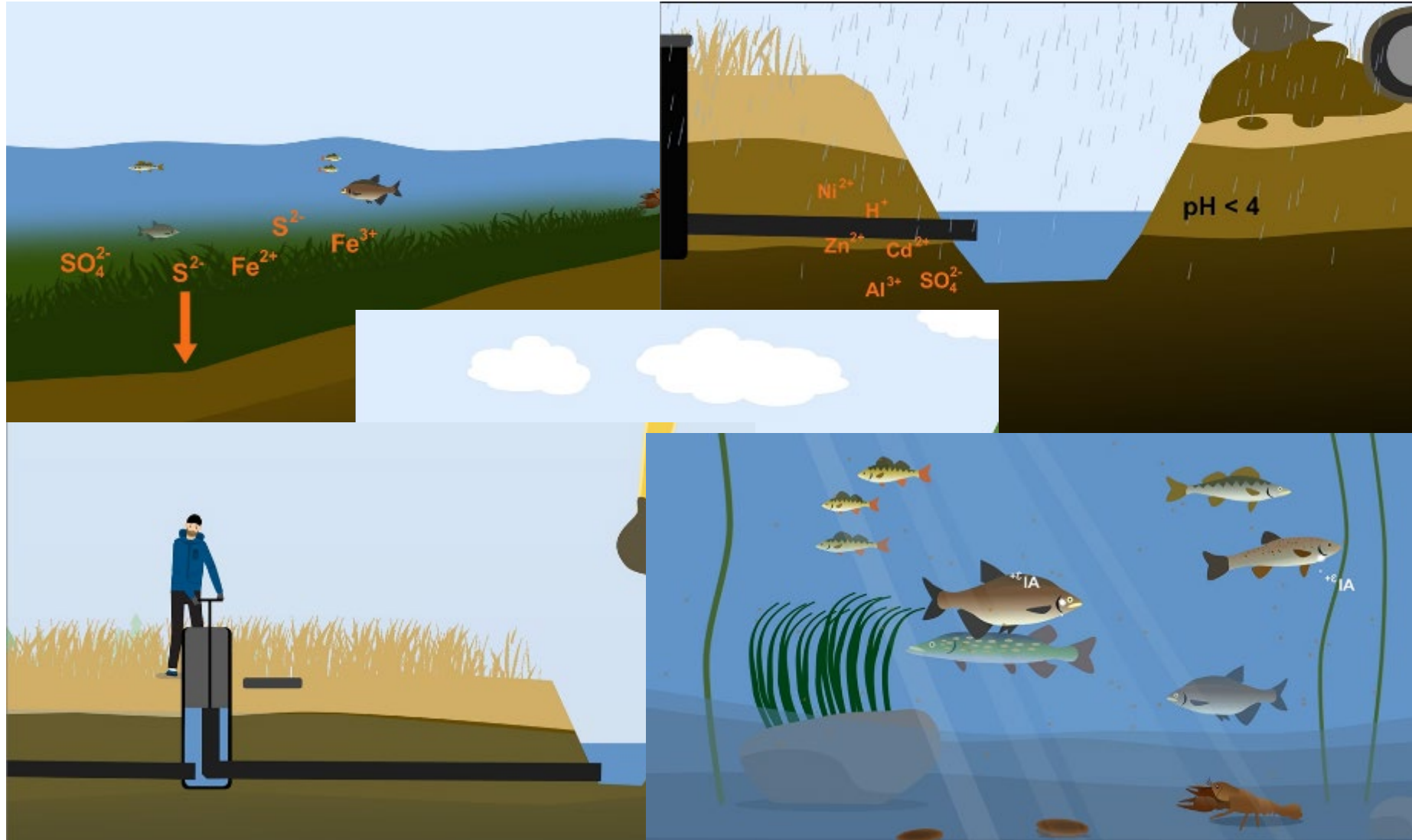




HAPPASU-Better water management of acid sulphate soils in the water catchment area of the river Eurajoki

Animation on acid sulfate soils



Risks with AS-soils

- ▶ Fish deaths
- ▶ Fish reproduction
- ▶ Disruption of ecosystem balance
- ▶ Bioavailability of nutrients affected -> plant growth
- ▶ Metal content in plants
- ▶ Precipitation of metals -> blocked subsurface drains
- ▶ Infrastructure: corrosion
- ▶ More metals from AS soils to waterbodies than from all the Finnish industry together
- ▶ Neurotoxic metals: MS-disease

Fältmarsch, R. M., Åström, M. E. & Vuori, K. M. 2008. environmental risks of metals mobilised from acid sulphate soils in Finland: a literature review. *Boreal environment research* 13: 444–456

Sutela, T. & Vehanen, T. 2017. The effects of acidity and aluminium leached from acidsulphate soils on riverine fish assemblages. *Boreal Environment Research* 22: 385–391

Åström, Mats E. & Roos, Per M. 2022. Geochemistry of multiple sclerosis in Finland. *The Science of the total environment*, 2022-10, Vol.841, p.156672, Article 156672

Artikkeli on yli 5 vuotta vanha

Eurajoki

Kaloja kuolee Eurajoessa – syynä joen happamoituminen

Kalakuolemien taustalla on pelloilta valuva hapan kuormitus, kertoo Varsinais-Suomen ely-keskus.



Eurajoesta on löytynyt kuolleita kaloja, mm. lahnoja. Kuva: Ely-keskus

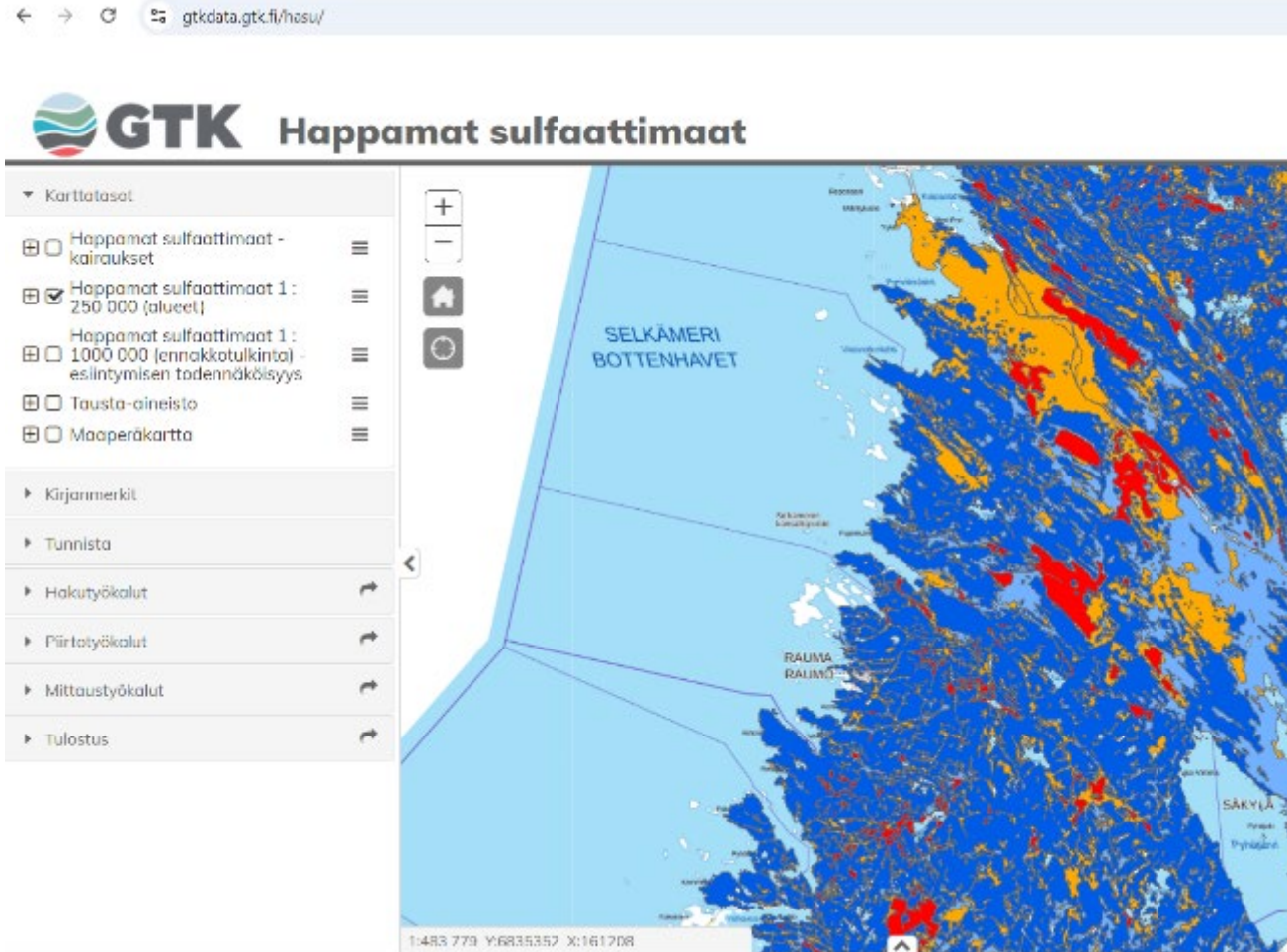
ANTTI LAAKSO

14.12.2018 16:19 · Päivitetty 14.12.2018 16:52

Satakunnassa virtaavassa Eurajoessa on havaittu kalakuolemia. Joessa sijaitsevasta Pappilankoskesta on löytynyt noin sata kiloa kuolleita kaloja.

Kalakuolemien syynä on Varsinais-Suomen ely-keskuksen mukaan joen matalaksi muuttunut pH-arvo. Eurajoen pH-arvo oli perjantaina jopa alle viisi.

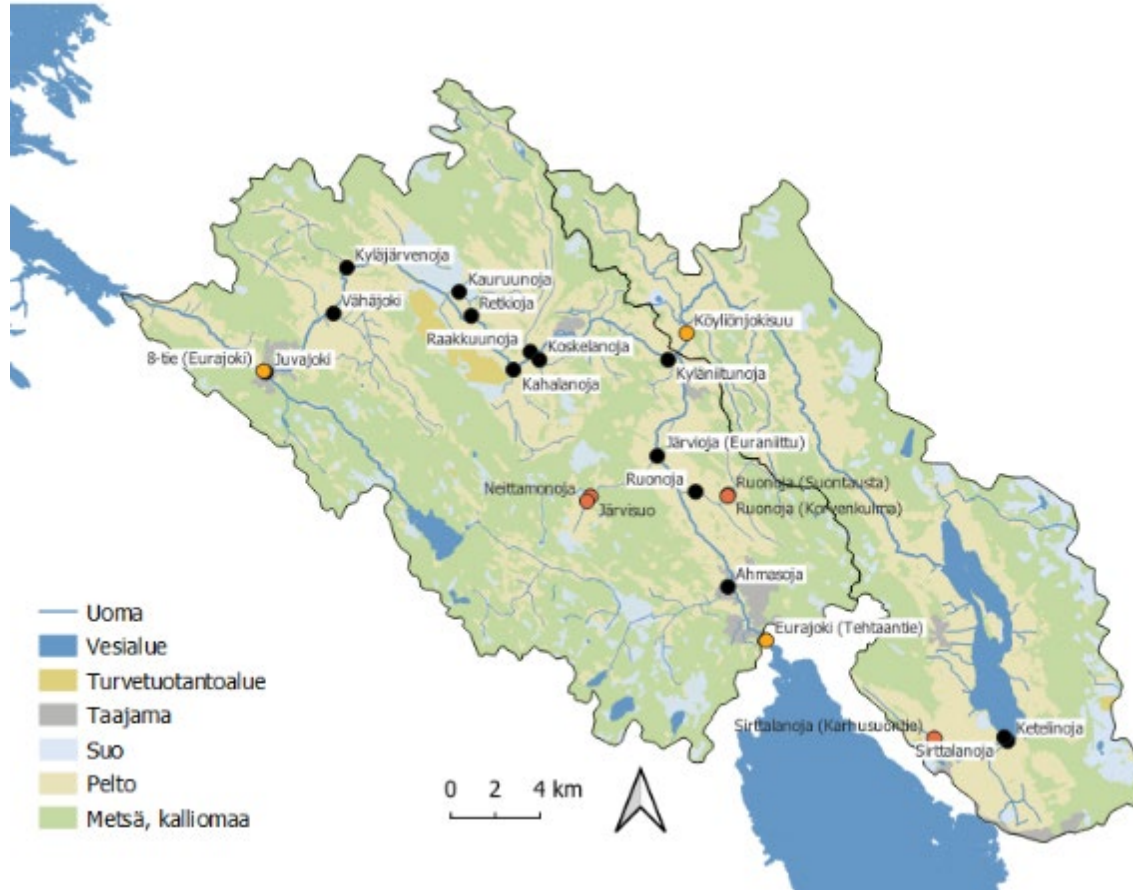
AS-soil Occurrence in Finland



- ▶ Geological Survey of Finland (GTK): AS-soil occurrence in Finland
- ▶ 2009-2021
- ▶ 23 000 sites on area of over 5 000 000 ha
- ▶ 7500 chemical analyses
- ▶ 40 000 samples incubated and measured for pH
- ▶ 1 000 000 ha of AS-soils on coast of Baltic Sea

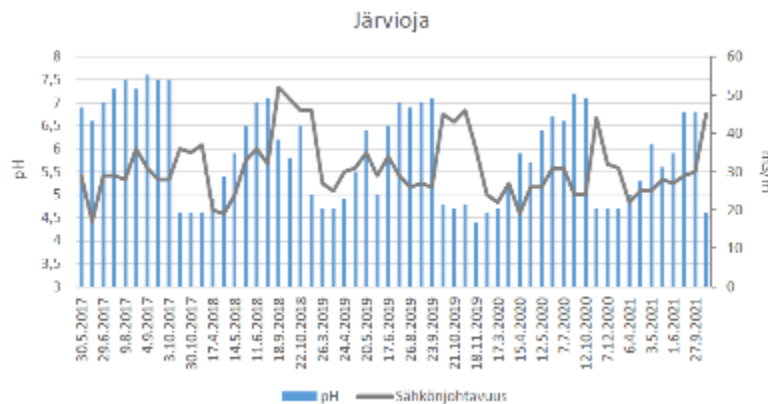
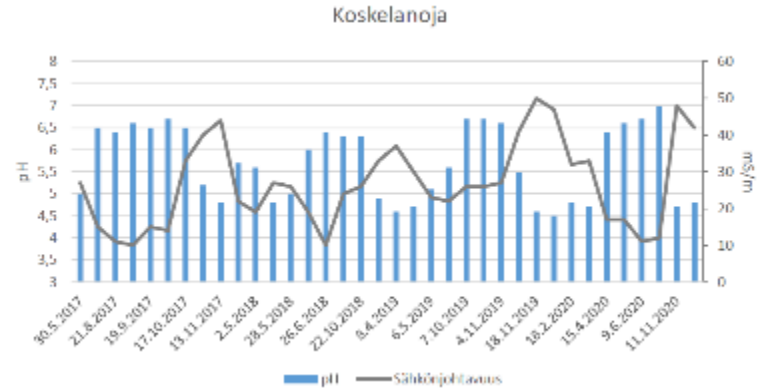
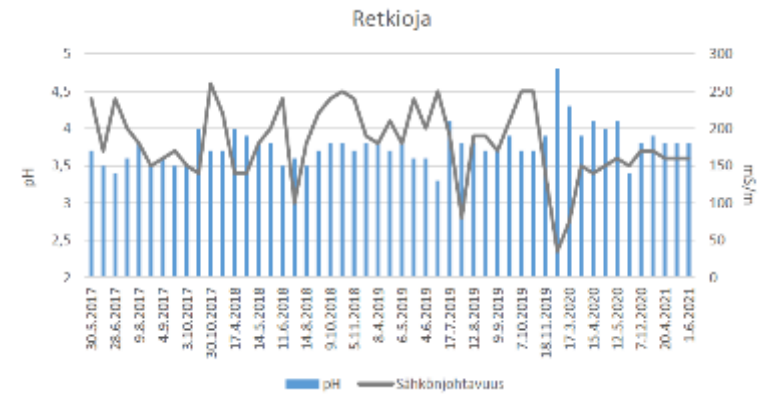
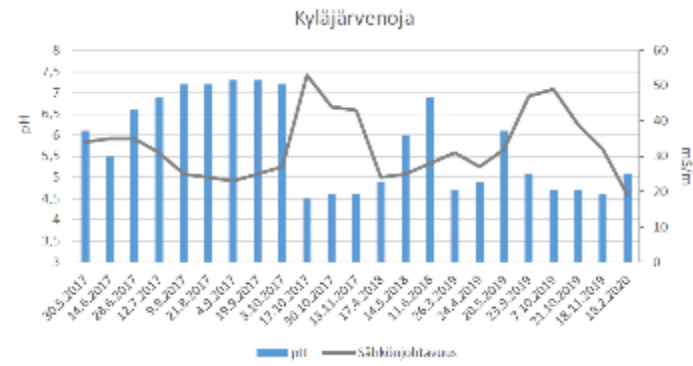
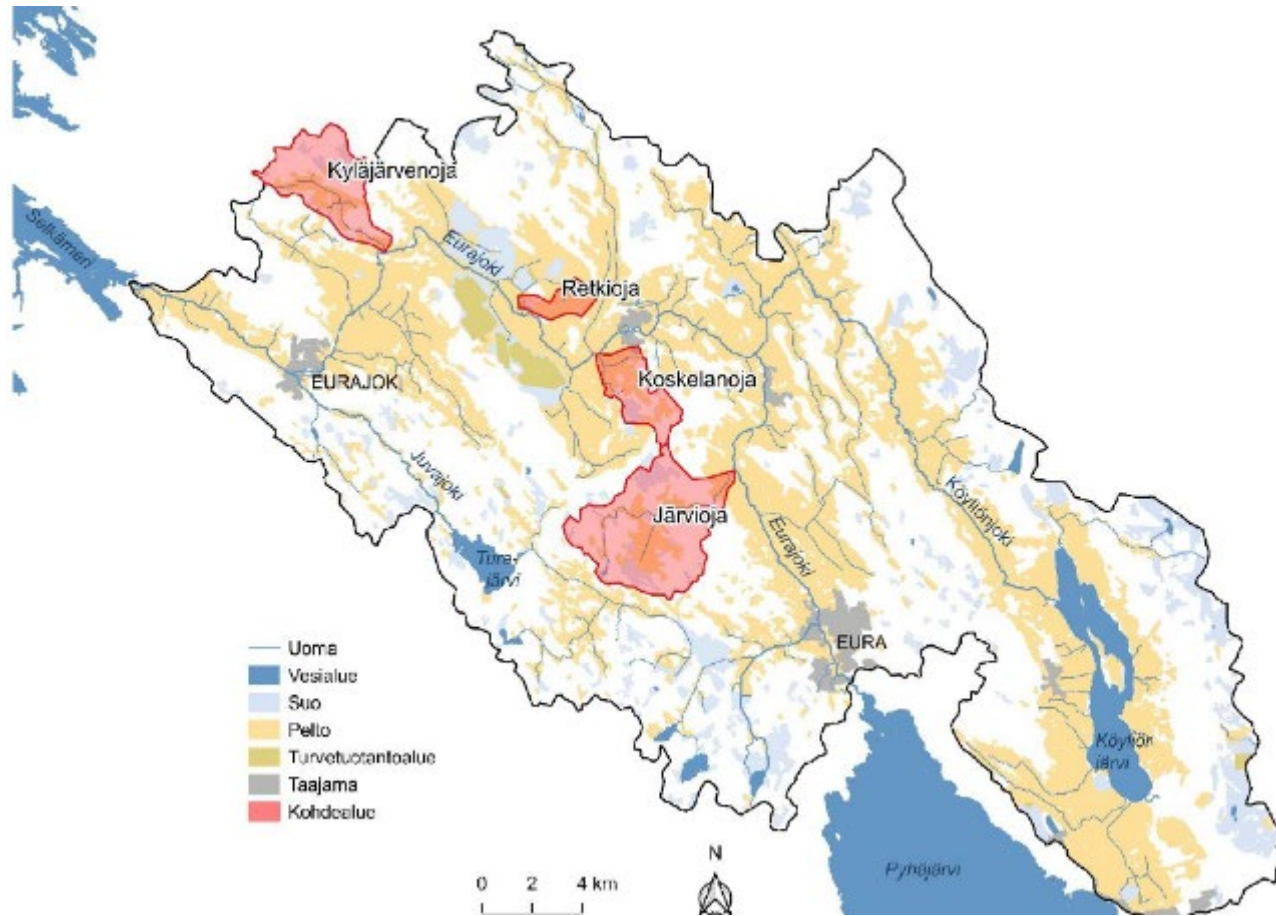
Eden, P., Boman, A., Mattback, S., Auri, J., Yli-Halla, M. & Österholm, P. 2023. Mapping, impacts, characterization and extent of acid sulfate soils in Finland. Bulletin of the Geological Society of Finland, Vol. 95, 2023, pp 135–160

The JOKIprogramme

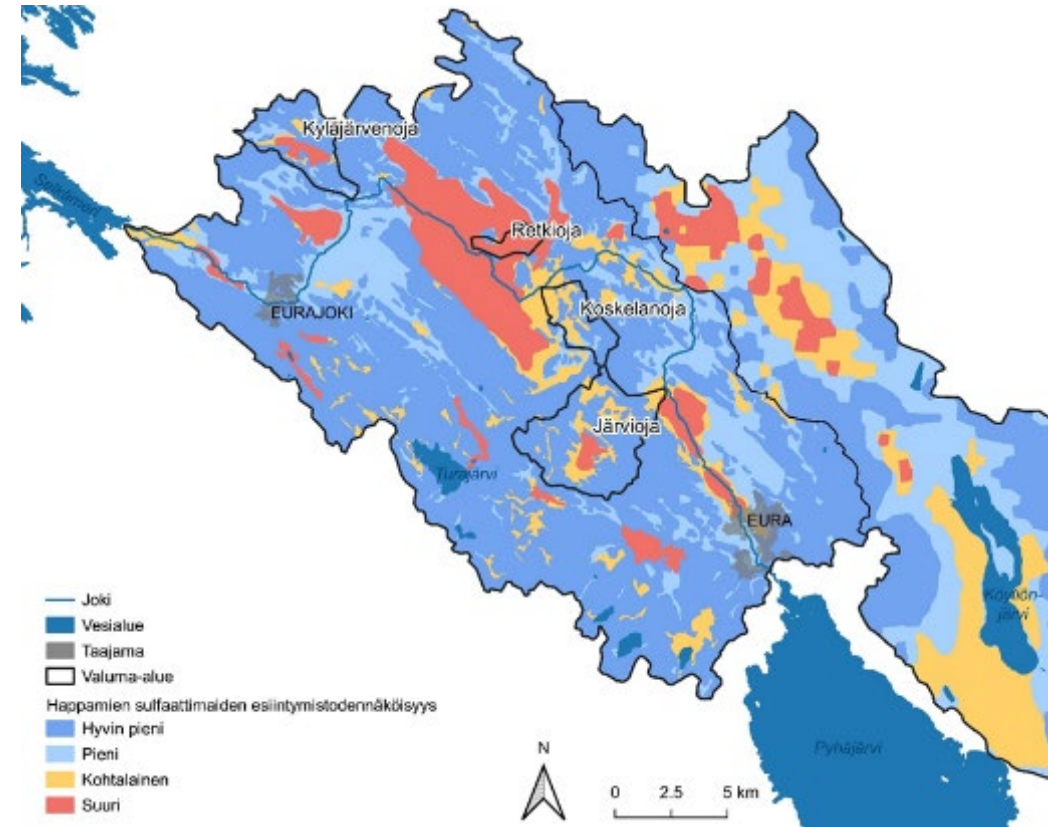


- ▶ Water protection programme that covers the river Eurajoki drainage basin
- ▶ AS-soils as one of the focus areas in strategy
- ▶ Water quality control since 2017
- ▶ Results used as basis for HAPPASU-project

Drainage water monitoring



- ▶ Project time: 12.4.2022 – 31.10.2024
- ▶ Project management: Pyhäjärvi institute
- ▶ Budget: 214 175 €
- ▶ Background: Acid and metal loading from acid sulfate soils is one of the most significant factors deteriorating the water quality of the Eurajoki River
 - fish deaths & effects on fish fry production
 - The chemical status is worse than good because of high Ni-concentration
- ▶ Project objectives:
 1. Reduce the impact of acid sulphate soils on the water quality and biocommunity of the river Eurajoki
 2. Produce a risk management plan to reduce the environmental damage caused by sulphate soils in the subcatchment area of Retkioja
 3. By means of pilot projects and advice, raise awareness about acid sulphate soils and the strategies of risk management.



Acid sulfate soil probability of occurrence in Eurajoki drainage basin (Source: GTK).

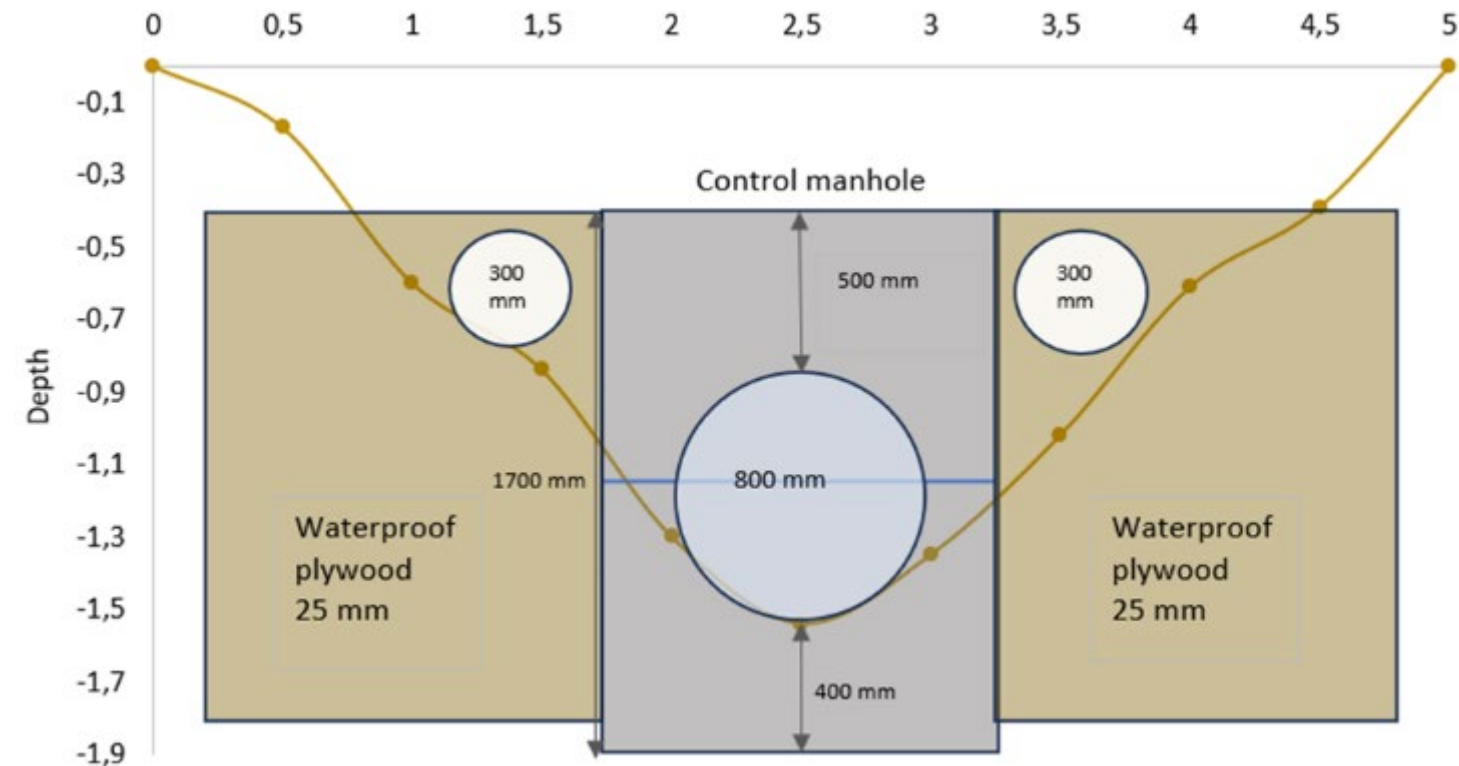
Targeted risk assessment

- ▶ Drainage water monitoring:
 - ▶ Water samples
 - ▶ pH ja electric conductivity measurements
- ▶ Further mapping of AS-soils
 - ▶ Soil sampling from fields 0-3 meters
 - ▶ Analysing depth of oxidized horizon
 - ▶ Analysing potential sulfidic acidity
 - Potential risk

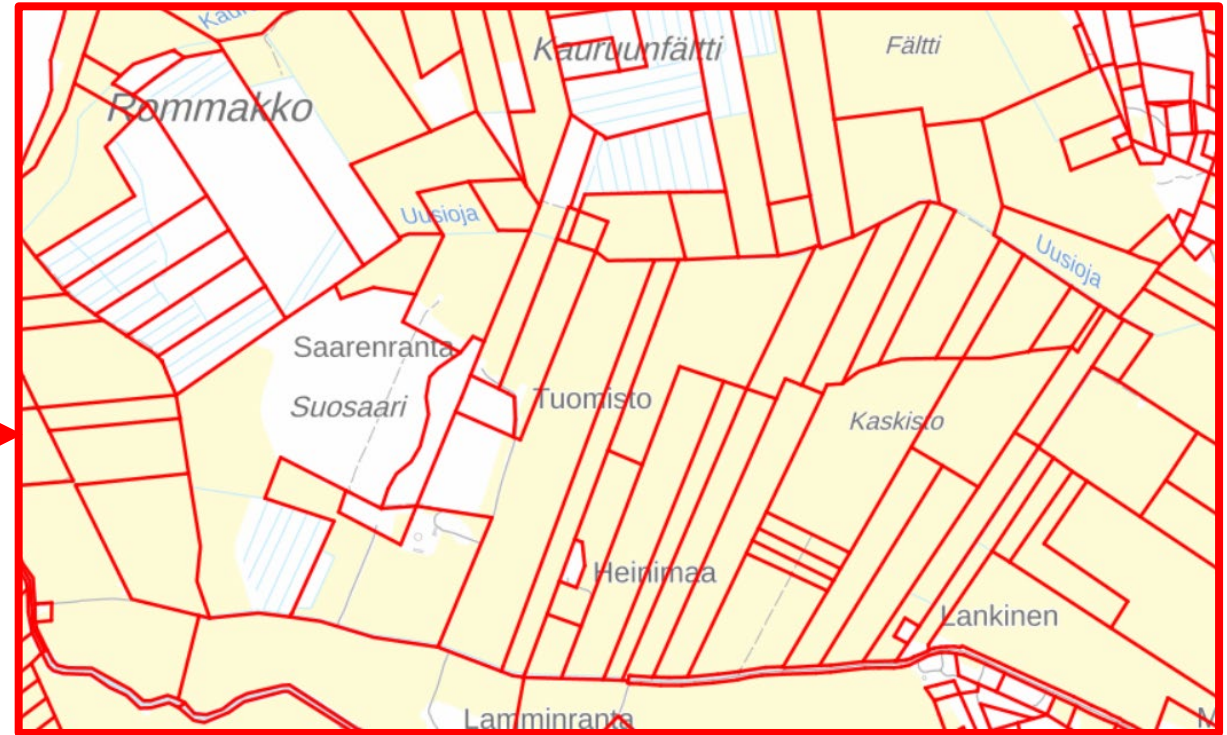
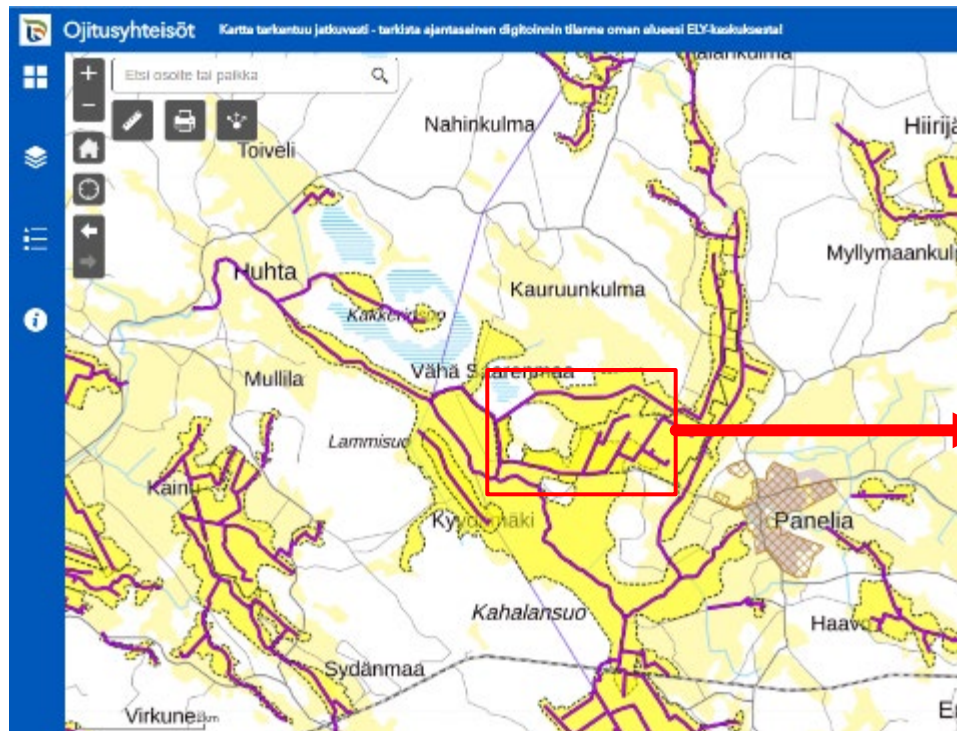


Pilot projects

- ▶ Controlled drainage system
- ▶ Drainage water neutralisation: coarse (5-35 mm) limestone



Risk management plan 1/2



Risk management plan 2/2

► Introduction

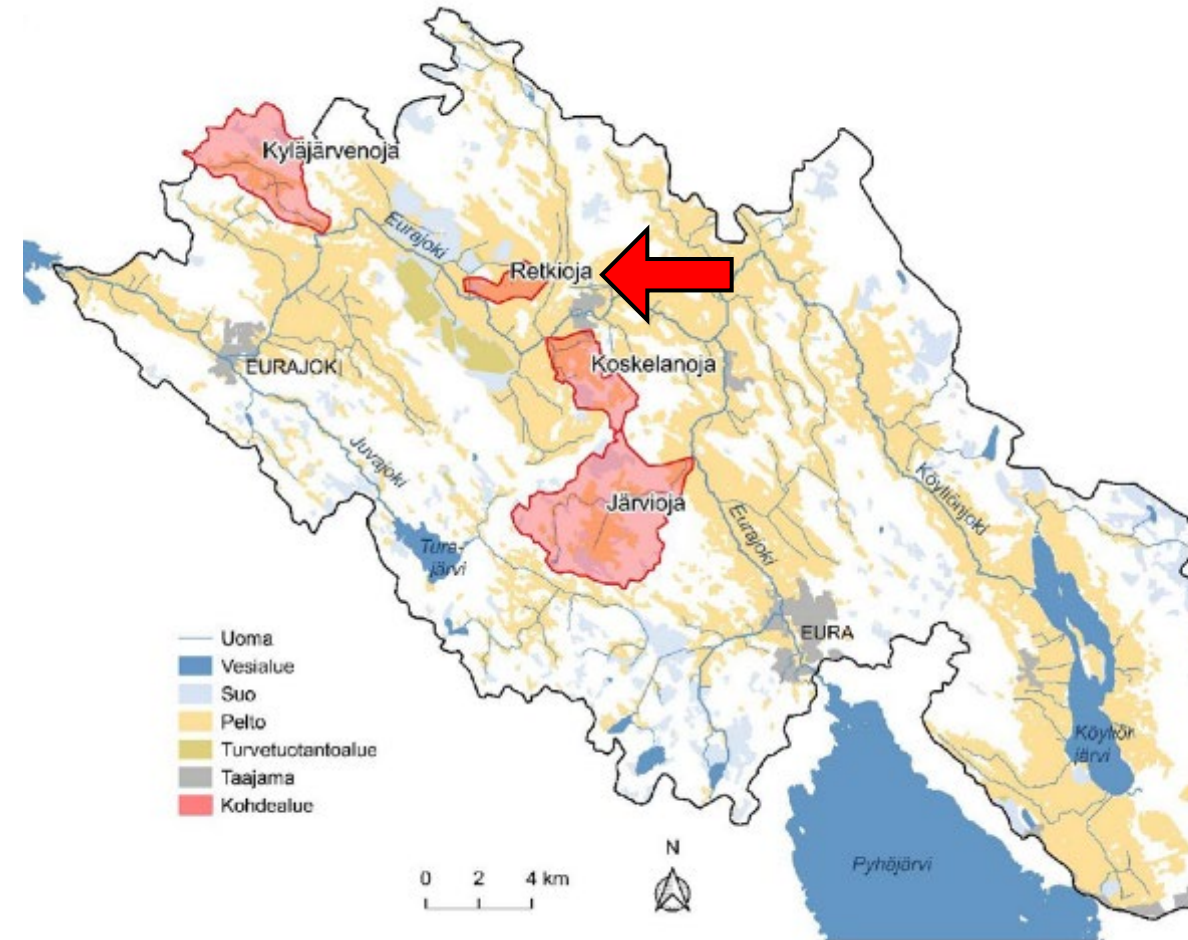
- Formation of AS-soils
- Distribution of AS-soils in river Eurajoki drainage basin
- History of land use
- How does changes in climate and weather affect the risks from AS-soils
- Data from drainage water control and soil analyses

► Describing Retkioja drainage basin

- Drainage association
- Distribution of AS-soils
- Recognising risks

► Risk management

- General advice
- Water management plan



Future monitoring

- ▶ Drainage water control: new monitoring point for the future
- ▶ Soil monitoring



Level = water level (cm)
ECW = water electric conductivity (mS/cm)
ECS = soil electric conductivity (mS/cm)
TW = water temperature (°C)
TS = soil temperature (°C)
VWC = soil water content (l/m³)

5

Liquid Level LL-2
Level, TW

1

Aqua Guard AQ-2
Level, ECW

3

Soil Guard SQ-9
ECW, ECS, Level, TW,TS VWC



2

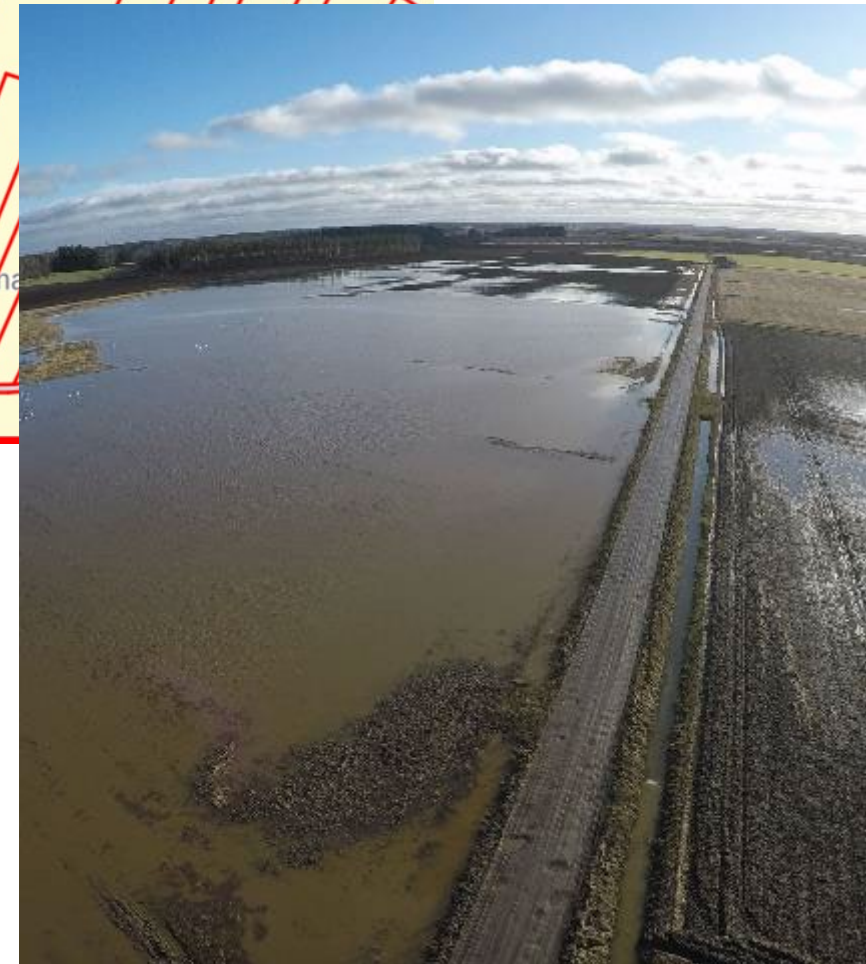
Aqua Guard AQ-2
Level, ECW

4

Soil Guard SQ-9
ECW, ECS, Level, TW,TS VWC

How to succeed?

- ▶ Do not hesitate to contact the landowner
 - ▶ Discuss even small details with interested parties. Trust is easily lost.
- ▶ Put yourself in landowner's shoes. What questions would you like to have answers to? What would make you hesitate?
- ▶ Be prepared! Make sure you know the objectives, benefits and risks.
- ▶ The benefits to landowner
 - ▶ Be clear with the facts
 - ▶ Be open about possible risks → have a plan on how to manage risks
- ▶ You should never be in too big a hurry to exchange few words.
 - ▶ Meeting landowners in person build the relationships and cooperation.



Good practices in landowner cooperation

- ▶ Make use of the contacts you already have
 - ▶ Communicating information to key figures in the area is an effective way to spread information on eg. seminars.
 - ▶ The most effective way to reach people is when landowners share good experiences to their peers.
- ▶ Don't neglect to use more traditional channels of communication
 - ▶ You can't reach everyone by social media
- ▶ Know when to let things be
 - ▶ If the initial reaction is highly critical and negative it is unlikely that you can change that
 - ▶ Be sensitive and have empathy: recognize situations where anything extra to think about is too much to deal with
- ▶ Schedule enough time and contact interested parties early in the project
 - ▶ Note the busy seasons eg. sowing and harvest times
 - ▶ Short term leases, estates, local drainage associations etc.



HAPPAMIEN SULFAATTIMOIDEN PAREMPAA VESIENHALLINTAA

HAPPASU -hankkeen loppuwebinaari

29.10.2024

klo 13-15.30

Katso lisätietoja ja ilmoittaudu mukaan:

pyhajarvi-instituutti.fi/tapahtuma/happamien-sulfaattimaiden-parempaa-vesienhallintaa-webinaari/



Thank you!

