

LIFE REstore improved activity data for accounting the greenhouse gas emissions due to management of wetlands

*International Conference “Degradēto kūdrāju ilgtspējīga apsaimniekošana un
ietekmes uz klimata pārmaiņām samazināšana” (Sustainable management and
reduction of impact on climate changes of the degraded peatlands)*

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Ainārs Lupiķis, Jānis Ivanovs, Toms Štāls, Andis Lazdiņš

Latvia State Forest Research Institute “Silava”

e-mail: andis.lazdins@silava.lv

The aim of the study

An aerial photograph of a peat extraction site. The site is a large, roughly rectangular area with a grid of smaller plots. The plots are colored in various shades of green, brown, and red, indicating different stages of peat extraction or different types of vegetation. The surrounding area is a mix of green fields and brown patches, suggesting a rural or agricultural landscape. The overall scene is captured from a high angle, providing a clear view of the site's layout and its integration with the surrounding environment.

To provide improved activity data for accounting greenhouse gas emissions from managed wetlands, particularly, to evaluate status of peat extraction sites to avoid double accounting of emissions from soil.

Input data and software tools

Forest inventory database
(updated in 2015)

Land-parcel identification
system (LPIS, updated in
2016)

Vectorized topographic
map (1:10000, updated in
2016)

Landsat satellite image
series from 1990

Sentinel II satellite image
series from 2016

Software tools – QGIS,
Grass GIS and SAGA GIS

Map of peatlands
digitalized within the
scope of the European
Regional Development
Fund project

Digitized maps of peat
extraction licence areas
provided by LEGMA

Aerophotographs
provided by LGIA from
2nd to 5th cycle (2003-
2015)

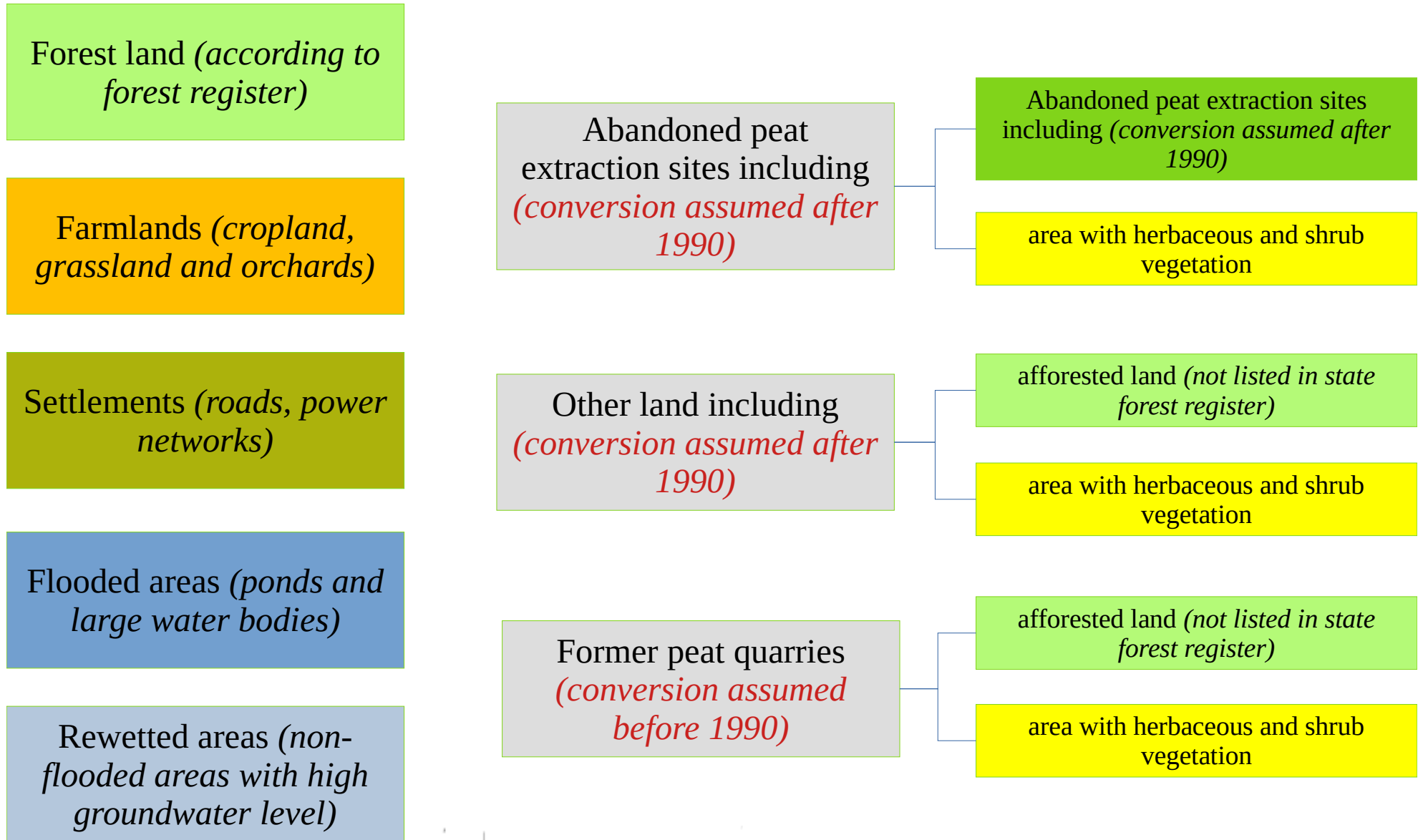
Data processing procedure (1)

- Creation of **spatial layer of peat extraction sites** using digitized information on peat extraction licences, expert judgement, Landsat images and aerophotographs to identify peat extraction sites outside licence areas.
- Visual identification of areas extracted using **milling and digging method** (and areas where the method can't be identified).
- Calculation of NDVI using Grass GIS for Sentinel II satellite image series and **separation of woodlands from other lands**.
- Identification of **forest land** (according to state forest register), **cropland, grazing land and settlements** using existing spatial data.

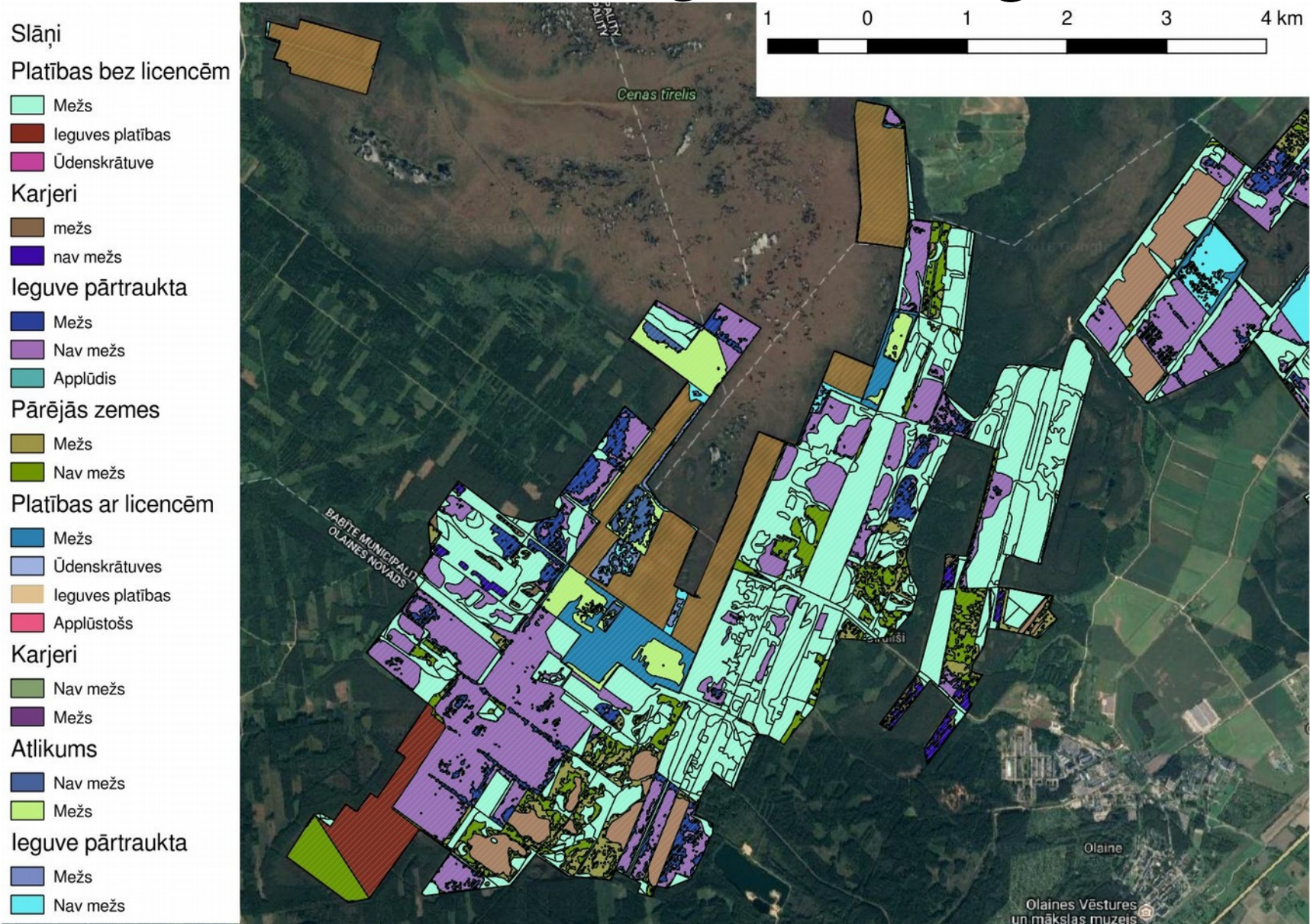
Data processing procedure (2)

- Visual identification (aerophotographs, 4th and 5th cycle) of **water regime** (flooded, rewetted and dry or drained areas).
- **Active peat extraction sites** are separated using existing licensing data and manual inspection.
- Non-flooded, rewetted or active peat extraction areas are split into **woodlands and non-forest lands**.
- Woodlands with area less than 0.1 ha are moved to non-forest land.
- After intersecting geometry of obtained plots were checked and corrected and all polygons are merged together to obtain corrected total area.

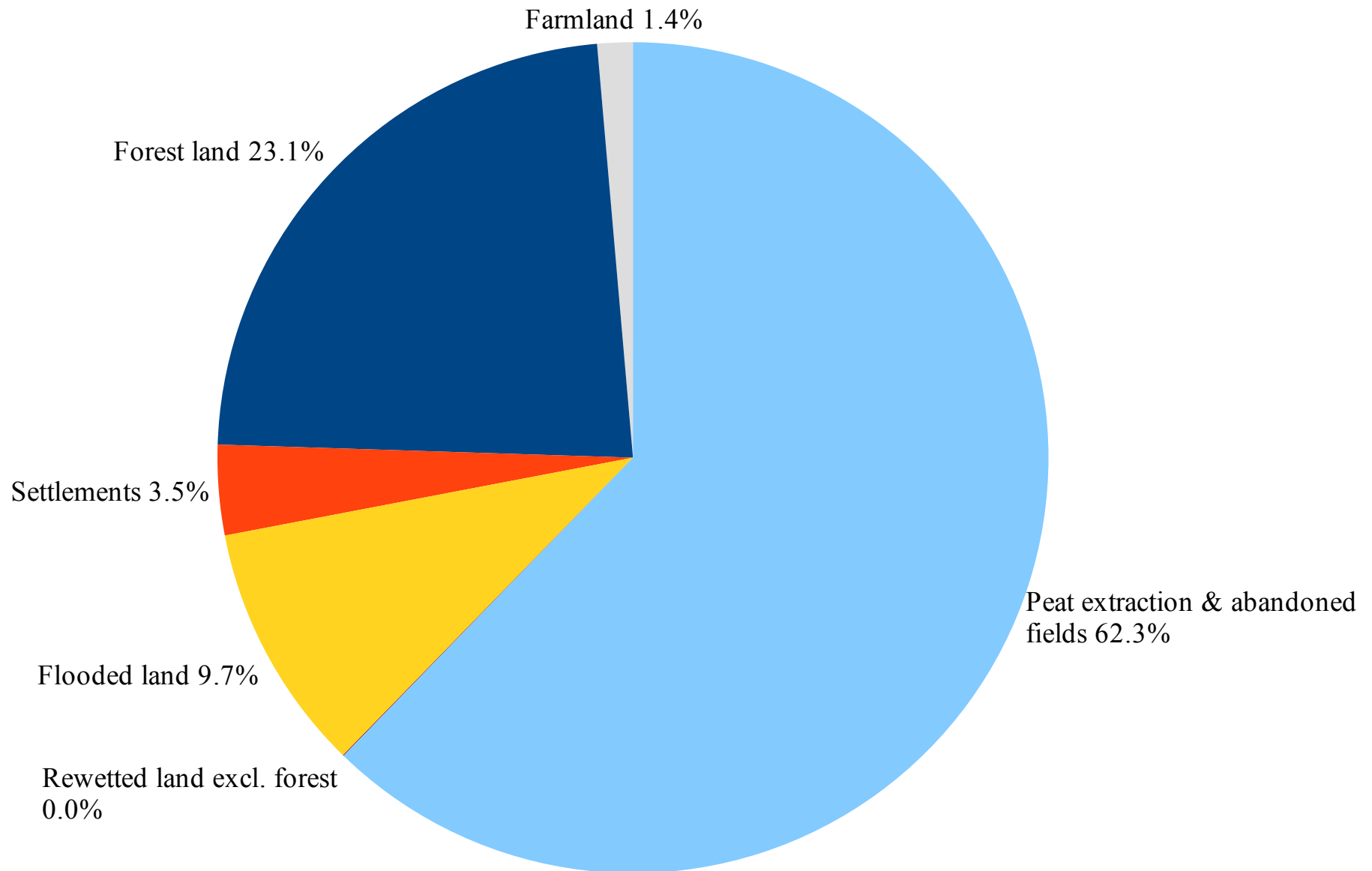
Identified land use categories



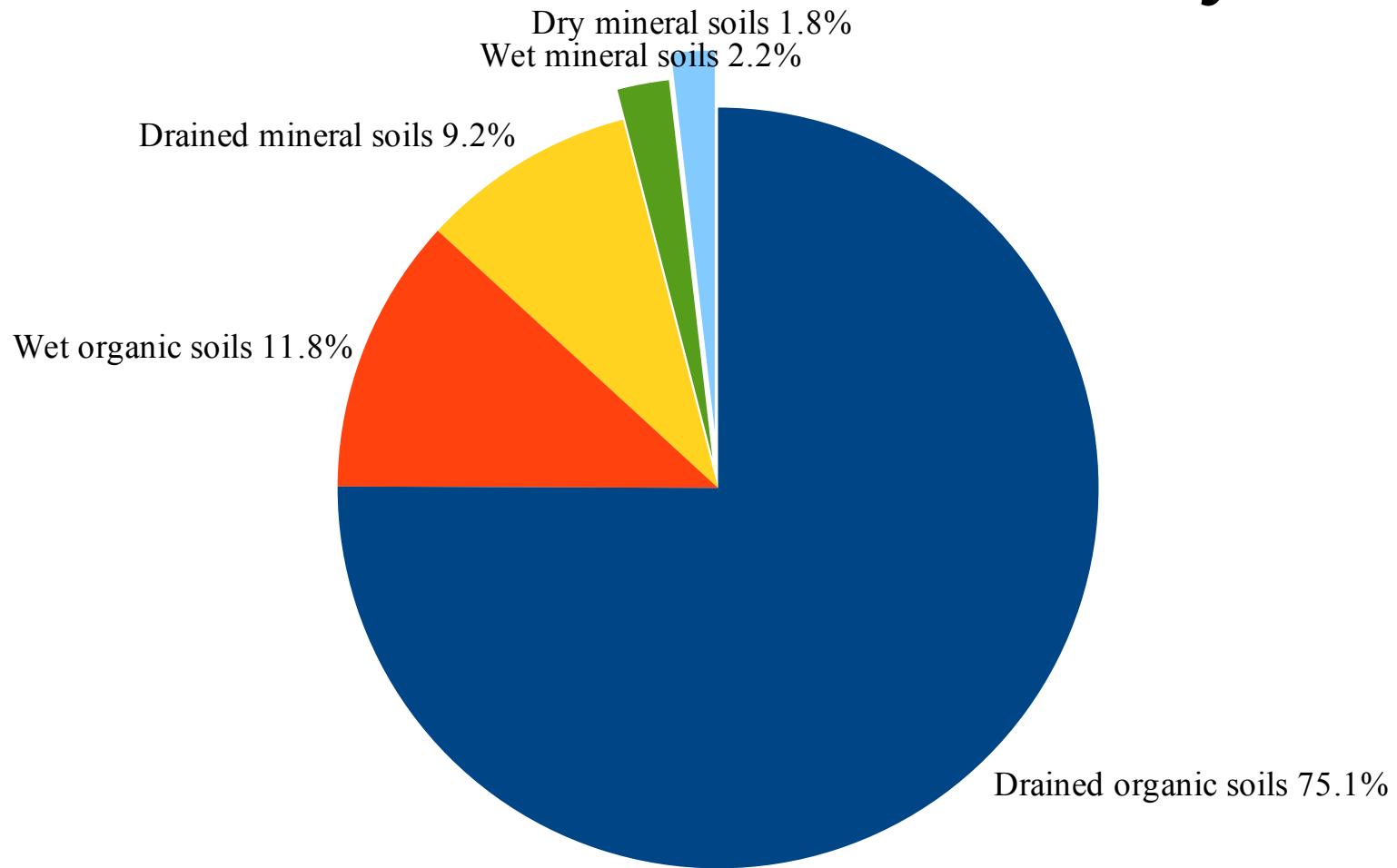
Example of land use classification in *Cenas bog* near Riga



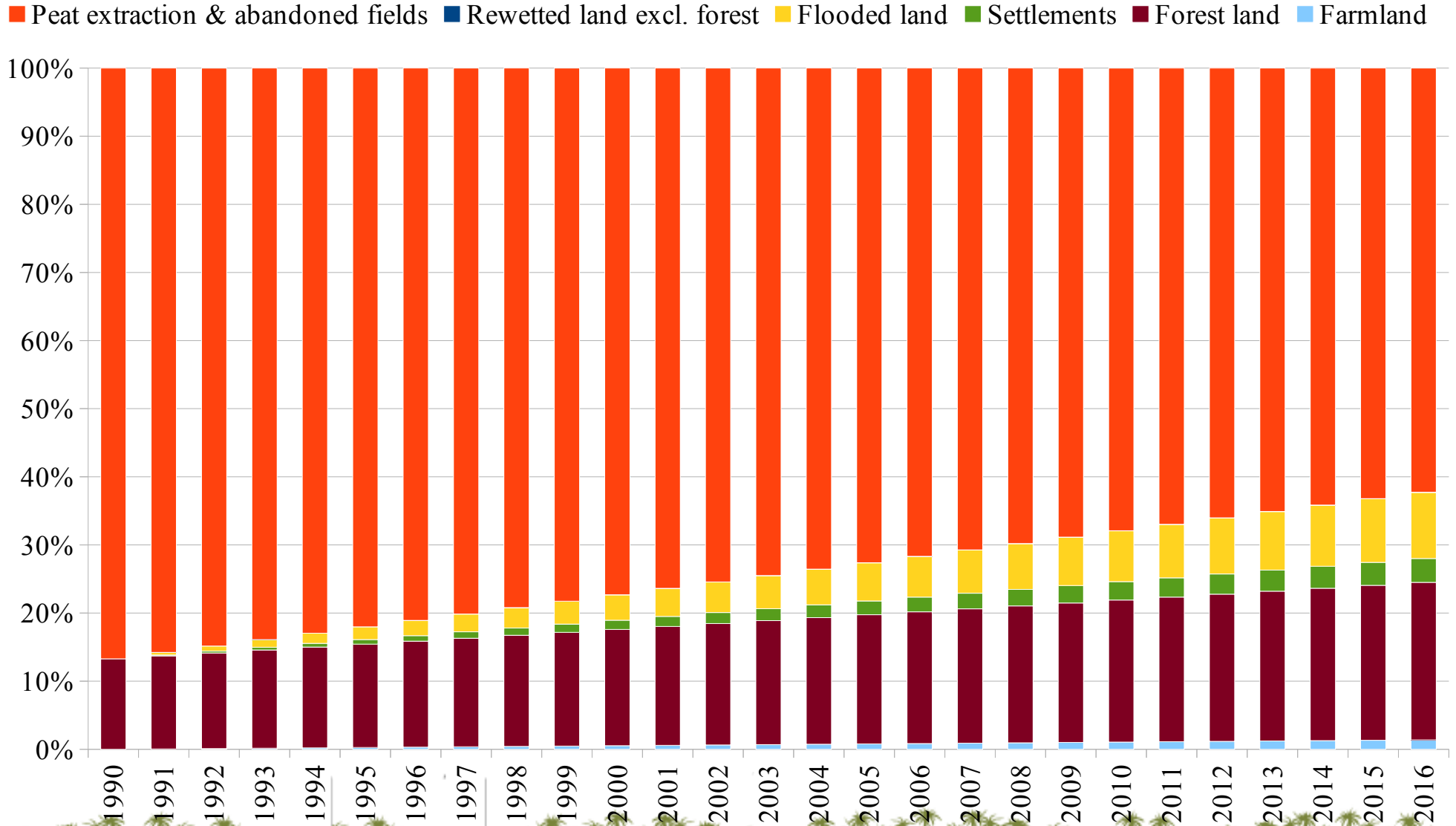
Land use in current and former peat extraction sites



Distribution of area of forests on extracted peatlands according to stand wise forest inventory



Linearised land use changes in areas used for peat extraction

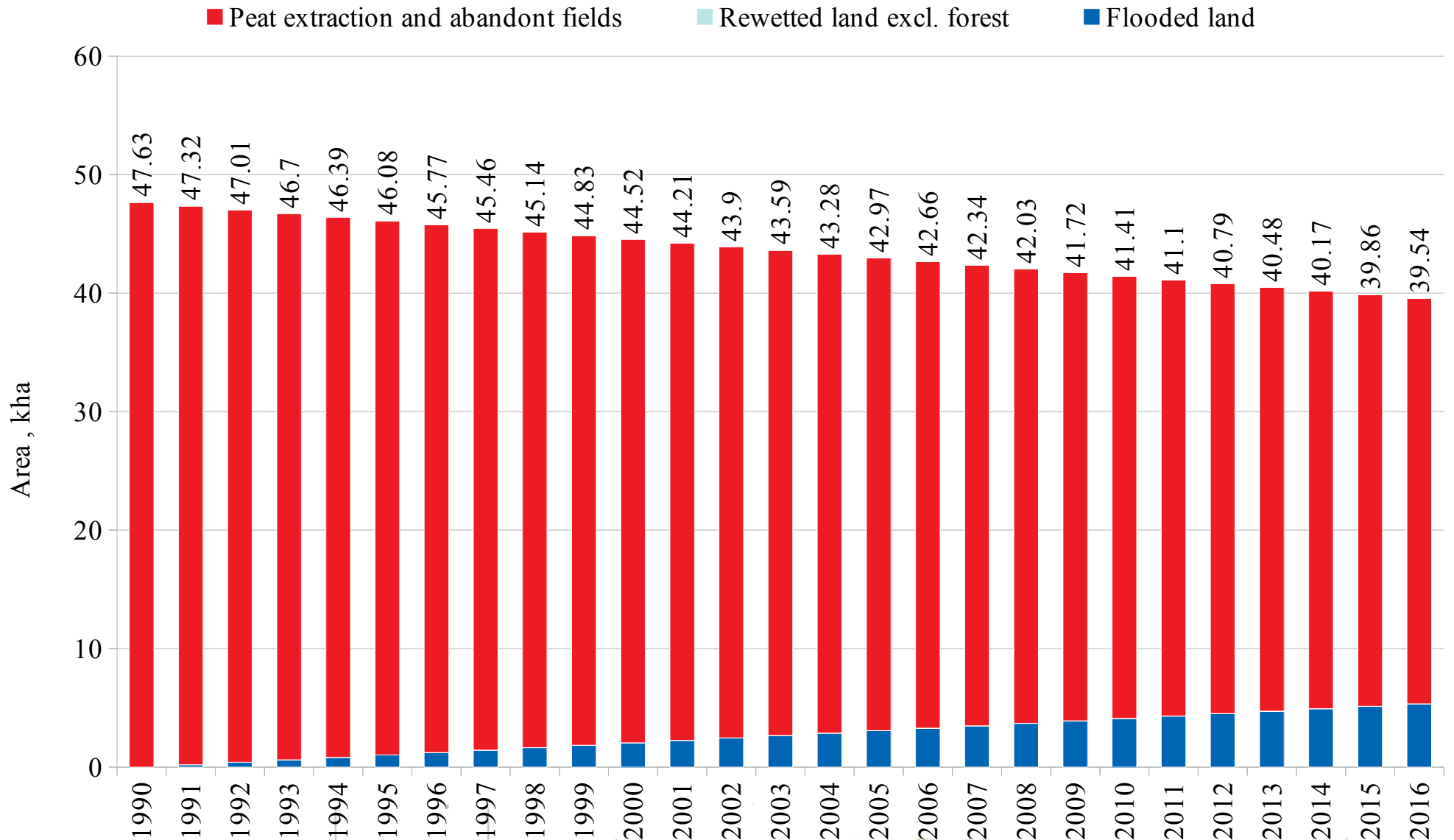


Summary of land use changes in former peat extraction sites

Land use	1990	1995	2000	2005	2010	2016
Farmland	0.0	0.1	0.3	0.4	0.6	0.8
Forest land	7.3	8.3	9.4	10.4	11.5	12.7
Settlements	0.0	0.4	0.7	1.1	1.5	1.9
Flooded land	0.0	1.0	2.0	3.1	4.1	5.3
Rewetted land excl. forest	0.0	0.0	0.0	0.0	0.0	0.0
Active peat extraction & abandon fields	47.6	45.1	42.5	39.9	37.3	34.2
Total area	54.9	54.9	54.9	54.9	54.9	54.9



Area to report under managed wetlands category of the GHG inventory



Conclusions & recommendations

- The study results can be used as a land use activity data for calculation of GHG emissions in wetlands category of the National GHG inventory, including land use changes since 1990.
- Further improvements are necessary to interpolate land use change data and integrate different data sources.
- Linearised approach in calculation of emissions may result in overestimation or underestimation of GHG emissions in certain periods of time.
- Area of managed wetlands is considerably bigger than currently reported in the National GHG inventory, mainly due to abundance of abandoned peat extraction fields, which are not yet afforested.
- There is need to introduce new land use category – flooded land – into National GHG inventory and to elaborate methodology for calculation of the emissions.
- It is necessary to elaborate emission factors for nutrient-rich peat soils and to continue work on separation of nutrient-poor and rich soils.

Slāņi

Platības bez licencēm

- Mežs
- leguves platības
- Ūdenskrātuve

Karjeri

- mežs
- nav mežs

leguve pārtraukta

- Mežs
- Nav mežs
- Applūdis

Pārējās zemes

- Mežs
- Nav mežs

Platības ar licencēm

- Mežs
- Ūdenskrātuves
- leguves platības
- Applūstošs

Karjeri

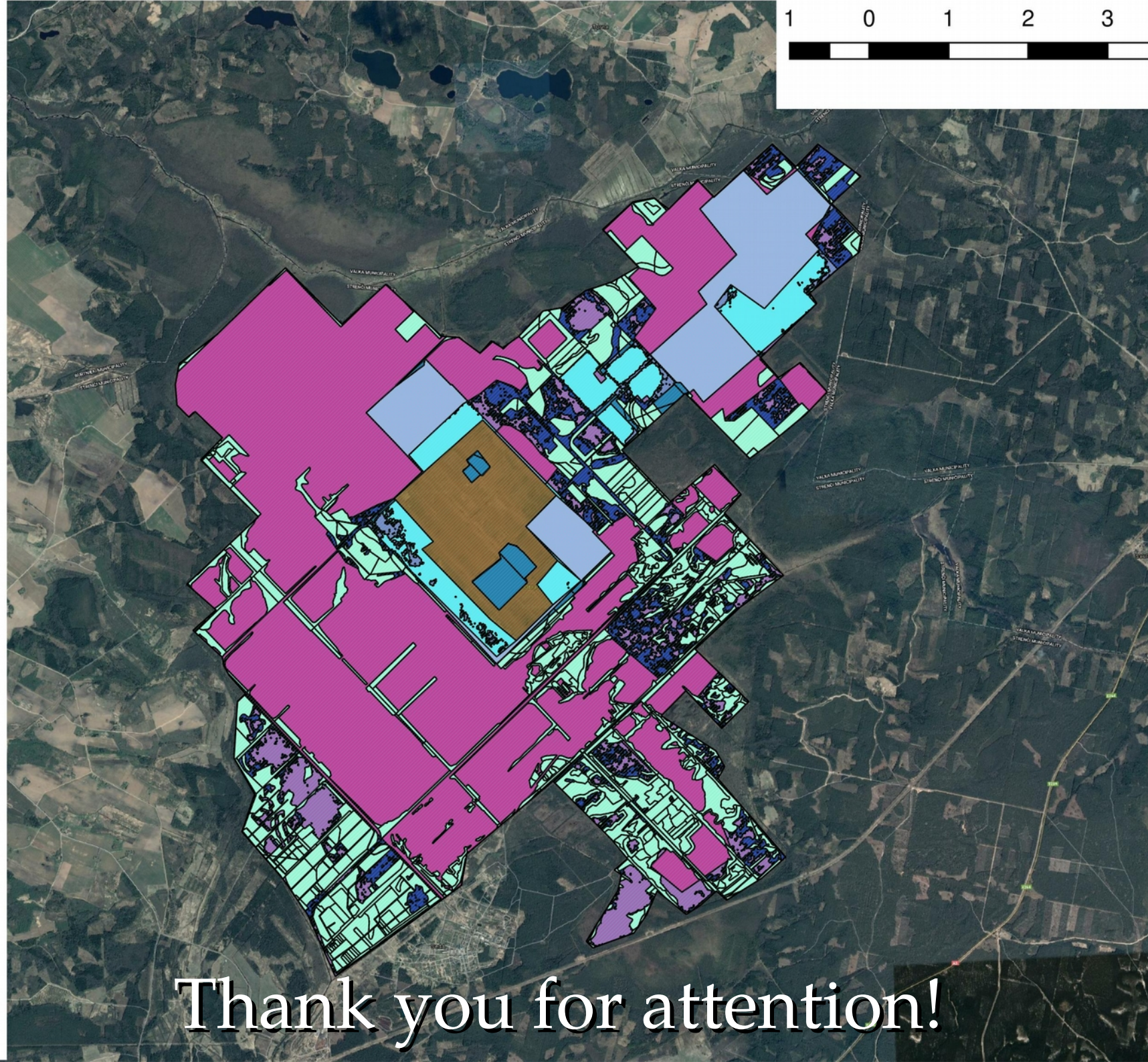
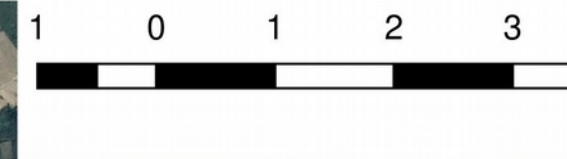
- Nav mežs
- Mežs

Atlikums

- Nav mežs
- Mežs

leguve pārtraukta

- Mežs
- Nav mežs



Thank you for attention!