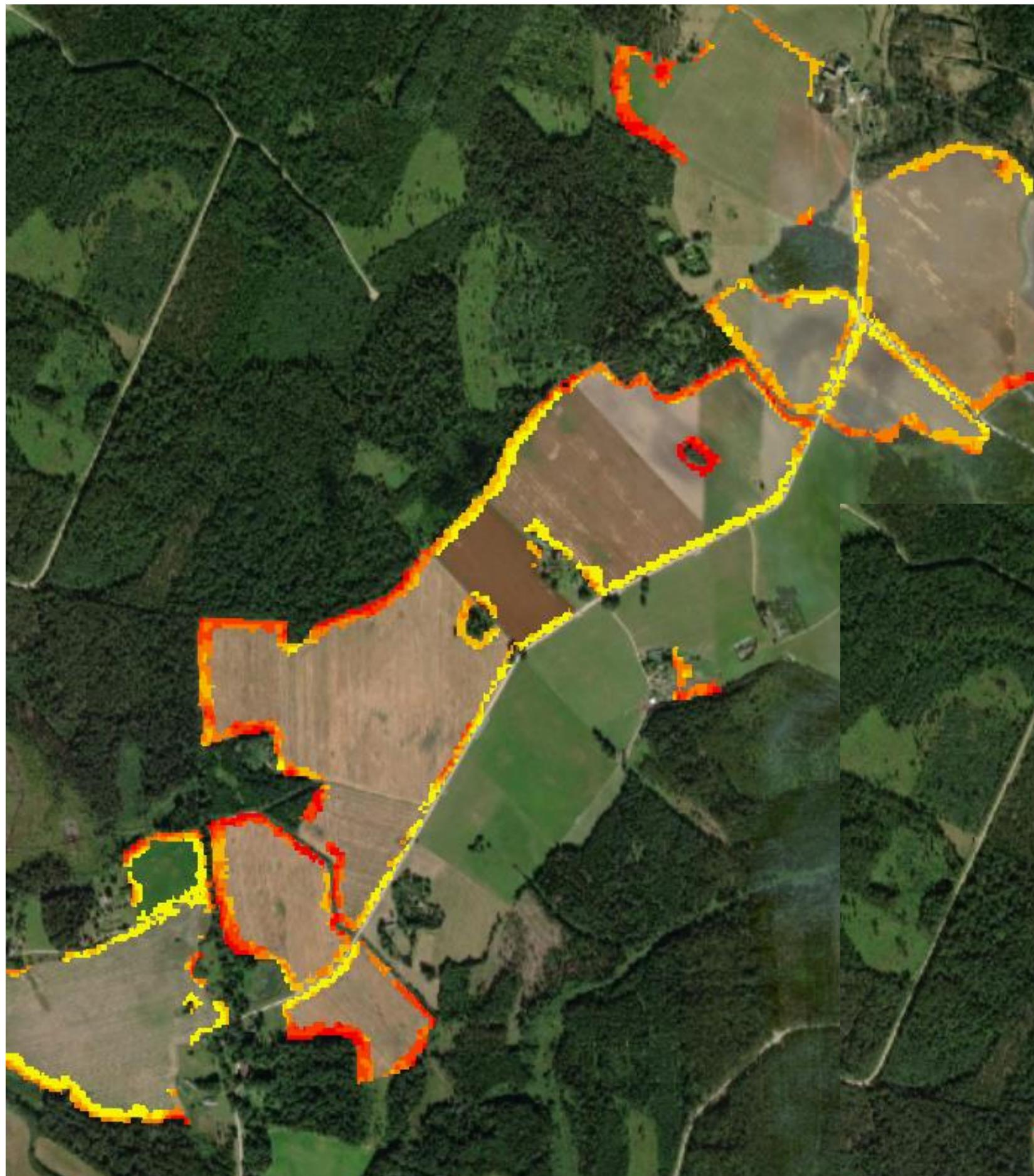
- 30% randomly distributed throughout the study area
- 70% concentrated in different landscape-ecological conditions



To ensure maximum utility, field data should be objective and reproducible; it should be collected using an objective sampling design that ensures reproducibility and resampling. It shall be as accurately localised as possible in both space (geolocation) and time. It shall describe and measure actual conditions in their current state (and current land use).

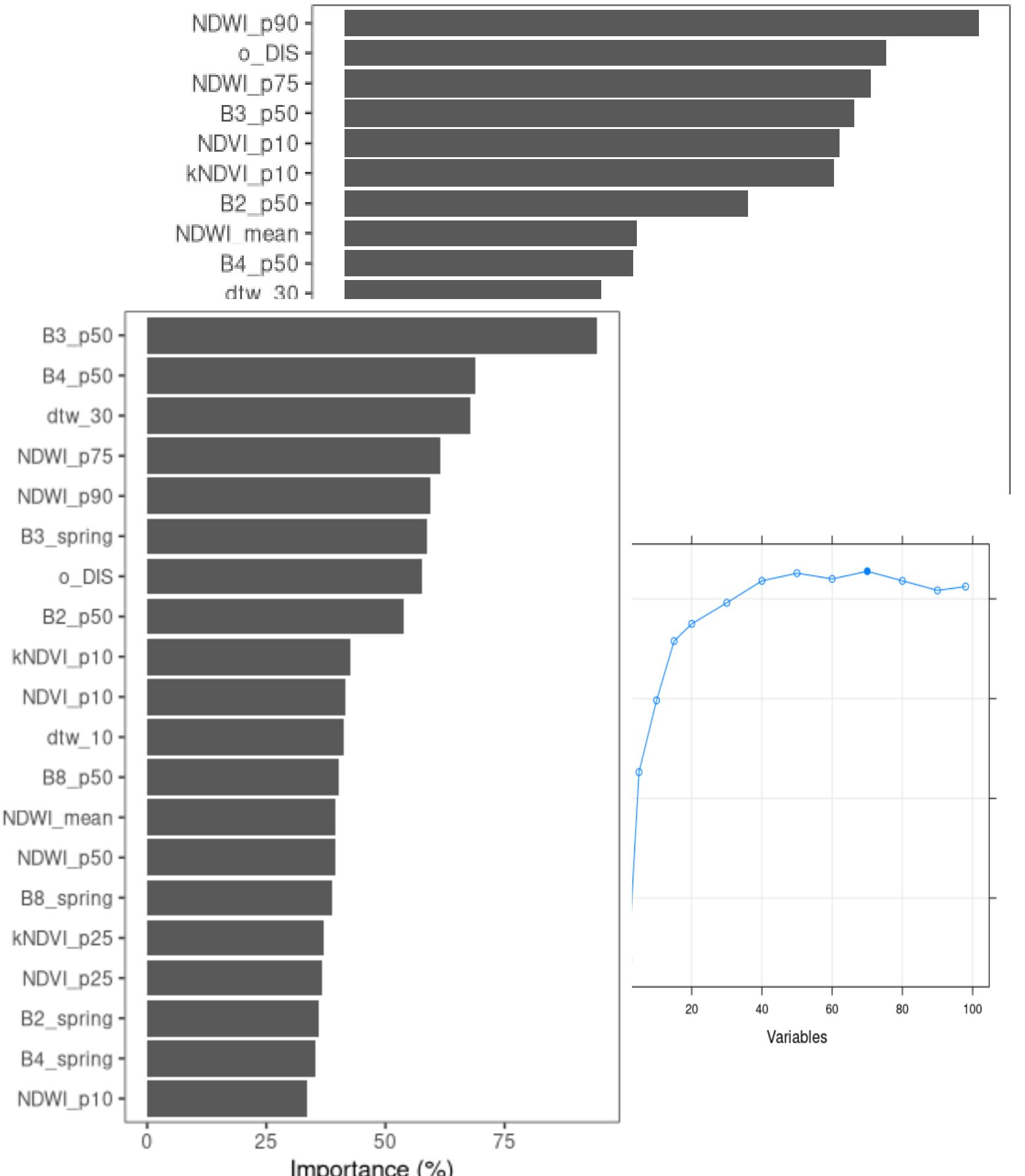
# Models

- Direct observation
  - arable land
  - grasslands
  - overgrown areas
- Indirect observations
  - arable land
  - grasslands
  - overgrown areas

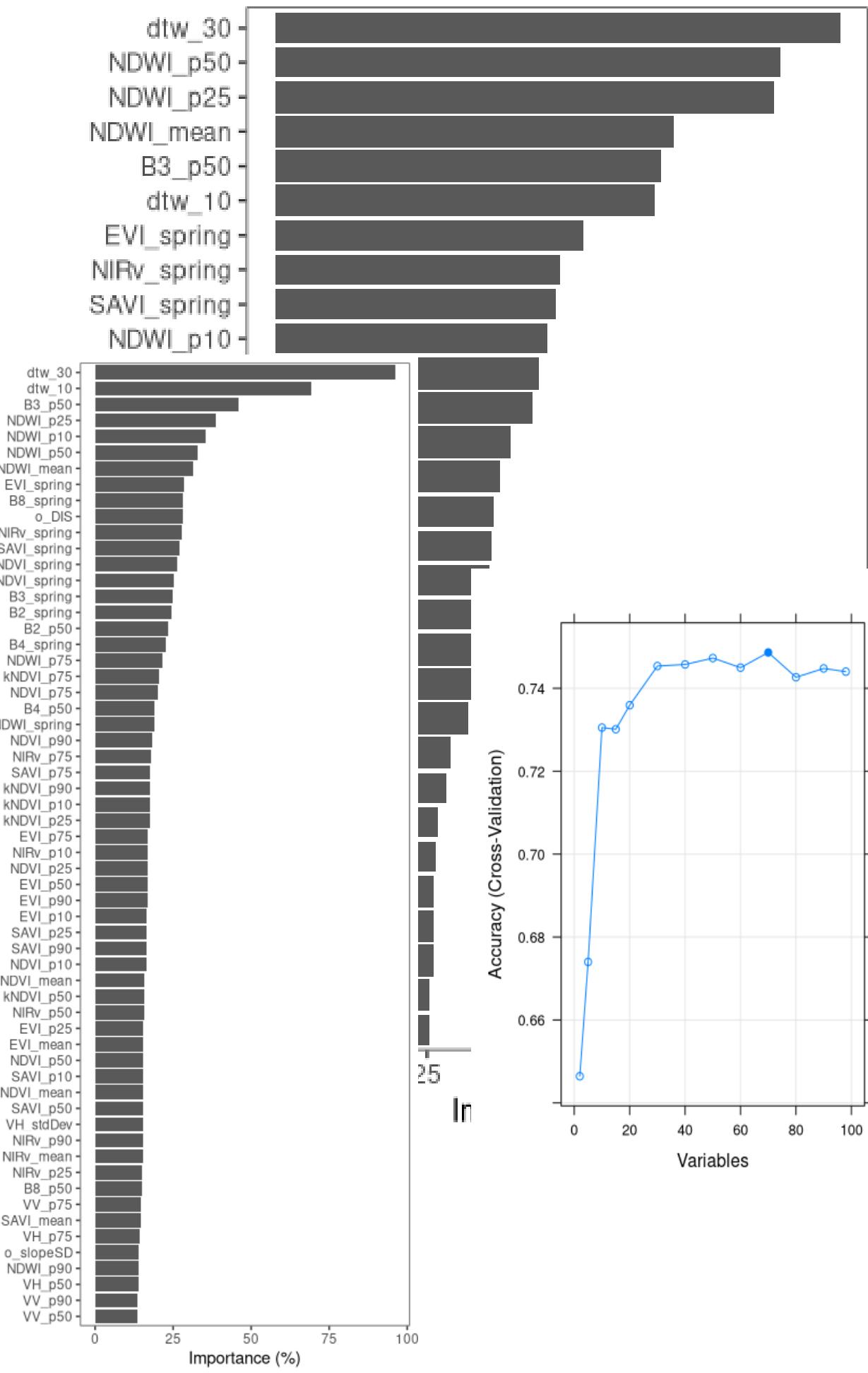


# Geospatial variables

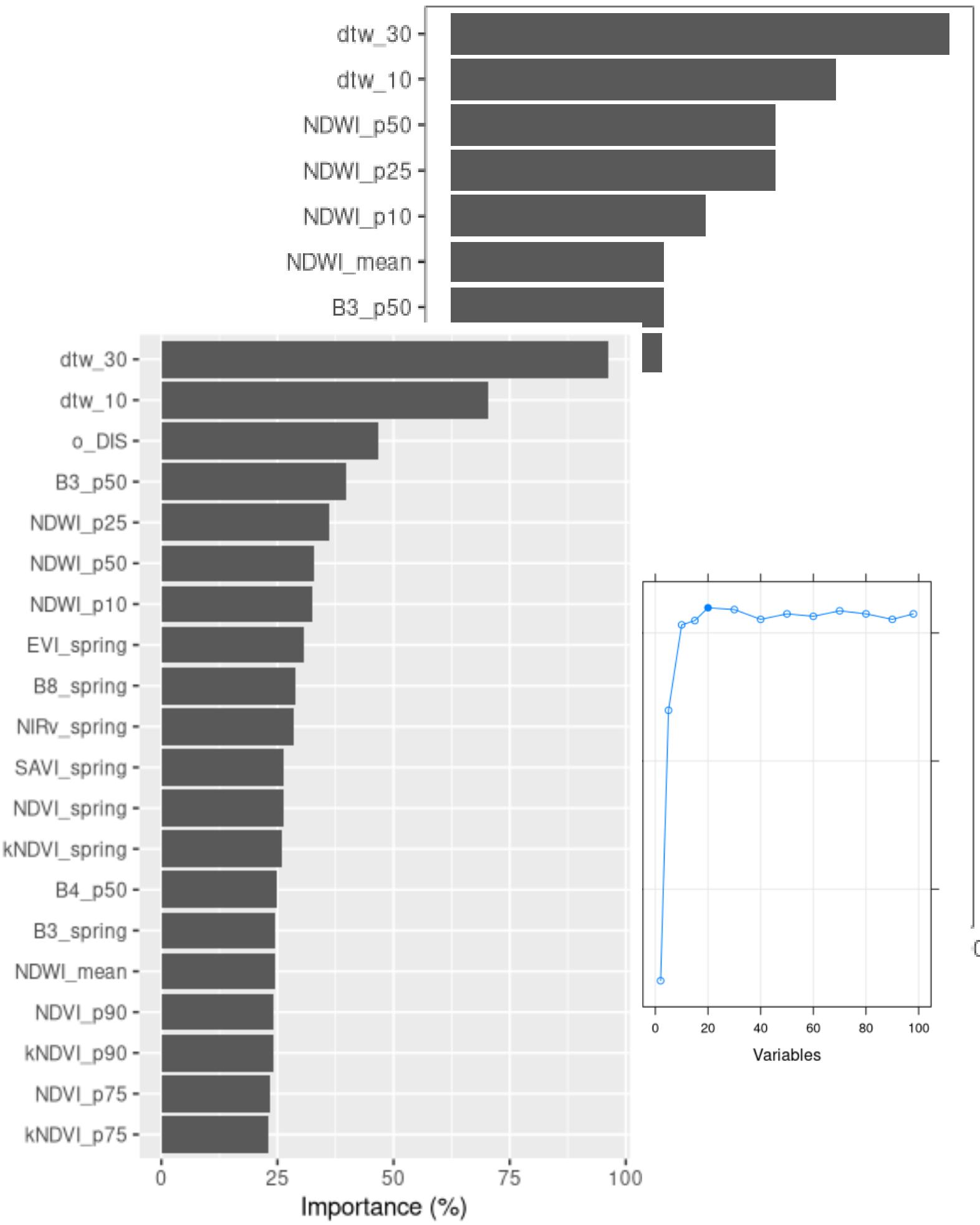
arable land



grasslands

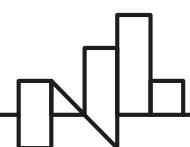
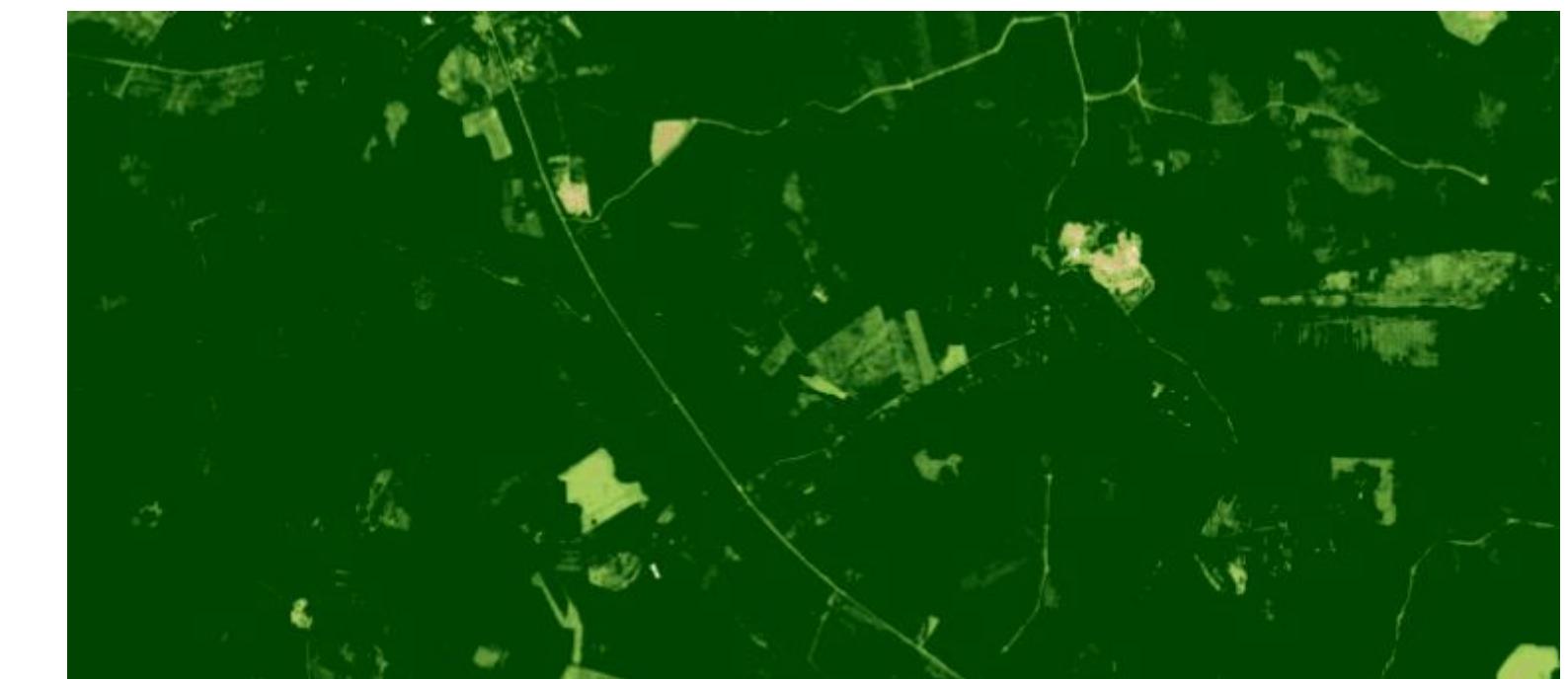
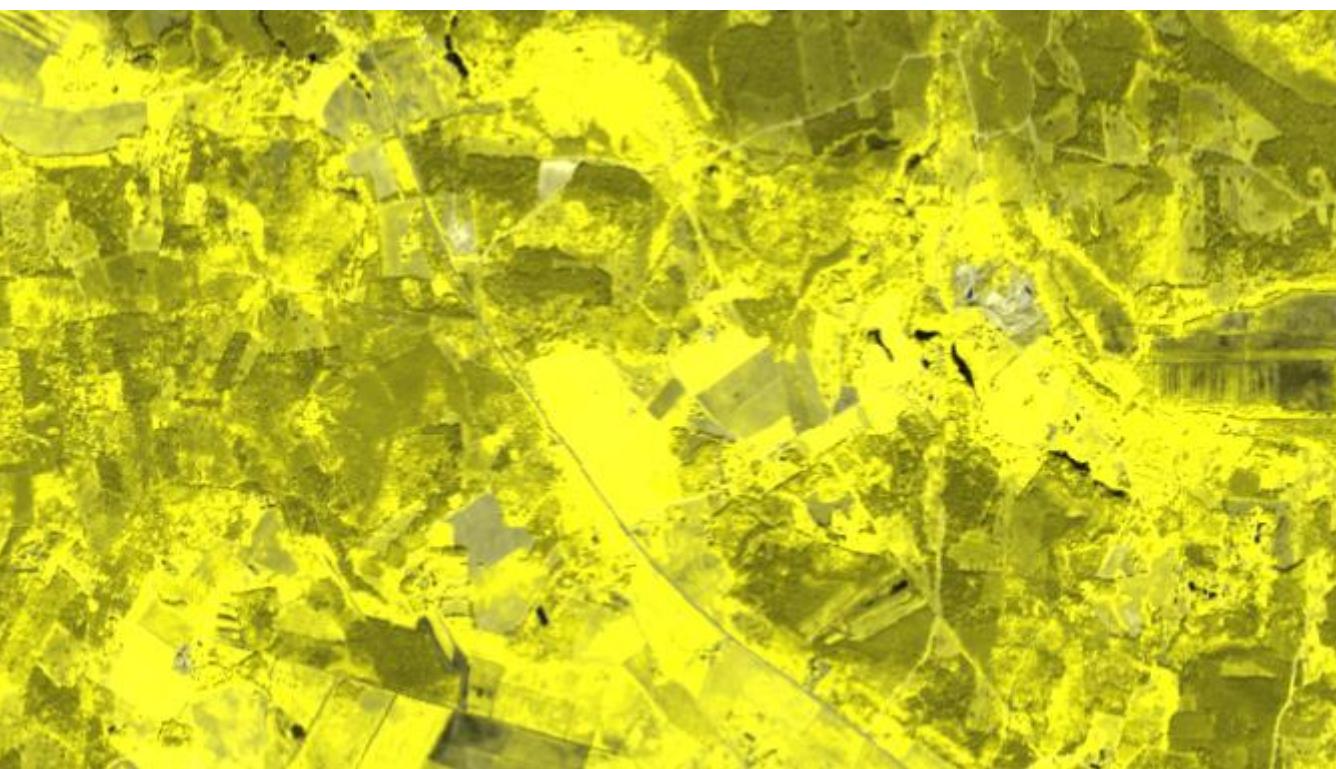


overgrown areas



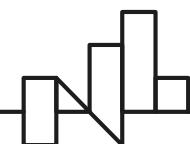
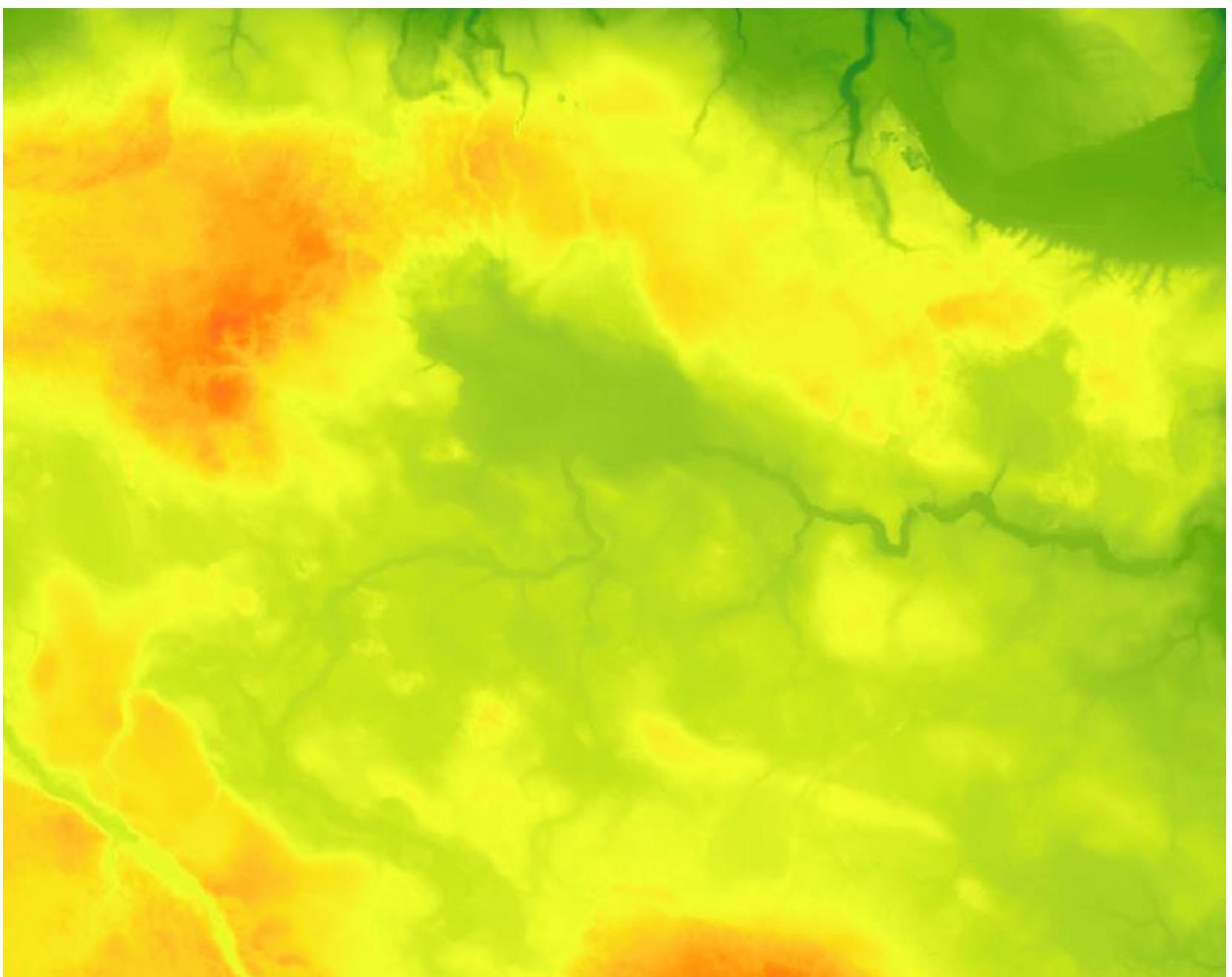
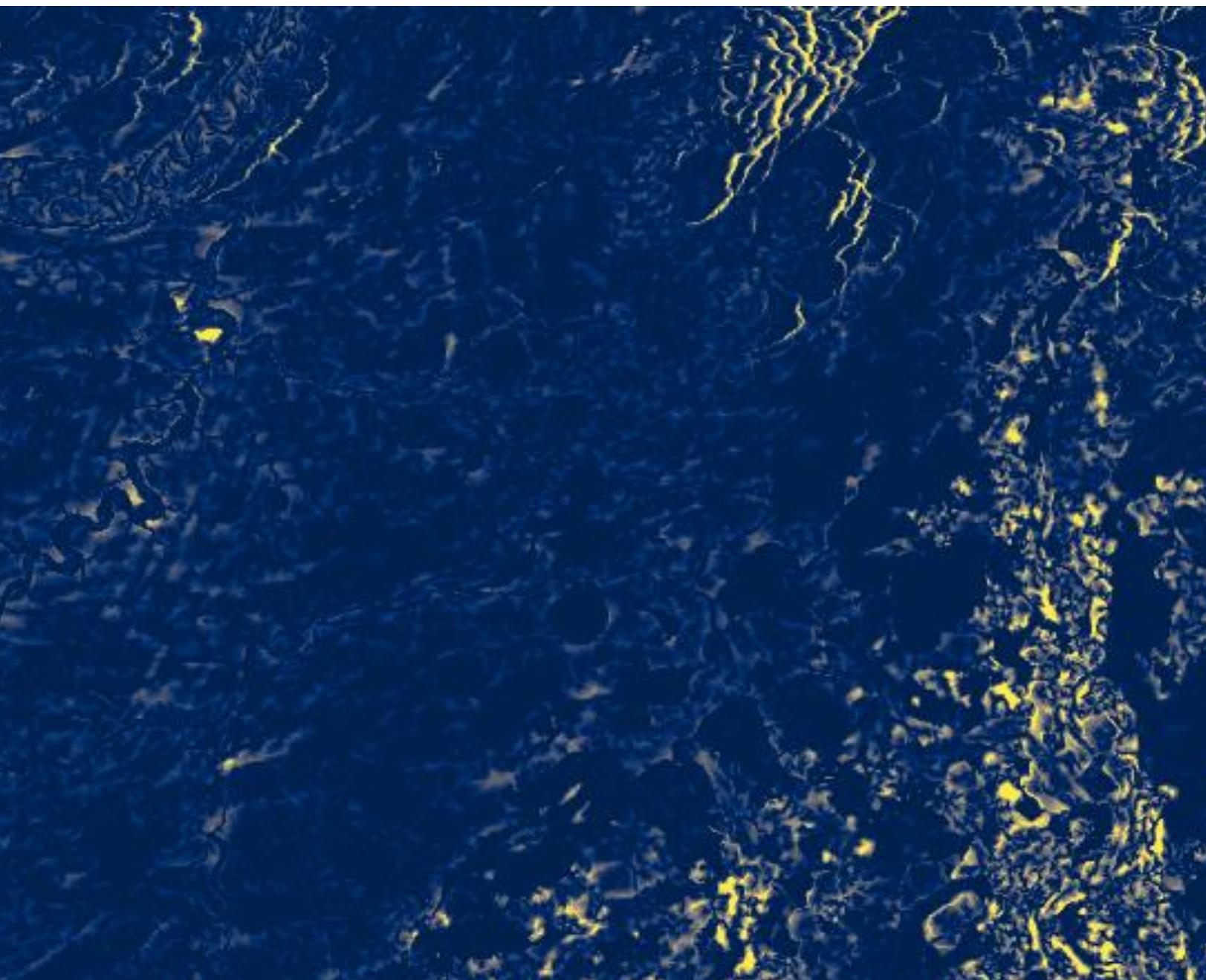
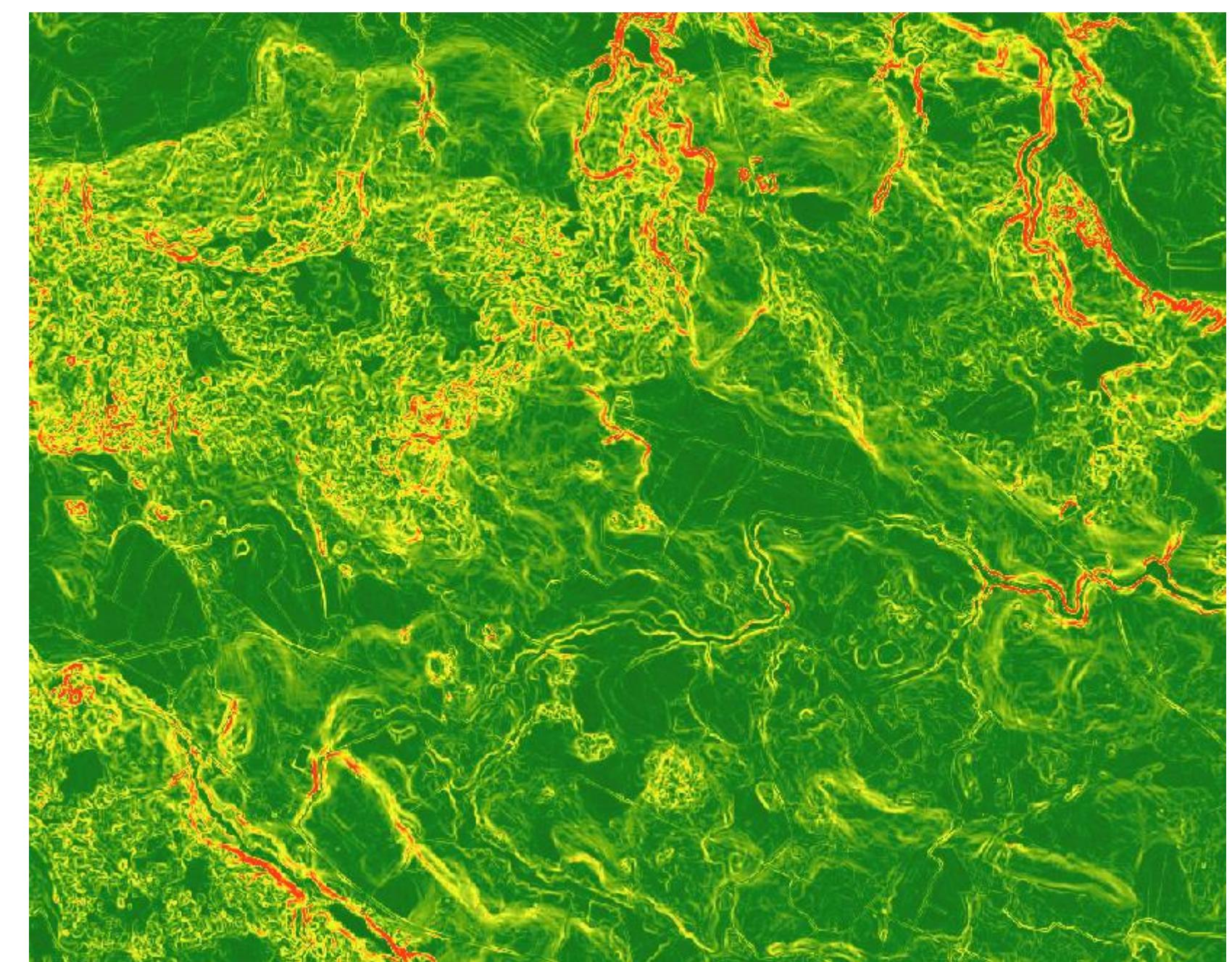
# Geospatial variables

- Spectral (Sentinel-2)
  - B3 (spring; p50)
  - B4 (p50)
  - B8 (spring; p50)
  - EVI (p10; p50)
  - NDWI (p50; p90)
  - NIRv
  - kNDVI (spring; p10; p25; p75; p90)



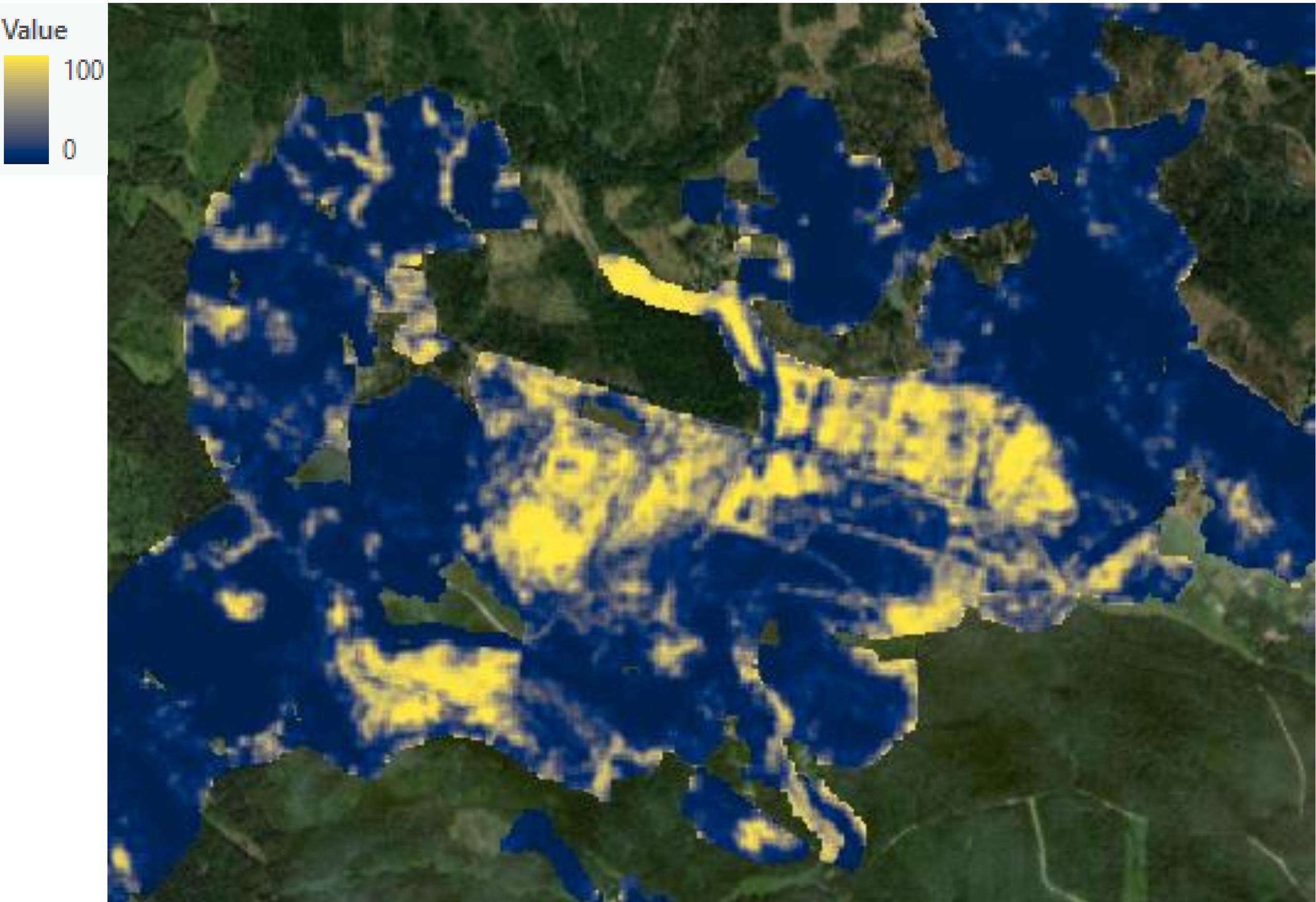
# Geospatial variables

- Relief data (LiDAR)
  - DTW (10m; 30m)
  - DIS (depth in sink)
  - Slope (5m; SD)

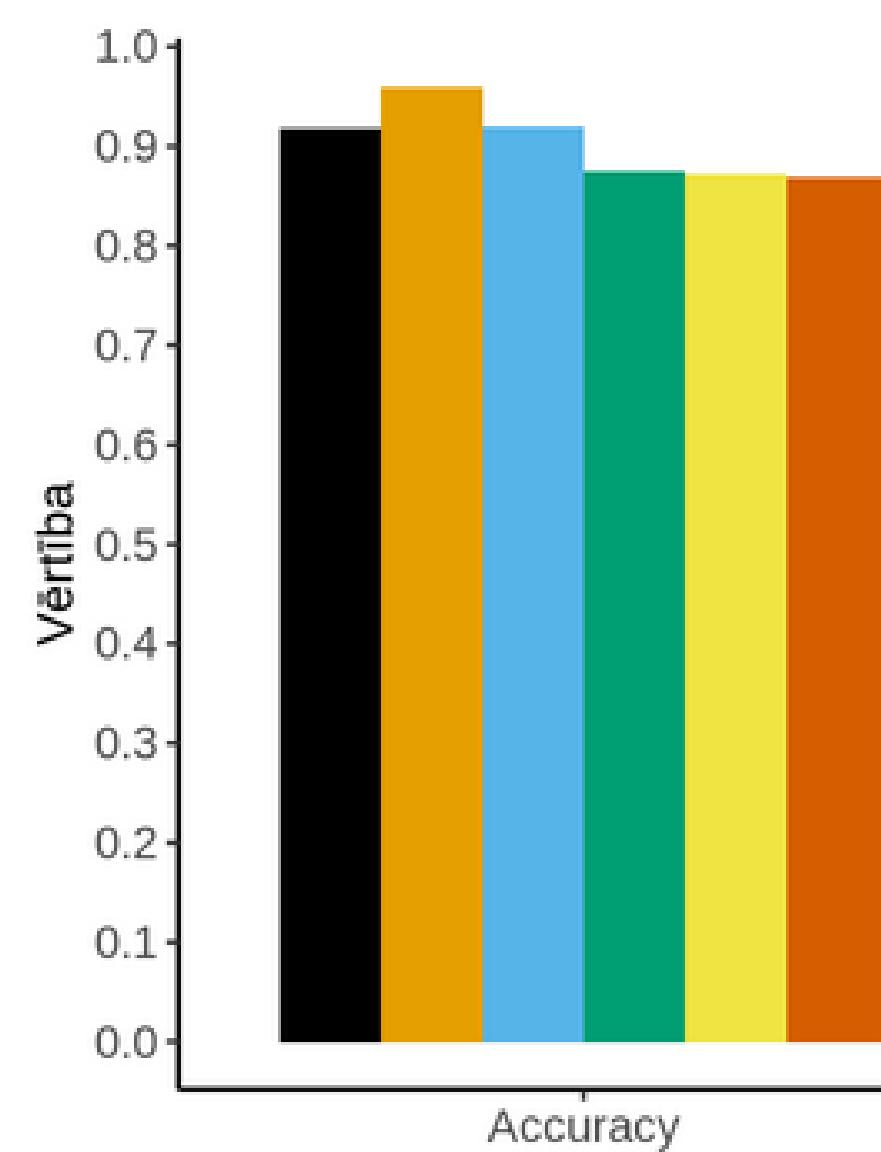


# Results

Continuous probability  
1-100

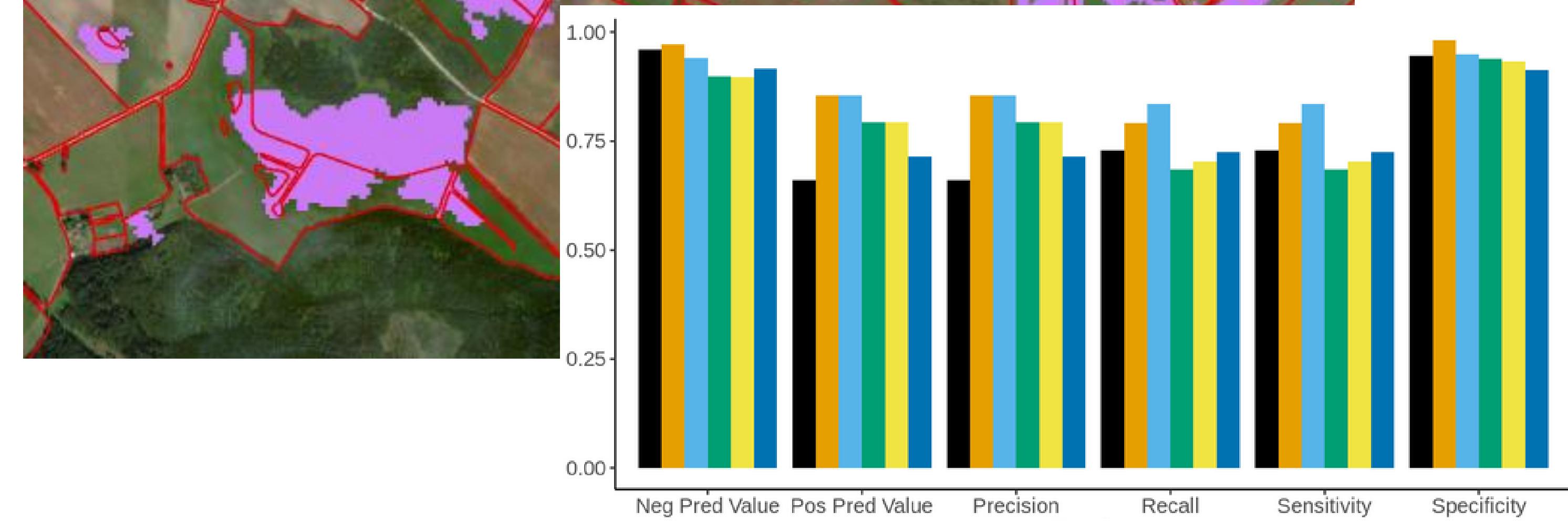
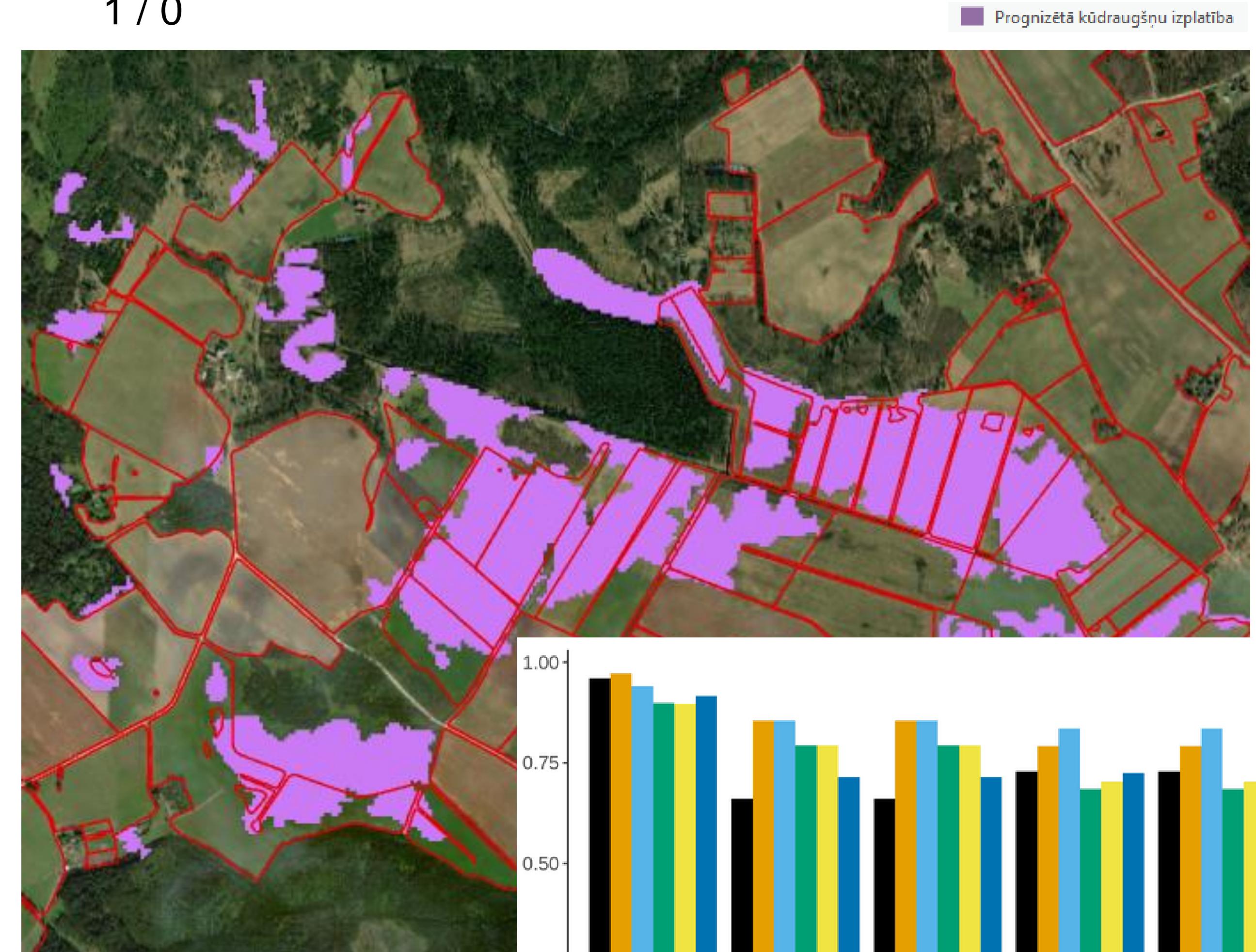


# Results

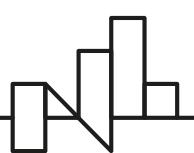
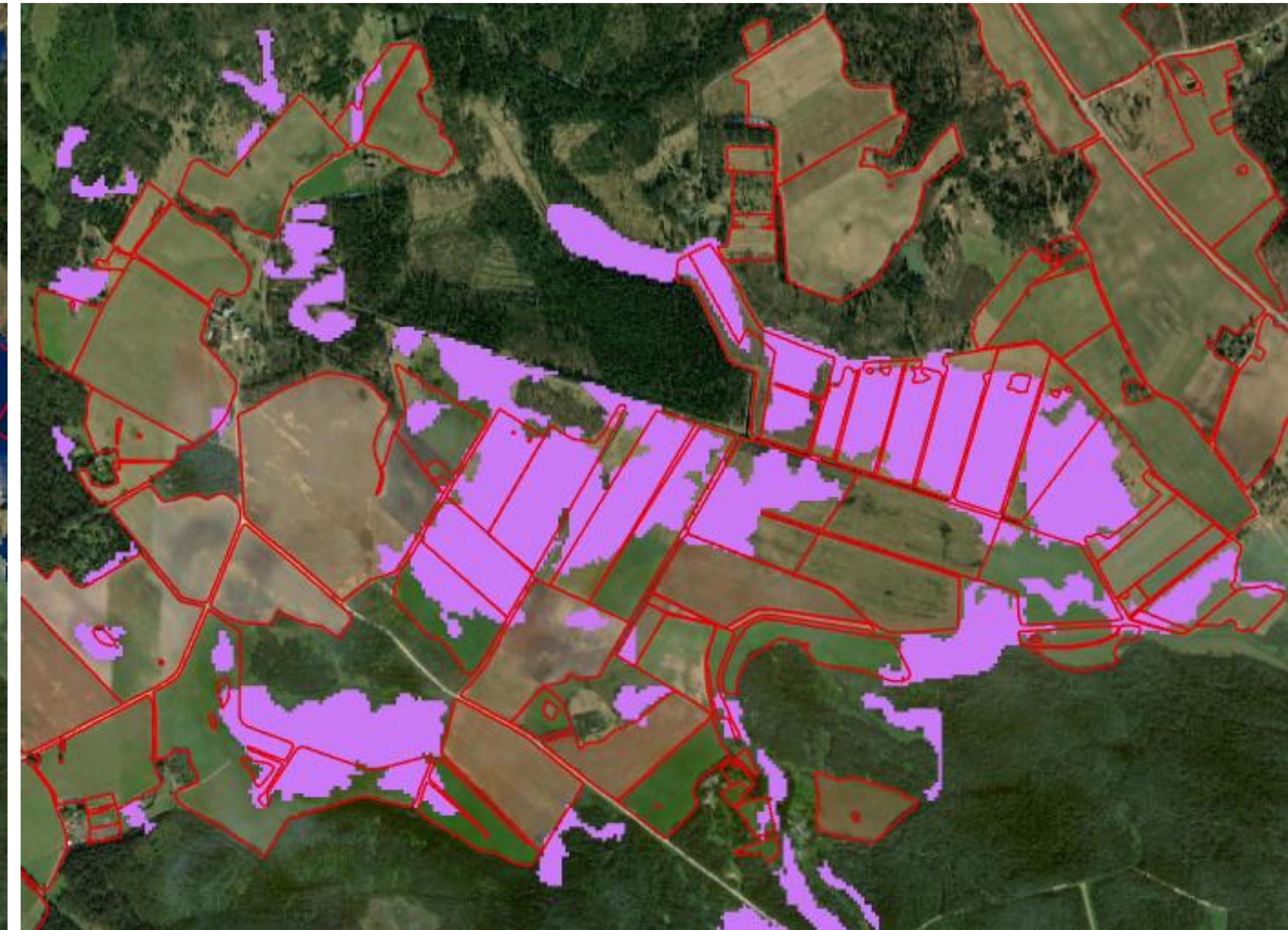
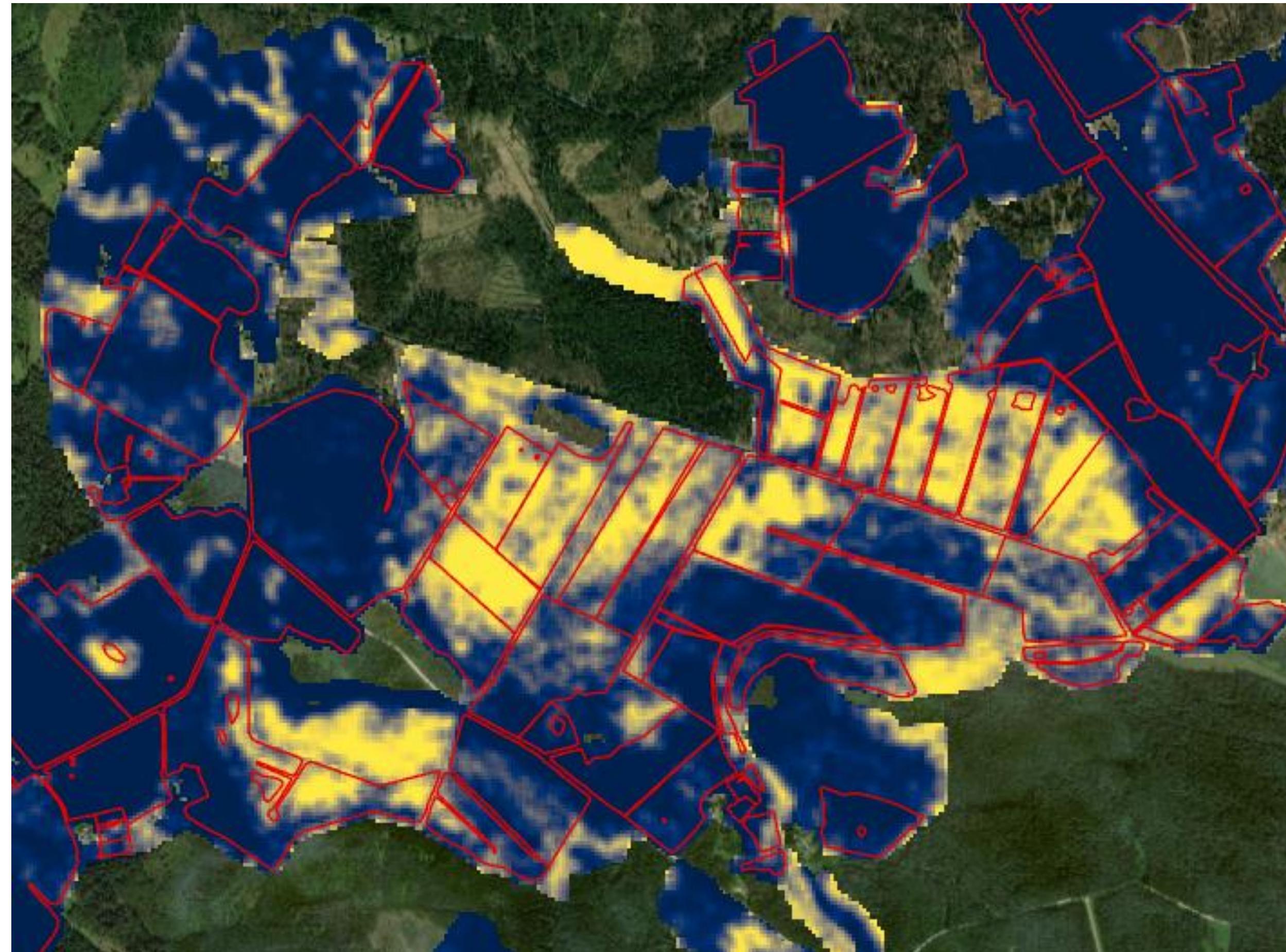


**Accuracy 91.67%**

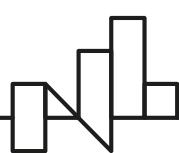
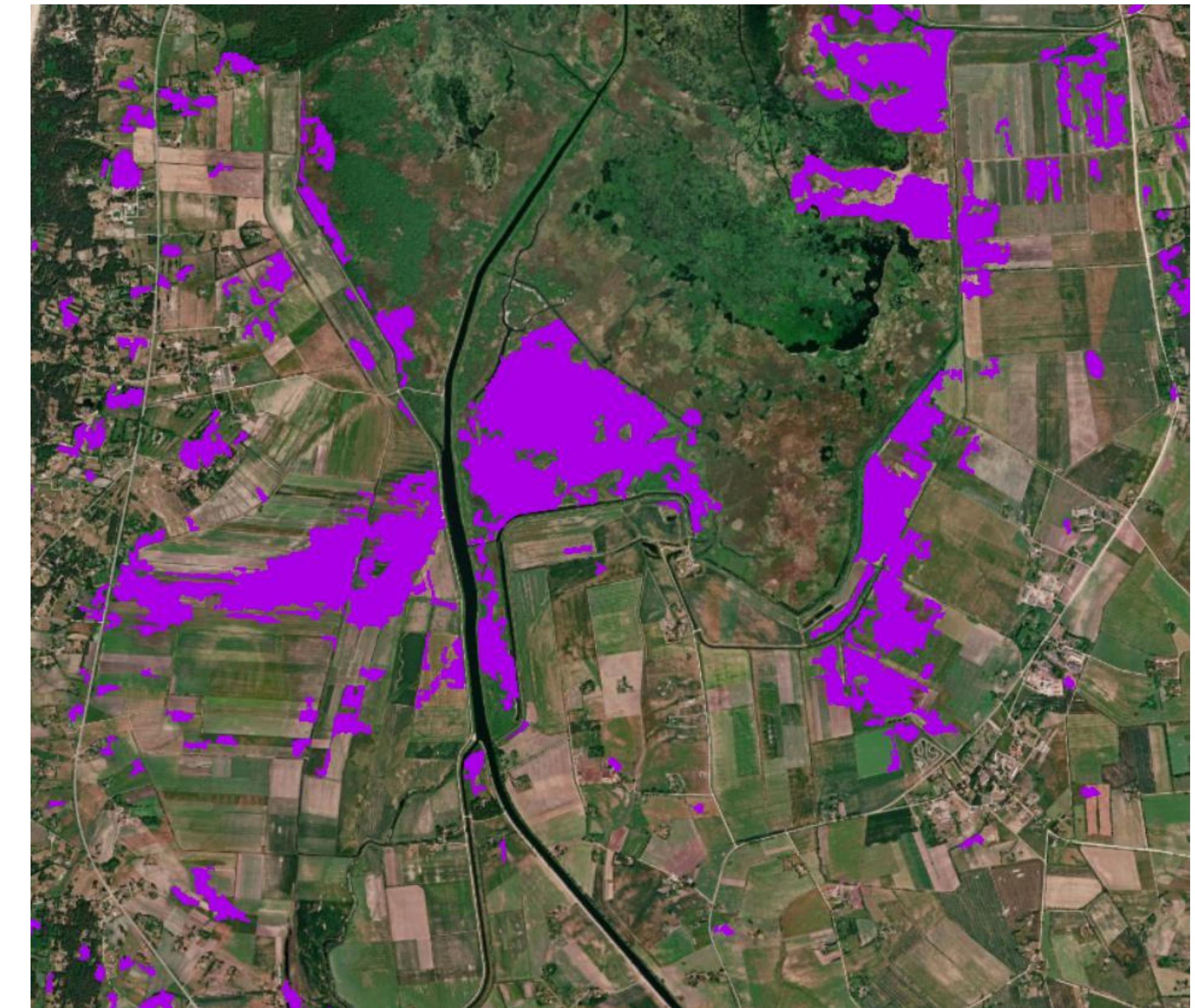
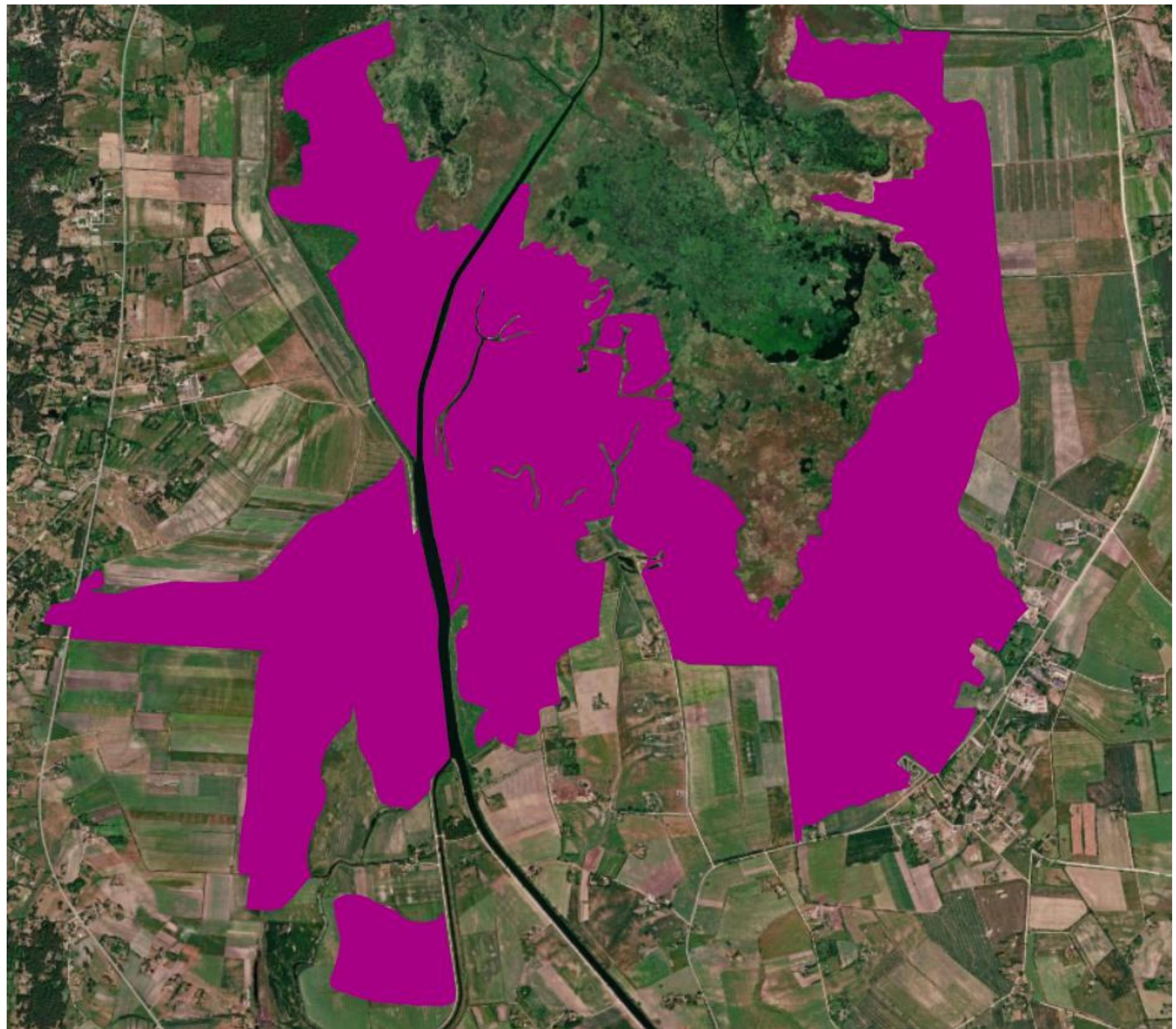
Binarized data(Y / N)  
1 / 0



# Results



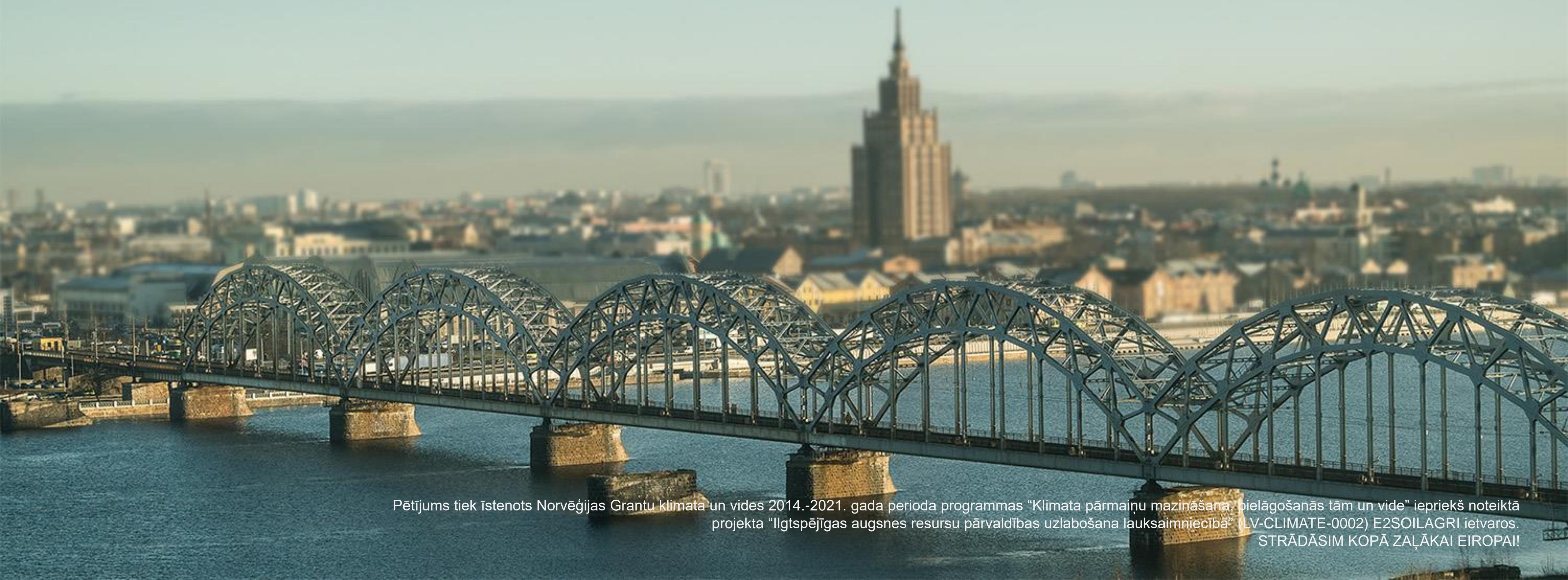
# Examples





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# Thank You for Your Attention



Pētījums tiek īstenots Norvēģijas Grantu klimata un vides 2014.-2021. gada perioda programmas "Klimata pārmaiņu mazināšana, pielāgošanās tām un vide" iepriekš noteiktā projekta "Ilgtspējīgas augsnes resursu pārvaldības uzlabošana lauksaimniecībā" (LV-CLIMATE-0002) E2SOILAGRI ietvaros.  
STRĀDĀSIM KOPĀ ZAĻĀKAI EIROPAI!