



# **Finnish national strategy for the sustainable and responsible use of mires and peatlands**

## **– background – goals – affects –**

Samu Valpola

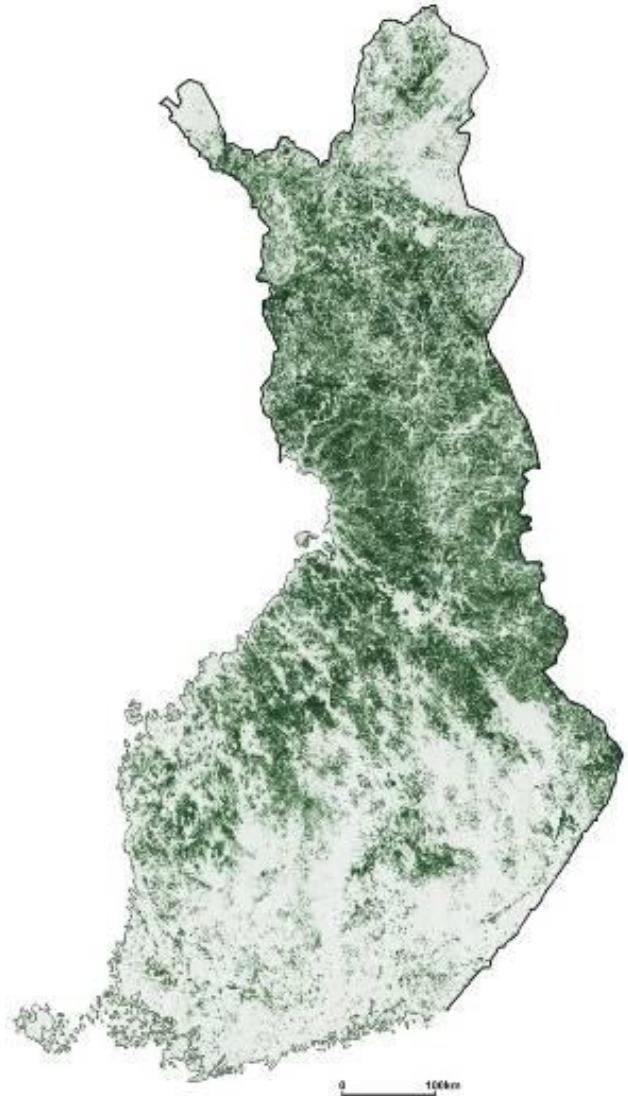
Geological Survey of Finland

Western Finland Office

Kokkola

# Peat and peatlands in Finland

- The area of Finnish peatlands is ca. 9,4 million hectares
- Geological peatland area is ca. 5.1 million hectares (thickness of the peat layer > 30 cm)
- Estimated volume of peat ca. 70 billion m<sup>3</sup>
- 24 billion m<sup>3</sup> suitable for energy purposes, 6 billion m<sup>3</sup> for horticultural and environmental purposes

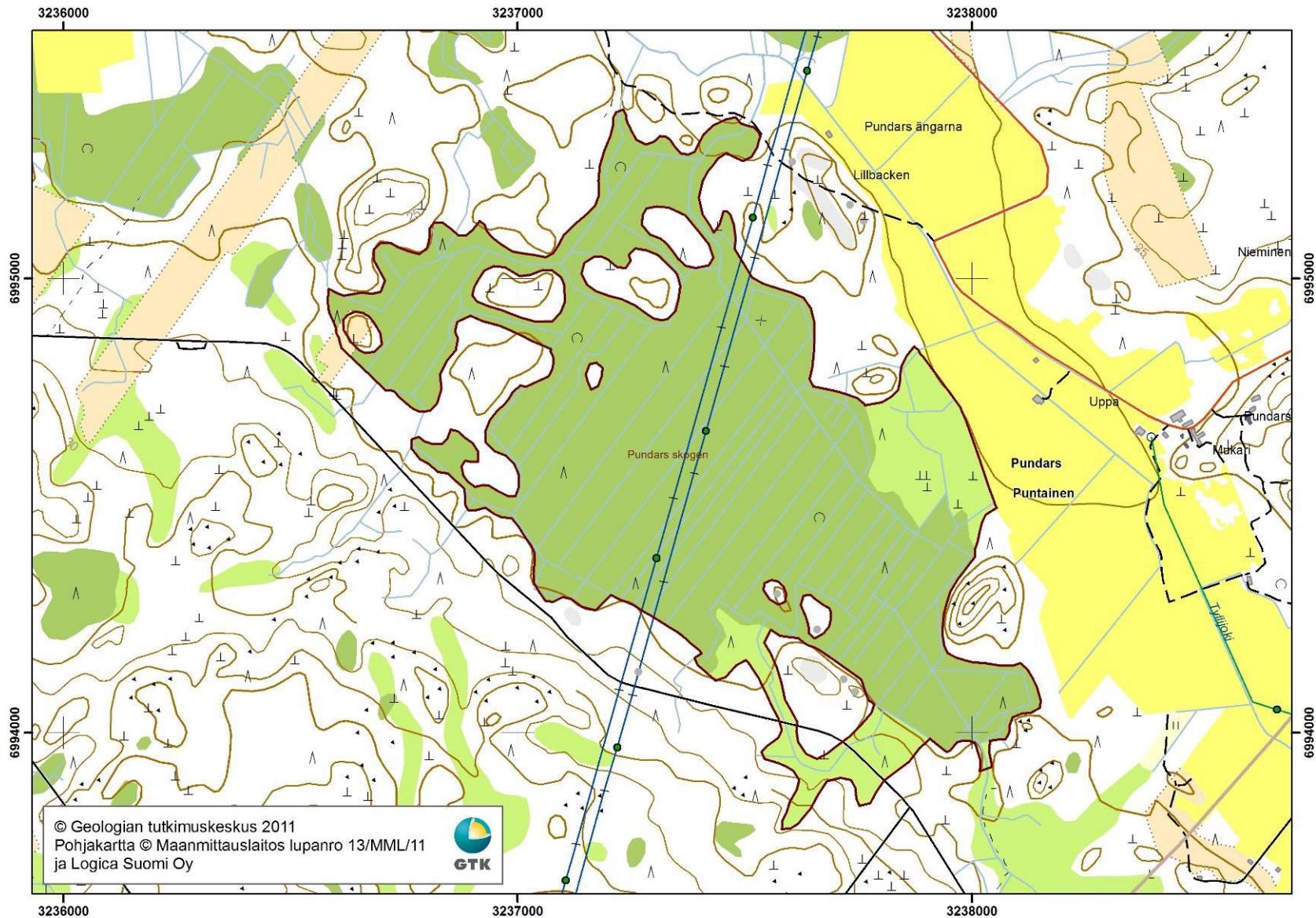


# GTK's peat investigations in Finland

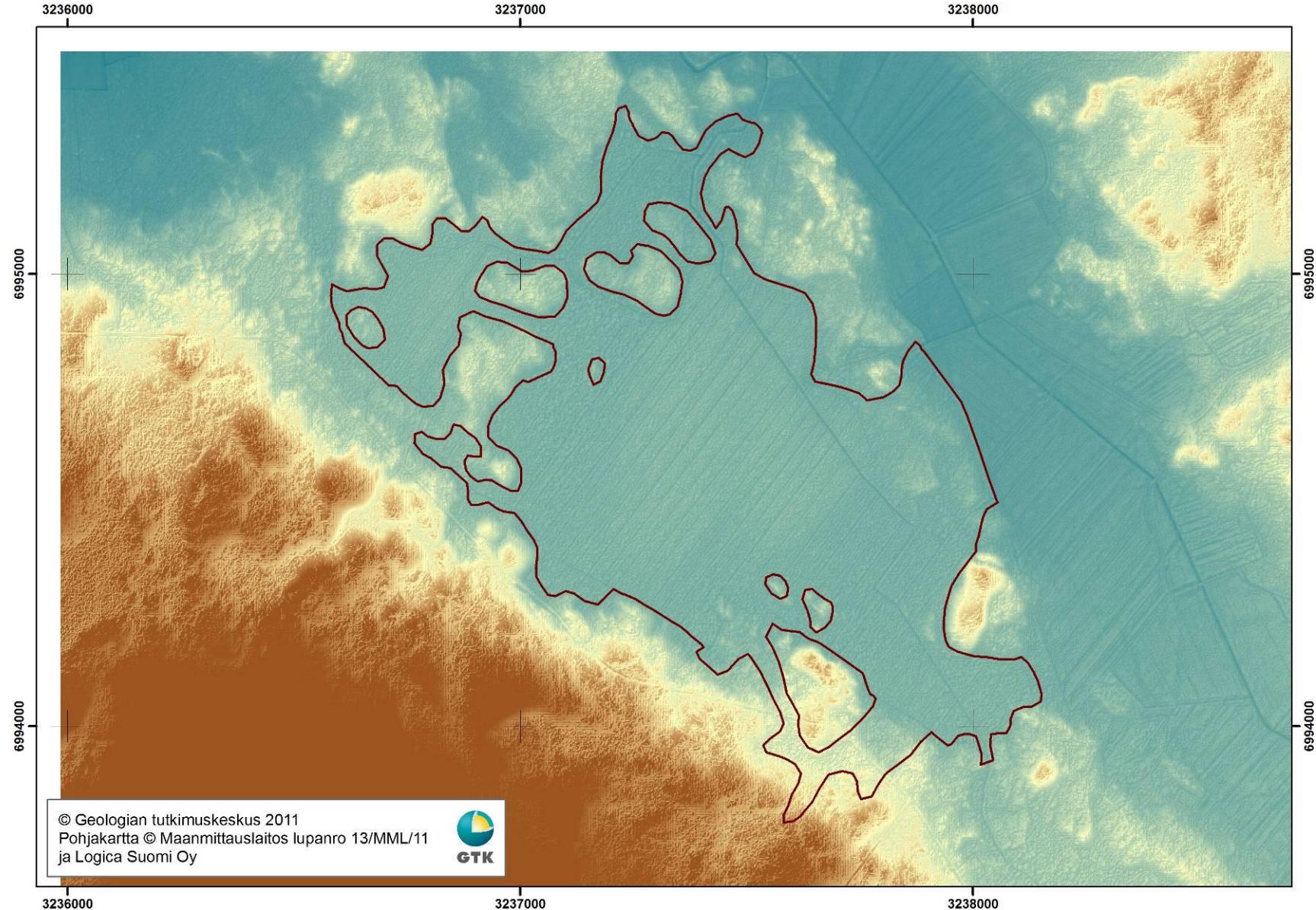
- GTK investigates ca. 30 000 hectares of geological peatlands yearly
- During 1975 – 2013 ca. 2 million hectares of mires and peatlands has been investigated
- GTK's databases contain ca. 17 000 mires / peatland areas and over 1,5 million coring points
- The peat resources are mapped to provide information on the reserves of energy peat and other peat based raw materials
- Proper land use planning is nowadays very difficult without this kind of information



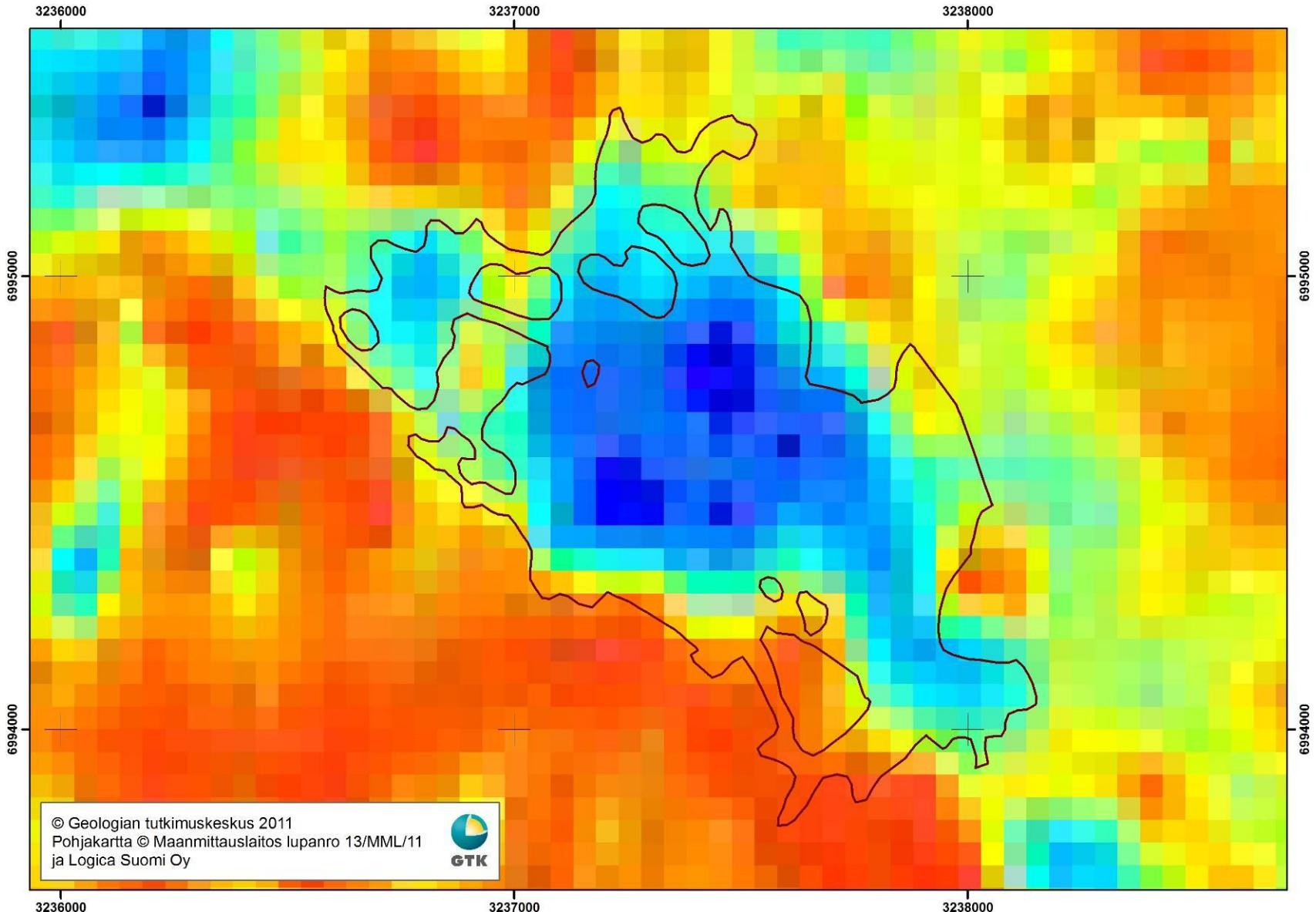
# Research planning: base maps



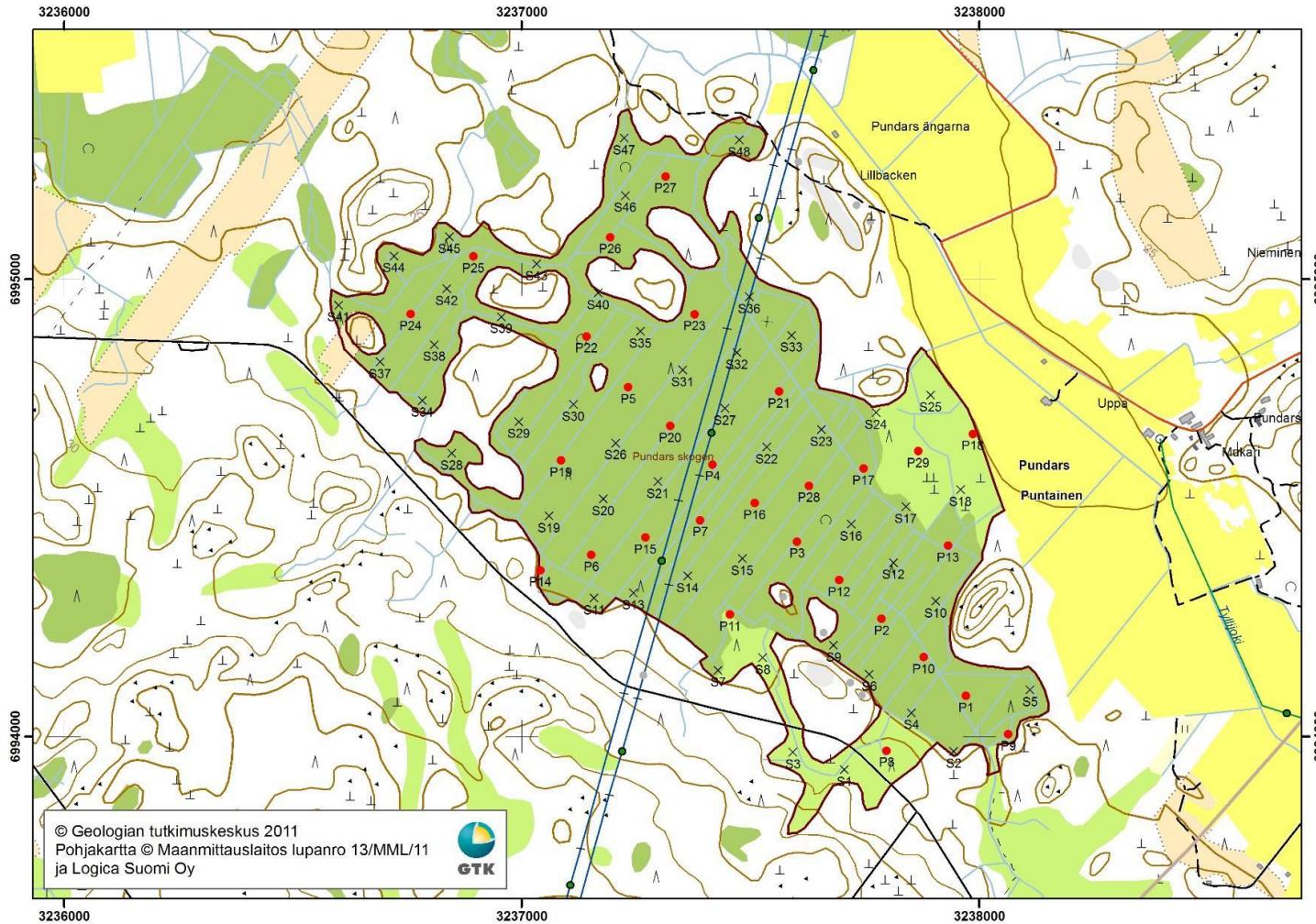
# Research planning: laser scanning data



# Researc planning: airborne geophysical data



# Research planning: completely GIS –based mapping ready for fieldwork



# Fieldwork: coring

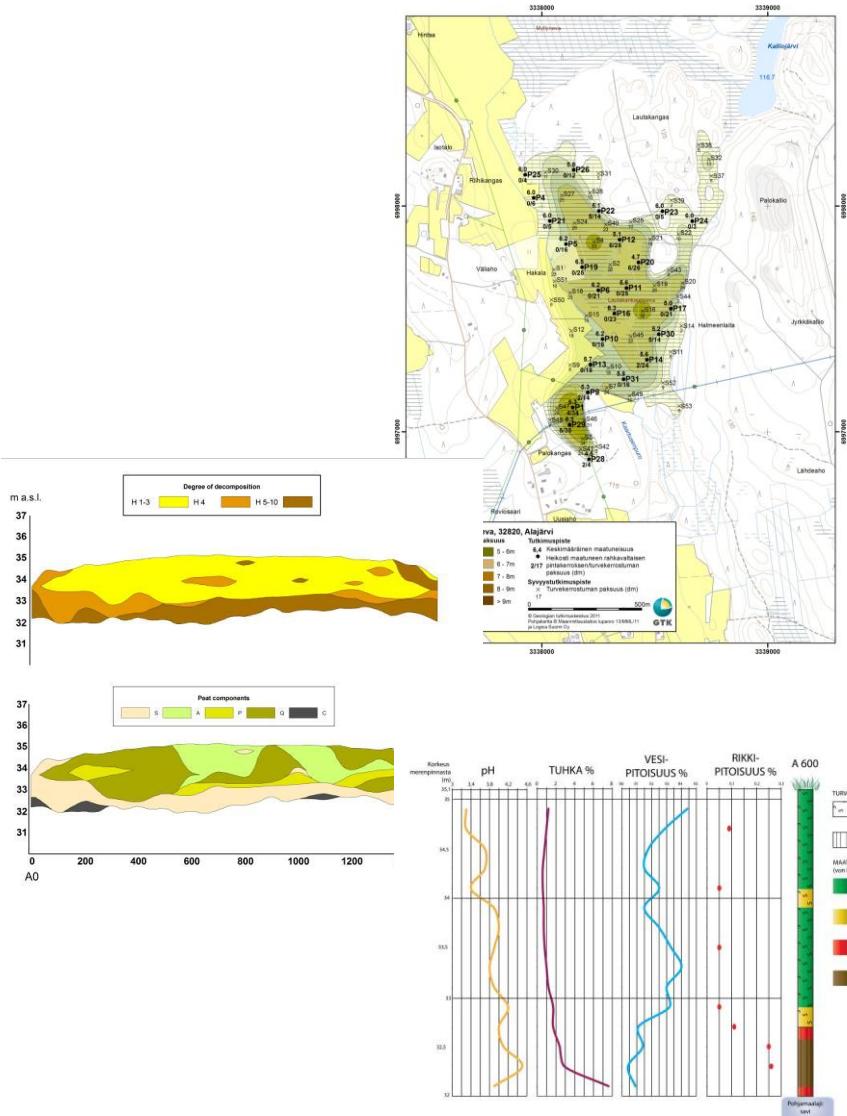
- The field research on the mire is made by a geologist and an assistant
- At each site, observations are made on the vegetation to determine mire type and to evaluate the stand of trees
- The drainage situation is also noted
- Stratigraphic peat data, such as botanical peat components and the degree of humification, are gathered by coring
- At the mire bottom, the mineral sediment is determined
- Ground penetrating radar measurements can also be used for detecting peat thickness
- The natural state of the hydrological mire complex is determined according to the Finnish national strategy for the sustainable and responsible use of mires and peatlands

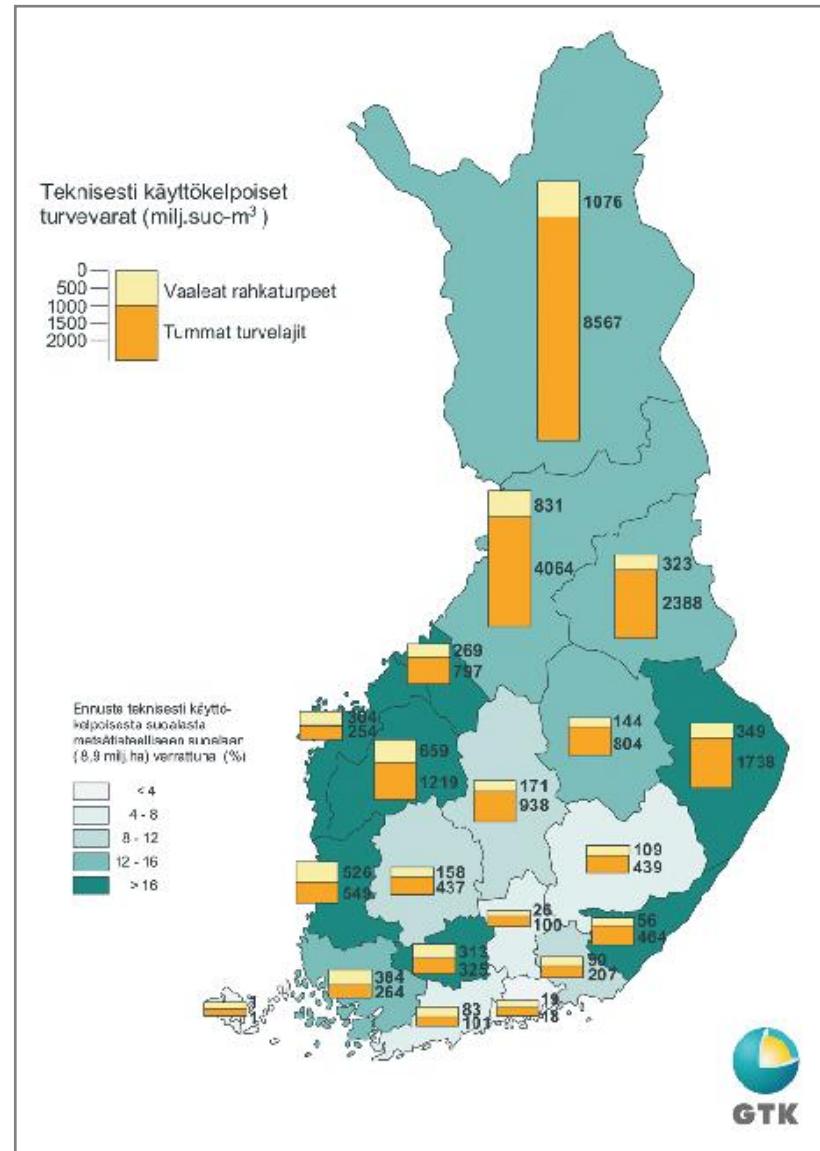
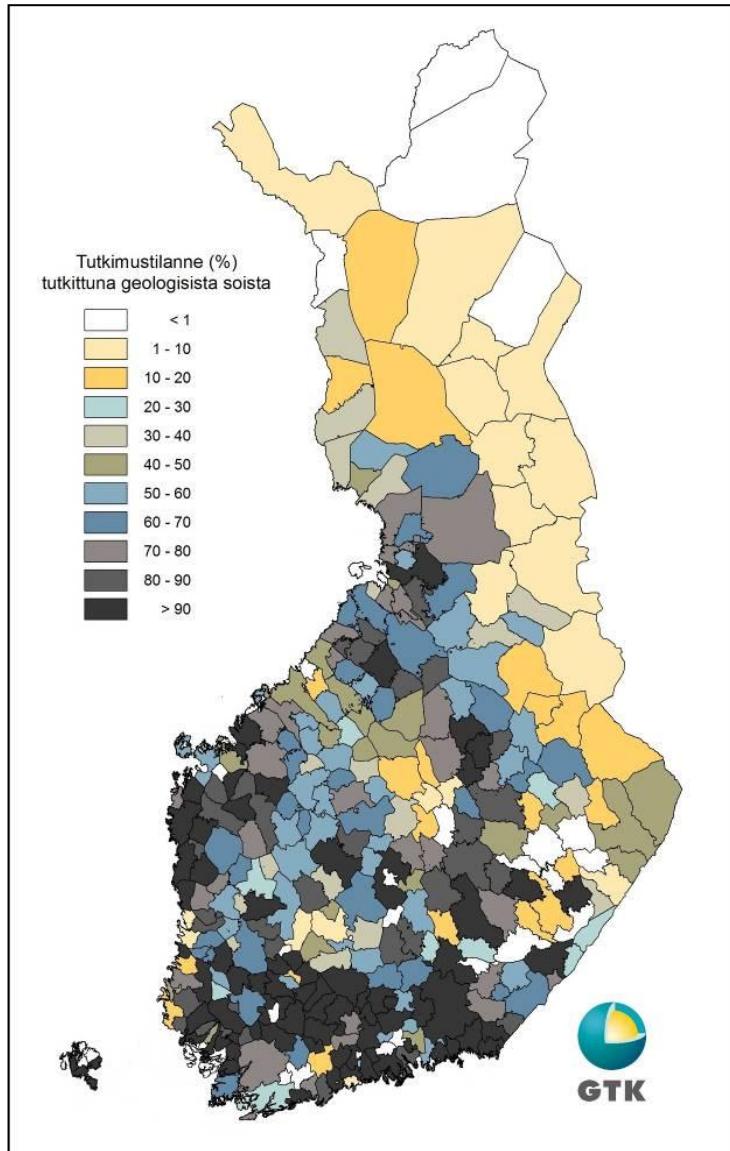


# Research reports, maps and web-service:

- A description about each studied mire is written, also maps and profiles are drawn. The usability of the mire is determined taking major peat production and mire conservation factors into account
- The information stored in the database can be used for producing nationwide summaries and summaries covering e.g. individual regions, municipalities and river basins
- Web –service: Accounting the peat reserves in Finland

[http://geodata GTK fi/Turvevarojen\\_tilinpito/index.html](http://geodata GTK fi/Turvevarojen_tilinpito/index.html)





# Peat and peatlands are a resource for various purposes



over 4,5 million hectares  
drained for forestry



3 million hectares are in  
pristine state



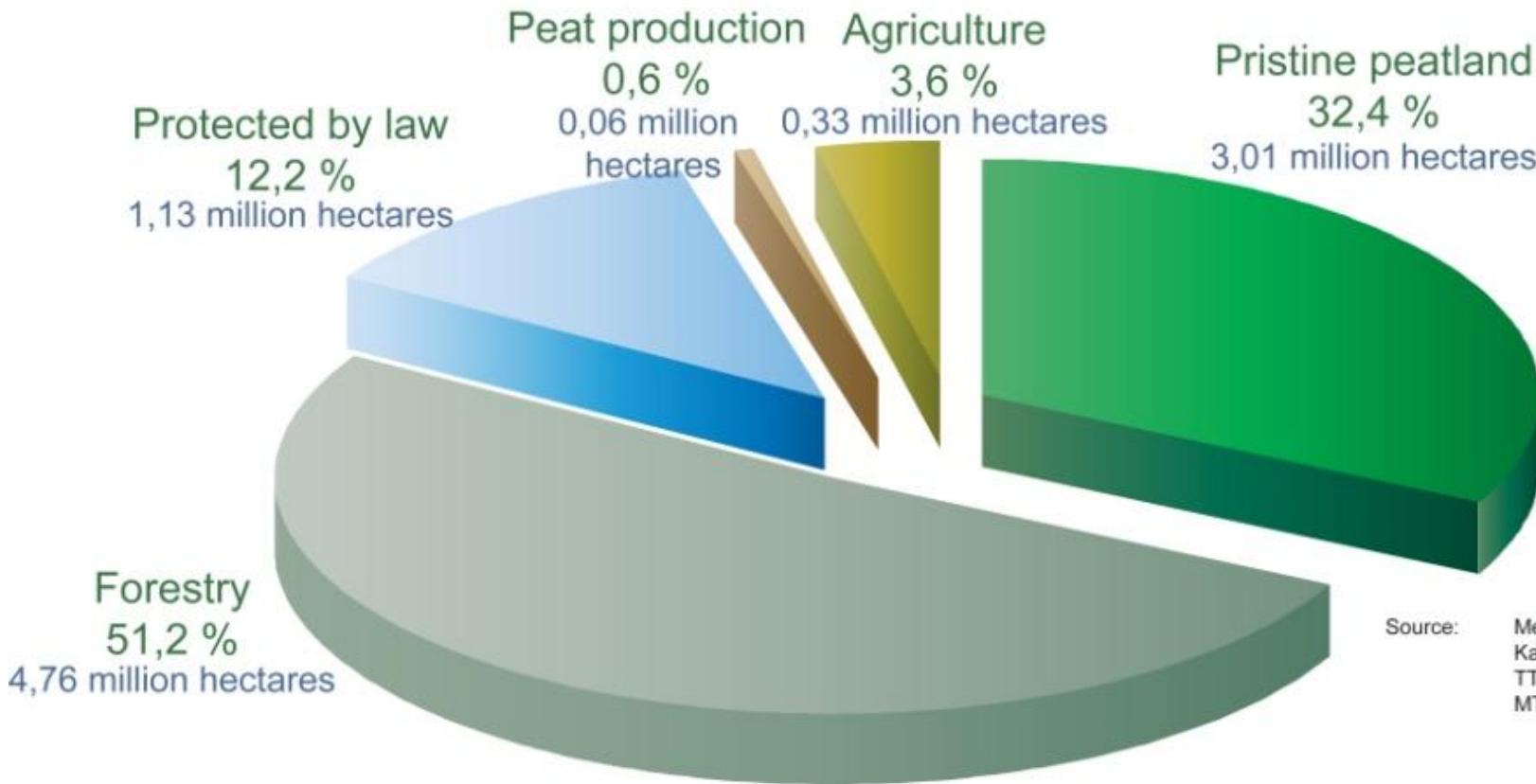
0,3-0,5 million hectares  
drained for agriculture



0,06-0,08 million hectares  
drained for peat production

# Use of Peatlands in Finland

Peatlands total 9,26 million hectares



# Various needs and ways of use:



Peat and peatlands must be managed!



# The basis for the good management:

- Relevant scientific peat and peatland research
- Reviewed data and results
- Sufficient popularisation of results
- Combining the research with policymaking



# **Finnish national strategy for the sustainable and responsible use of mires and peatlands**

- The proposal for a national strategy for mires and peatlands defines the objectives and measures relating to the sustainable and responsible use of mires and peatlands
- The objective is to secure the benefits and energy supply for agriculture and forestry, reduce the harmful impacts on waters and climate, achieve a favourable conservation status for mire nature and ensure the multiple use and cultural services
- The responsible use of mires and peatlands is reconciled by directing activities which considerably change the mires to such mires and peatlands which have been drained or whose natural state has otherwise been significantly changed (classification: scale 0-5)
- Strategy also summarises the factors which influence the magnitude of the impacts of the proposal on a general level and issues which impact on the implementation of the proposal
- In addition, the strategy presents the main research needs for promoting the sustainable use of mires and peatlands

# Finnish national strategy for the sustainable and responsible use of mires and peatlands

- 4 main ways to reconcile different activities concerning peat and peatlands
- 15 actions to promote these 4 ways
- 38 definitions of policy
- Over 80 actions to promote these definitions
- 12 proposals concerning research projects etc.

# Finnish national strategy for the sustainable and responsible use of mires and peatlands

- Classification of the natural state of mires and peatlands:
  - Scale 0-5:
    - 5 represents pristine mire
    - 0 represents totally changed area, completely ditched, practically no mire vegetation, hydrologically impossible to maintain mire ecosystem
  - Hydrology is the main factor: the less ditches, the better hydrology and mire ecosystem
  - Activities which considerably change the mires to such mires and peatlands which have been drained or whose natural state has otherwise been significantly changed
  - According to the Strategy classification should be done by "independent research institute"
  - So far GTK has classified ca. 7000 mires, almost 1 million hectares

# The National strategy for the sustainable and responsible use of mires and peatlands: Resource needs for the future:

- Agricultural purposes ca. 42 000 - 84 000 hectares
- Peat production ca. 58 000 hectares
- Conservation ca. 100 000 hectares
- Re-ditching of forested peatland areas  
ca. 80 000 hectares / a
- Construction, roads, reservoirs, logistics?



- Maintenance and supply of energy - need of 20 TWh / a?
- Biofuels – wood from forested peatlands? Peat?
- Restoration of degraded peatlands?
- Co<sub>2</sub> sink – Co<sub>2</sub> source? Total carbon stock?
- Berries, hunting, reindeer management, recreation areas?



# The National strategy for the sustainable and responsible use of mires and peatlands: Urgent need for research:

- Resource and reserves: quantity and quality  
i.e. what, where and how much
- Impacts on the environment, especially lakes and rivers
- Acid sulphate soils
- After use and restoration of the production areas
- Carbon stock of the mires and peatlands
- Geochemistry and its applications

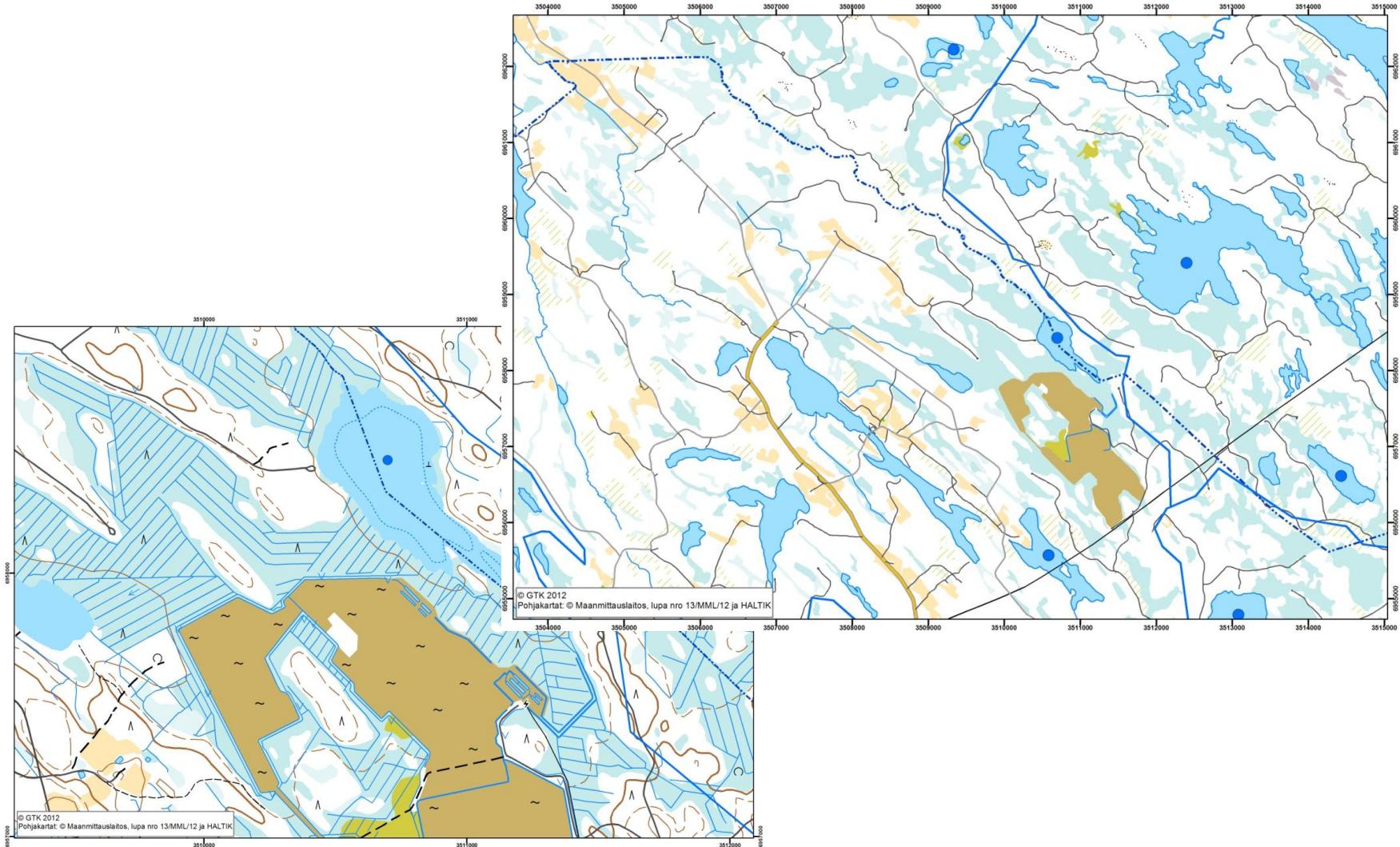


# Finnish lakes:

- There are 187 888 lakes in Finland ( $> 0,05$  ha)
- 56 000  $> 1$  ha, of which 2600  $> 1$  km<sup>2</sup>, of which 309  $> 10$  km<sup>2</sup>, of which 3  $> 1000$  km<sup>2</sup>
- Total area ca. 33 350km<sup>2</sup>
- The volume of the lakes  $> 1$  ha ca. 235 km<sup>3</sup>
- The annual fluctuation of the lake area 2350 km<sup>2</sup>
- The annual fluctuation of the total volume ca. 40 km<sup>3</sup>



# Peat production: impact on the lakes?



# Finnish lakes are naturally filling with sediments:

- The lake sedimentation in Finland started after the last ice age, ca. 10 000 years ago

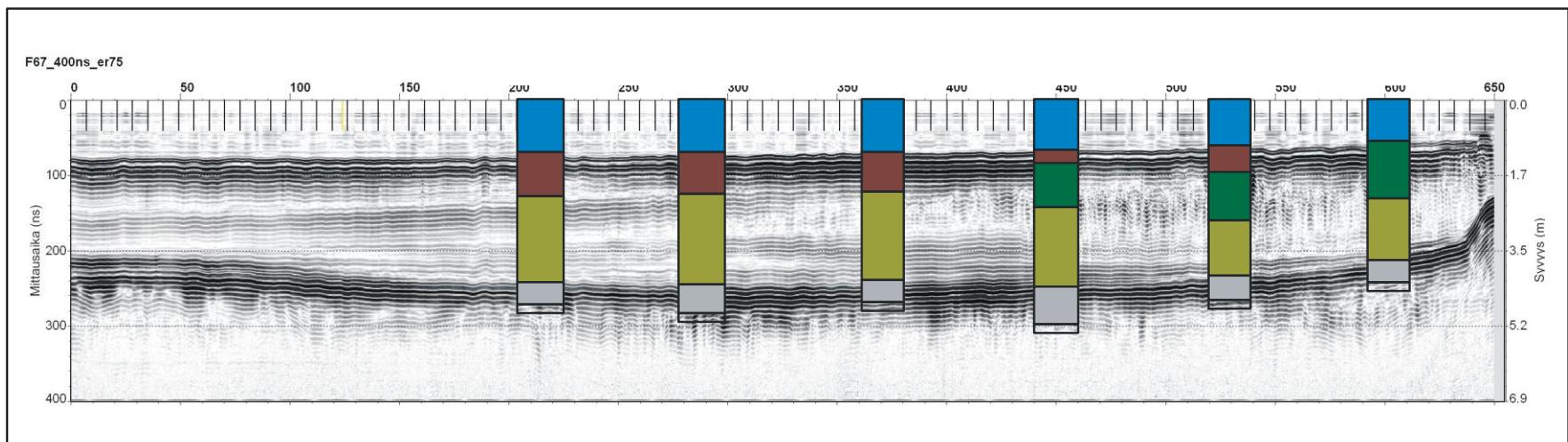
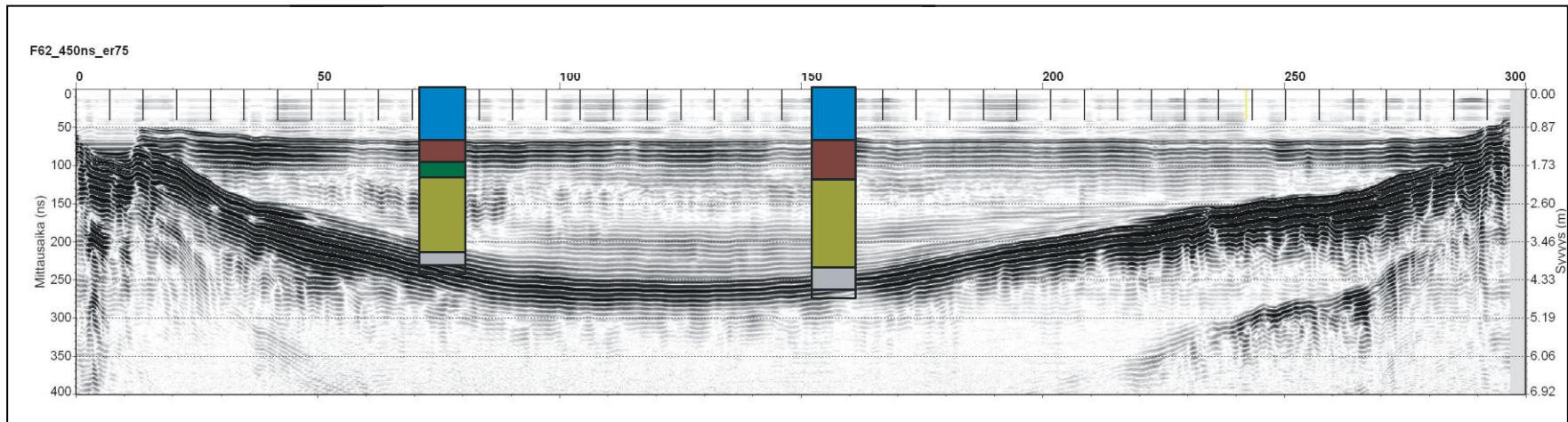
Kokoluokka (km <sup>2</sup> ) Size class (km <sup>2</sup> )	Altaiden alkuperäinen syvyys (m) Original depth of basins (m)	Täyttymisaste (%) Rate of filling-in (%)	Täyttymiseen kuluva aika (v) Estimated life-time (yr)
>100	10,9	7,5	120 000
100 - 10	7,3	16	50 000
10 - 1	5,1	30	24 000
1 - 0,1	5,0	38	16 000
<0,1	3,6	31	22 000

Pajunen, 2004

The role of the peat production: how much the load of humic substances and solid matter has accelerated the natural process?

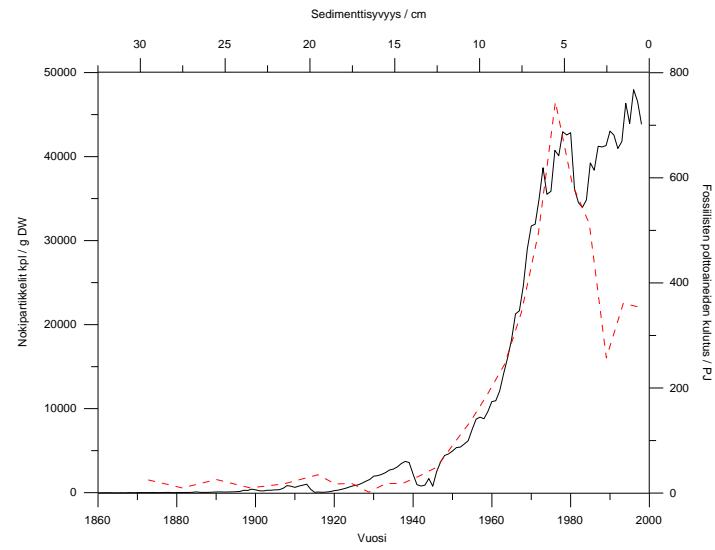
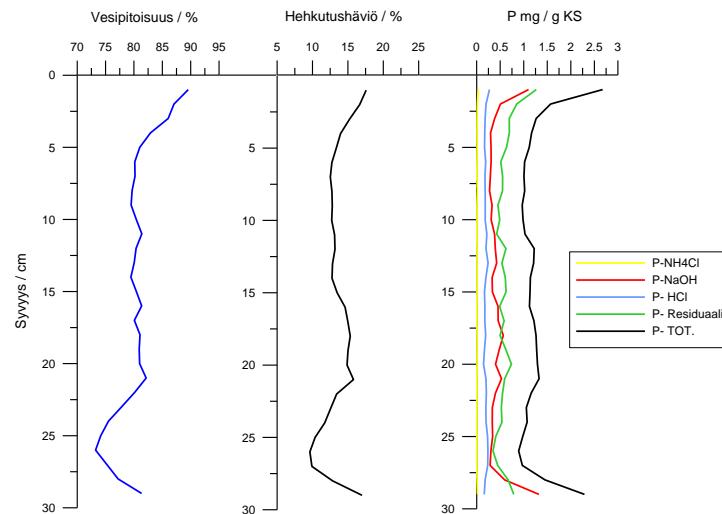
# Sediment research:

- Corings / GPR / Echo soundings



# Sediment research:

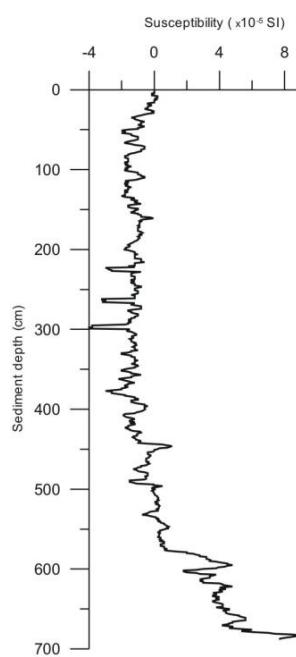
- Surface sediment samples and short cores:
  - e.g. recent sedimentation 0-100 years, impact of human activities, eutrophication, datings 0 -150 years, changes in chemical composition and biostratigraphy



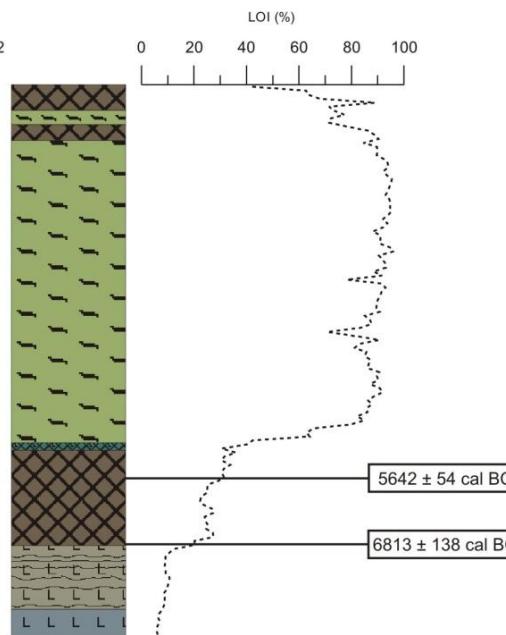
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# Sediment research:

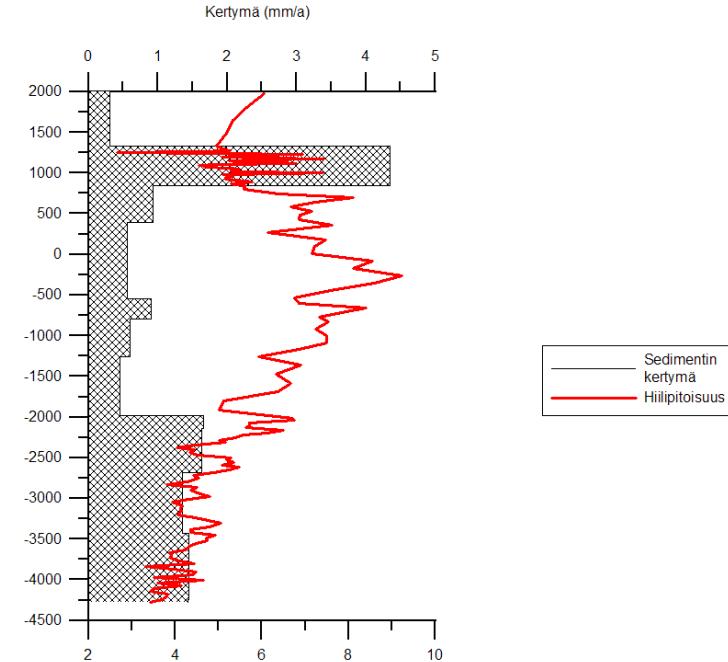
- Long cores:
  - Long cores: e.g. long term sedimentation 0-10 000 years, isolation, natural changes, climate history, physical properties, datings 0-10 000 years, biostratigraphy, carbon accumulation



Taka10



Valpola & Salonen, 2006



Valpola & Ojala, 2006

# Peat and peatlands: a relevant resource in the future:

## Challenges:

- Peat and peatlands are perhaps the most political geological resource in Finland at the moment
- Good governance
- Permission procedures
- Coal / shale gas
- Policymaking without proper information



# Peat and peatlands: a relevant resource in the future:

## Possibilities:

- Research
- National and international co-operation
- Substrates, litter
- The strategic importance of peat is increasing
- Finnish national strategy for the sustainable and responsible use of mires and peatlands supports the use of peat and peatlands
- The resource: we are not running out of peat and peatlands!





**Thank you!**

**Samu Valpola**

**GTK**

[samu.valpola@gtk.fi](mailto:samu.valpola@gtk.fi)

**+358-50-3486023**