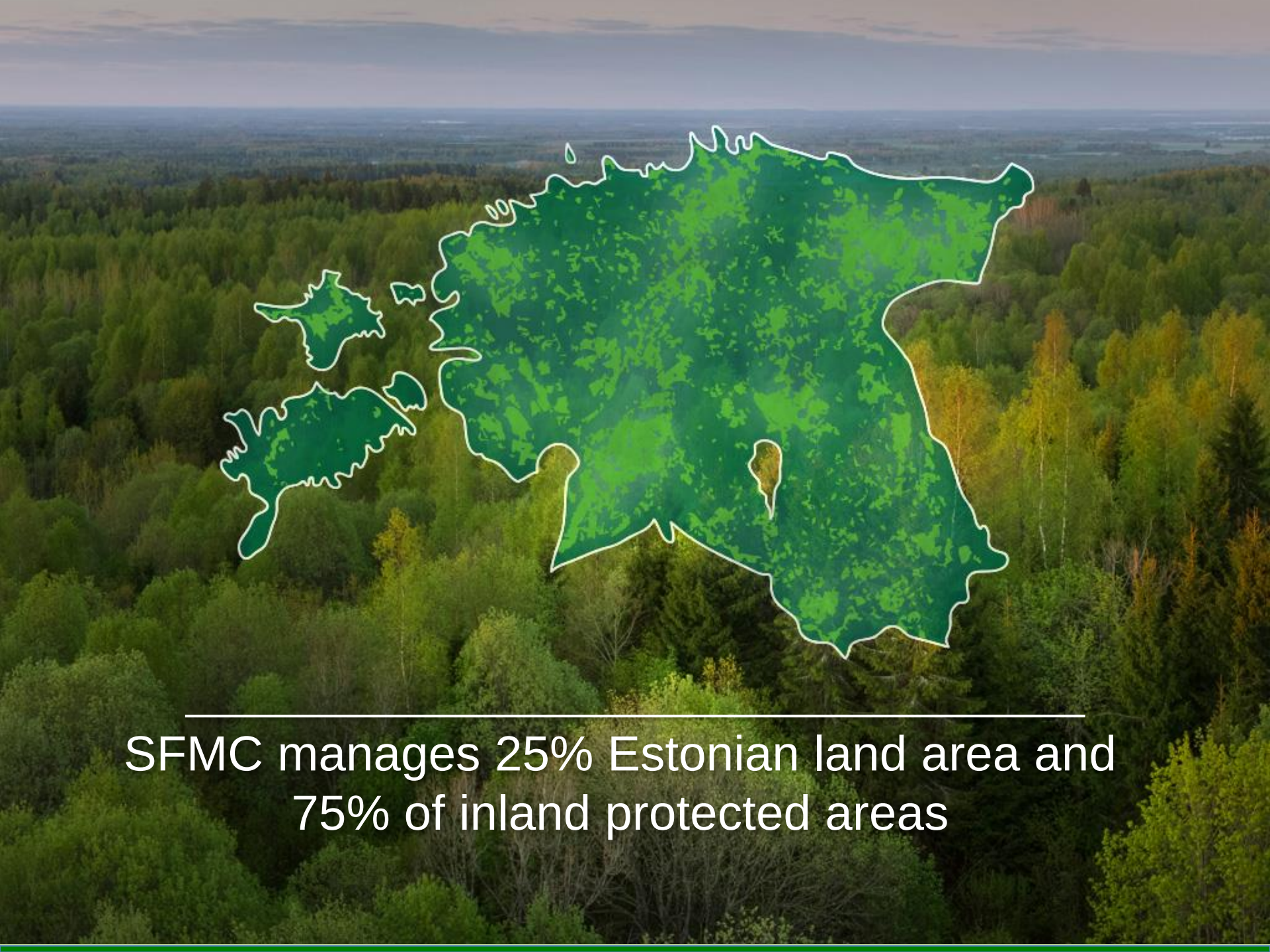
Mire (SOO) restoration in Estonia

Kaupo Kohv

State Forest Management Center



SFMC manages 25% Estonian land area and 75% of inland protected areas

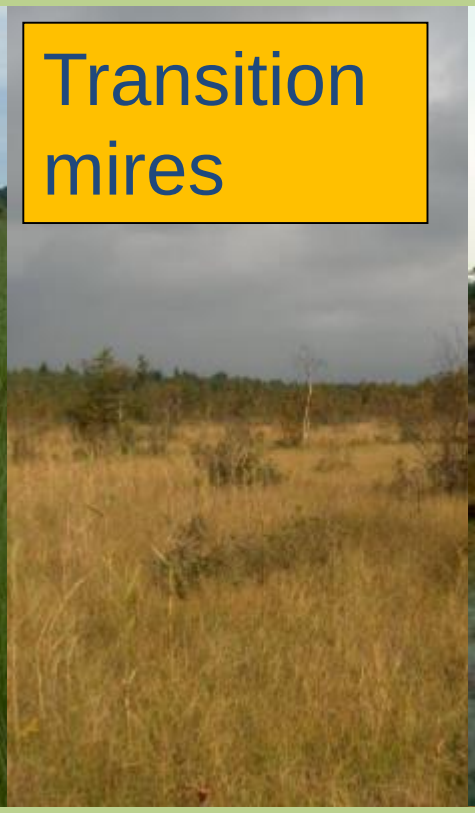
Important definitions

- **Peat** – organic substance, comprising mineral component less than 35%

- **Peatland** - all areas with some layer of peat

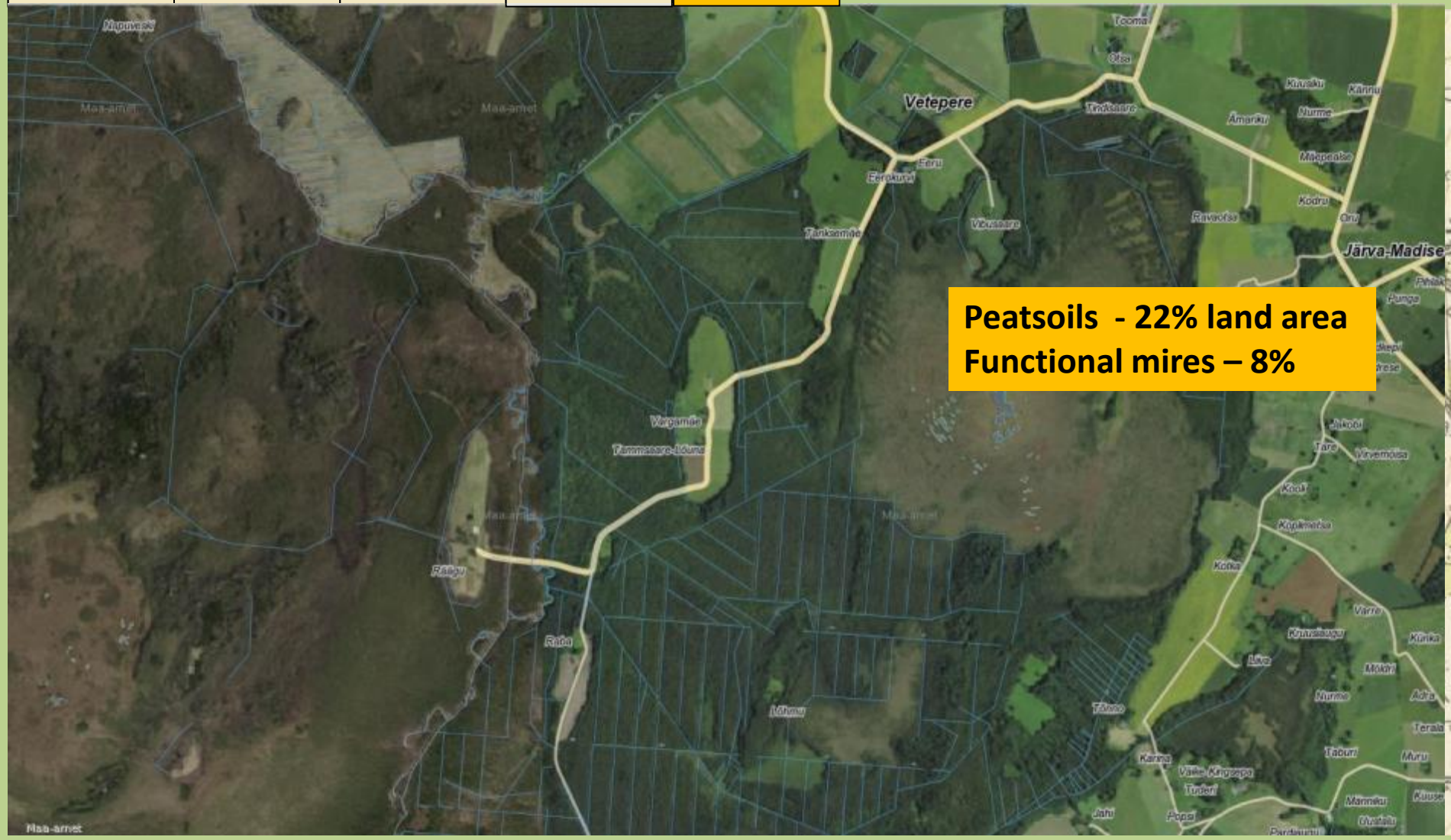
- **Mires** – peatland with more than 30 cm peat layer with active peat formation process

Main mire habitat types in Estonia



Drainage in Estonian landuse history

1915	1932	1962	1981	**1981**




1940

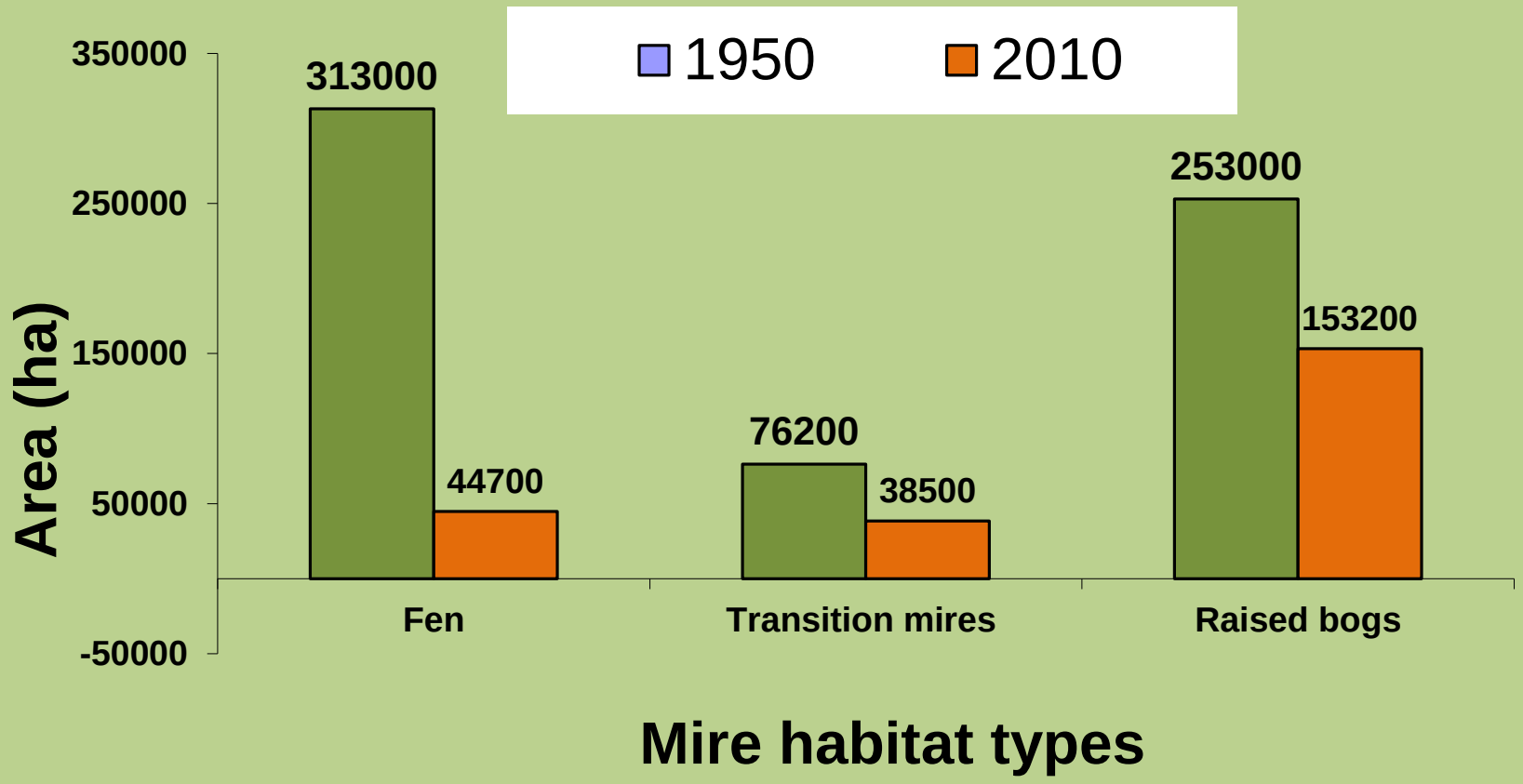

1960


1980

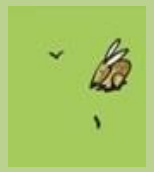

2010

The loss of open mire habitats in Estonia

1950 – 642 200 ha
2010 – 236 400 ha



Why it is important?

	Good status	Degraded	Destroyd
			
CO_2 emission			
Quality of water			
Biodiversity (habitats/species)			
Fire safe landscapes			
Stability of hydrological conditions			

Sources: *Glenk,. K., Martin-Ortega, J., Byg, A. (2017). Peatlands ecological conditions and associated benefits. Open access under the Creative Commons copyright. Piltide autor Ximena Maier.*; Fotod: Maa-amet.

Fire safe landscapes

History of mire restoration practices before 2012

Roles of institutions in restoration process

Strategic planning	Planning and implementing restoration projects	Monitoring
Ministry of Environment & Environmental Board	State Forest Management Center	Environmental Board

EESTI MÄRGALADE ÜHING

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Strategic planning

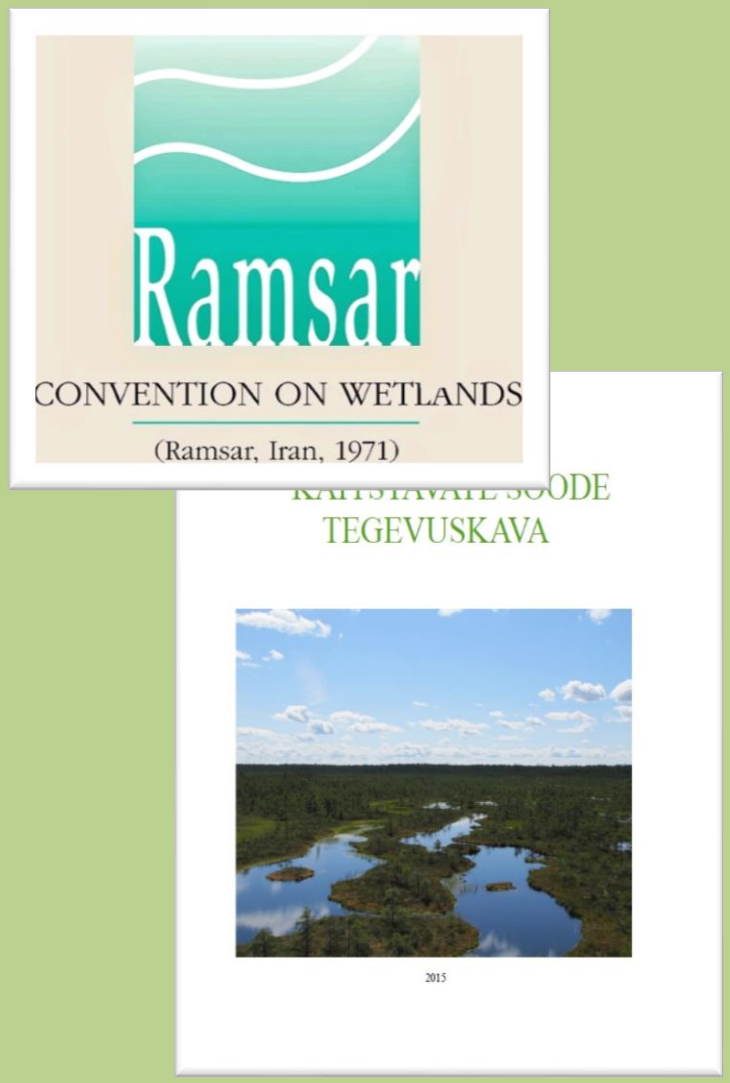
Nature Conservation Development plan 2020 (2012)

Targets:
Restoration of water regime on 10000 ha of mire habitats
Restoration of water regime on 1000 ha of former peat mining areas

Action plan for mire restoration in protected areas (2015)

Priority list of mires in need of restoration

Prioritization



- Wetlands with international importance - Ramsar sites
- Biggest mire complexies in Estonia
- Priority habitas are different fen habitats and transition mires

Site level planning and implementation

1. Describing the scope of planned actions with preliminary impact assessment

2. Going trough planning process (field works, modelling, background studies, technical writing, etc)

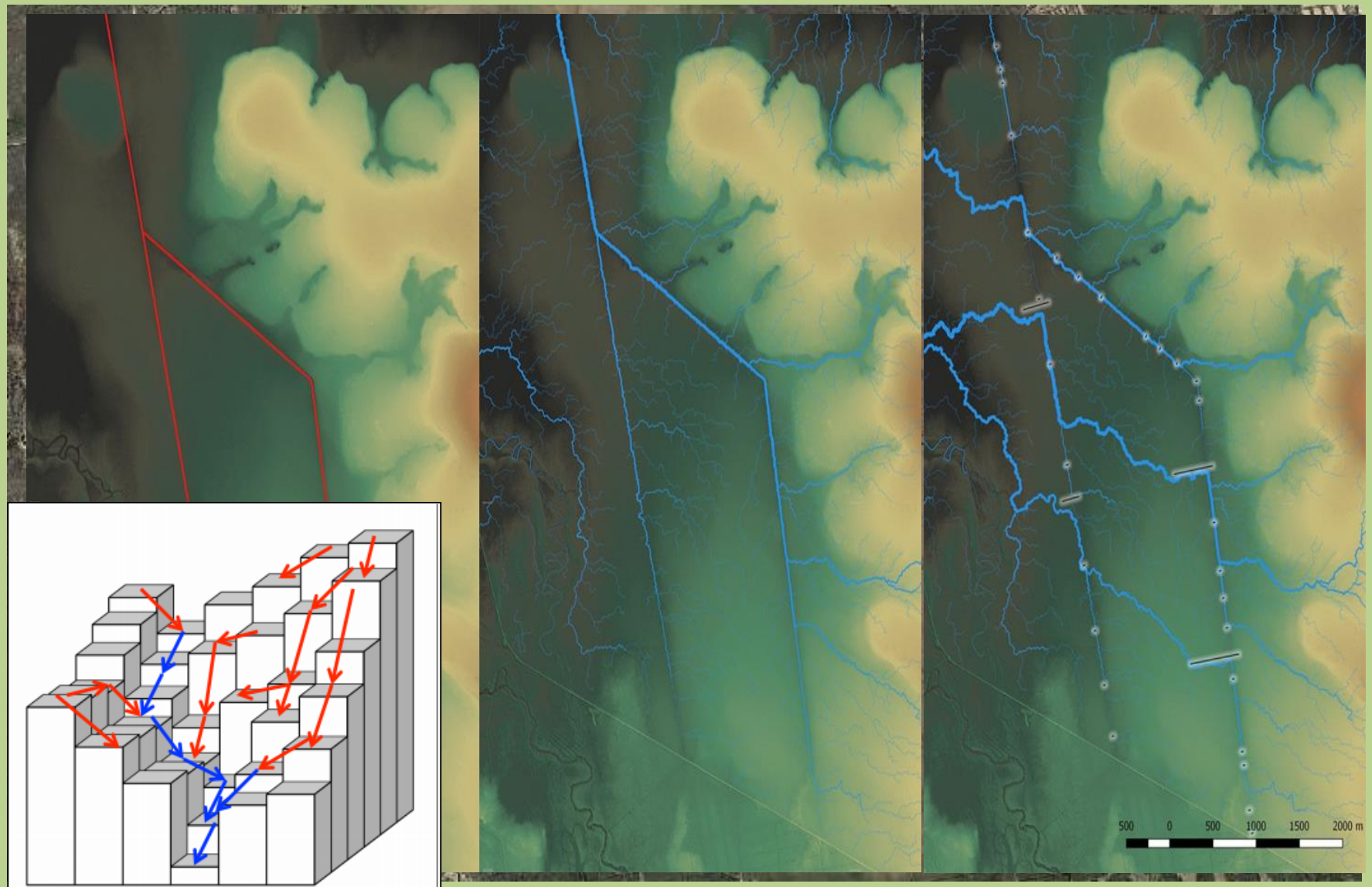
3. Implementation of project

4. Monitoring built constructions and ecological changes. Planning corrective actions if needed.

Stakeholder involvment

Ecological aspects of restoration

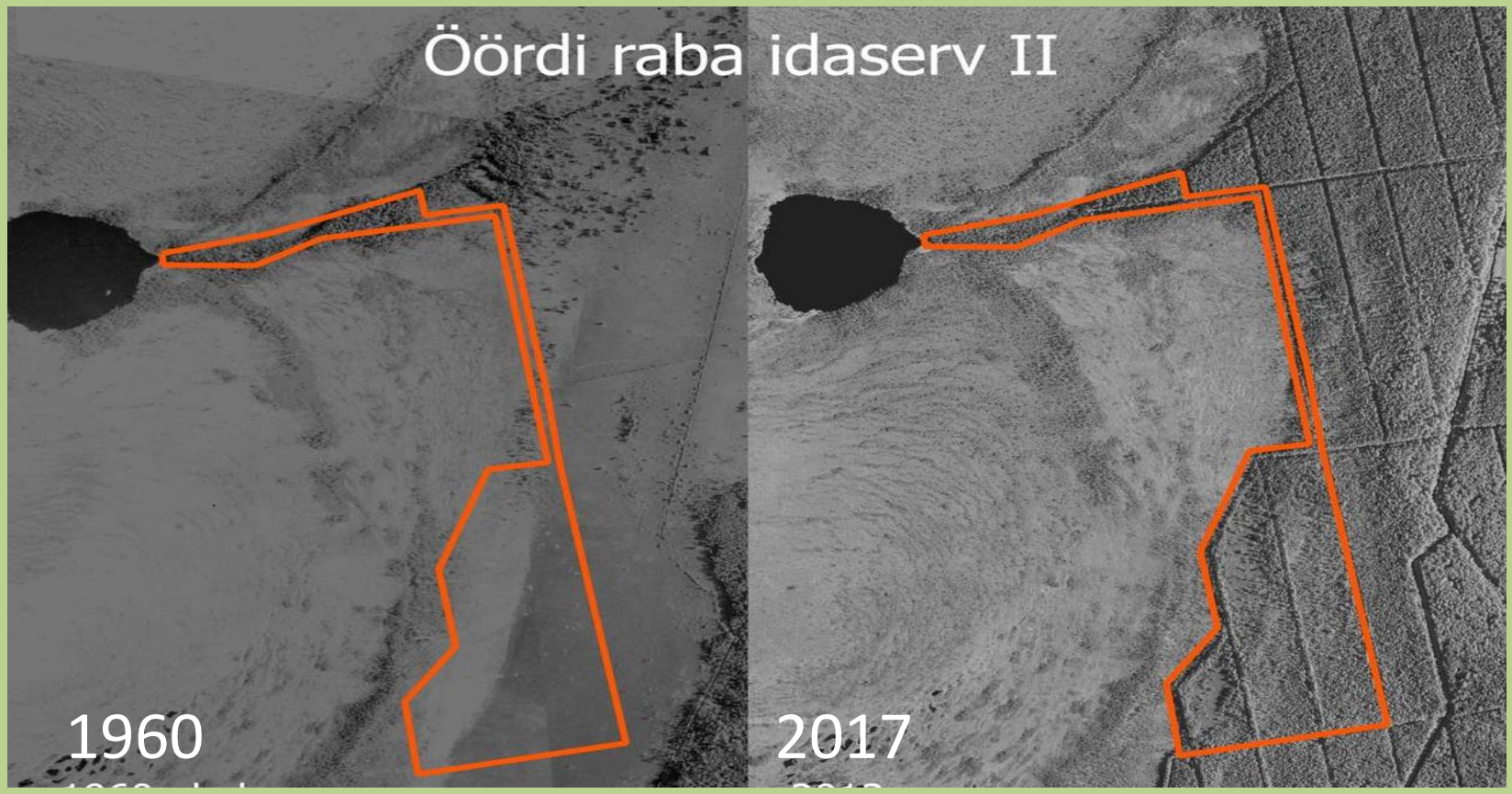
Planning for hydrological restoration



Planning for cuttings

Main input:

1) Historical aerial photos
2) Field works
3) Different inventory data about existing values

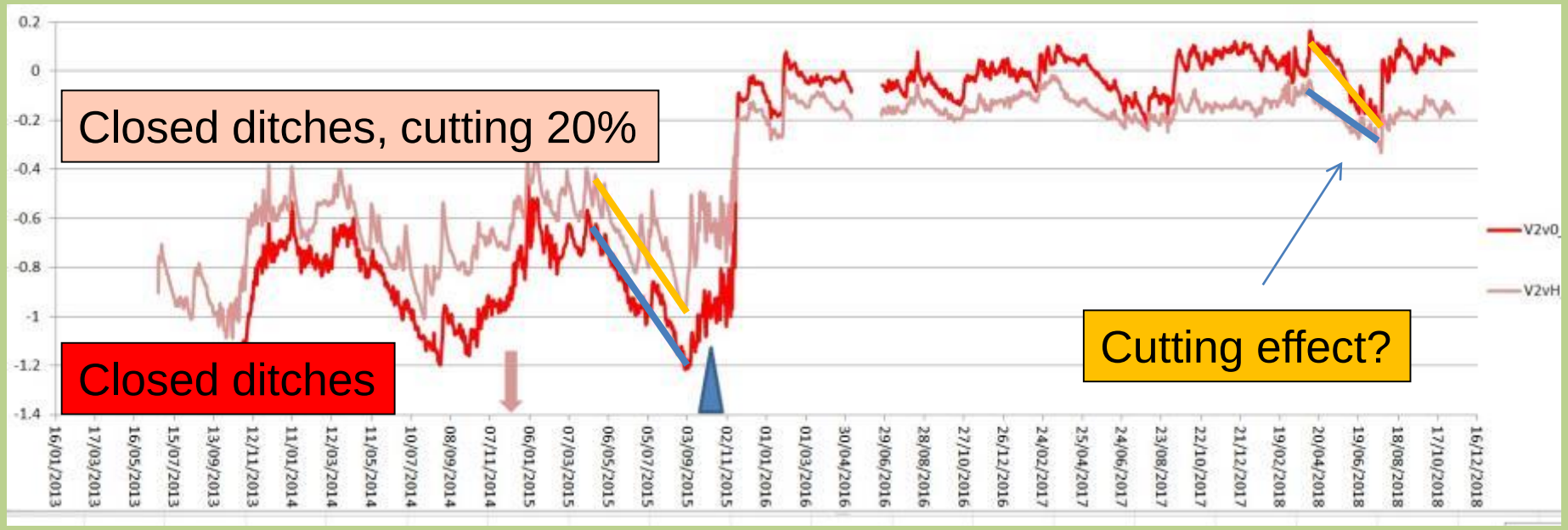


Why to cut?

1) To contribute to recovery of water table (lower evapotranspiration and less water entrapped in canopy)

2) To create suitable light conditions for open mire species

Cutting effect on water table?

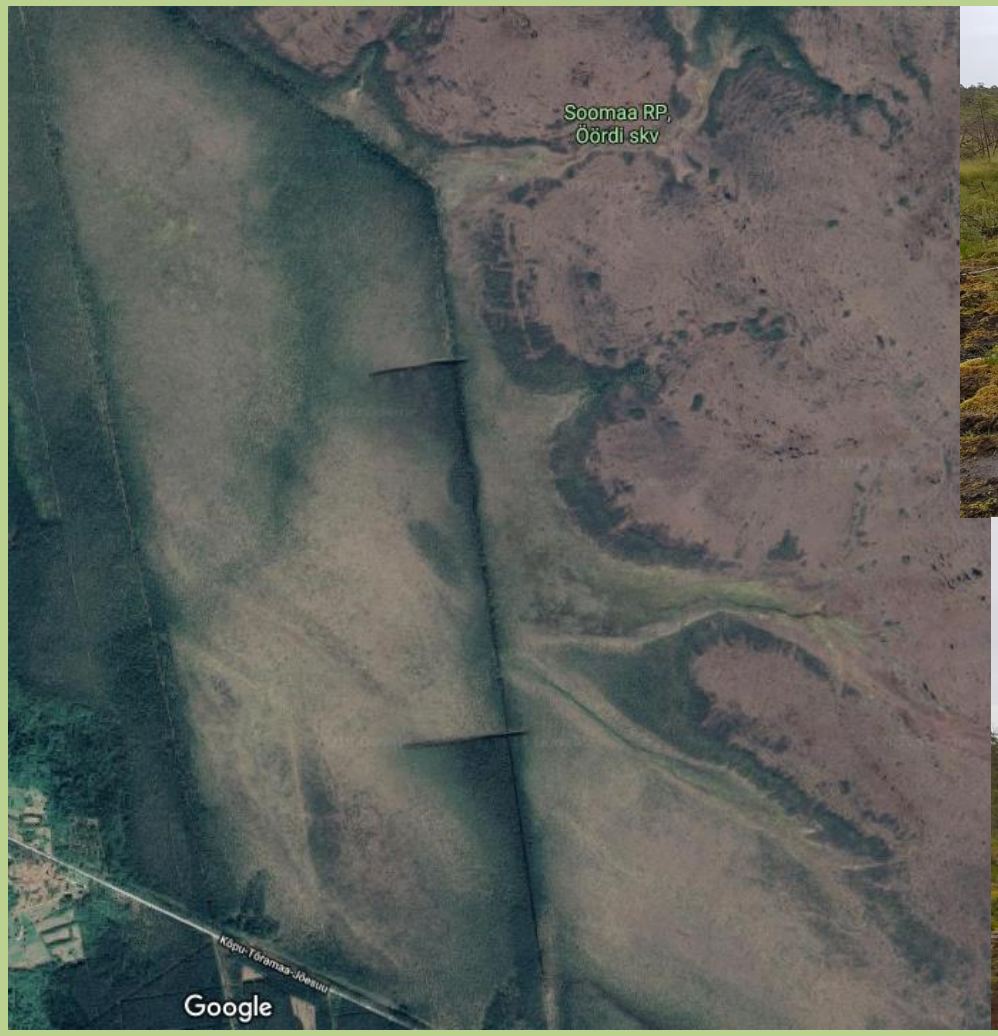


Implementation . Dams

Dams

Building plastic walls

Biggest dams



Equipment

Voluntary work camps

Dams. Failures.

Dams. Failures.

Implementation

Implementation. Cuttings.

Cuttings

Cuttings

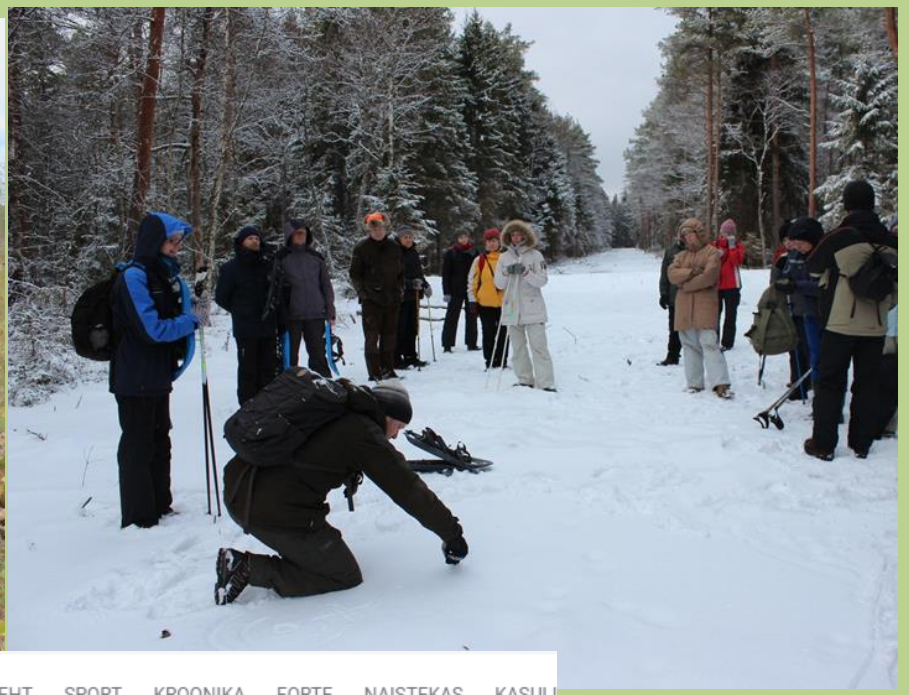
Cuttings. Failures

Costs?

Stakeholder involvement

1) **Many stakeholders**
2) **Conflict interests**
3) **Big fears**
4) **Changing context**
5) **Never enough information**

Stakeholder involment



Saarte Hä
ARHIIV

Maaomaniku
kooskõlastar
asuda taasta

AUTOR: ALVER KIVI – 03/08/2018
RUBRIIK: MAAKOND

DELFI 20 DELFI RUS ÄRILEHT SPORT KROONIKA FORTE NAISTEKAS KASULI

13.10.2019, 16:29

Kaitseministeerium hakka
taastama (16)

www.DELFI.ee

RMK looduskaitse
24. Oktoober kell 14:45 ·

👏😳Ohoo! Põhjarannik annab ülevaate Selisoo idaserva veerežiimi taastamise plaanidest!

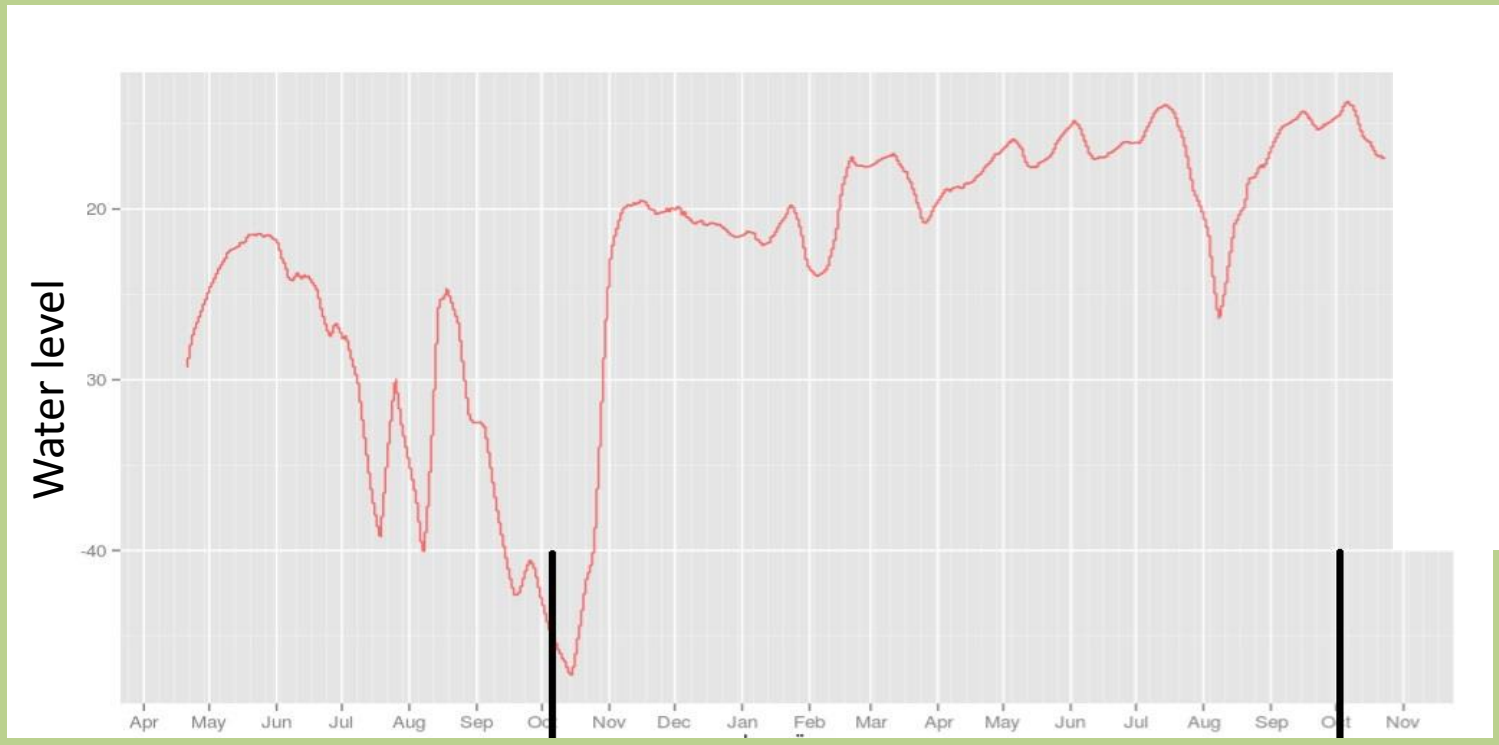
Põhjarannik
24. Oktoober kell 14:33 ·

Meeldib

Jooksu läinud vesi sohu tagasi.

Monitoring

Water table is monitored with automatic divers
Different speacies groups are monitored through general state level monitoring scheme or by project based monitoring schemes

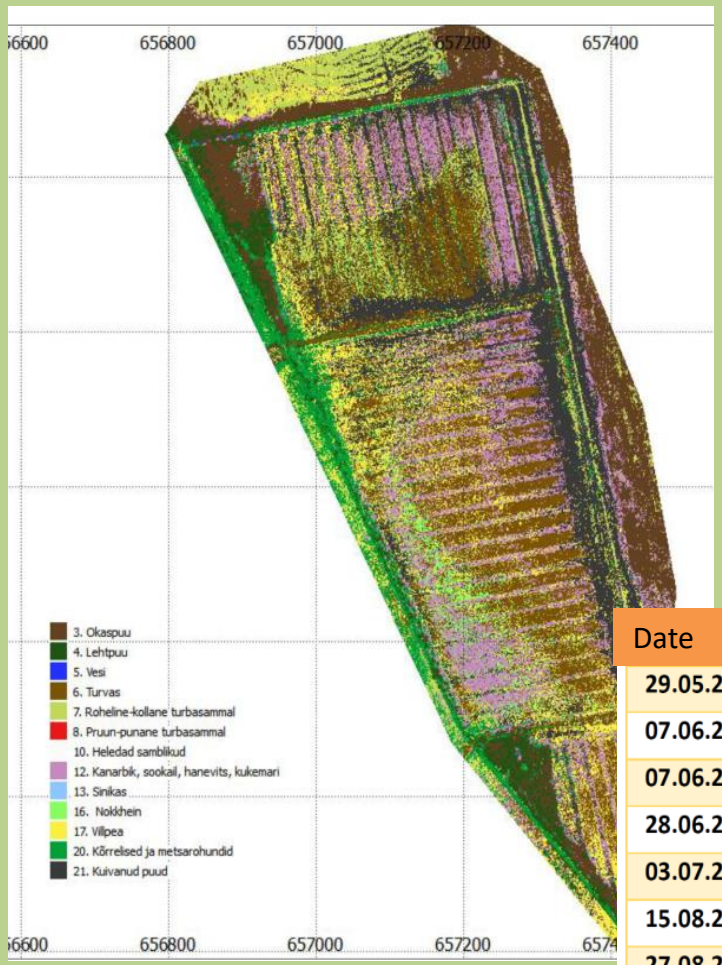


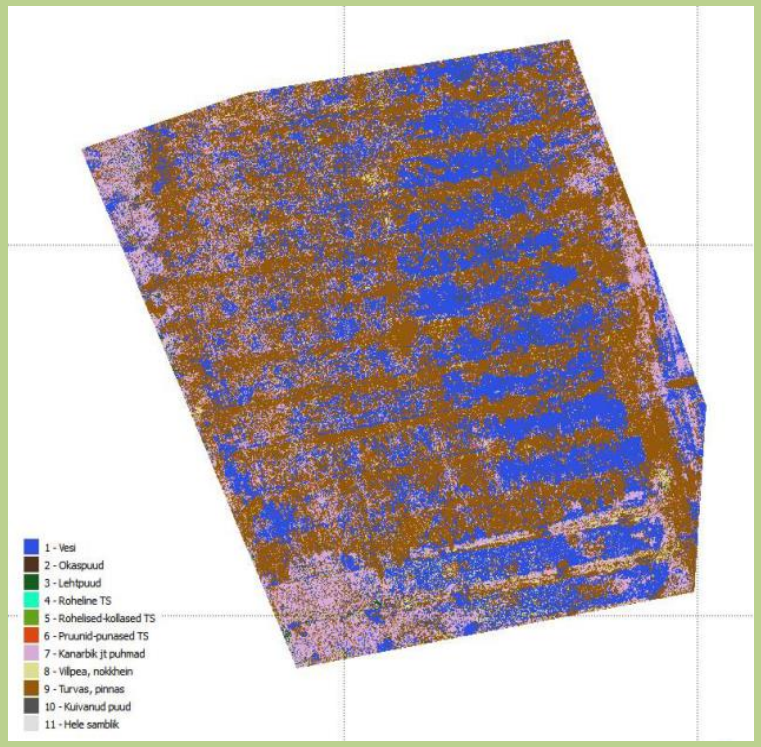
Unmanned aerial systems for monitoring

- **Platforms**
  - Multirotors
  - Fixed-wing
  - VTOL fixed wing
- **Sensors**
  - RGB cameras
  - Multispectral camera
  - Thermal + RGB camera

LIFE Mires Estonia; LIFE14 NAT/EE/000126

Results





Date	Place	Training data	Control data	Precision
29.05.2018	Soosaare (multispektraal)	1191	298	80,4
07.06.2018	Laukasoo L1 - järv	1001	251	94,3
07.06.2018	Laukasoo L2	558	139	79,7
28.06.2018	Palasi (multispektraal)	1305	327	84,3
03.07.2018	Soosaare (multispektraal)	1117	278	86,4
15.08.2018	Palasi	1126	281	89,4
27.08.2018	Ohepalu Mädajärv	531	135	94,7
27.08.2018	Ohepalu Udriku	720	178	90,3
08.10.2018	Palasi	288	72	92,4
16.10.2018	Feodorisoo L1	768	192	88,9
16.10.2018	Feodorisoo L2	715	178	90,5

3D models for implementation monitoring

Mire habitats where retoration actions has been finished

Lessons learned

- Strategic planning phase is very important.
- Modelling is very cost-effective method.
- Peat dams and „filling back“ is most effective method for restoring the hydrology.
- Cuttings should be avoided if there are risks related with effectivness of hydrological restoration.
- Good planning regarding stakeholder involment is important.
- Solid support from env. authorites, eNGO-s and academia is neccessary for big projects.
- Failures will happen, it is important how quickly they are noticed.
- Site managers have to have resources for fixing errors.
- Weak monitoring concept is problematic.