

Peatland rewetting for defense and climate change mitigation

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NATO peatland belt

NATO frontline states, like Poland, Finland, Estonia, Latvia, and Lithuania are considering restoring peatlands along their borders with Russia and Belarus to create natural barriers against potential military advances while simultaneously addressing climate goals.



Peatland role

The **NATO peatland belt** refers to defense strategy being explored by NATO's eastern flank countries that combines environmental restoration with military defense.

Dual Benefits and strategy

Defence: Rewetting of degraded peatlands is a critical nature-based solution for enhancing defense functions. When peatlands are wet, no heavy military vehicles can simply drive through it because of waterlogged conditions.

Climate: Preserving peatlands is crucial to counteract the effects of climate change and biodiversity loss. Peatland rewetting can reduce greenhouse gas emissions significantly.



Peatland restoration in the border area



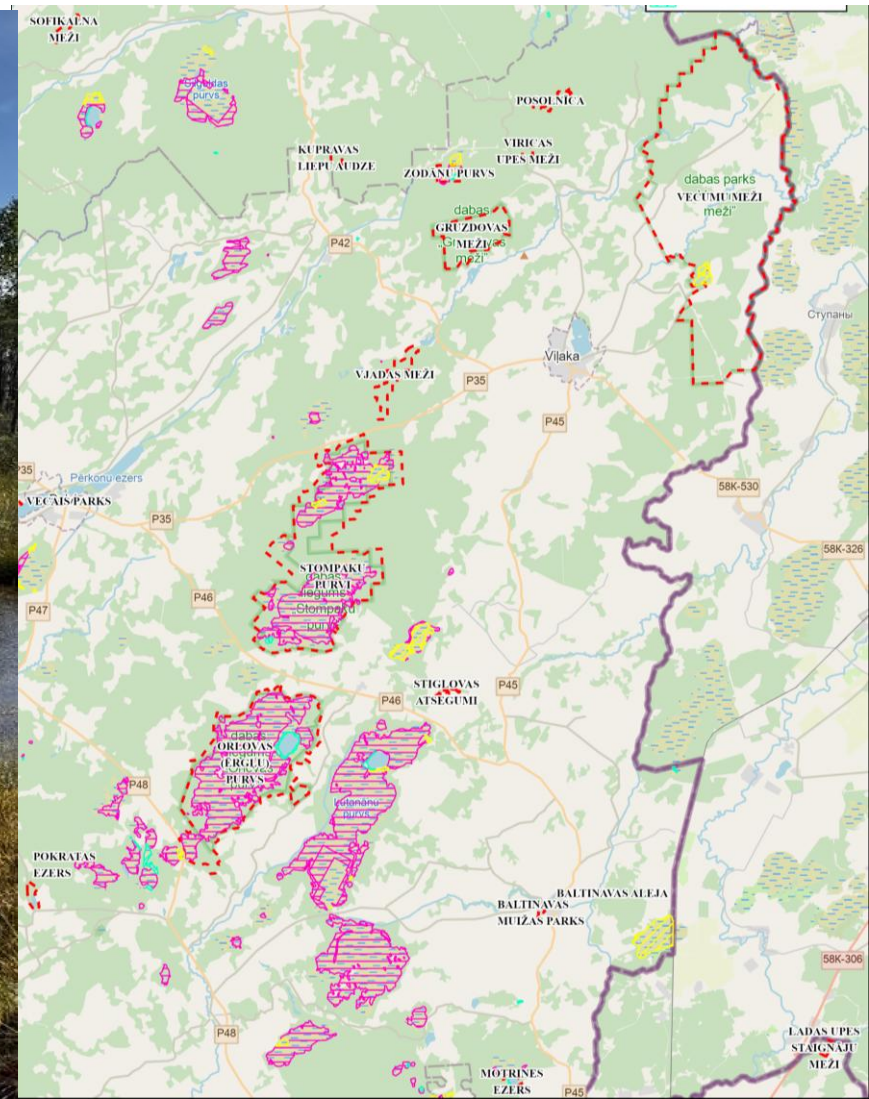
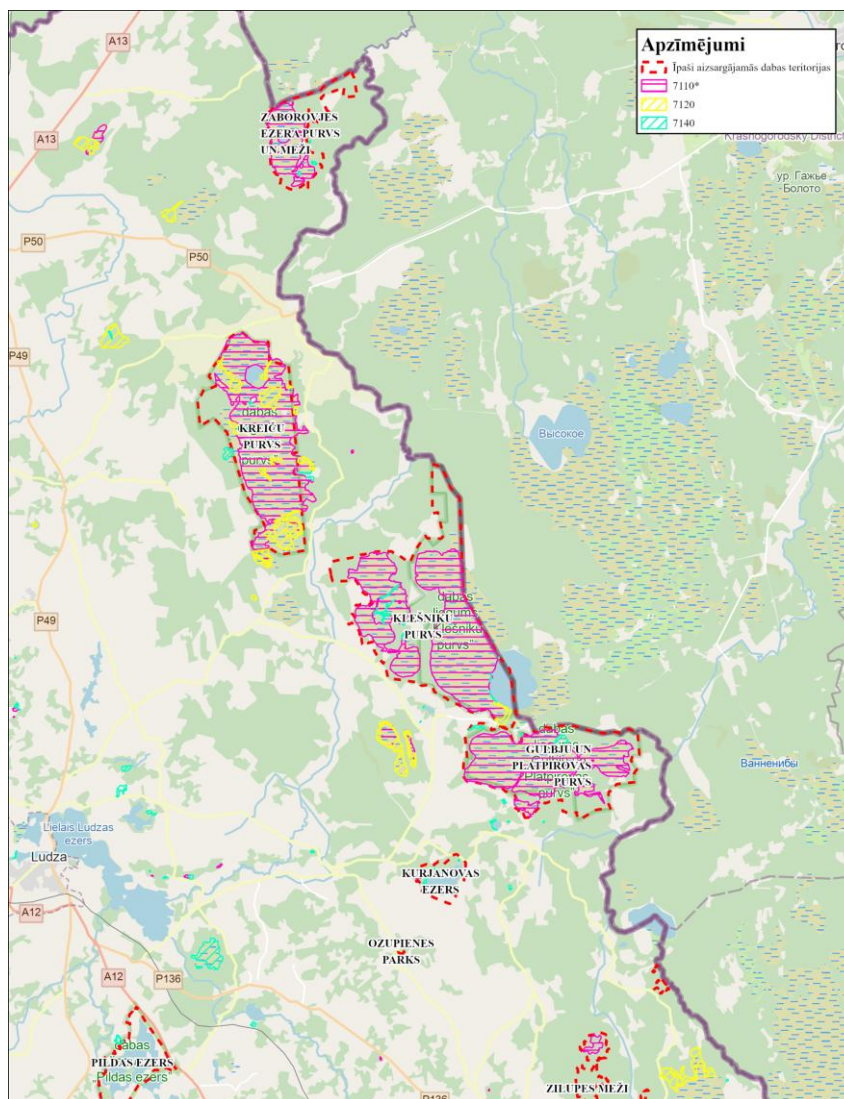
The border between Latvia and Russia is 217 km and has been part of the EU's external border since 2004. Most of Latvia's peat bogs are located in the east of the country

Latvia plans the restoration of historical peat extraction fields to transform degraded areas into natural protective barriers that reduce vulnerable areas along borders.

This initiative is part of Latvia's broader Baltic defence line project and is an innovative approach that combines environmental restoration with national security objectives.

<https://www.dw.com/en/peatlands-as-defense-climate-nato-finland-poland-russia-co2-rewetting/a-74513628>

Peatlands near Latvian – Russian border





Peatland restoration in Kreiču Mire

- Total area 2273 ha.
- Located about 2 km from Russian border
- In 2023 JSC “Latvijas Valsts Meži ” has completed the construction of 7 dams (restoration area 61 ha with positive effect up to 100 ha).
- The aim of optimizing the hydrological regime, along with thinning overgrown wet forests or completely clearing degraded raised bogs.



Stompaku Mire near Russian border



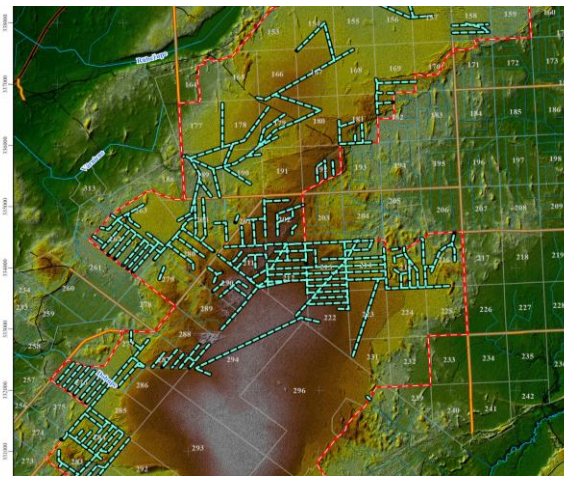
Restoration in Stompaku Mires Nature reserve

Total area 3881,03 ha

About 16 km from the
border

Management Plan has been
prepared

Restoration area 675 ha



European Commission LIFE Programme
Climate change mitigation sub-programme project
101074396 - LIFE21-CCM-LV-LIFE PeatCarbon
(2022-2027)

Peatland restoration for
greenhouse gas emission
reduction and carbon
sequestration in the Baltic Sea
region



The main objectives

- Reduction of greenhouse gas (GHG) emissions in the peatlands of Latvia and Finland, including habitats of EU importance, like 7110* Active raised bogs, 7120 Degraded raised bogs.
- Testing innovative monitoring methods for the comprehensive assessment of GHG emissions in Latvia.
- Monitoring of CCM measures in 2 restoration sites in Latvia - Lielais Pelečāre and Cena Mire Nature Reserves and 2 sites in Finland - Välisuo and Matorova Mires, as well as 3 LIFE Project sites where peatland restoration was carried out previously.



Project sites



Peatland restoration results



Skaists Lake in Cenas Mire in 2006 before raising of water level



After 8 years die-off of pine trees can be observed after 8 years. The positive impact is far behind the direct influence zone.

Skaists Lake in 2025



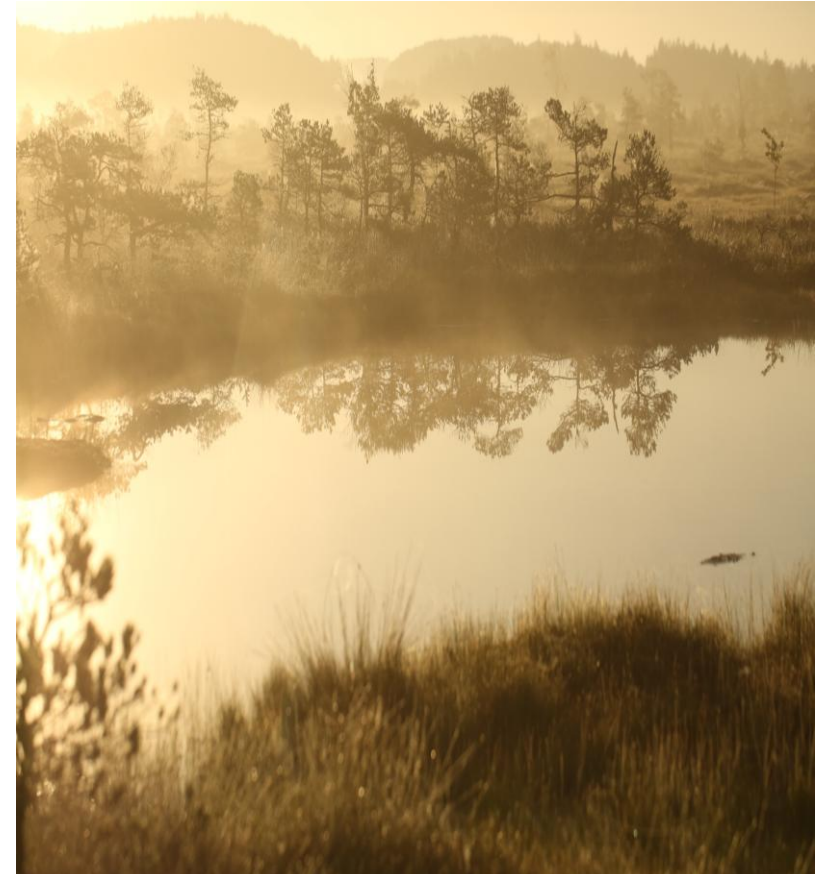
Cenas Mire Nature Reserve



Sphagnum pulchrum

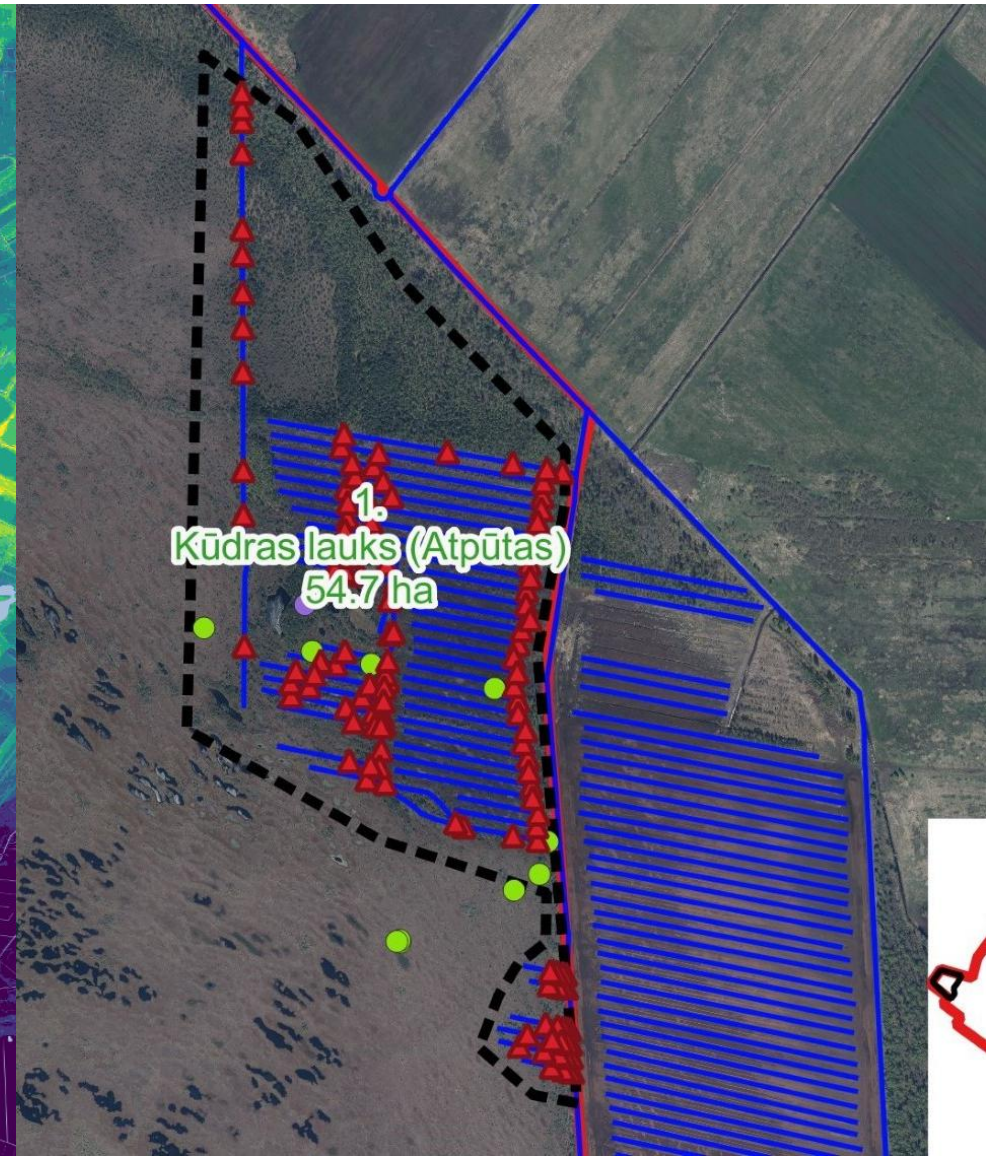
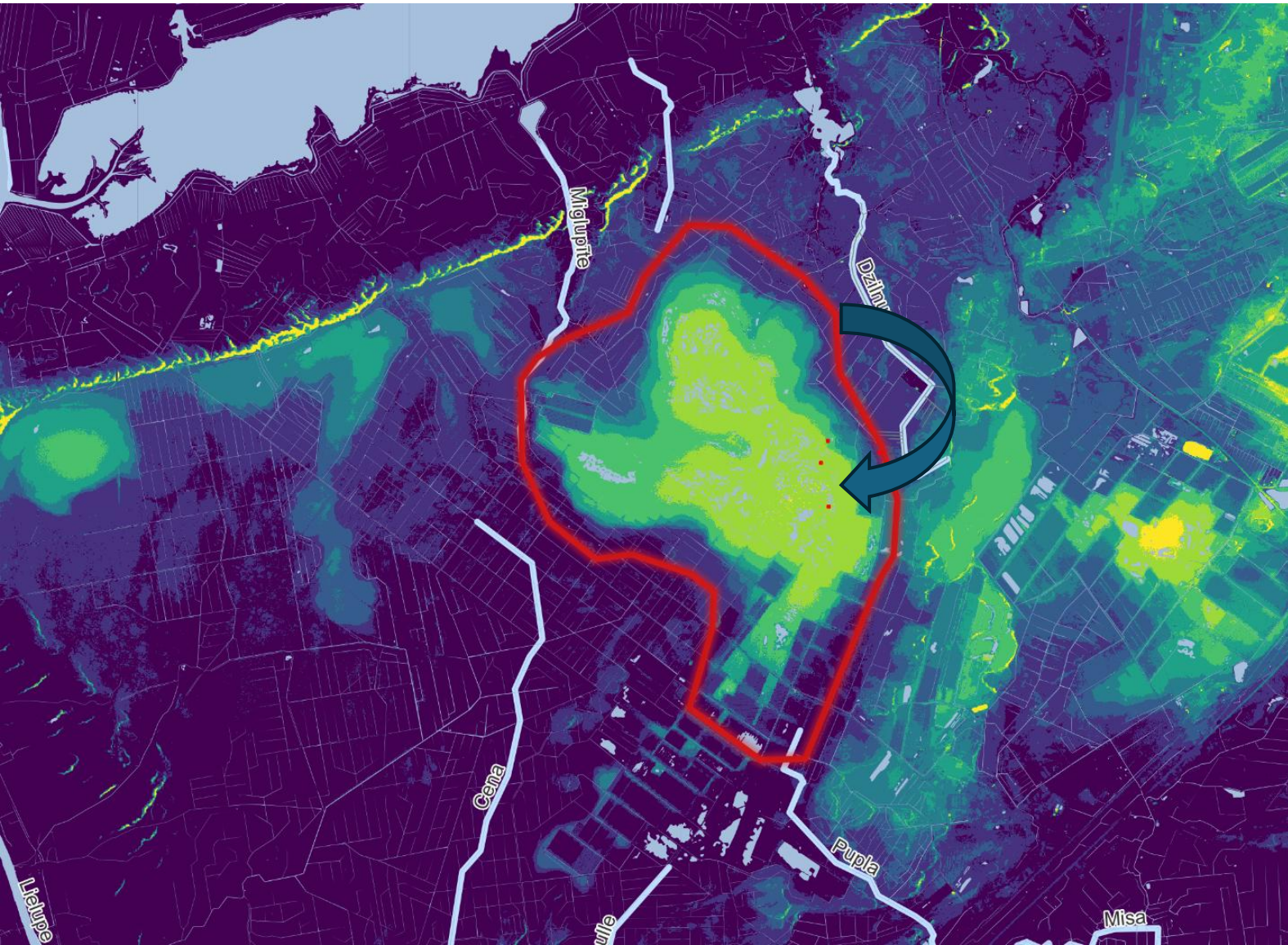


Betula nana

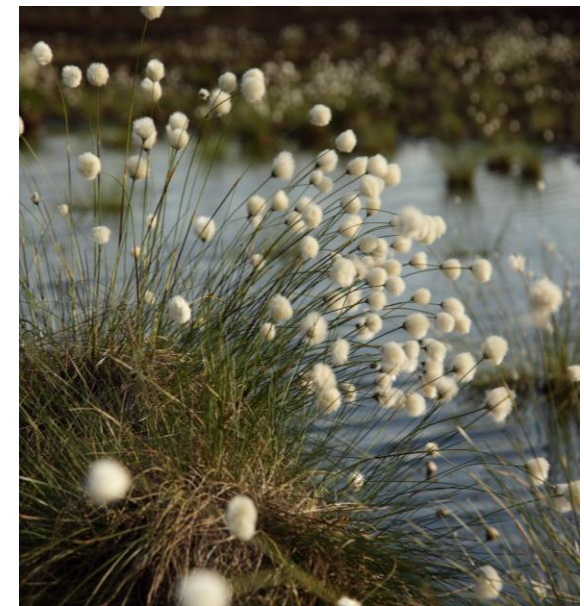
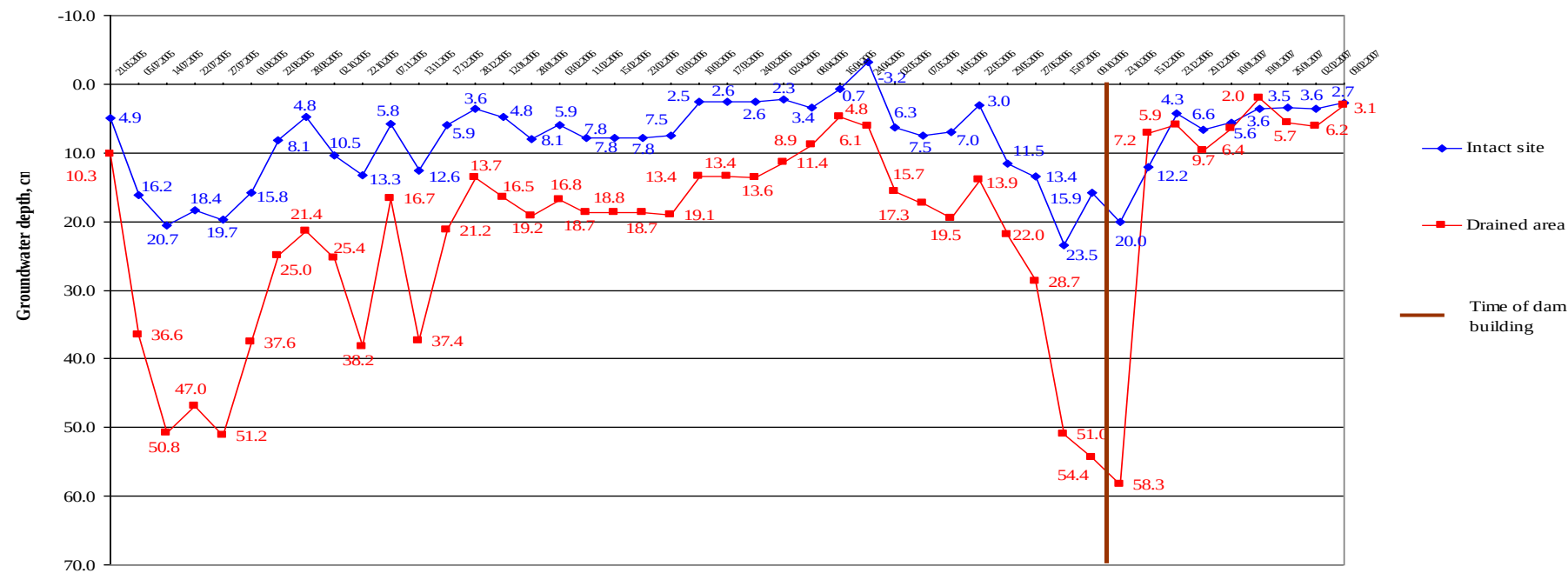
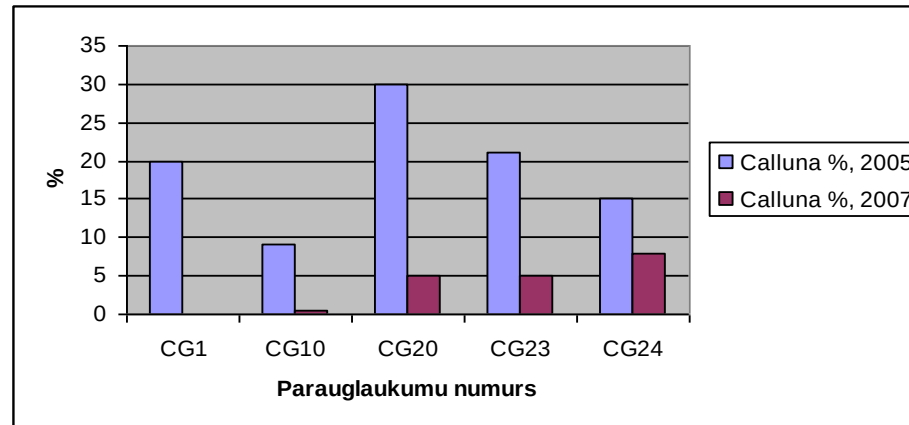
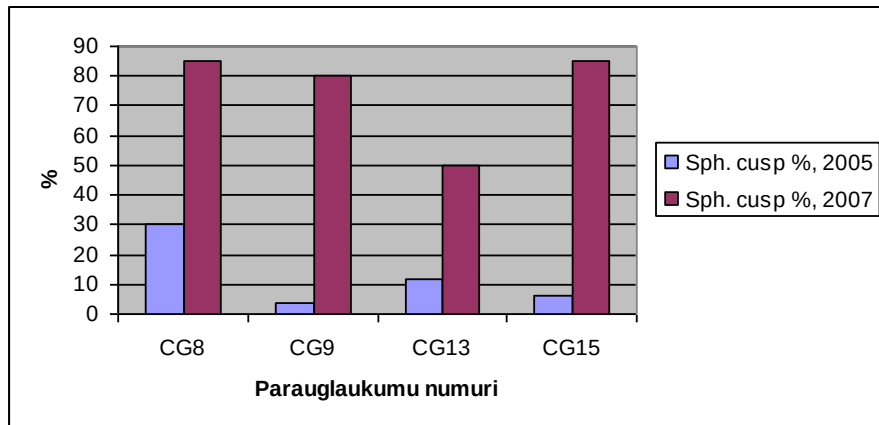


Raised bog pools

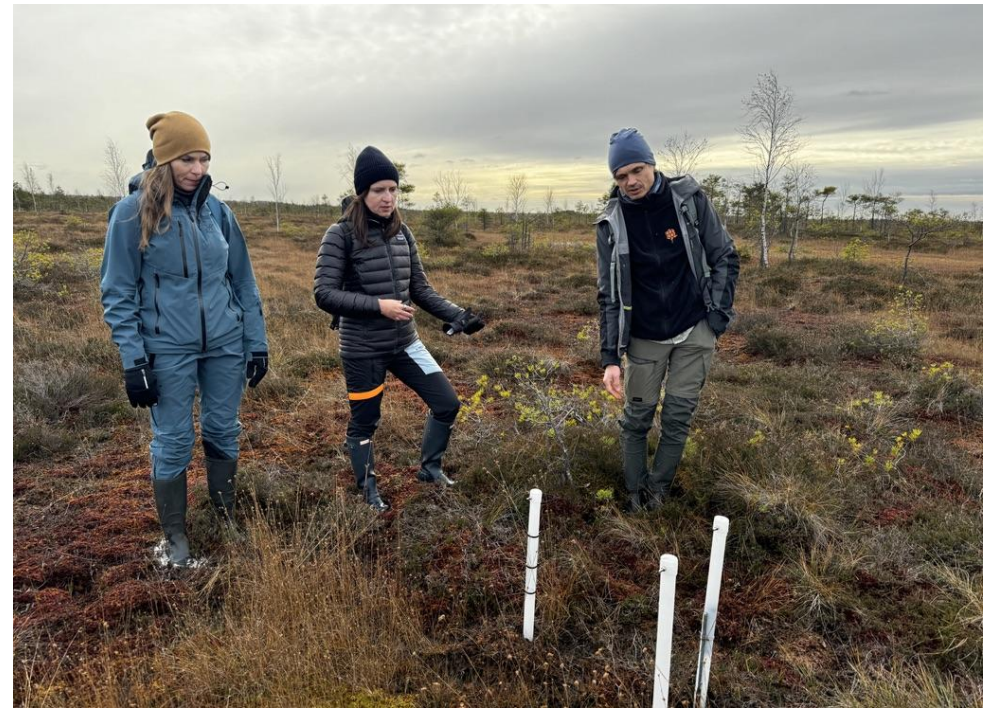
Cena Mire terrain, hydrological network and restoration area



Cenas Mire restoration results in 2007

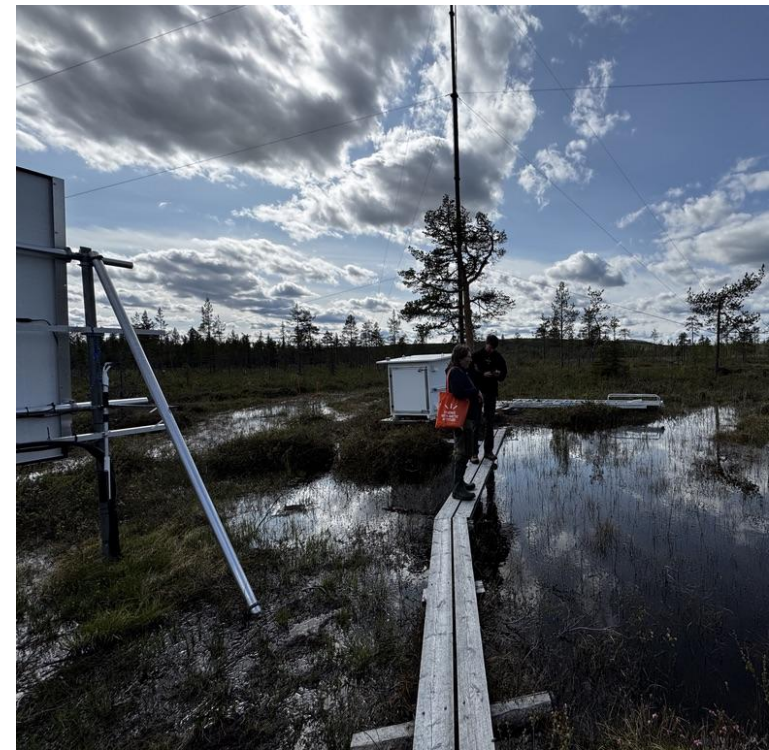


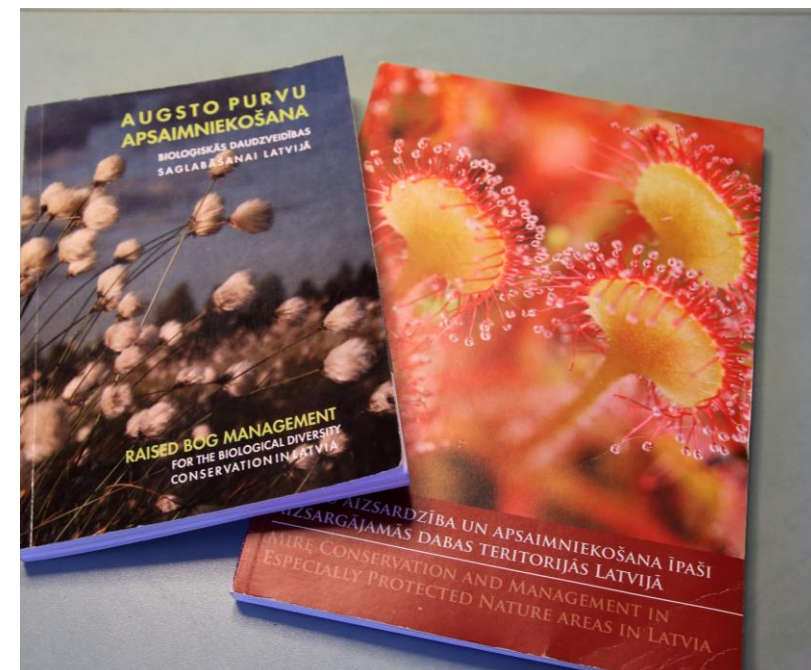
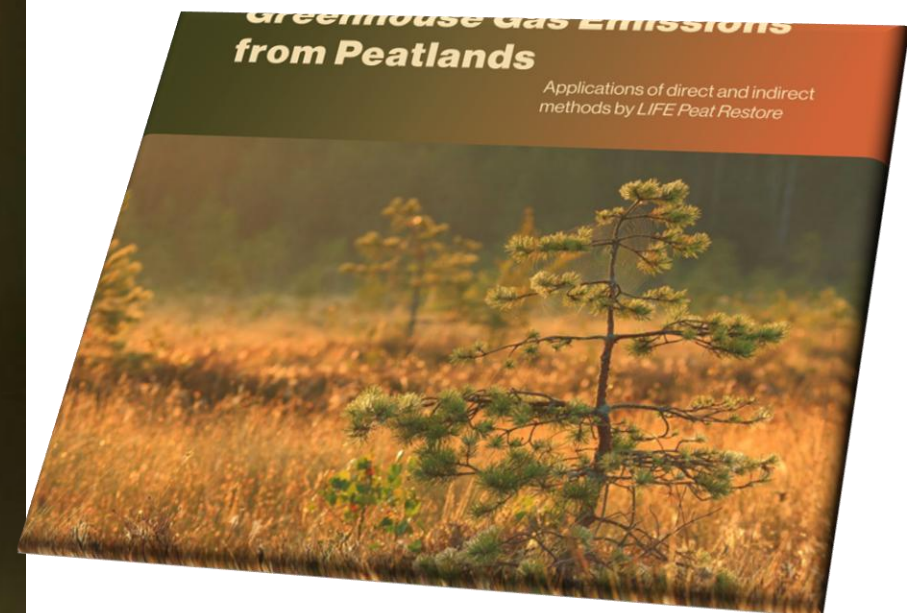
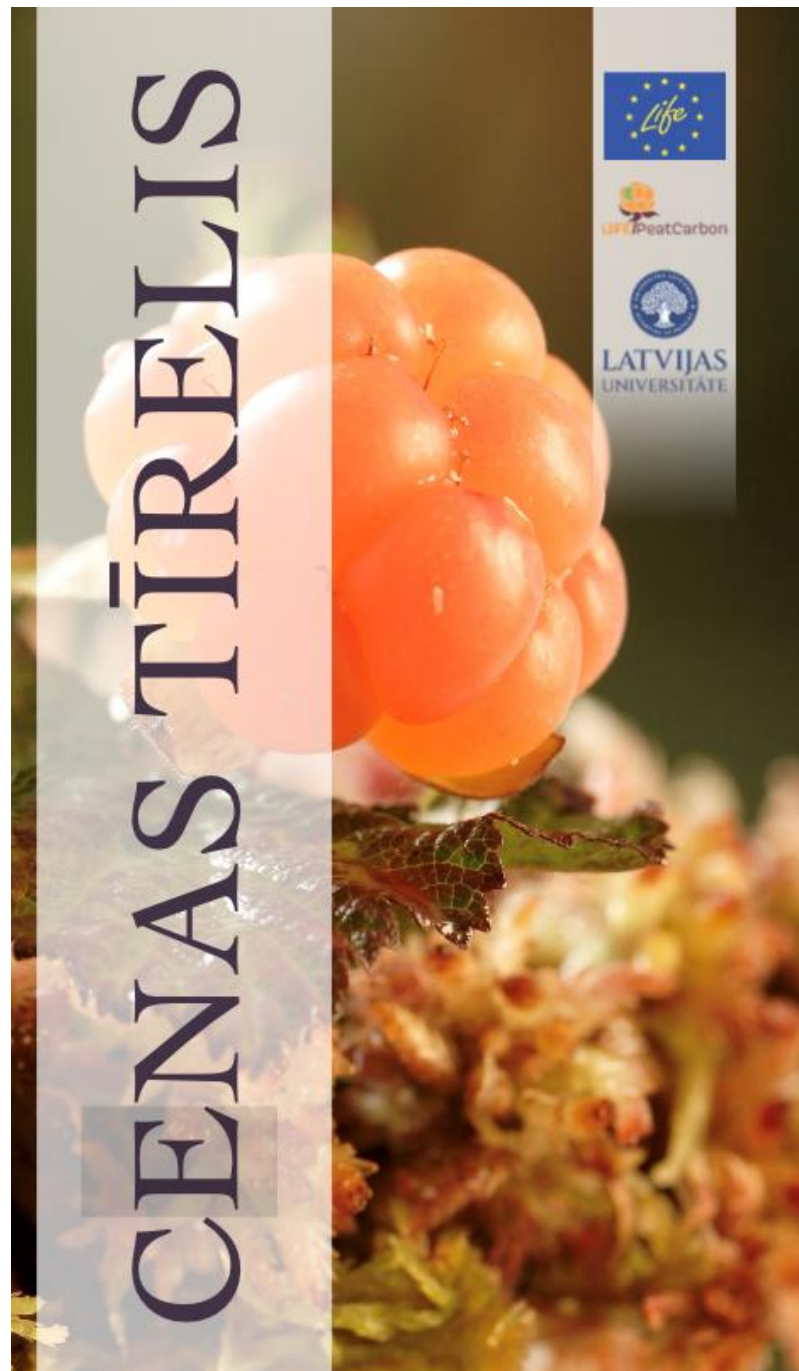
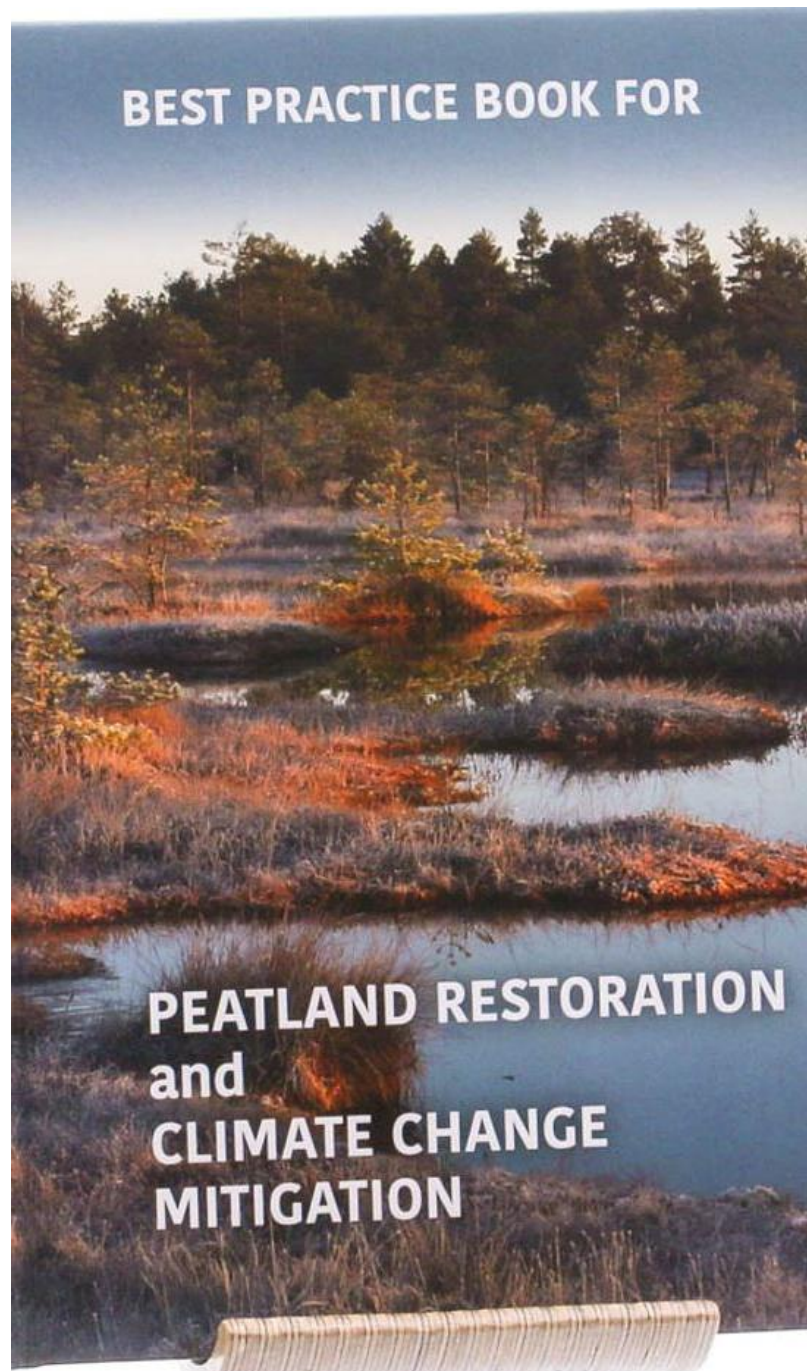
Hydrological, vegetation and GHG monitoring



Peatland restoration results in Finland

- Drainage ditches closed in Matorova and Välisuo Mires in 2024
- Trees cut in 2024
- Area rewetted as a result of water table rise; also near the Eddy covariance tower.





Public awareness for the border peatland restoration

Photo exhibition
156 photos
21 author



Māra Pakalne

LV

Dabas liegums "Melnā ezera purvs" vēsturiski ir daļa no kādreizējā 10 000 ha lielā Cenas tīrelja. Purva platība ir 317 ha un tas veidojies pirms 5 000 – 6 000 gadiem.

Teritorijā ir saglabājušies trīs Eiropas Savienības īpaši aizsargājami biotopi: aktīvs augstais purvs, pārejas purvs un slīdņos un degradēti augstie purvi, kuros iespējams vai noris dabiskā atjaunošanās. Purvā ir saglabājušies divi ES aizsargājami meža biotopi – purvaini meži un veci vai dabiski boreāli meži, un viens ES

īpaši aizsargājams ezera biotops – distrofi ezeri.

Lielākoties purvā mit mītrummīlošas sugas un mazāk ietekmētajā daļā ir sastopamas purviem raksturīgi augi, kā sfagni, rasenes, spļives un grīši. Dabas liegumā ir konstatētas 17 putnu sugas, kas iekļautas Eiropas Padomes Putnu direktīvas I pielikumā, piemēram, ūpiis.

Eiropas Komisijas projekta "LIFE Augstie purvi" (LIFE08 NAT/LV/000449) ietvaros Melnā ezera

purvā 2012. gadā uzbūvēti 54 kūdras aizsprosti, kas veiksmīgi paaugstinājuši purva gruntsdēns līmeni un stabilizējuši hidroloģisko režīmu, veicinot purva veģetācijas atjaunošanos.

LIFE PeatCarbon projektā tiek veikta veģetācijas, hidroloģiskais un siltumnīcefekta gāzu monitoringa, lai novērtētu senāk atjaunošanas darbu sekmes uz bioloģisko daudzveidību, purva hidroloģiju un SEG emisijām.

ENG

Melnais Lake Mire (317 ha) used to be part of what once was the Cēna Mire with area of 10 000 ha.

In total, six different habitats of EU importance can be found here.

Active raised bogs, transition mires and quaking bogs, and degraded raised bogs still capable of natural regeneration takes the largest area. Two protected forest habitats are also here, i.e. bog woodland and western taiga, as well as dystrophic lakes.

Most of the Melnais Lake Mire has been drained for peat extraction and

farmland formation, starting in the 1920s and '30s, and continuing today. Drainage ditches occupy 84% of the areas perimeter, having drastically changed the hydrology. As a result of the lowering of the water table, much

of the typical flora and open bog landscape has disappeared. It is impossible to restore the excavated peat fields, therefore the primary goal is to reduce the drainage impact. For this aim the project "LIFE Raised Bogs" (LIFE08 NAT/LV/000449) was implemented.

During the time of the project, dams were built in old drainage ditches and the hydrology indeed was stabilized. Bog vegetation started to return to degraded areas.

In the LIFE PeatCarbon project, vegetation, hydrological and greenhouse gas monitoring is carried out to assess the success of past restoration works on biodiversity, bog hydrology and GHG emissions.



Jack Chapman

LV

Matorovansuo purvs atrodas Somijas ziemeļos, ielejā starp Matorova un Aittavaara-Lumavaara pakalni formējumiem. Purvam ir mozaikveida struktūra ar pārmitru zāļu purva veģetāciju, kurā dominē grīši.

Teritorijā ir arī minerālzemēs salas. Koki aug pārsniedz purva daļā, kā arī gar caurtekstošo avotu.

Zāļu purvā krūmu joslas mijas ar oligo-mezotrofām purva lāmām, kurās dominē brūnās sūnas un dažas sfagnu sugas. Mežainajā purva daļā raksturīgi meža sūnu ciņi, bet starp ciņiem

dominē sfagni ar sīkrūmiem, īpaši ar pundurbērzu Betula nana.

Mežsaimniecības vajadzībām 1960-tajos vai 1970-tajos gados purva mežainās daļas nosusināja. Tas ietekmēja – 60 % no purva platības. Šķēršļi klimata dēļ apmežošana gan ir bijusi lēna.

Mellorācijas pasākumi samazināja ūdens ielodumus un apkārt esošajiem kalniem un ir ietekmējuši zāļu purvu hidroloģisko režīmu. Grāvi nesasniedza vienīgi mitrās, atklātās vietas.

ENG

Matorovansuo peatland is located in Northern Finland in a valley between two fairly large upland hill formations, Matorova and Aittavaara-Lumavaara. This groundwater-fed mire has a mosaic structure of wet open sedge fens, typical of northern bogs, and patches of thin-peated tree pine-sedge fens and some mineral soil islands.

A small stream runs through the peatland, and its riparian zones are also treed as well as the transitional zones of the mire margins close to

the upland edges. The wet sedge fen parts are patterned with shrubby strings and oligo-mesotrophic wet flarks dominated by brown mosses and some Sphagnum species. The wooded parts are characterized by shrubby forest moss hummocks, and Sphagnum-dominated ground vegetation together with dwarf shrubs, especially Betula nana, prevails between the hummocks.

Drainage for forestry of the tree parts (ca. 60 % of the mire area) was conducted probably in the late 1960's

or 1970's (exact time not known). Ditching did not extend to the wet open parts of the mire.

The hydrological status of the sedge fens has, however, also changed as the entire peatland was surrounded by ditches in order to cut the surface water flow from the uplands. The impact of the drainage on tree growth has been very modest, obviously due to the harsh subarctic climate and short growing seasons.

The most evident changes in

the vegetation structure of the pine mires involve increased abundance of dwarf shrubs, especially Betula nana, and decreased abundance of tall sedges, such as Carex lasiocarpa.



Silkeborgs kommune (Silkeborg Municipality)

LV

Dānijas purvi ir ievērojami izmainīti cilvēku saimnieciskās darbības rezultātā. Ar dažādu projektu un pasākumu palīdzību, iegūdot laiku un līdzekļus, tiek īstenota purvu atjaunošana un pakāpeniski sasniegti pozitīvi rezultāti.

LIFE PeatCarbon projekta komanda devis pieredzes apmaiņas braucienā īpaši Dānijas purvu atjaunošanas piemērus var ieviest mītrāju teritorijās un diskutēt ar daļu kolēģiem par dažādām purvu

apsaimniekošanas iespējām un metodēm.

Stenholt Mose purvā hidroloģiskā režīma atjaunošanai pielieto ģeotekstila metodi. Šādas metodes pozitīvais efekts uz purva ekosistēmu, kavējot bērzu ieviešanu, novērojams arī Hālā Mose un Store Vildmose purvos. Savukārt Lille Vildmose purvā apsaimniekošana nepieciešama, noņemot lielo veģetāciju, tam izmanto lielos zāledājus.

ENG

The LIFE PeatCarbon project team visited Denmark to exchange experience in raised bog restoration.

Stenholt Mose is the third largest intact raised bog in Denmark. Although the site was not affected by peat mining or intensive agriculture, it was nevertheless drained, as there are 2 m deep ditches along its border with adjacent cultivated fields. A geotextile membrane was installed along two edges of the bog to stabilize the water level. This method

was applied also in other raised bogs in Denmark like Håls Mose and Store Vildmose.

Clearing of trees and bushes is also carried out in Denmark to restore open bog habitats. Cutting down older birches is relatively easy, while the struggle with young shoots can take many years. On the other hand, in other sites, such as Lille Vildmose, large herbivores are used to graze the excess biomass.

MELNĀ EZERA PURVS

LATVIJA

MATOROVANSUO

SOMIJA

DĀNIJA

International seminar in Latvia on the role of wetlands for defence and security

<https://www.peatcarbon.lu.lv/en/>



Thanks for the attention!

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