LITHUANIAN FUND FOR NATURE

Wise use of degraded peatlands – tool to mitigate climate change

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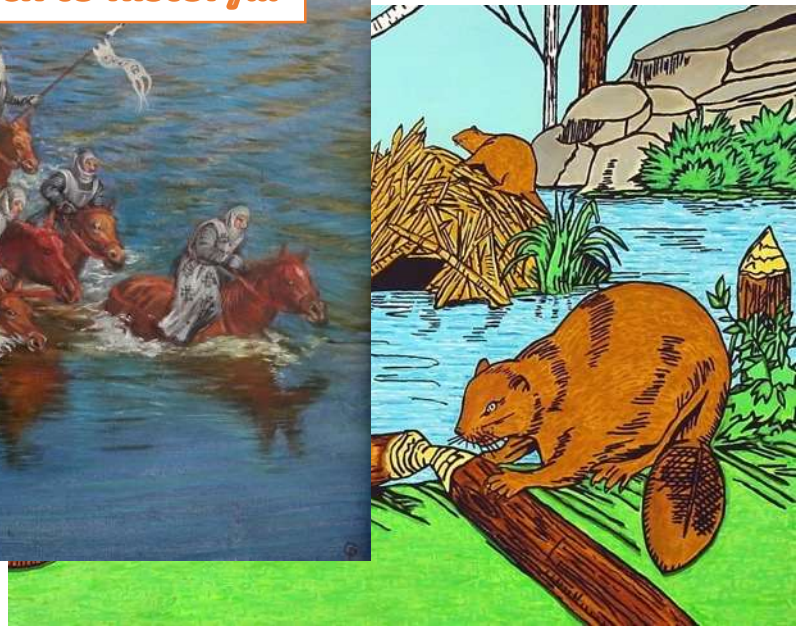
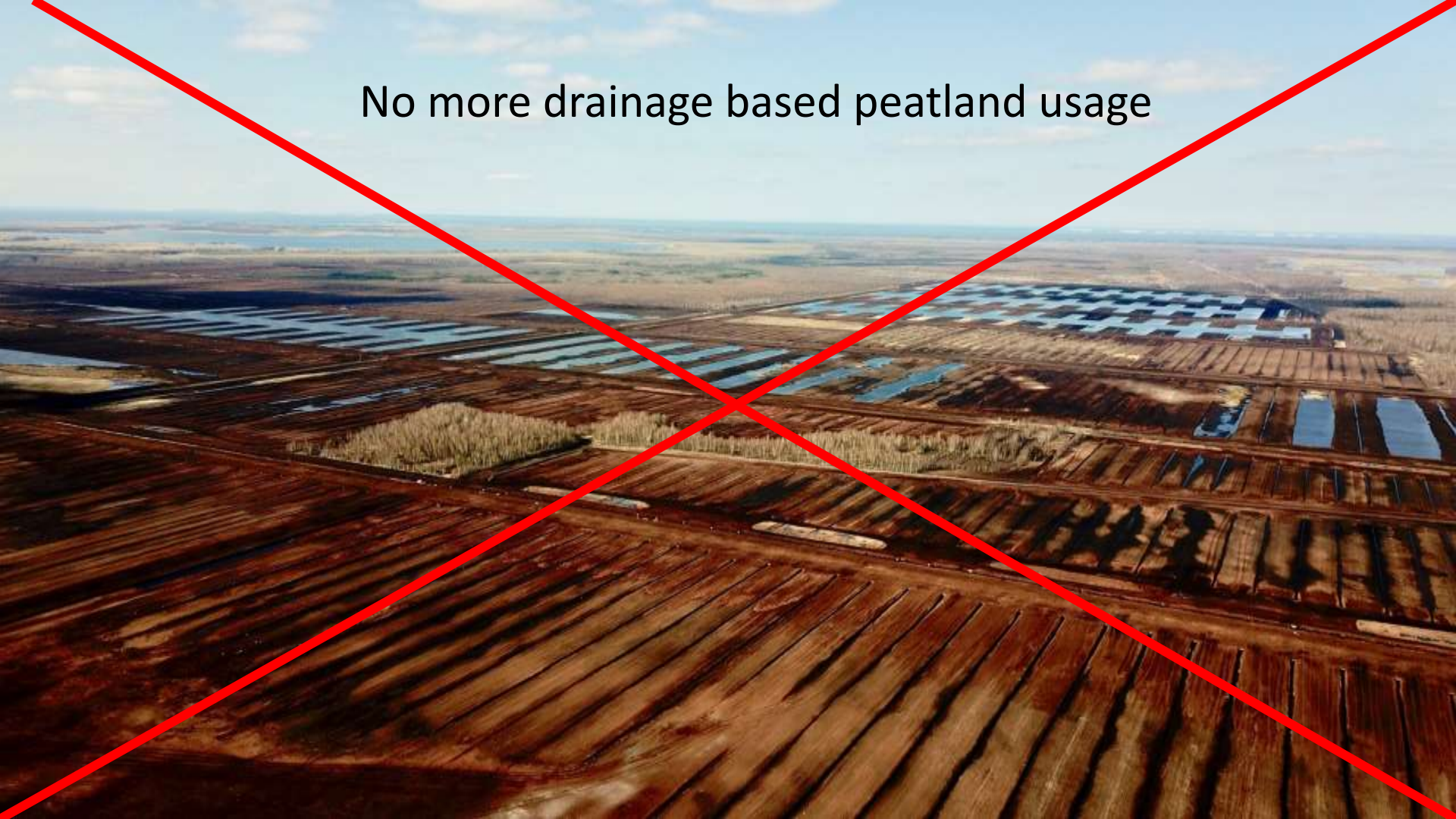
Environmental expert

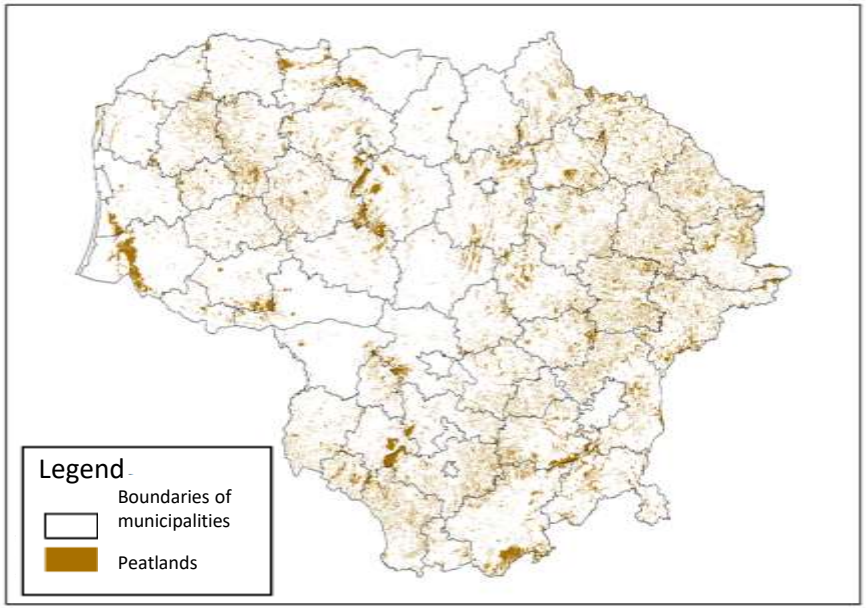
Wise use - what does it mean?

Is it this?

Or even this? Back to history…




No more drainage based peatland usage



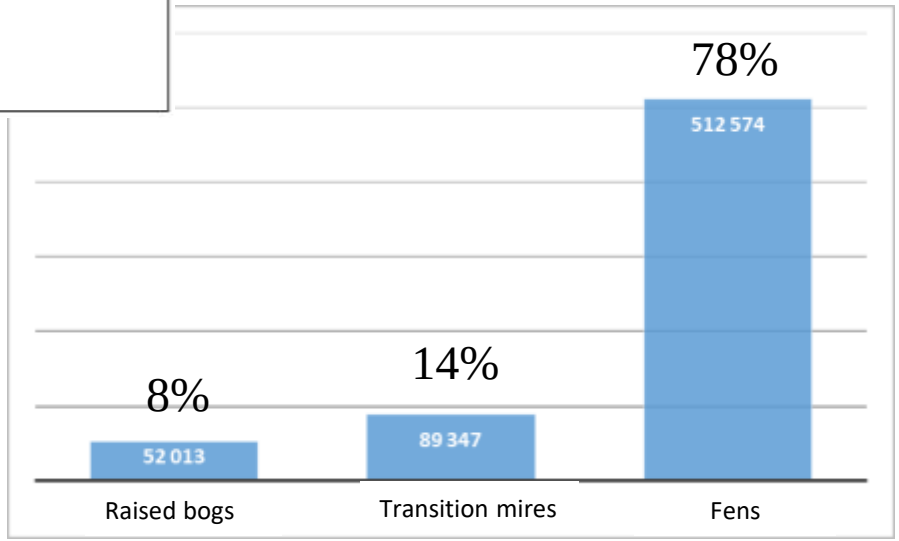
Area of Lithuanian peatlands

654 00 ha = 10 % of countrys‘ territory

78 % – fens

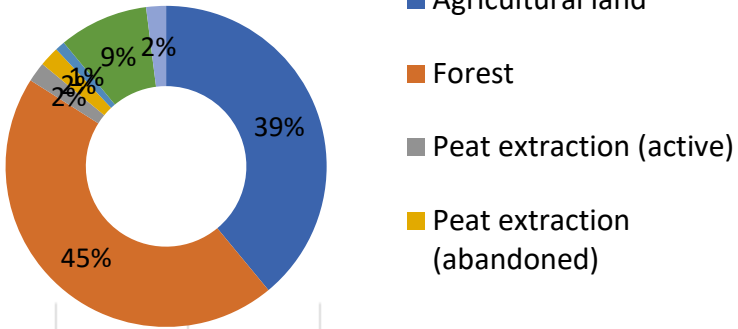
14 % – transition mires

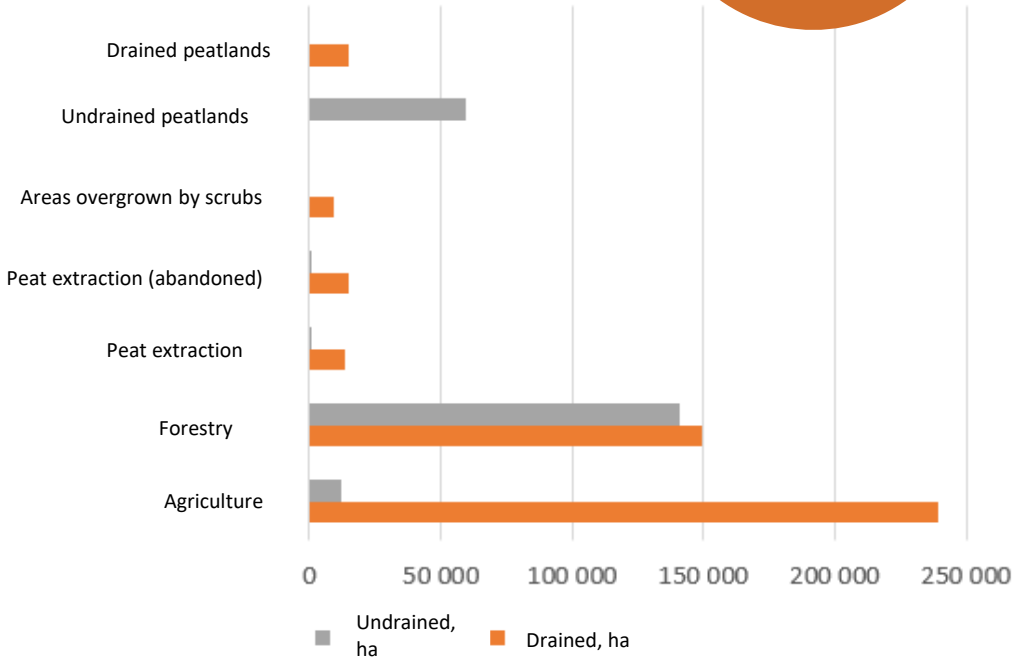
8 % – raised bogs



Peatlands usage

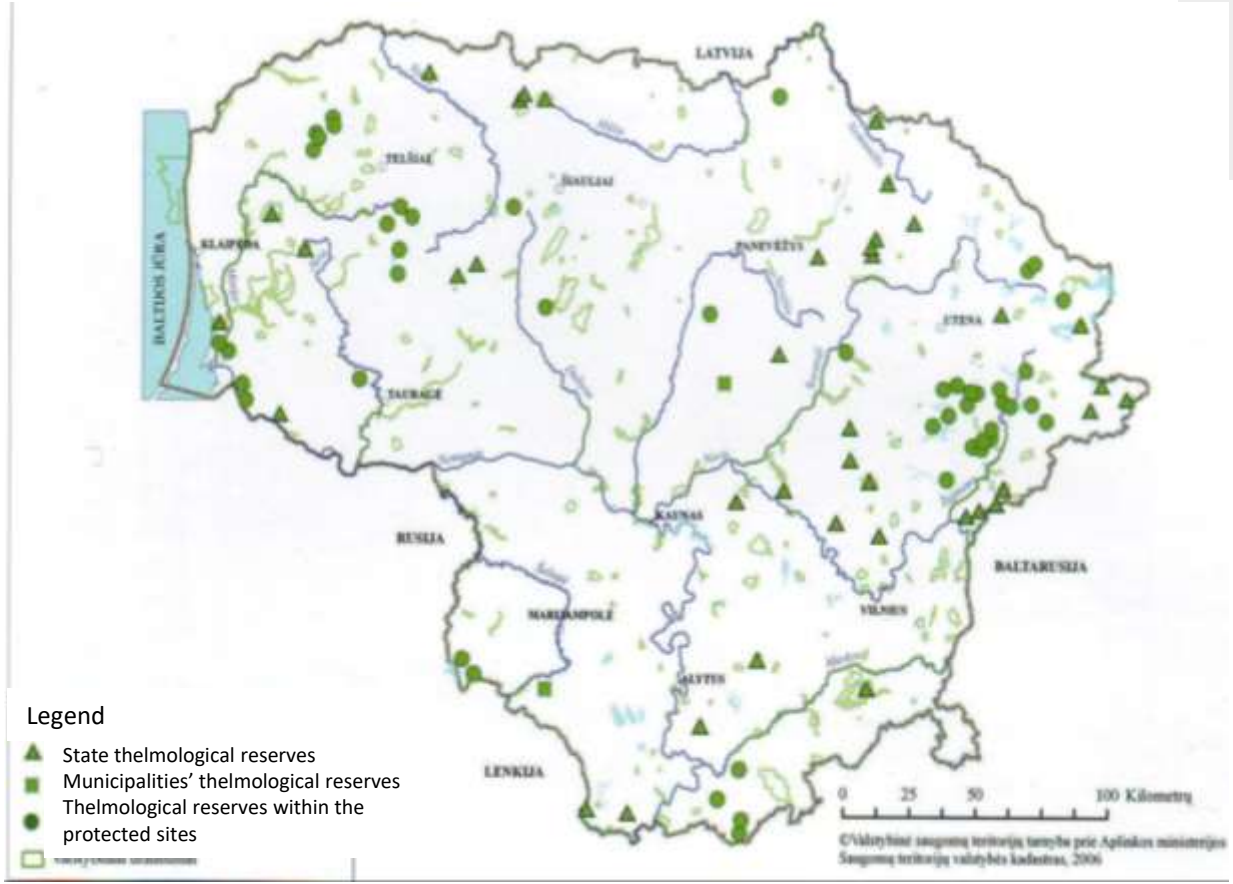
Area of drained peatlands ~70 %





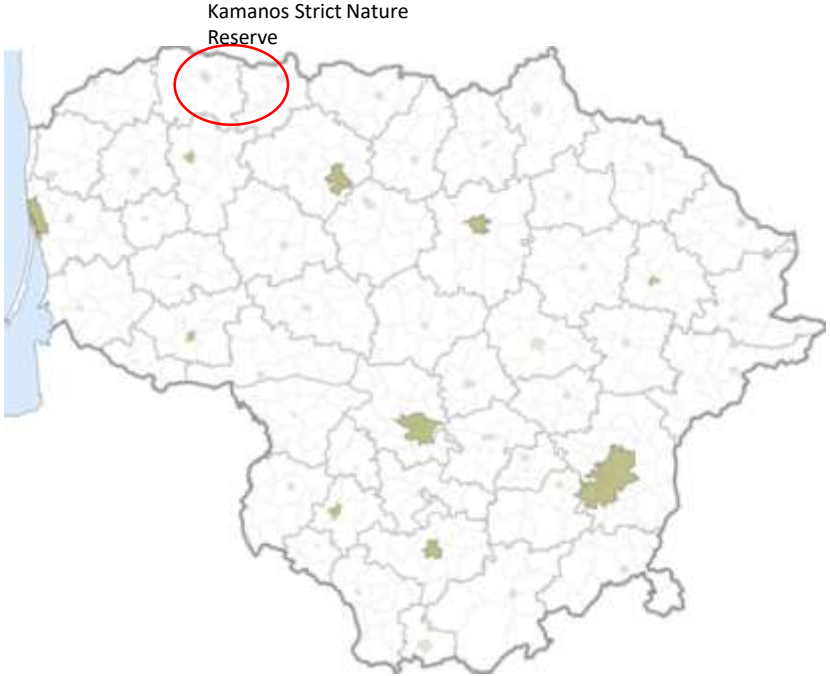
Protected peatlands in Lithuania

- 27 % of all peatlands (179 774 ha) are protected under different legislative status, e.g. sites of Natura 2000 network.
  - 107 Thelmological reserves, mainly raised bogs;
  - 7 peatlands complexes are included into the list of Ramsar sites. Their area is 65 600 ha.



The first known restoration of peatland in Lithuania

First “official” damming activities in the Kamanos Strict Nature Reserve in early 1980th



Nr.	Pavadinimas	Plotas (ha)
1	Algirdėnų	54.77
2	Amalvas	1599.16
3	Aukštumala	873.07
4	Balandinės	71.97
5	Baltosios Vokės	37.42
6	Baužaičių	157.34
7	Gegužinės	43.16
8	Ilgašilio	7.78
9	Kamanos	3727.87
10	Kepurinės	700.47
11	Mūšos Tyrelis	477.3
12	Notigalės	145.28
13	Novaraistis	827.1
14	Pakalnių	53.38
15	Pūsčia	80.74
16	Siberijos	64.93
17	Tyruliai	551.57
18	Velniabalė	119.43
19	Žaliosios girios - Klimbalės	156.89

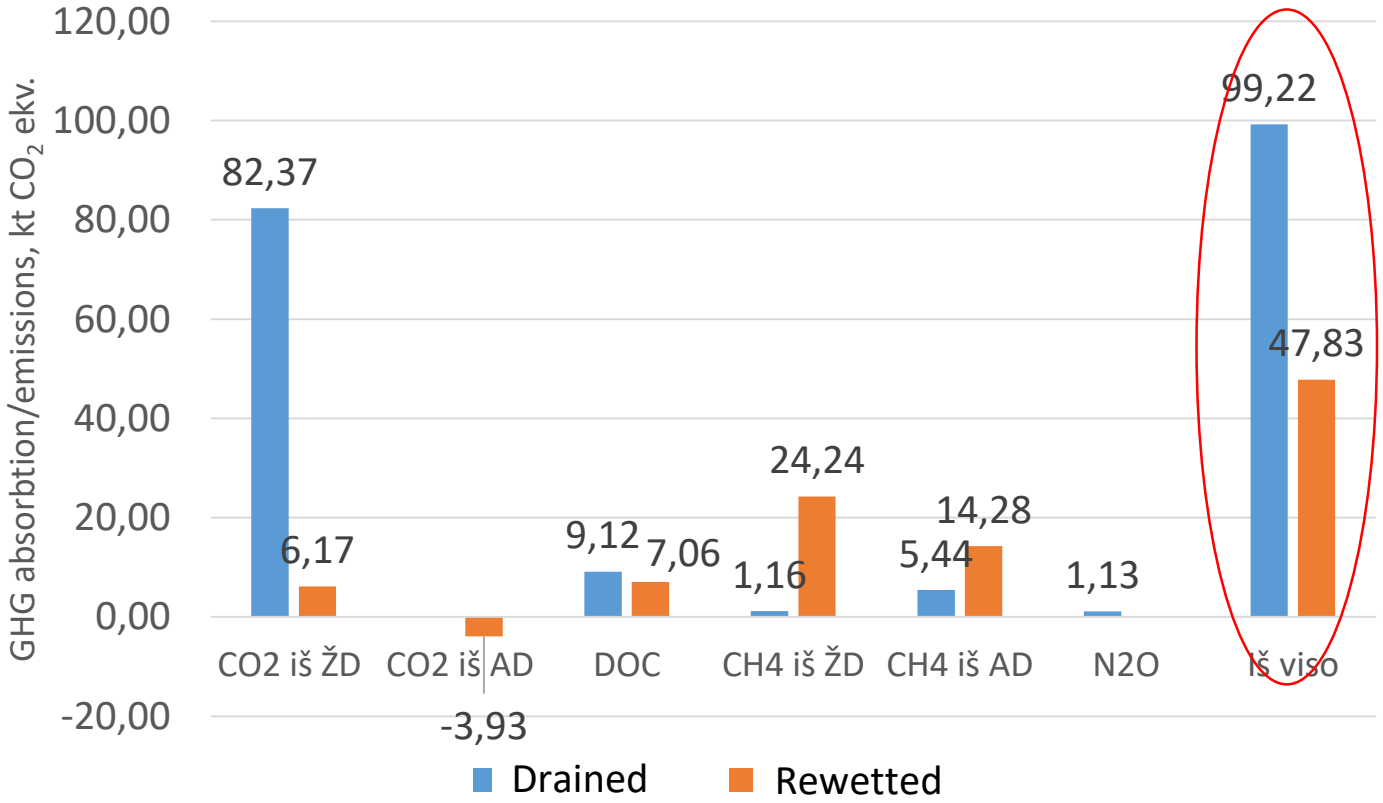
Peatlands, were hydrological regime was restored since 1991

Hydrological regime restoration in Natura 2000 sites

- Different data sources were used to estimate impacted areas in *Natura 2000* sites by interventions of hydrological regime restoration:
  - www.biomon.lt database of nature management actions developed by State Service for Protected Areas (LT);
  - Questionary of employees managing protected sites.
- Not an easy task to estimate really impacted area, mainly due to missing monitoring.
- Collected data were interacted with official reclamation data adjusted with “expert” estimation.
- It was estimated that MOST probably positive effect achieved in **8 023 ha** area:
  - 4 656.56 ha in raised bogs;
  - 3 366.73 ha in fens + transition mires.

Impact on emissions of rewetted Natura 2000 sites based on IPCCC (2013...) updated coefficients

We get poor ~ 50 kt CO_2 saving



Greenhouse Gas Emission Sites Types (GEST) approach was developed for assessing greenhouse gas (GHG) emissions from degraded and rewetted peatlands using vegetation as a proxy. The concept was elaborated by the mire researchers' group at Greifswald University (Couwenberg 2009; Couwenberg et al. 2008, 2011).

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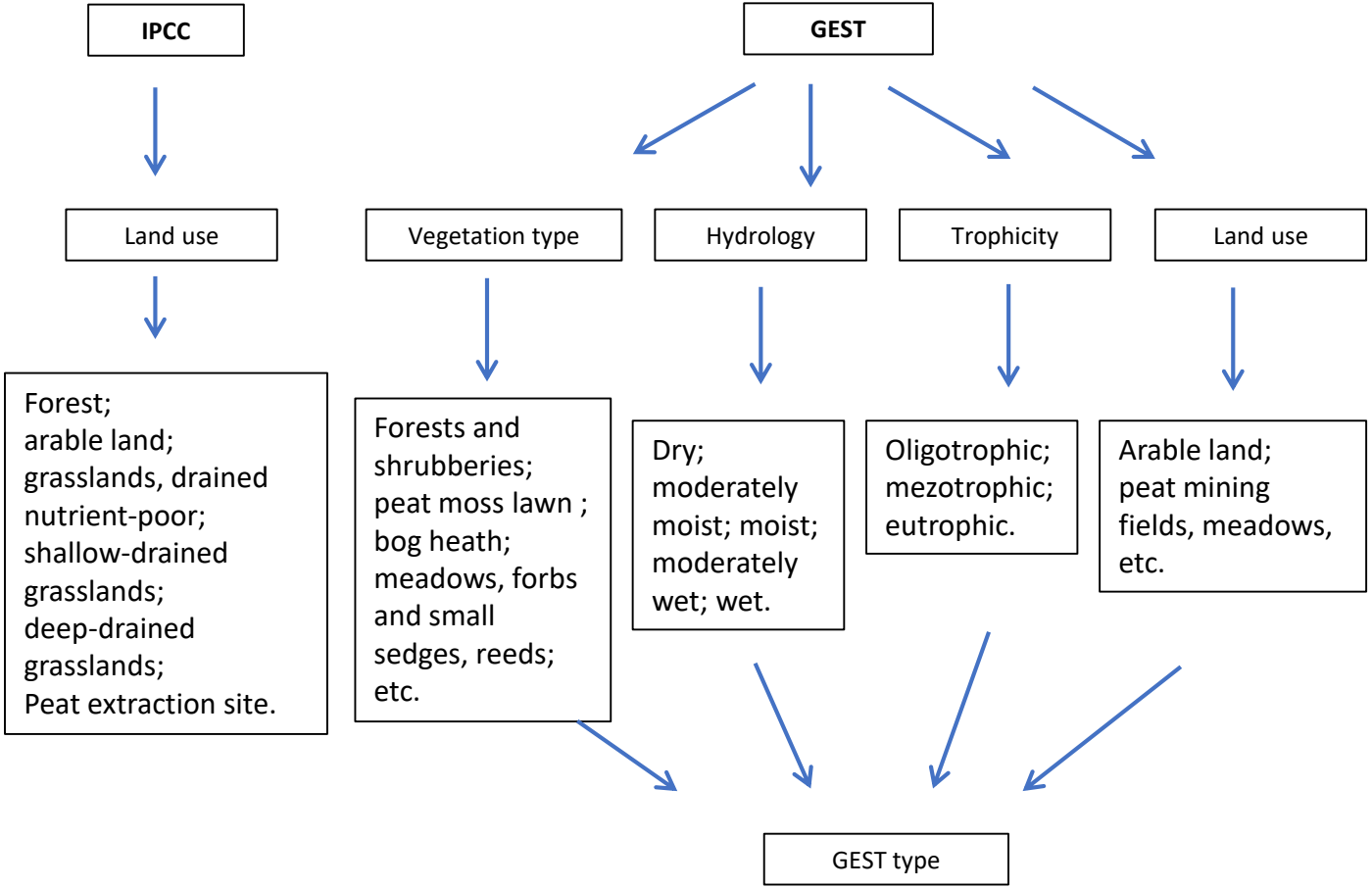
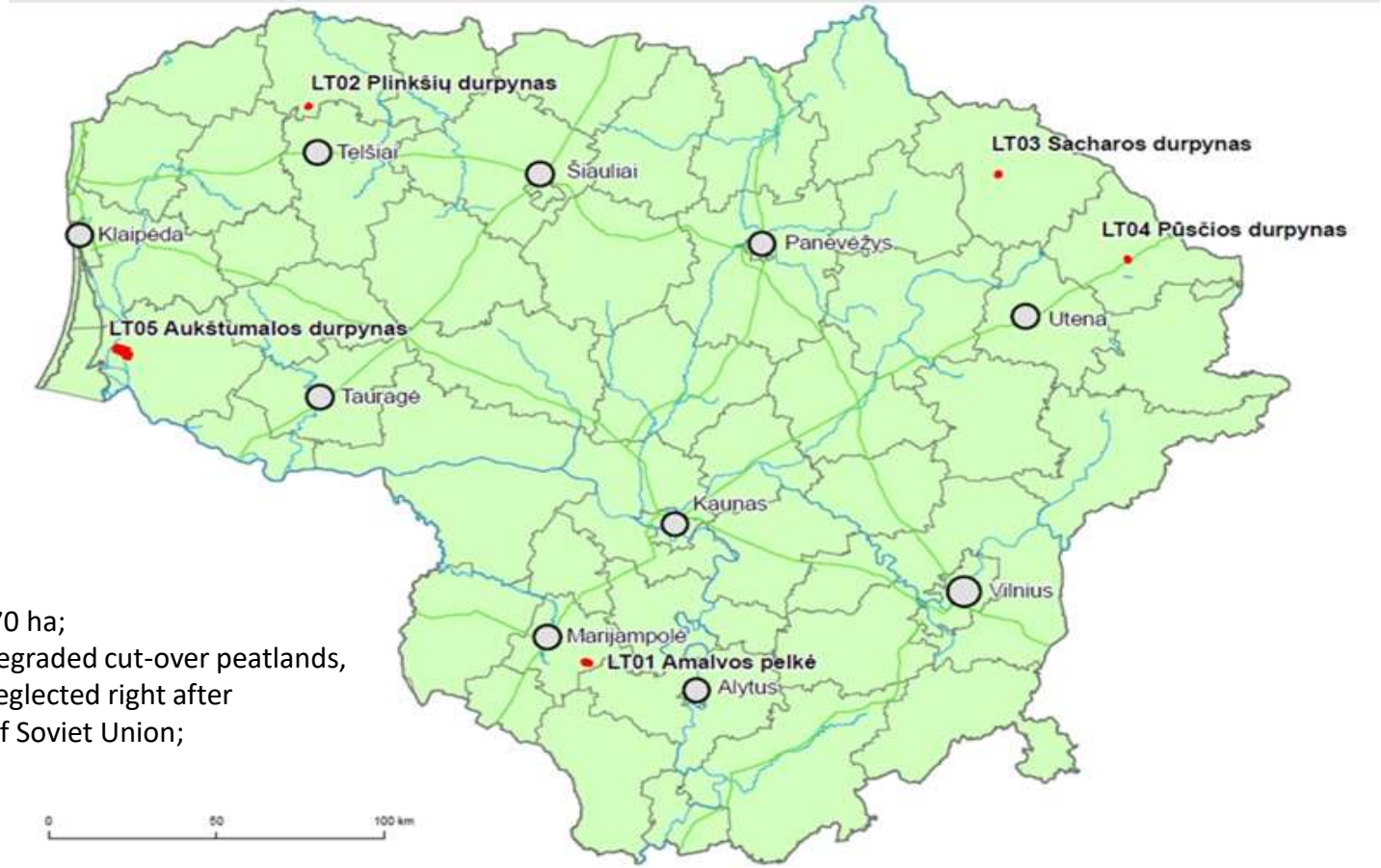
As direct measurements of GHG emissions are laborious and expensive, this approach gives a possibility to evaluate GHG fluxes by interlinking vegetation types, water table depth, peat properties and thickness.

GEST approach since its initial establishment has been developed further, however, even more detailed investigations and additional data collection from various geographical regions is necessary to improve it, e.g. integrating climatic gradients, adjusting new vegetation types, etc.

Comparison of methodologies



LIFE Peat Restore project sites



- Total area ~470 ha;
- Abandoned degraded cut-over peatlands, which were neglected right after the collapse of Soviet Union;

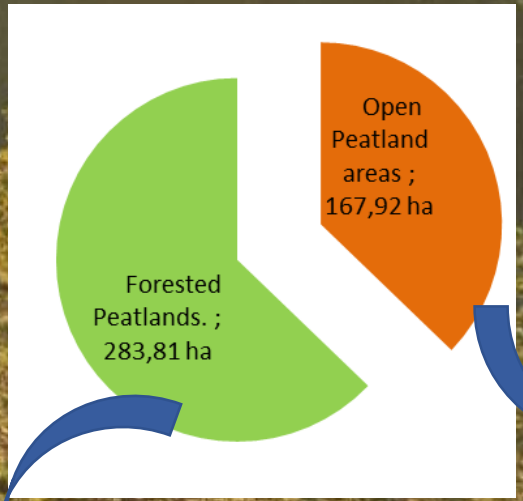
Amalvas

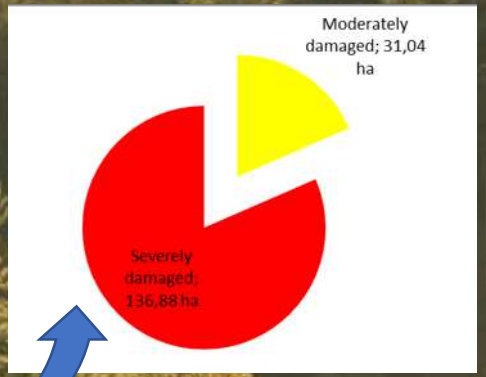
Sachara

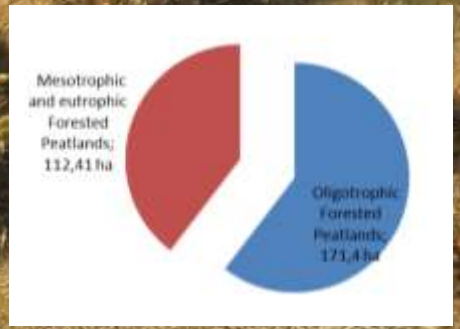
Pūsčia

Plinkšiai

Aukštumala







Both forested and severely damaged open peatland GEST types emit considerably big amounts of GHG gasses.

GHG emission estimation in Project sites based on GEST approach

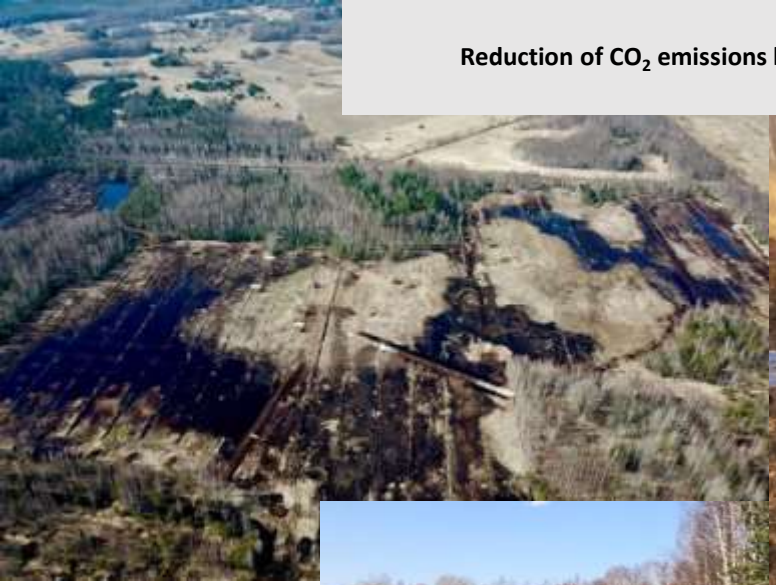
GEST type	GWP estimate (t CO2 eq/ha/year)	Area, ha					Total area	Total emmissions
		Amalvas	Aukstumala	Sachara	Plinkšai	Pūsčia		
Open Peatland areas (Unused)								
Moderately moist (forb) meadows	24.0		0.86				0.86	20.64
Moderately moist bog heath	no data	3.61	1.43				5.04	
Moist reeds and (forb) meadows	12.2					4.22	4.22	51.484
Moist bog heath	9.4					6.37	6.37	59.878
Bare Peat (moist)	6.2			8.78	0.89	23.88	33.55	208.01
Bare Peat (dry)	7.5		1.33				1.33	9.975
Very moist Meadows, forbs and small sedges reeds	1.6		3.82			0.42	4.24	6.784
Wet Meadows and forbs	5.8					9.79	9.79	56.782
Very moist bog heath	4.6	2.03					2.03	9.338
Wet bog heath	24.7							
Wet small sedges reeds mostly with moss layer	3.3			9.66			9.66	31.878
Wet tall reeds	4.0		4.67			0.65	5.32	21.28
Wet peat moss lawn	-0.3			3.78	50.5		54.28	-16.284
Peat moss lawn on former peat-cut off areas	1.9							
Wet peat moss lawn with pine trees	4.1	20.6		10.43		0.2	31.23	128.043
Forested Peatlands.								
Oligotrophic Peatlands								
Moderately moist Forest and shrubberies	-3.2	89.3		19.44	16.12	11.47	136.33	-436.256
Moist Forests and shrubberies	-0.5			34.51		0.56	35.07	-17.535
Very moist Forests and shrubberies	-0.5							
Mesotrophic and eutrophic peatlands	0.0							
Dry Forests and shrubberies	43.4	89.5					89.5	3884.3
Moderately moist Forests and shrubberies	**20.0**	1.1	0.44			**20.41**	21.95	439
Moist Forests and shrubberies	12.2					0.96	0.96	11.712

Pūsčia Thelmological Reserve – a terribly looking abandoned site

LIFE PEAT RESTORE

Reduction of CO_2 emissions by restoring degraded peatlands in Northern European Lowland

LIFE15 CCM/DE/000138



GHG emission reduction in project sites

Summarized table of GHG emission reduction in 5 Lithuanian project sites

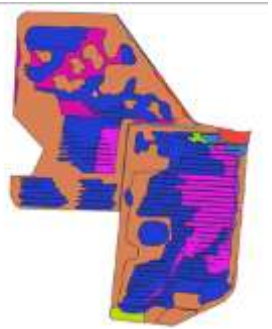
Scenarios	CO_2 (kt CO_2-eq. /year)	CH4 (kt CO_2-eq. /year)	GWP (kt CO_2-eq. /year)
Baseline, 2018	8,3	0,3	8,5
Post restoration scenario	1,3	1,3	2,6
Savings	7,0	-1,0	5,9
Savings (%)	84	-0,4	69

Mapping example from abandoned peatland Pūsčia:

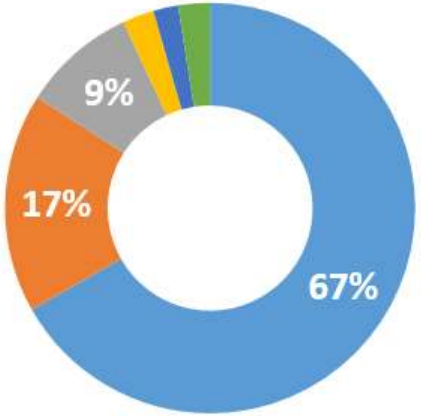
Baseline

After restoration

Without restoration



GHG emissions in LULUCF



- Agriculture
- Forestry
- Peat extraction
- Abandoned peat mining sites
- Sites overgrown by shrubs
- Drained peatlands

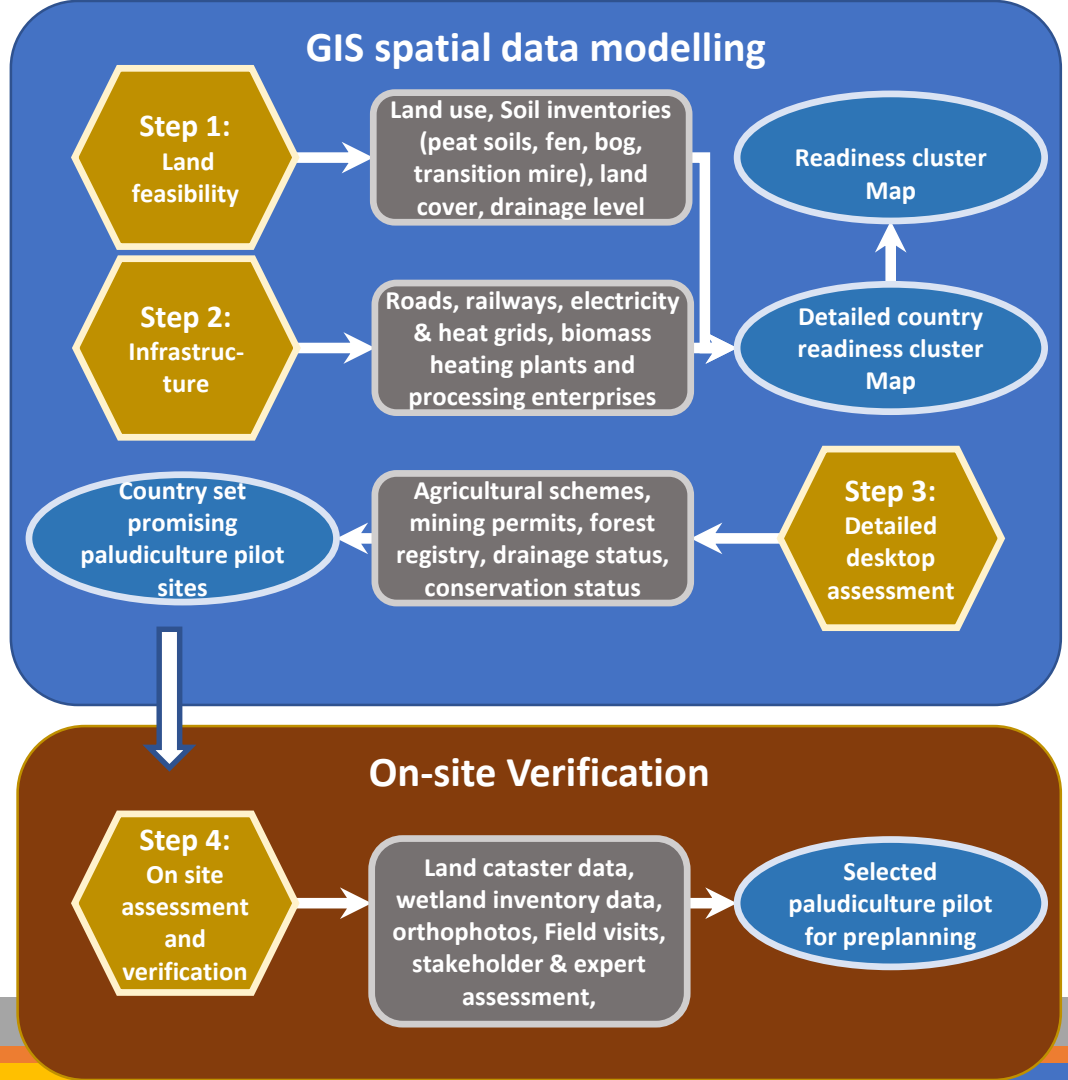
Lithuania's National Inventory of GHG –
1 900 kt of CO_2 eq. from peatlands in 2016.
Total country's emissions – 21 000 kt of CO_2 eq.

Target until 2030 –
Reduction by 9% in NON ETS sectors

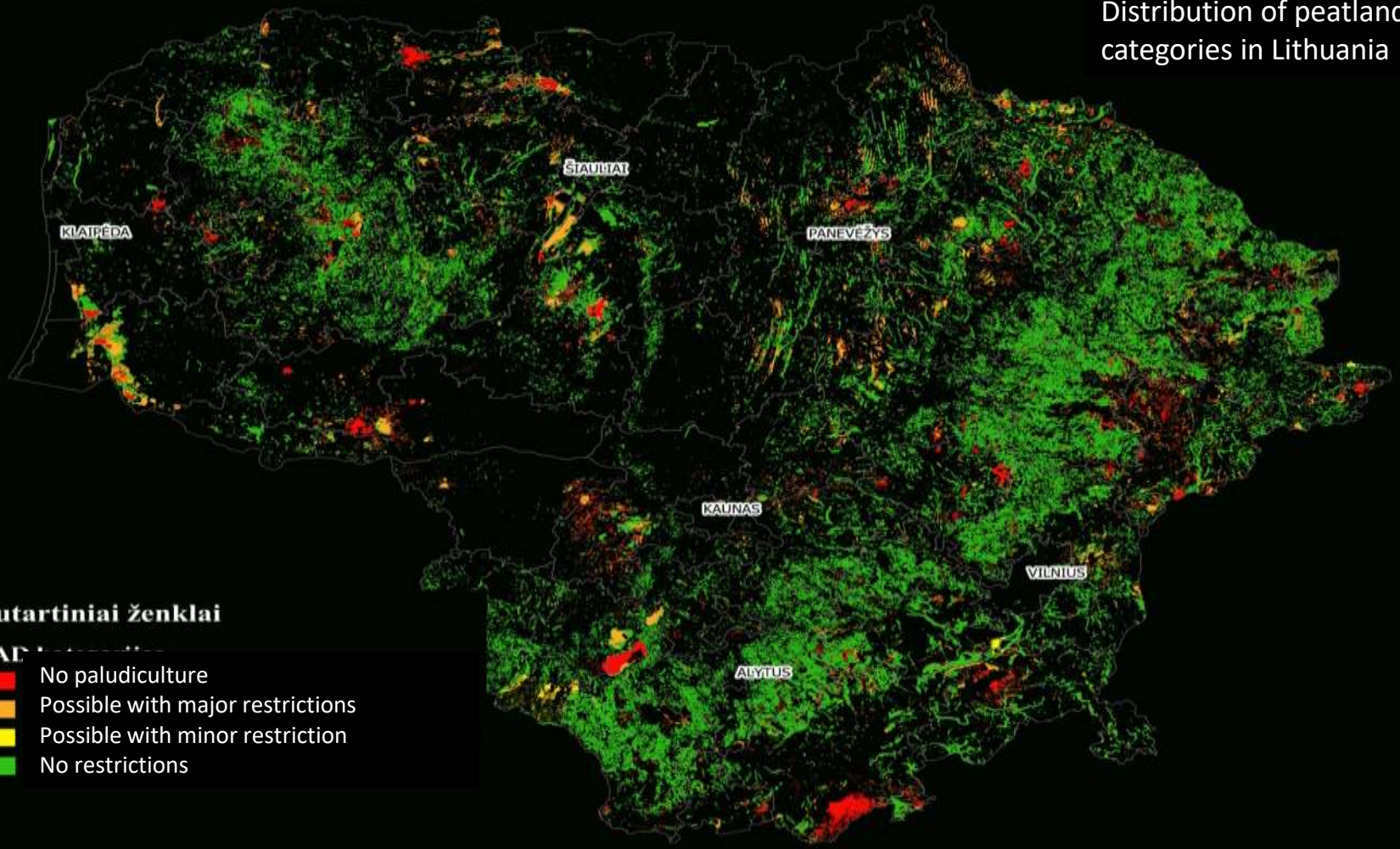
Calculation based on new coefficients:
2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands

Usage	GHG emissions kt of CO_2eq./year (from-to)
Agriculture	4 578-7 216
Forestry	1 868 - 2 117
Peat extraction	869 - 973
Peat extraction (abandoned)	268
Overgrown sites by scrubs	212
Drained peatlands	269
Total	**8 313 - 10 806**

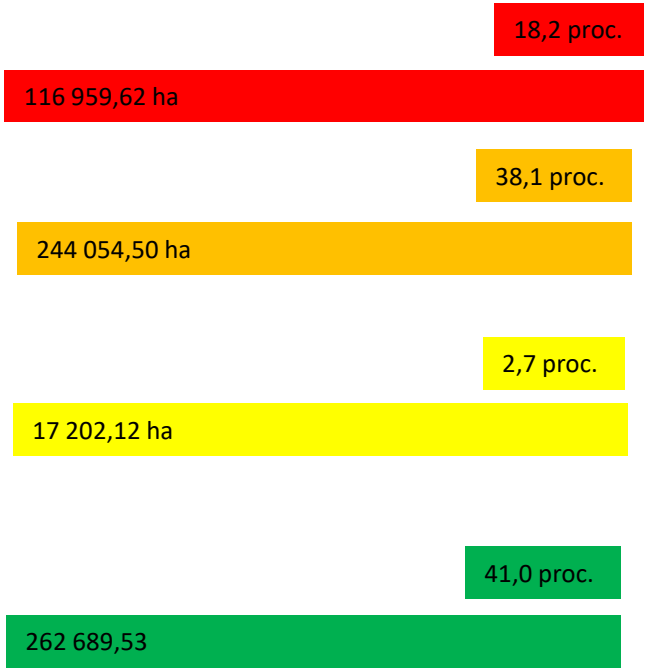
Assesment on possibilities for paludiculture



Distribution of peatland categories in Lithuania



Paludiculture categories in Lithuania



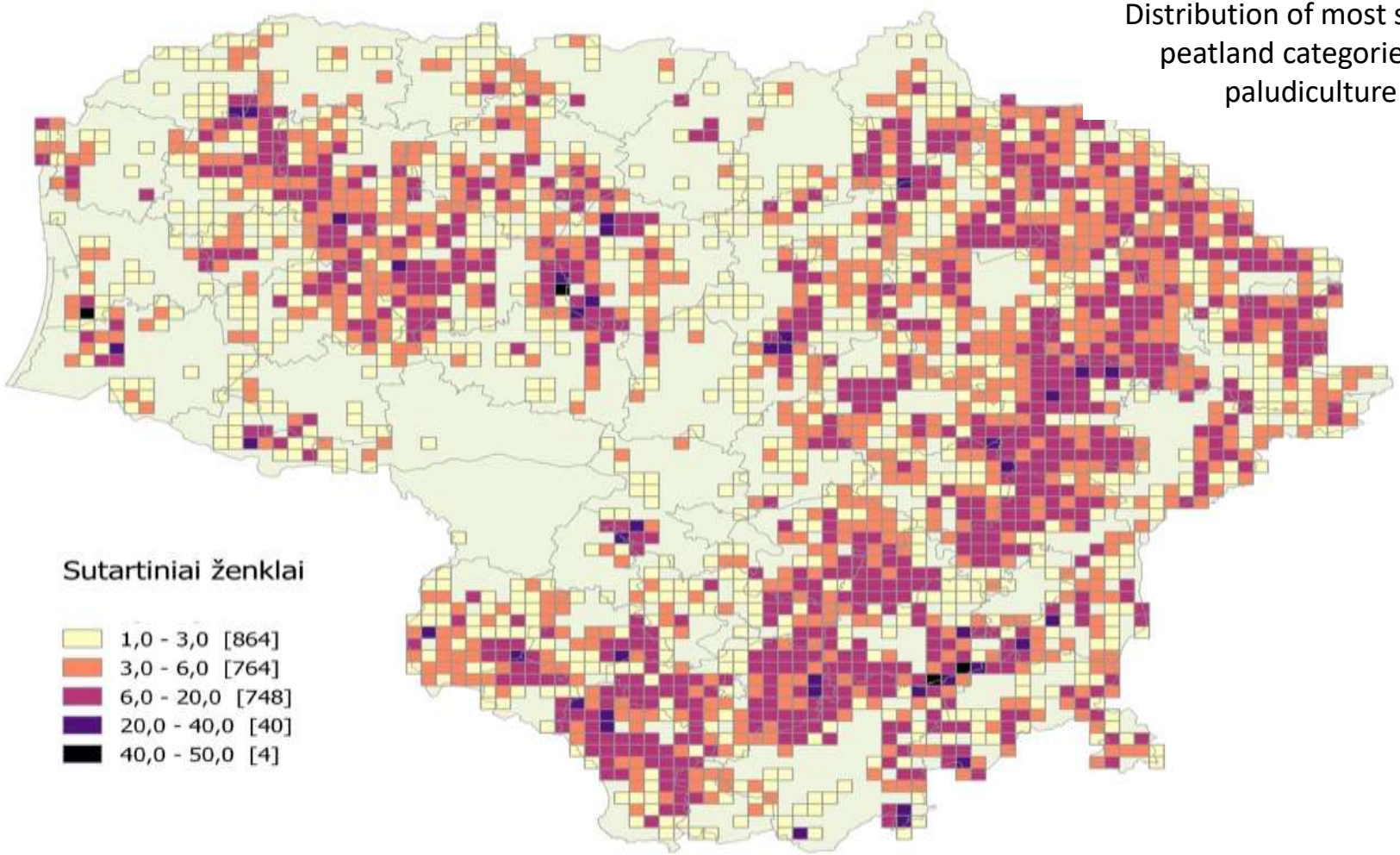
not possible. Mainly nature reserves, reserve forests

paludiculture possible only after considerations, but major restrictions might appear, e.g. valid peat mining permits

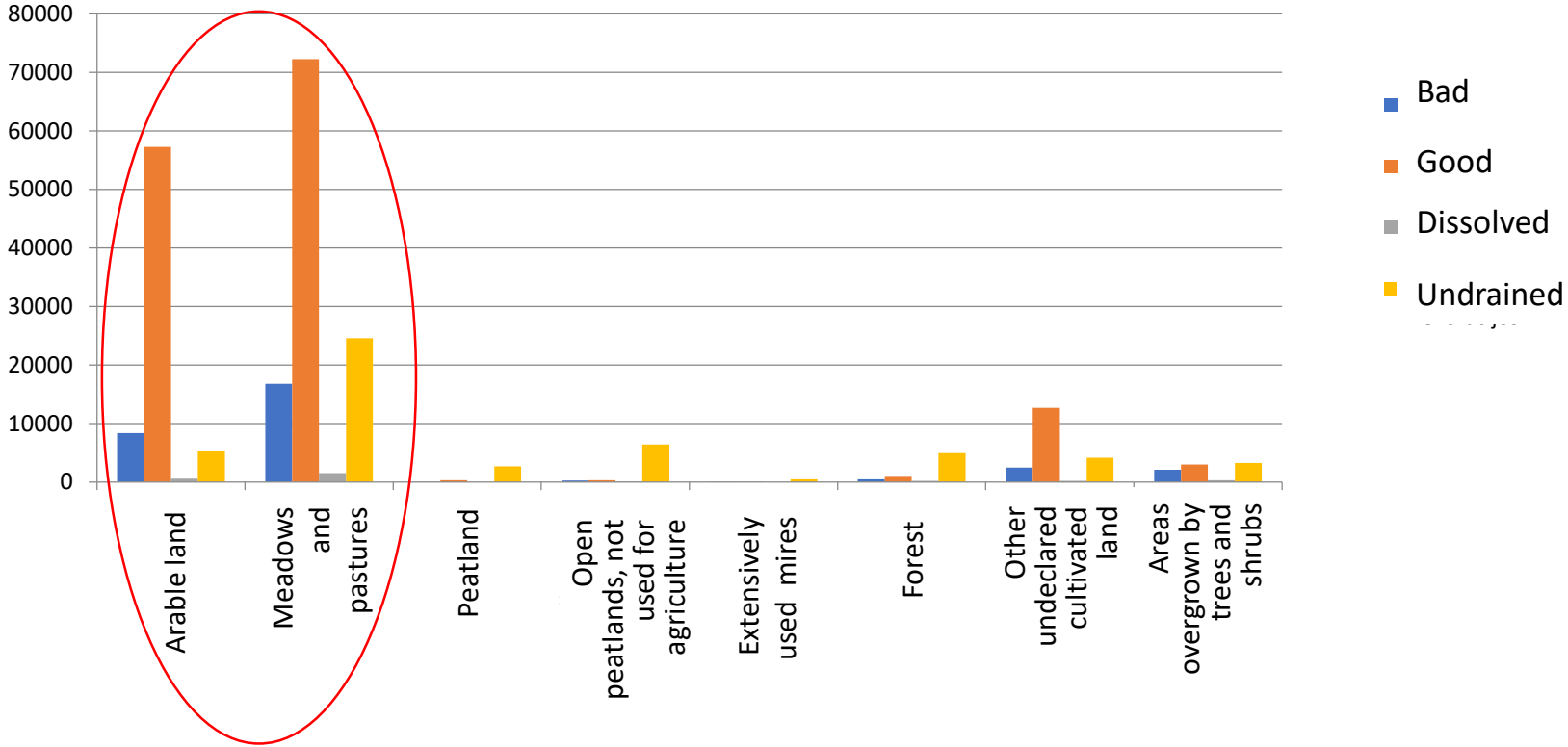
paludiculture possible after considerations, but it is likely more possible, e.g. abandoned peatlands without permits for minning

paludiculture is possible, e.g. agricultural sitesk

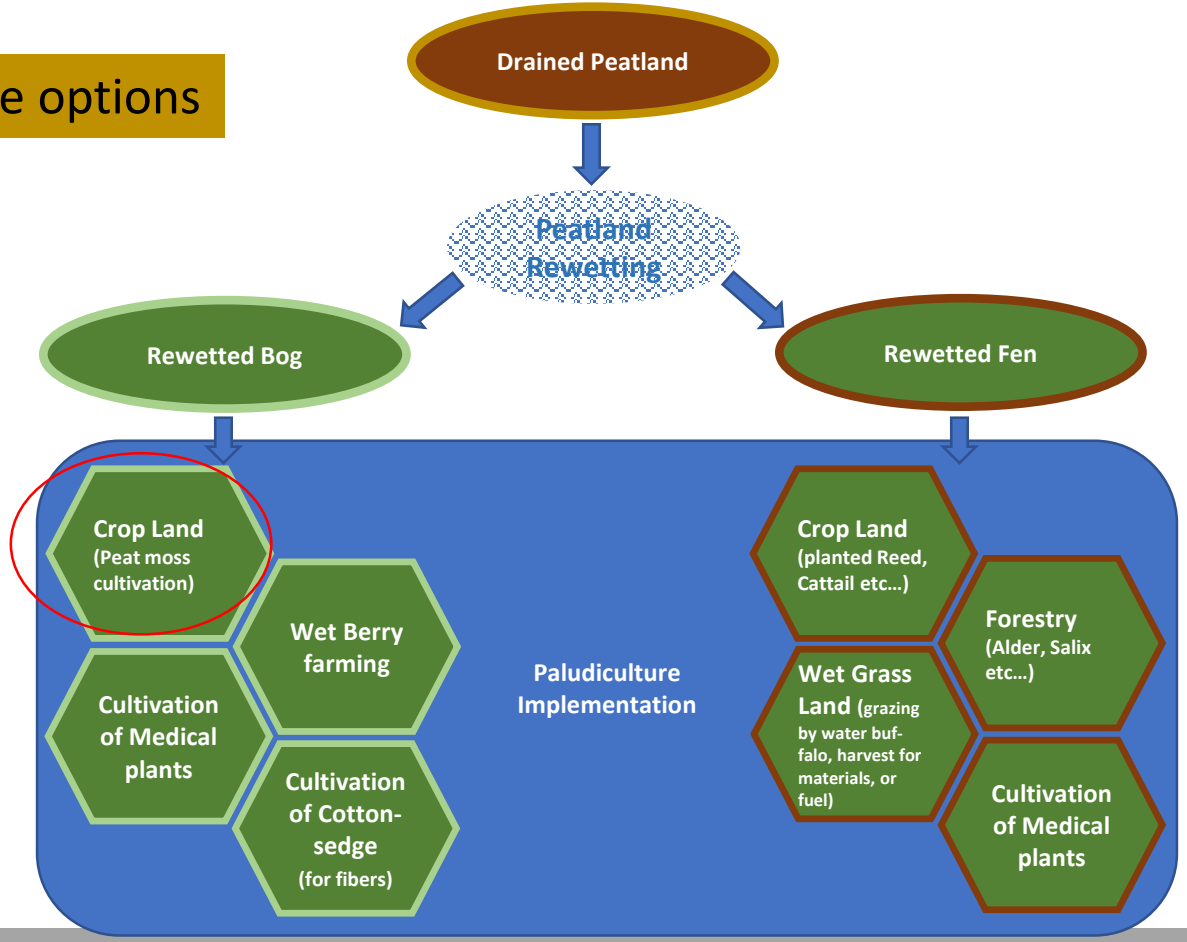
Distribution of most suitable peatland categories for paludiculture



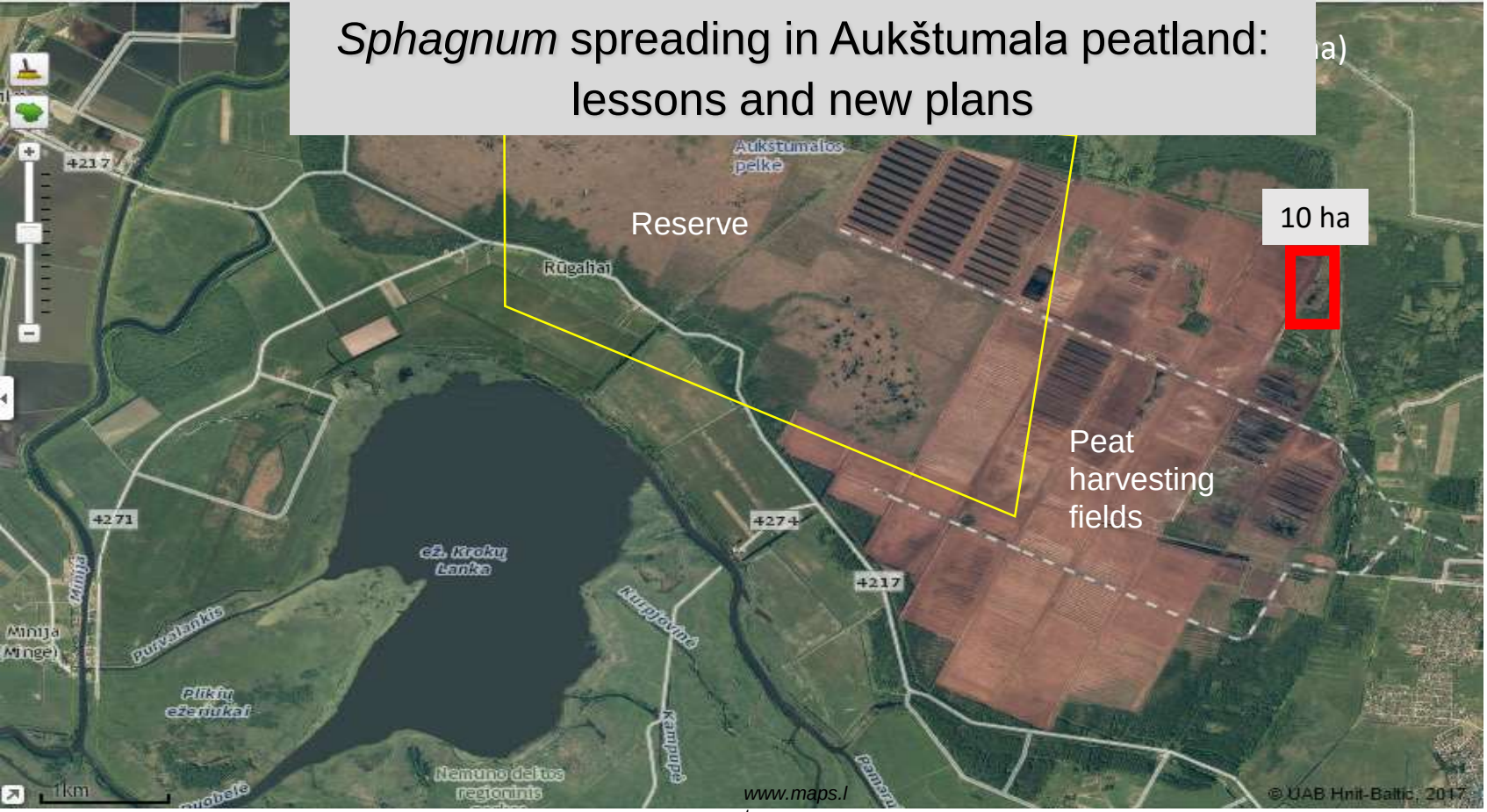
Status of melioration systems in agriculturally utilized peatlands



Paludiculture options



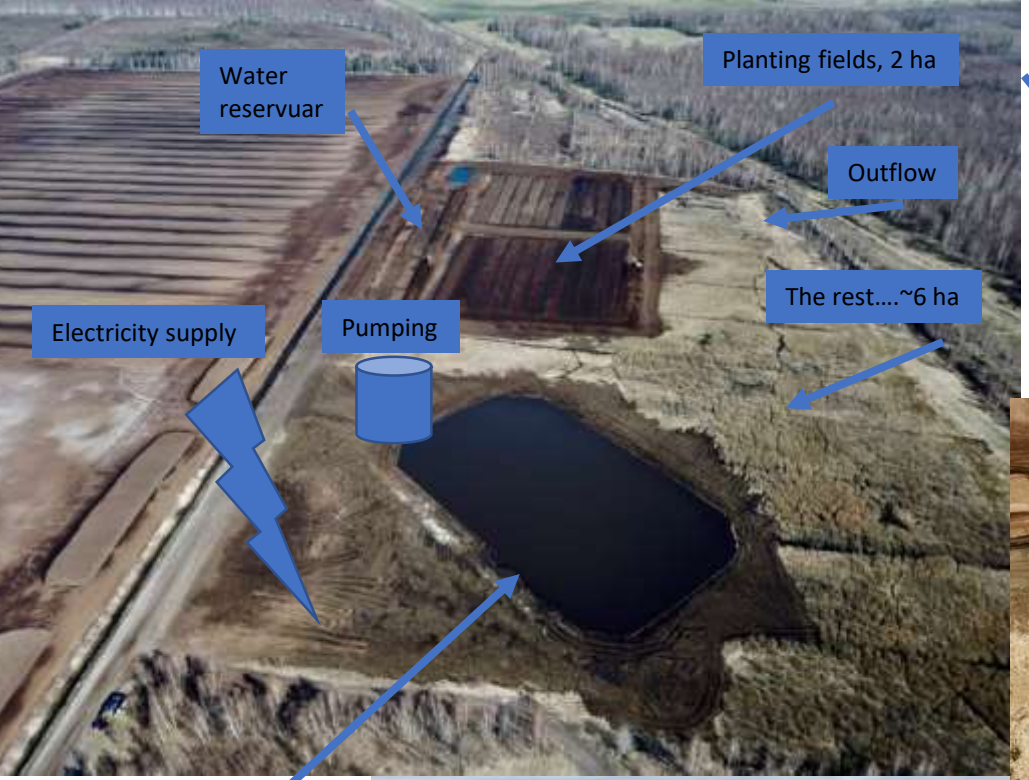
Sphagnum spreading in Aukštumala peatland: lessons and new plans



1993: wetland of international importance (Ramsar Convention)

1995: Aukštumala Telmological Reserve

2004: Nemunas Delta – NATURA 2000 site


Water reservuar
Planting fields, 2 ha
Outflow
The rest….~6 ha
Electricity supply
Pumping
Water reservuar for water supply

Do we have to pray?