



# Progress on LIFE Peat Carbon project activities in Finland 2024

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26.09.2024

LIFE Peat Carbon

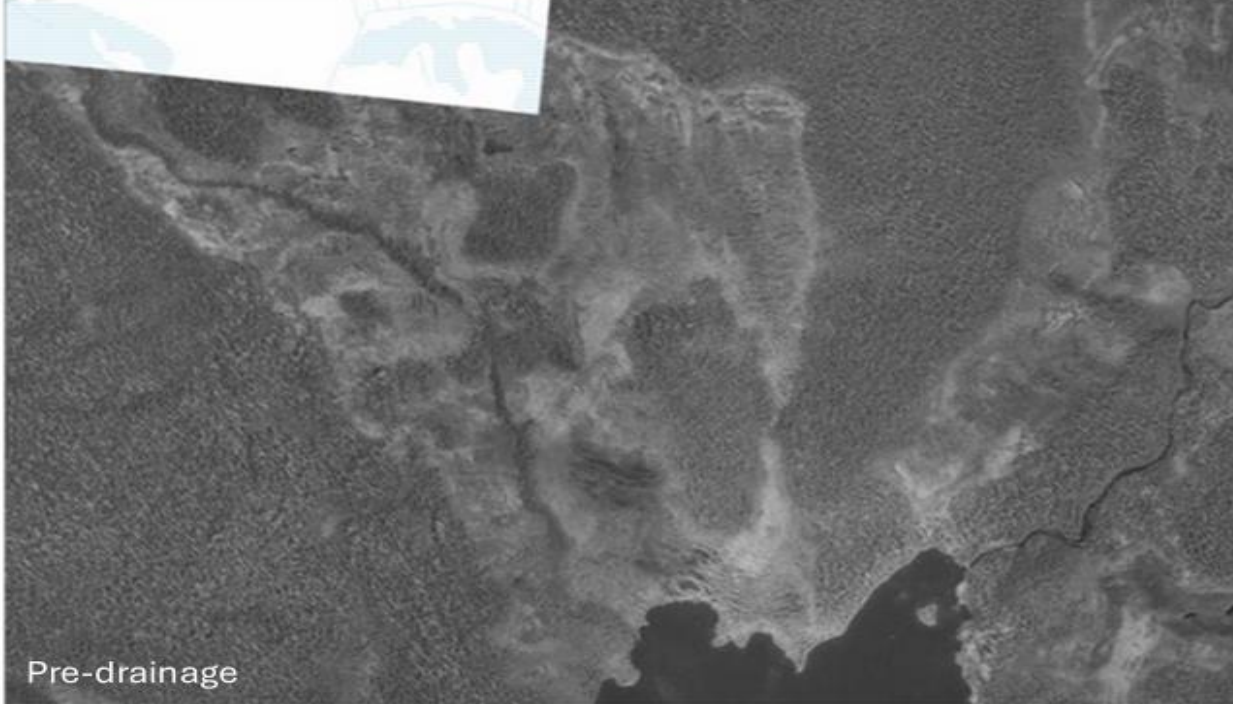


# Restoration

- Restoration activities in Matorova started in February 2024 by removing trees
- Tree harvesting continued until summer
- Filling of the ditches, building dams and directing water to peatland started in the beginning of July and lasted for several weeks
- Visit by Latvian colleagues to see the restoration in July
- Restoration video shooting incl. interviews both winter and summer
- See presentation by Jenni Hultman / LUKE







Pre-drainage



Pre-restoration



Pre-restoration

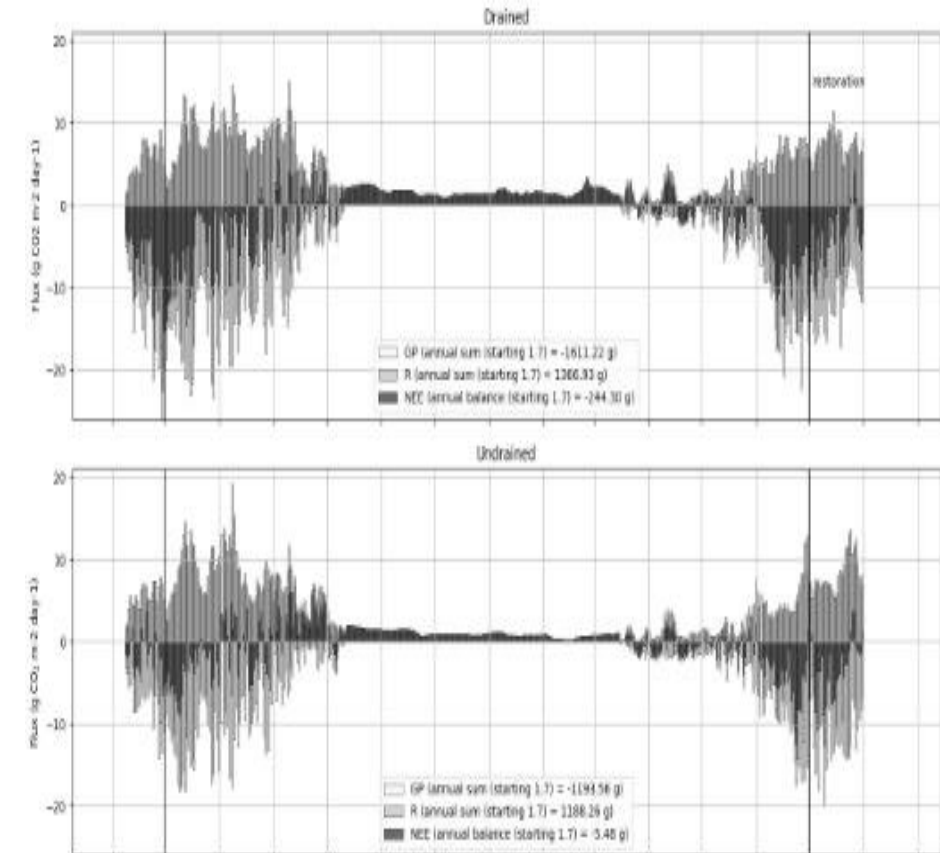
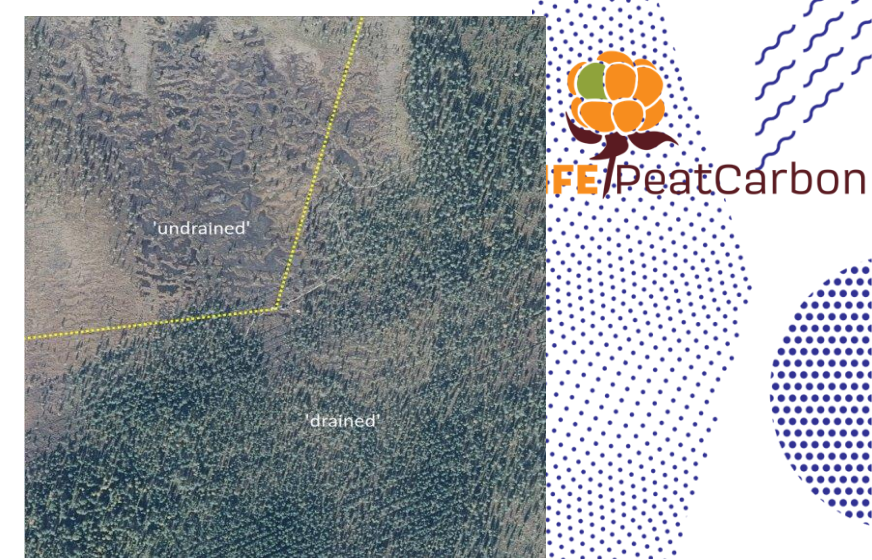


Post-restoration works



# GHG measurements

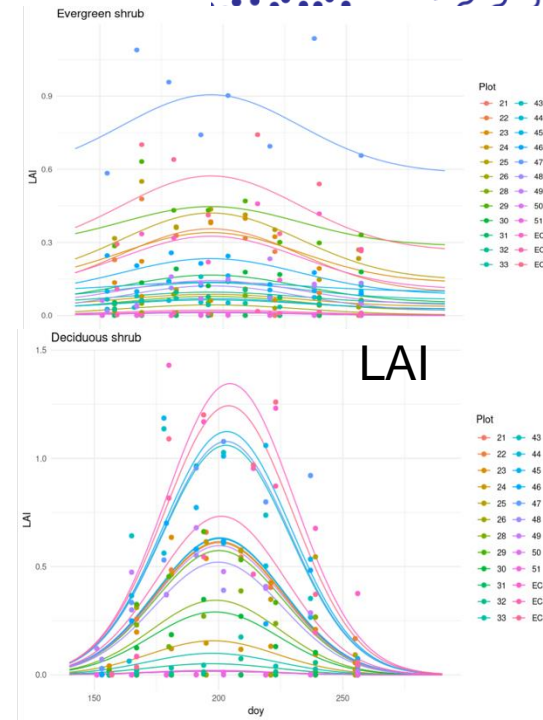
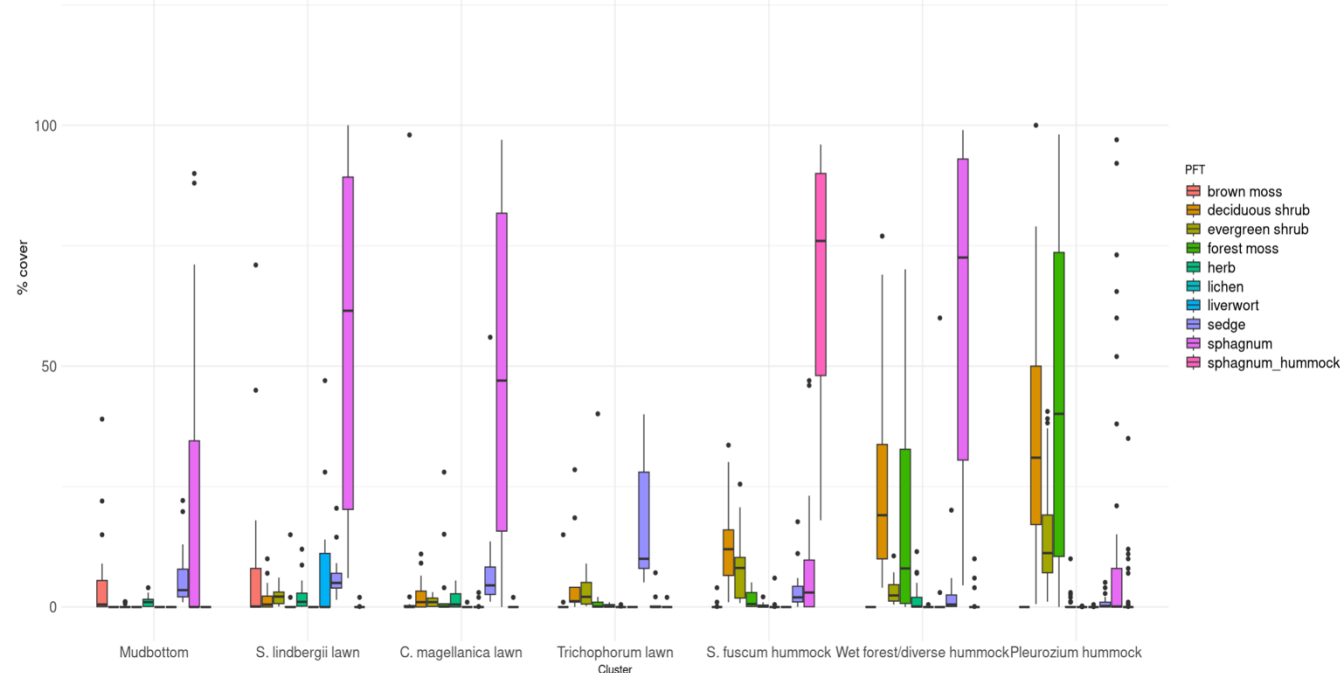
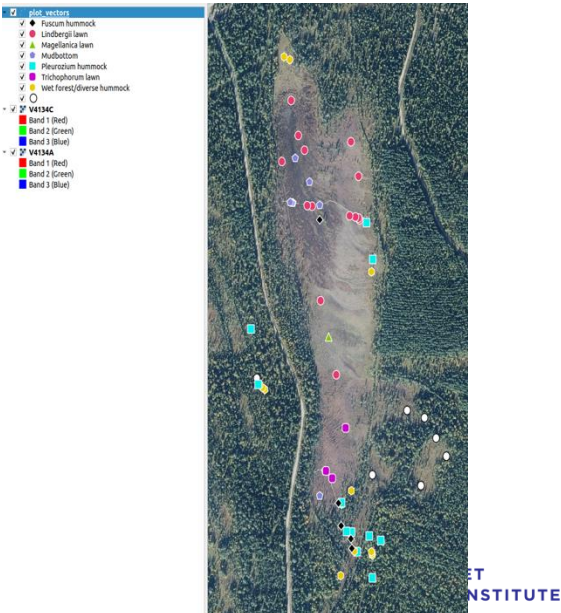
- Continuing CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O measurements in Välisuo and Matorovansuo
- Ecosystem level CO<sub>2</sub> flux from eddy covariance tower at Matorovansuo
- Chamber flux measurements throughout the year at 60 points, as well as 12 heterotrophic respiration points every 2-4 weeks, water table level
- Growing season: open water flux measurements (Kivijärvi), dissolved carbon and nutrients in water



# Vegetation measurements



- Vegetation inventory in the GHG-collars, coordinated with the larger vegetation inventory
- Clustering of plots: seven microhabitats with distinct vegetation (and water table and pH) characteristics
- Species-level leaf area index, 2nd year
- Forest: Sampling tree, branch and needle biomass, DBH, leaf area, tree height, scaling to plot level
- More about GHG measurements and vegetation clustering in a presentation by Sari Juutinen/FMI

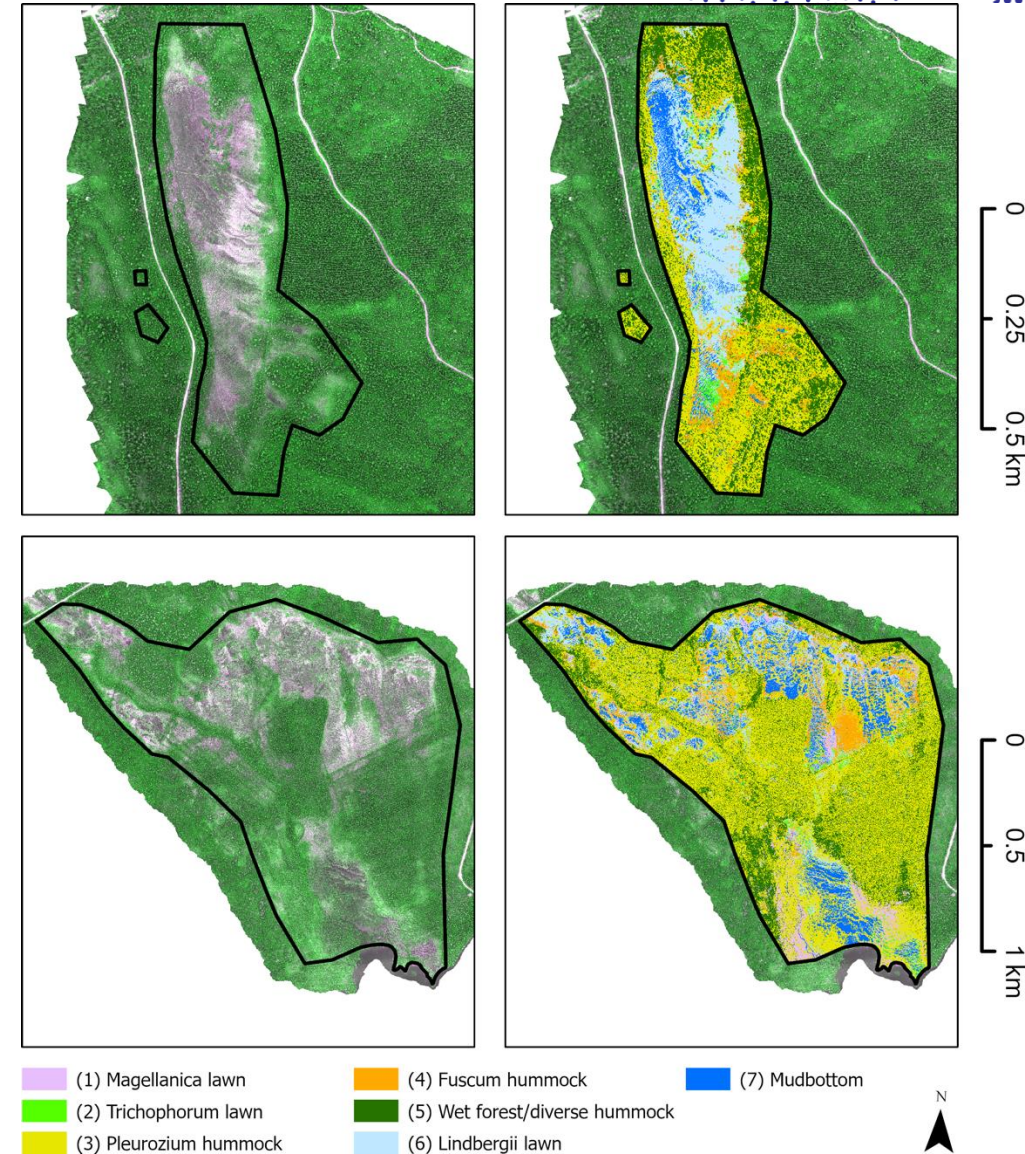




# Vegetation studies

- Vegetation inventories: 206 plots, mostly species level, linked to FMI clustering
  - Ground vegetation, indicative for wetness
  - Tree abundance will be added
- Drone flights (UEF) before restoration in July 2023, after in August 2024
  - Multispectral and thermal imagery, drone LIDAR for topography
- NLS aerial images

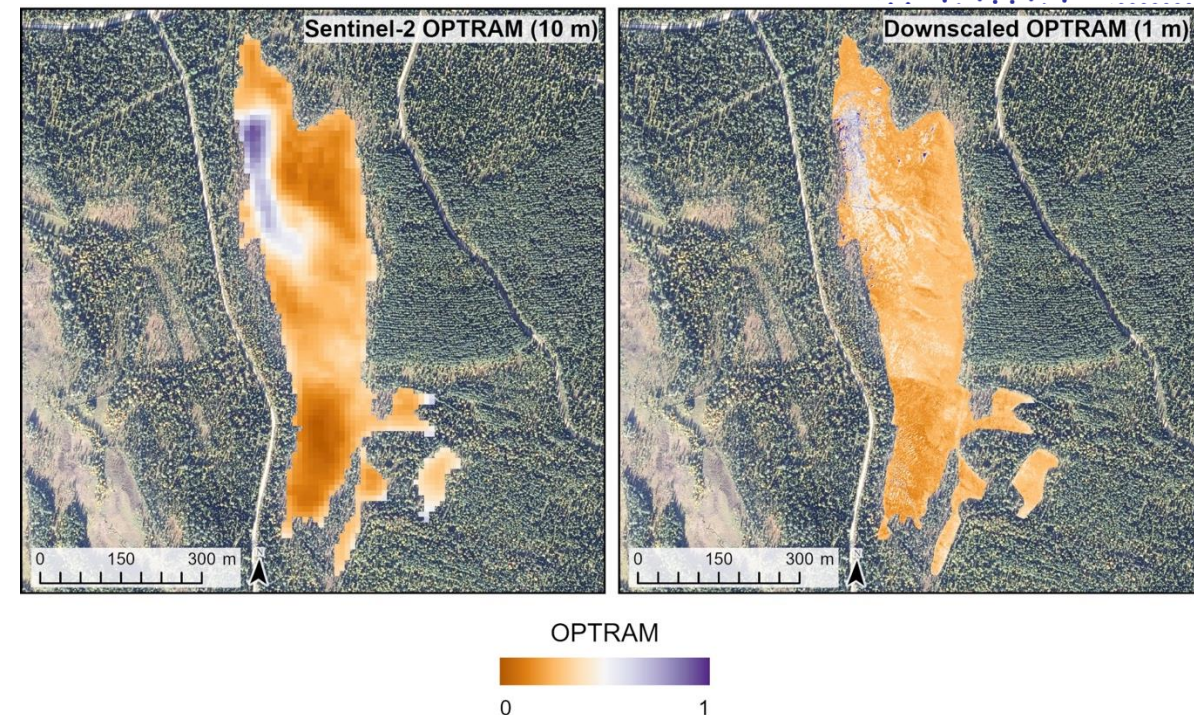
Upscaled microhabitats





# Vegetation studies

- Combining manual water table measurements, drone imagery and satellite-based moisture index to have a better understanding of spatial variations in the WT
- More about the vegetation and water table measurements and remote sensing in a presentation by Aleksi Isoaho/LUKE

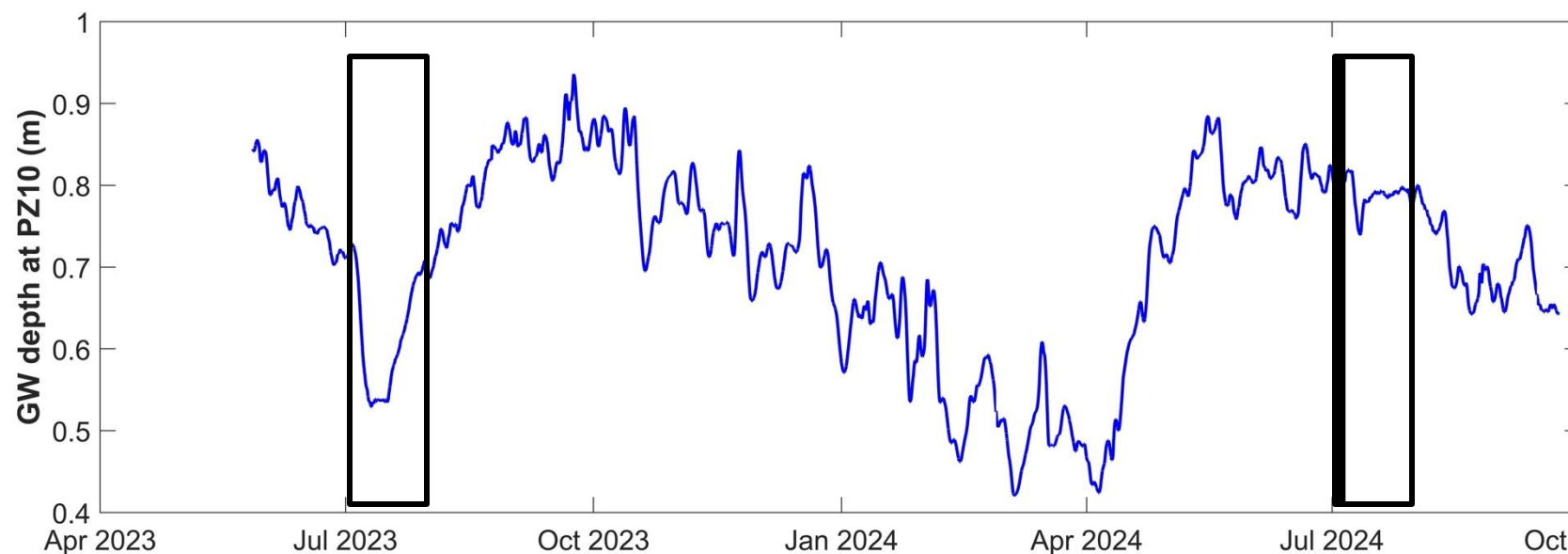




# Hydrological monitoring



## Restoration

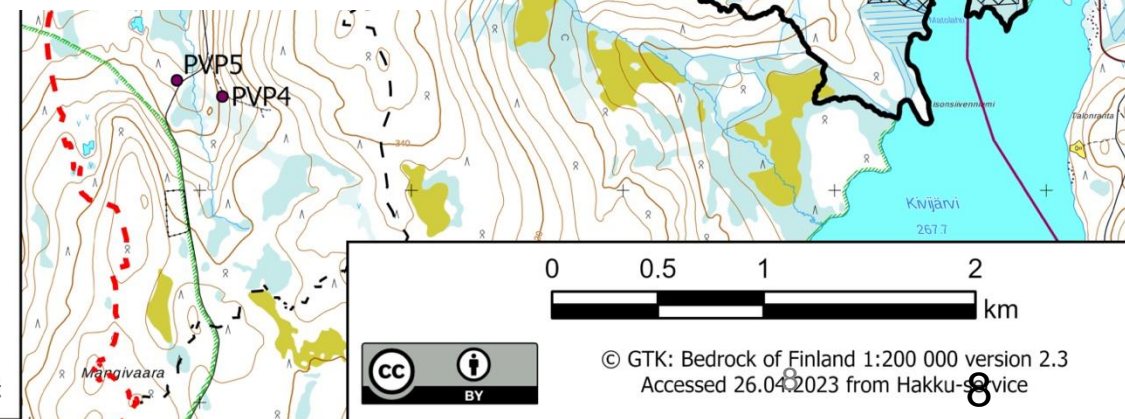


- Can the impact of restoration be seen on the ground water depth?
- Versatile hydrological measurements continued, more in presentation by Anna Autio and Omar Nimr / University of Oulu

Time

### Legend

- Valisuo restoration area
- Valisuo mire
- Pallaslompola catchment
- Matorova restoration area
- Matorova catchment
- Lompolonvuoma catchment



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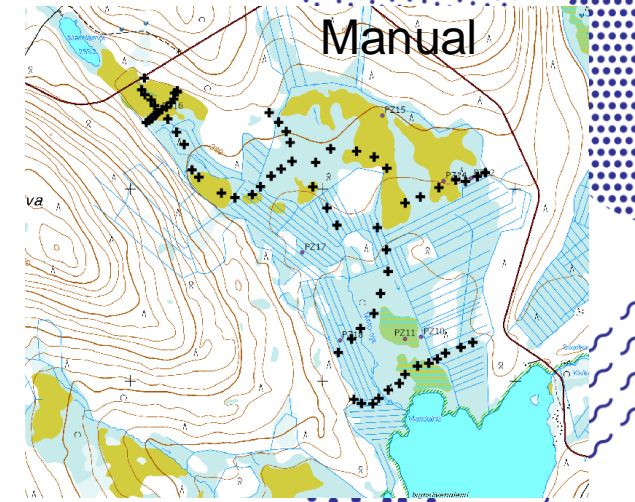
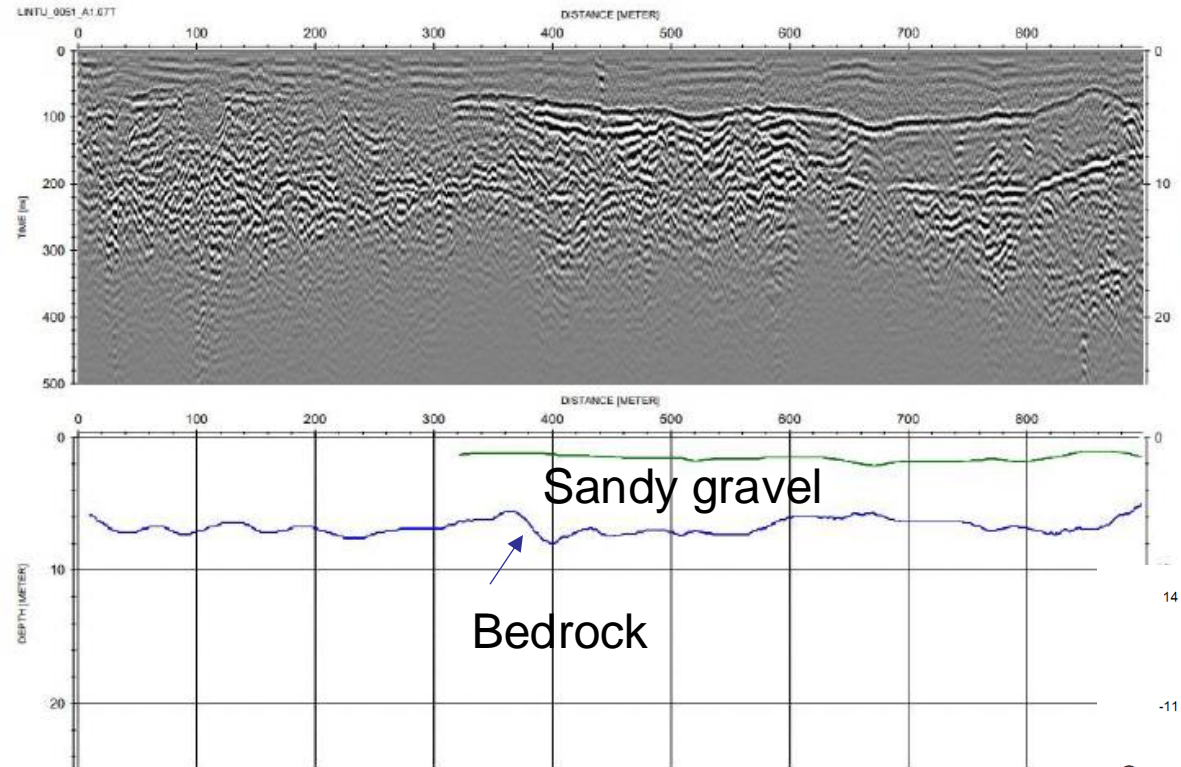
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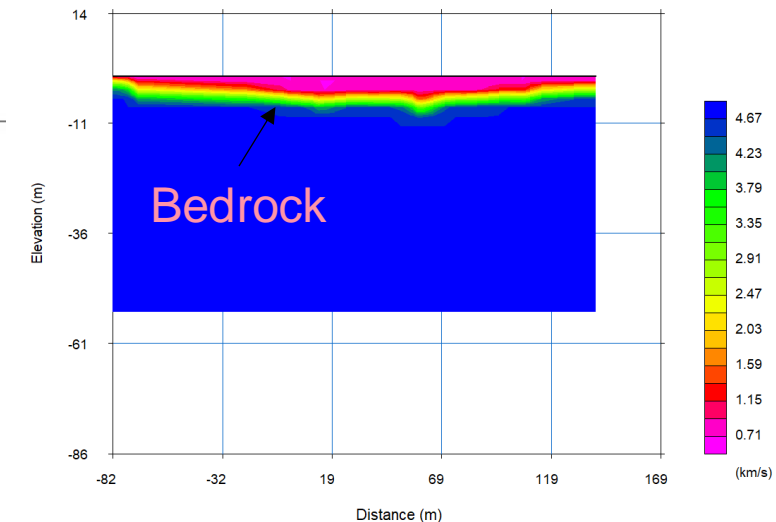
# Hydrogeological monitoring



GPR



Seismic



- Hydrogeological surveying with geophysical methods
- Measurements in 2024 with ground penetrating radar, seismic refraction, manual peat depth measurements



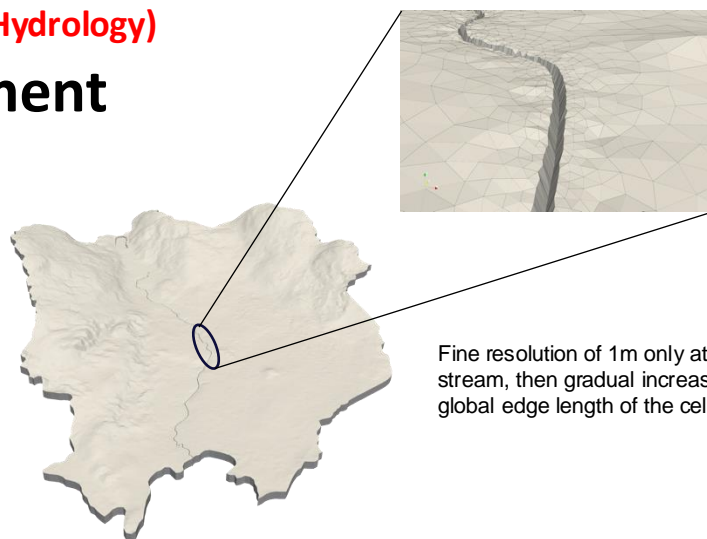
# Hydrological modelling



HydroGeoSphere

(Surface + Subsurface Hydrology)

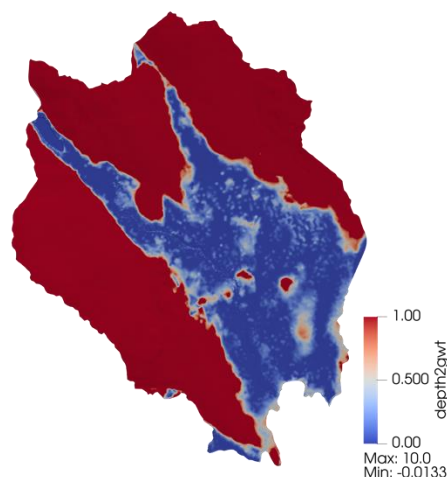
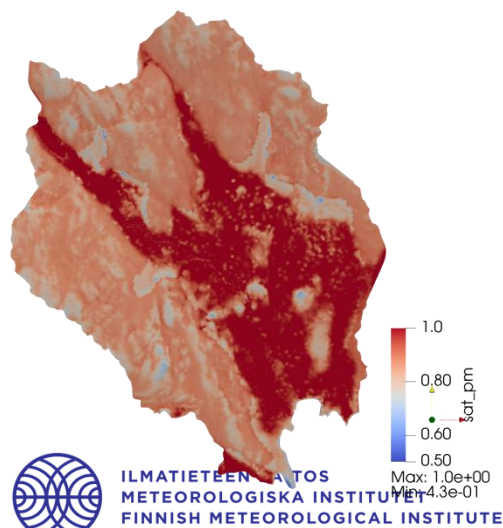
## Pre-management model



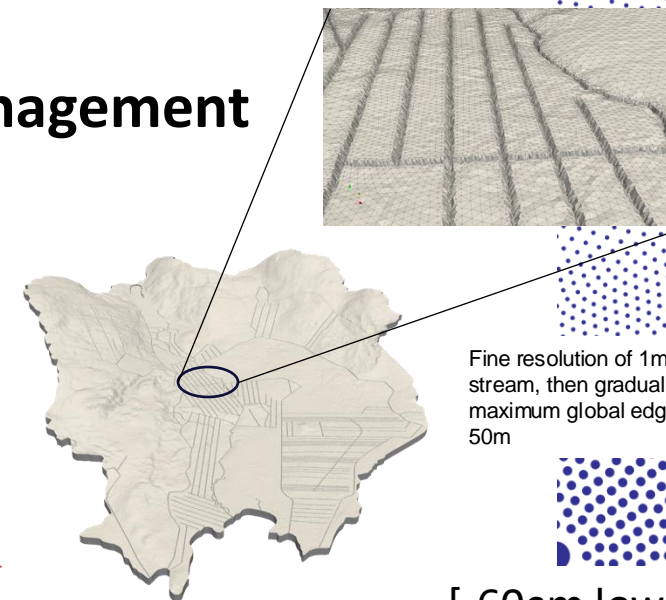
Fine resolution of 1m only at a buffer of the stream, then gradual increase reaches maximum global edge length of the cell = 20m

[Saturation]

[Depth\_to\_GWT]



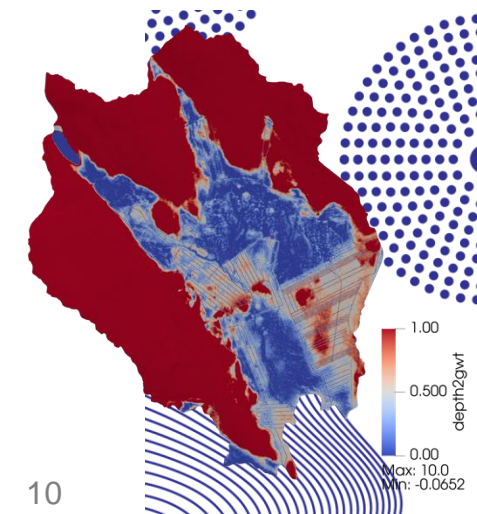
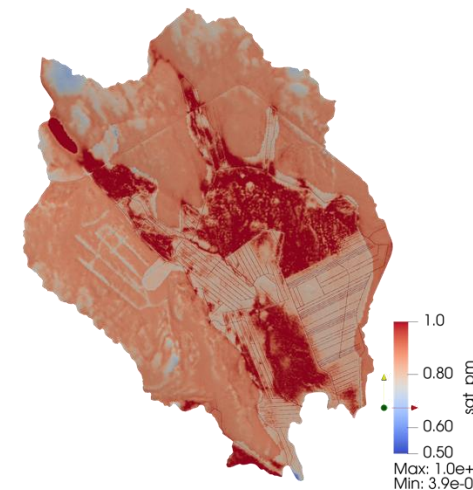
## Post-management Model



Fine resolution of 1m only at a buffer of the stream, then gradual increase reaches maximum global edge length of the cell = 50m

[20% less moisture]

[-60cm lower GWT]





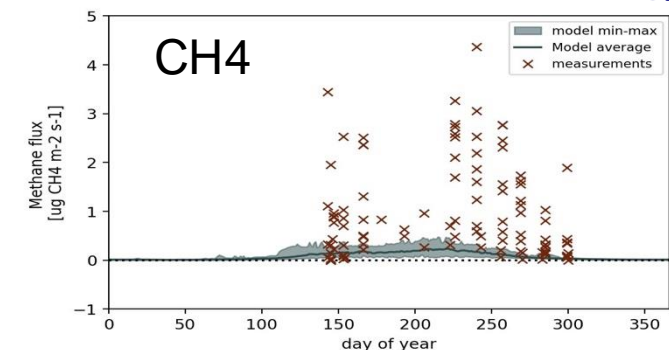
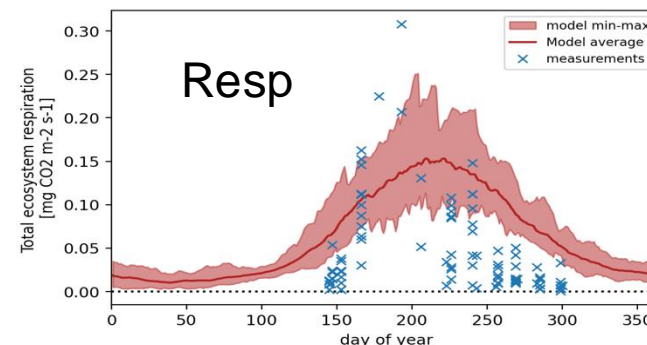
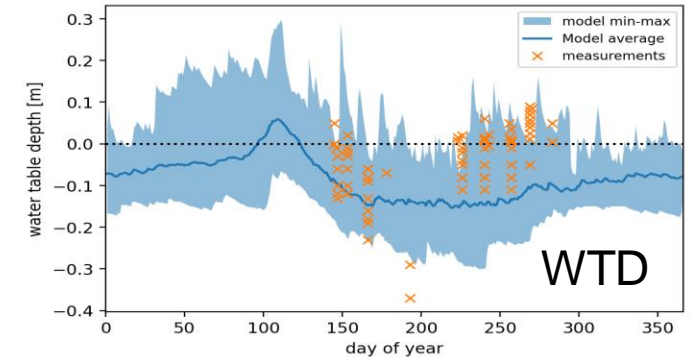
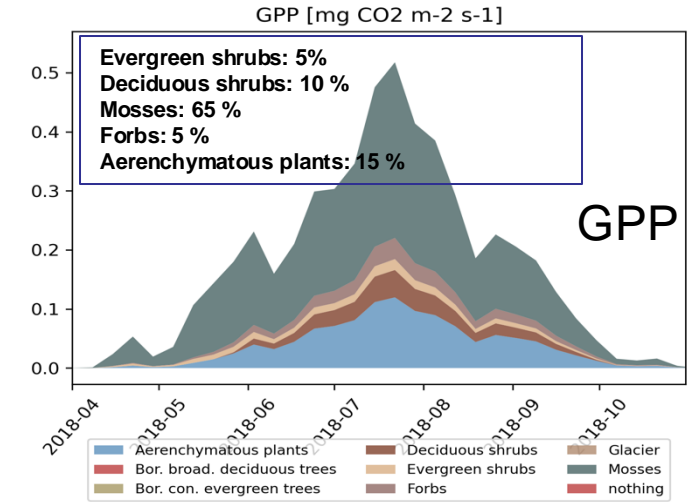
# GHG modelling



Model results for  
one cluster

- New plant functional types (PFTs) in the JSBACH-HIMMELI model based on the vegetation analysis at Matorovansuo and Välisuo
- PFT parameter calibration based on GHG and other site measurements
- Model simulations for the seven microhabitat clusters with a specific distribution of PFTs
- Linking to GEST types
- Linking to hydrological modeling for WT
- Upscaling
- More about GHG modeling in a presentation by Kieli Isomäki/FMI

Boreal evergreen coniferous trees  
Boreal deciduous broadleaf trees  
Evergreen shrubs  
Deciduous shrubs  
Mosses  
Sphagnum  
Forbs  
Aerenchymatous plants



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# Outreach

- Project meeting and conferences

- LIFE project meeting, Denmark
- Wetland day, Helsinki
- SERE-conference, Tartu
- Visit to restoration site in Pallas
- Alfawetlands Austria

- Web-stories and news

- Related to restoration, meetings and visits, world wetland day
- New peatland-project focused web-page at FMI:

<https://en.ilmatieteenlaitos.fi/climate-impacts-of-peatland-land-use>

- Video footage of restoration

- winter (tree logging) and summer (filling ditches) -> Presentation by Indigo Janka