

# Improved activity data for accounting greenhouse gas emissions due to management of wetlands

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# The aim of the study

- 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).
- Map of peatlands digitalized within the scope of the European Regional Development Fund project.
- Digitized maps of peat extraction licence areas provided by LEGMA.
- Landsat satellite image series from 1990.
- Aerophotographs (provided by LGIA) from 2<sup>nd</sup> to 5<sup>th</sup> cycle (2003-2015).
- Sentinel II satellite image series from 2016.
- Software tools – QGIS, Grass GIS and SAGA GIS.

# 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)

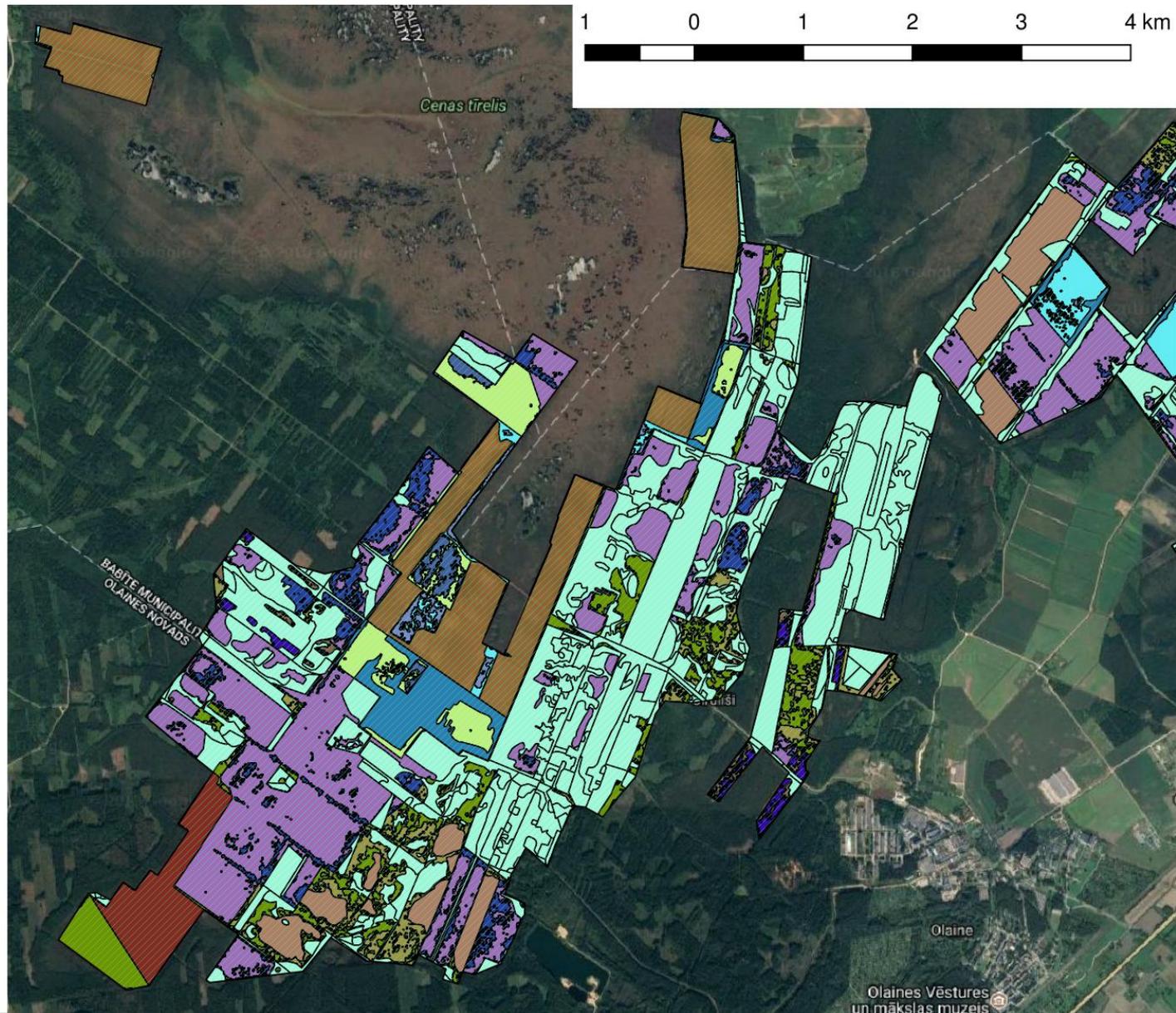
- Visual identification (aerophotographs, 4<sup>th</sup> and 5<sup>th</sup> cycle) of **water regime** (flooded, rewetted and dry or drained areas).
- **Active peat extraction sites** are separated using existing licensing data and manual inspection.
- Non-flooded, rewetted or active peat extraction 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

- Forest land (by state forest register).
- Farmlands (cropland, grassland and orchards).
- Settlements (roads, power networks).
- Flooded areas (ponds and large water bodies).
- Rewetted areas (non-flooded areas with high groundwater level).
- Former peat quarries (conversion assumed before 1990) including:
  - afforested land (not listed in state forest register);
  - area with herbaceous and shrub vegetation,
- Abandoned peat extraction sites including (conversion assumed after 1990):
  - afforested land (not listed in state forest register);
  - area with herbaceous and shrub vegetation,
- Other land including (conversion assumed after 1990):
  - afforested land (not listed in state forest register);
  - area with herbaceous and shrub vegetation
- Peat extraction sites.

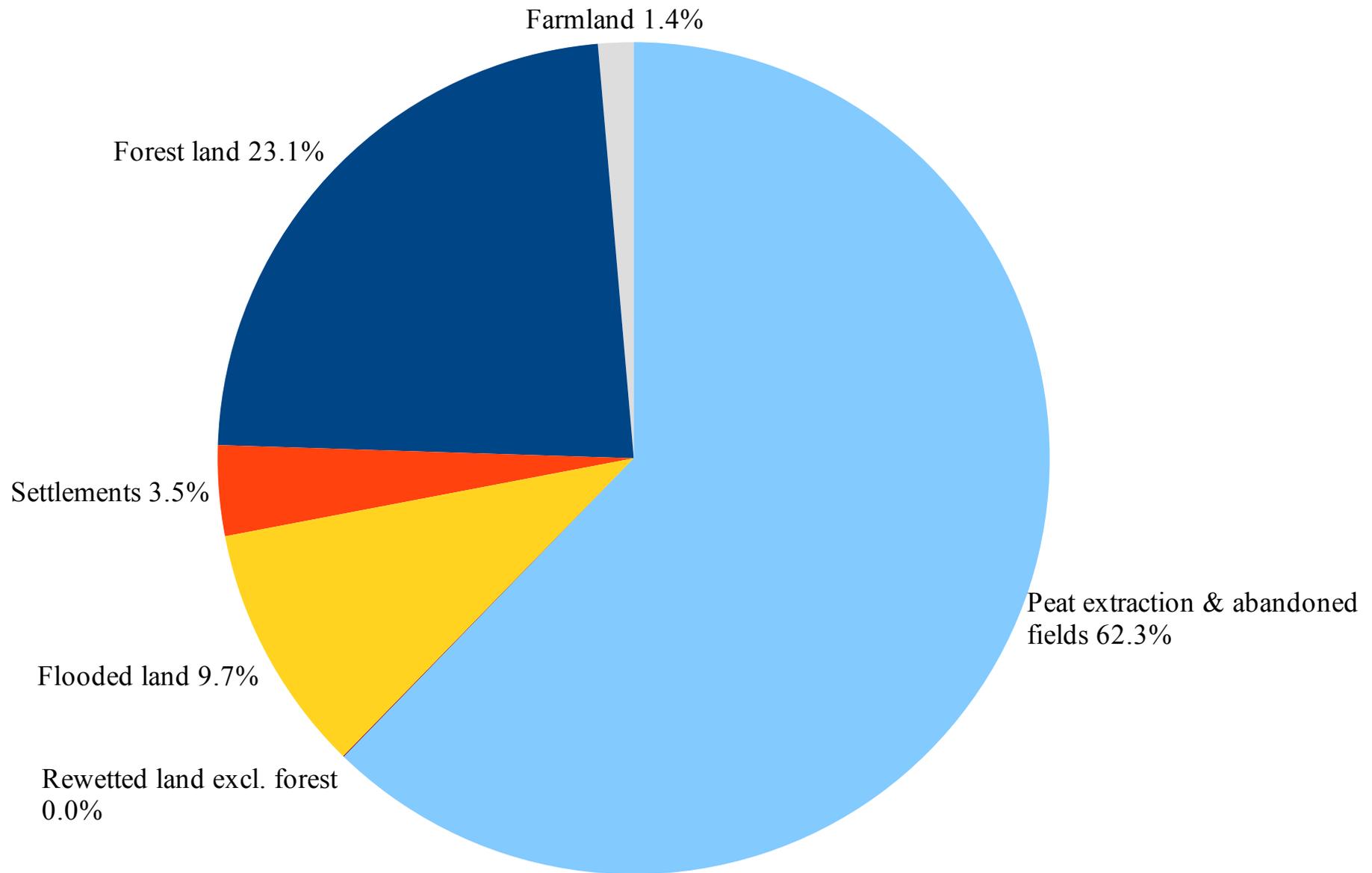
# Example of land use classification in *Cenas bog* near Riga

- 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

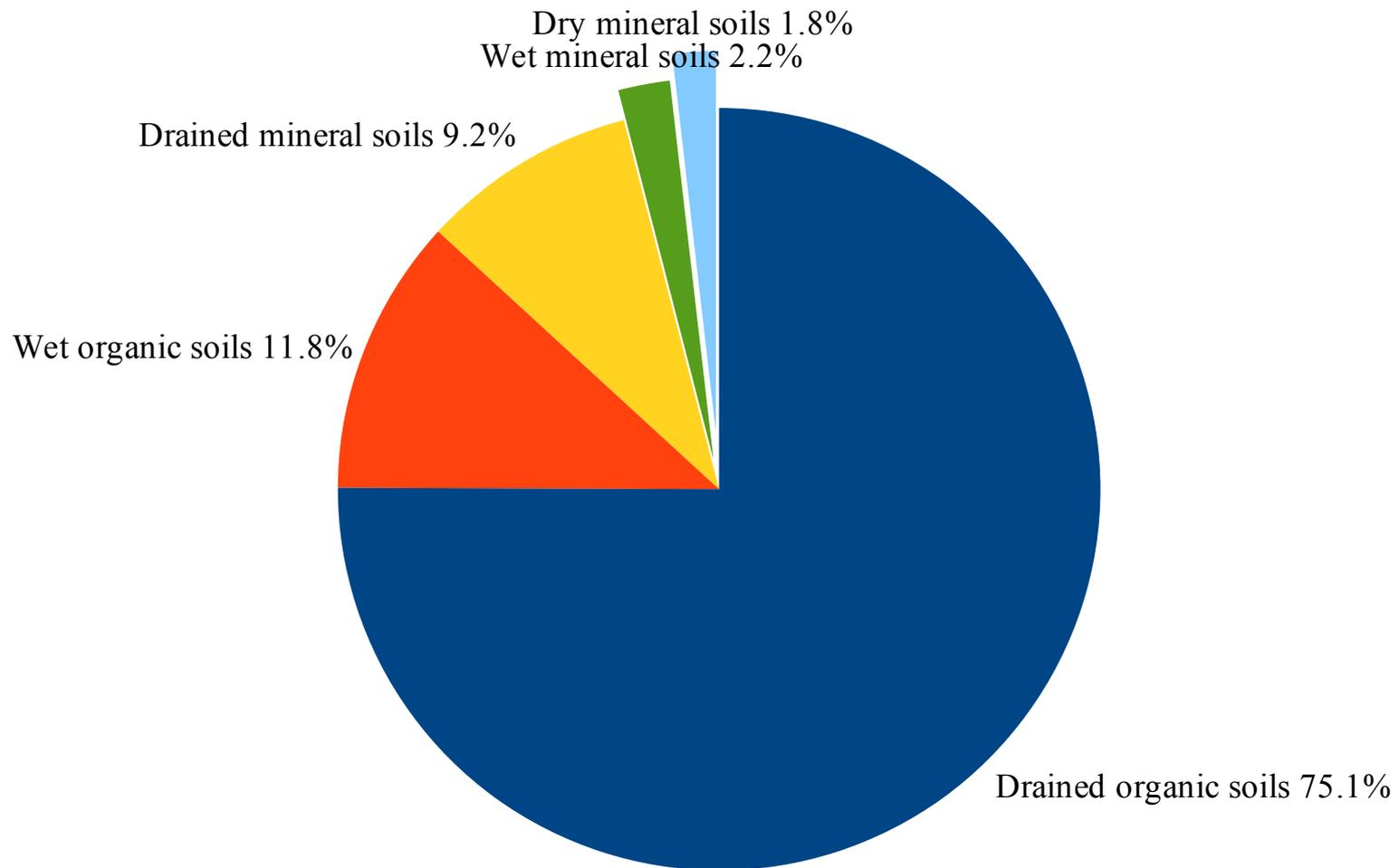




# Land use in current and former peat extraction sites

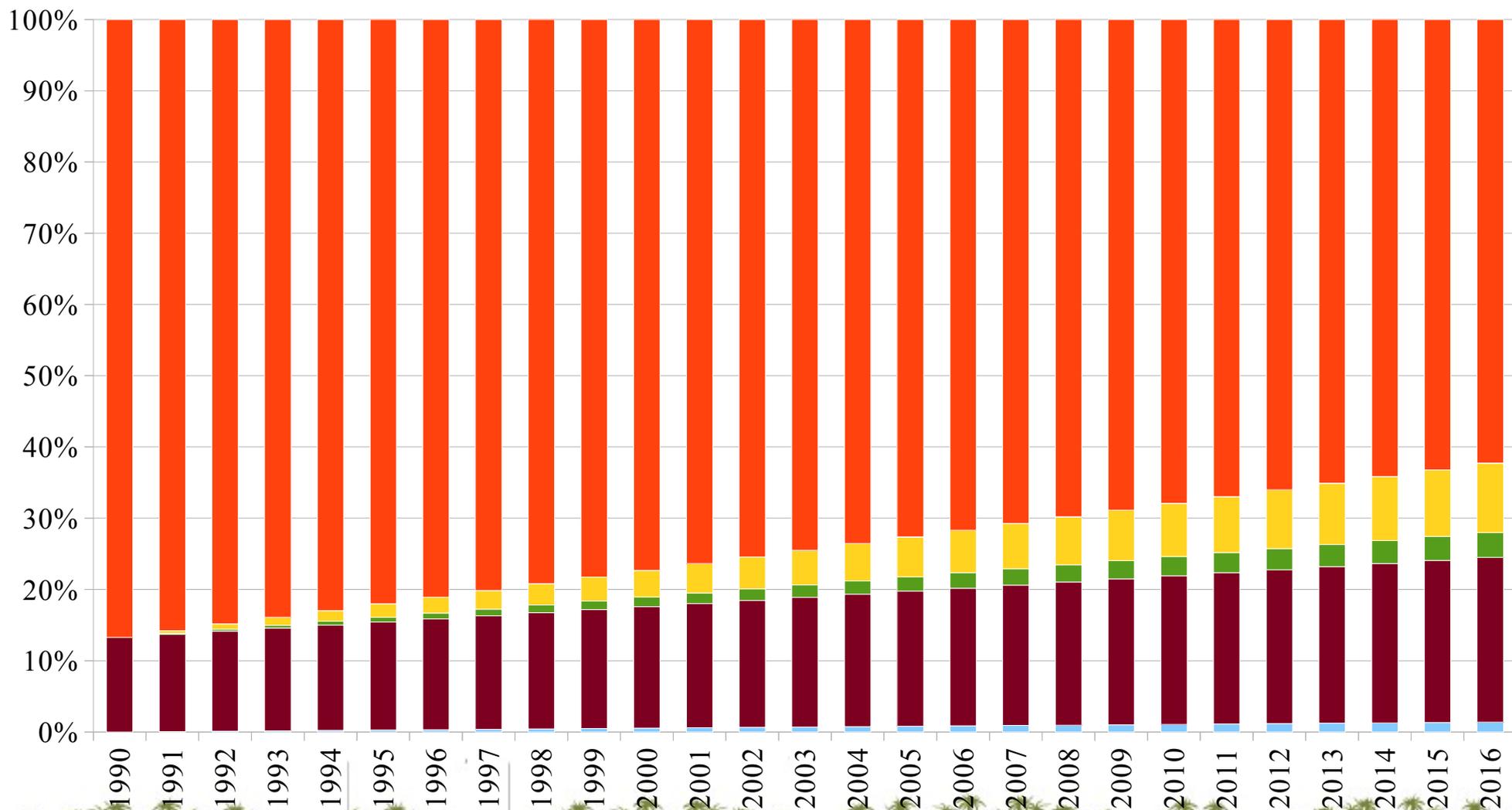


# Distribution of area of forests on extracted peatlands according to stand wise forest inventory



# Linearised land use changes in areas used for peat extraction

Peat extraction & abandoned fields   Rewetted land excl. forest   Flooded land   Settlements   Forest land   Farmland

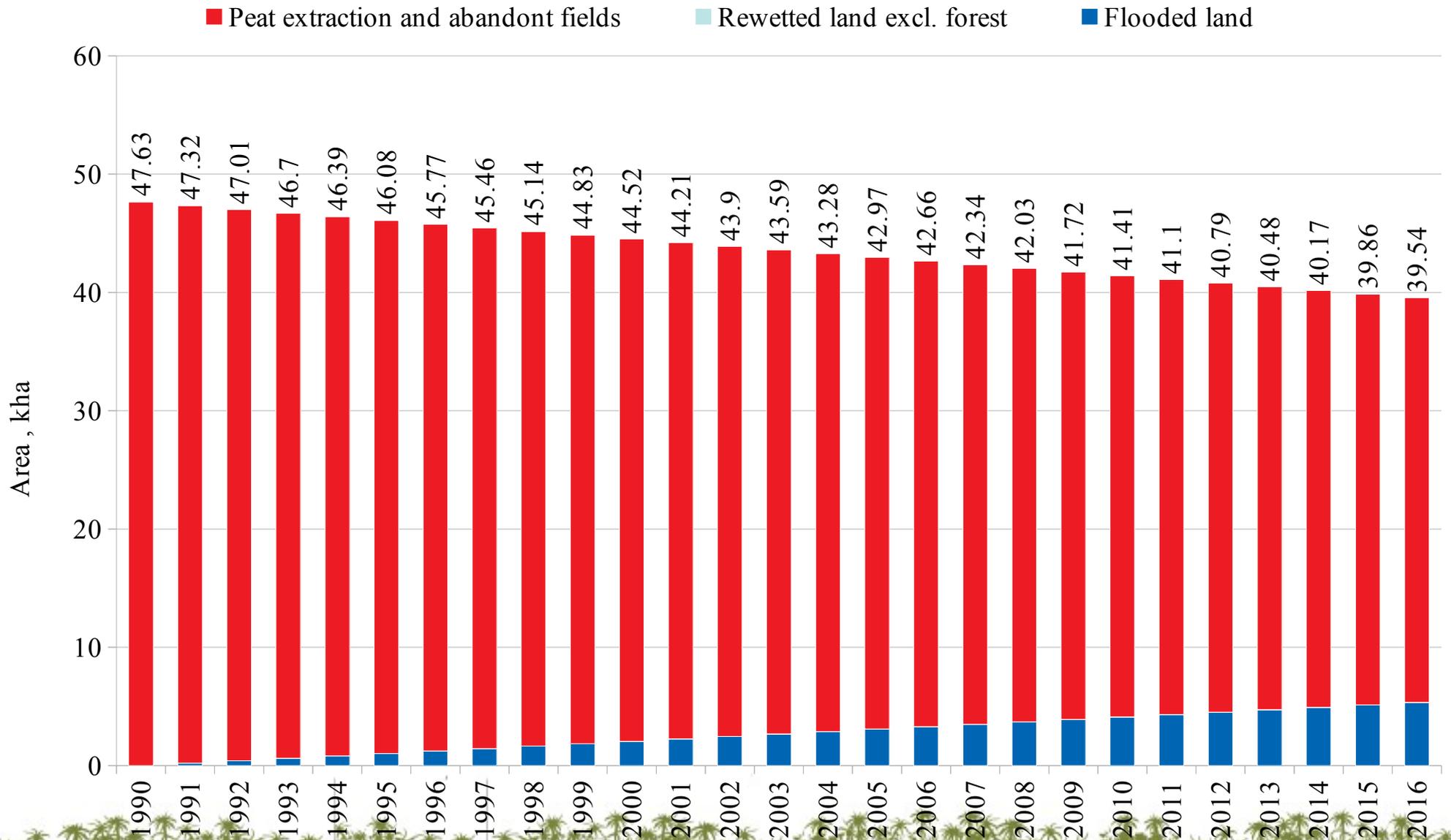


# Summary of land use changes in former peat extraction sites

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



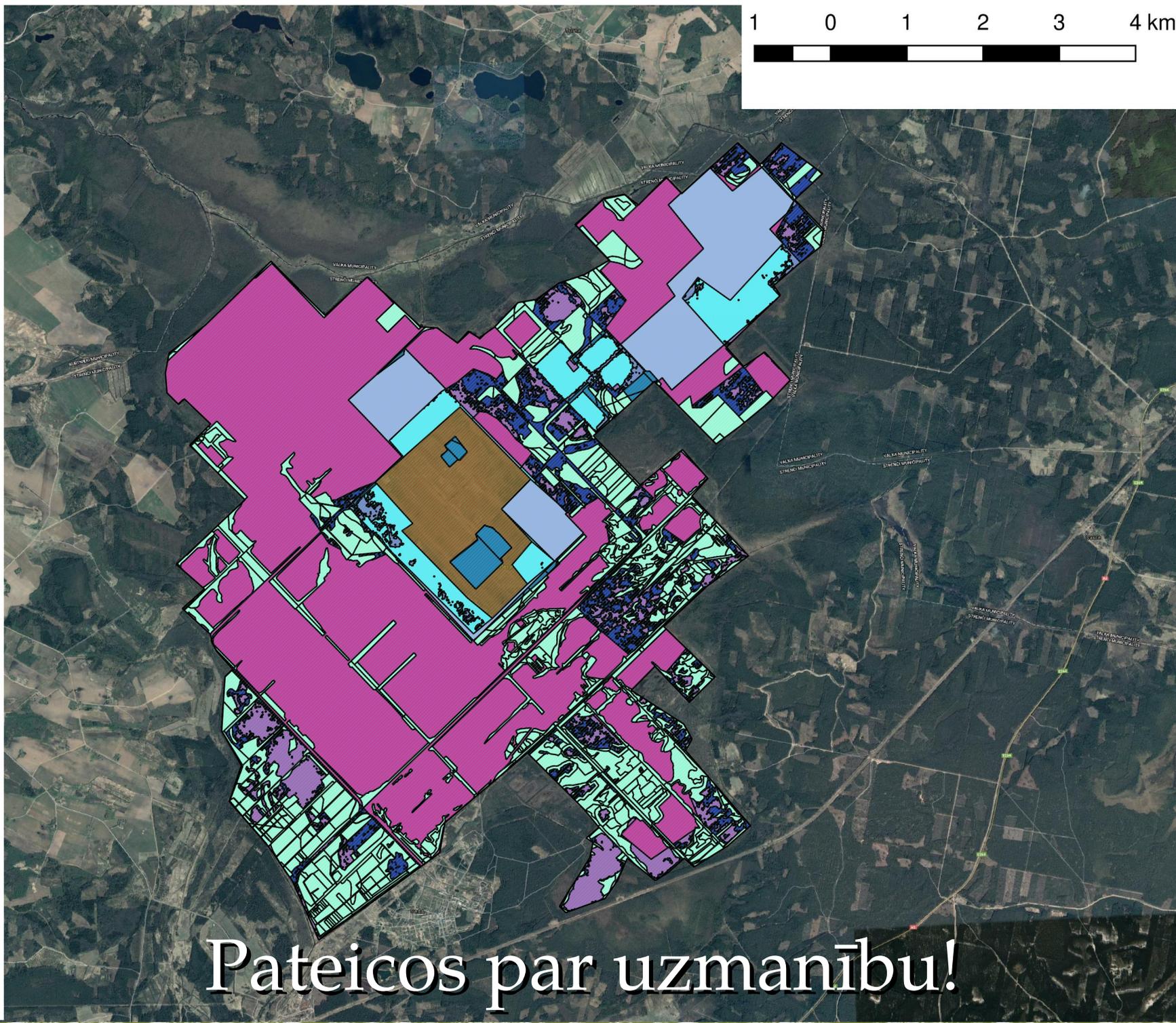
# Area to report under wetlands category of the GHG inventory



# Conclusions

- 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.
- Linearised approach in calculation of emissions may result in overestimation or underestimation of GHG emissions in certain periods of time, but is sufficient to estimate average data at the end of reporting period.
- Area of peat extraction sites 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 or flooded.
- 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 fertile and non-fertile peat extraction sites and continue work on separation of different soils.

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  - Nav mežs
  - Mežs
- leguve pārtraukta
  - Mežs
  - Nav mežs



Pateicos par uzmanību!