Progress on LIFE PeatCarbon project activities

Dr. biol. Māra Pakalne

16/04/2025

101074396 - LIFE21-CCM-LV-LIFE PeatCarbon

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

Dr. biol. Māra Pakalne

05/03/2025

LIFE21-CCM-LV-LIFE PeatCarbon
Peatland restoration for greenhouse gas emission reduction and carbon sequestration in the Baltic Sea region

Project location: Latvia, Finland, Germany and Denmark

Duration: 01/07/22 - 30/06/27

Coordinating beneficiary: University of Latvia

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 tasks

- Internationally applicable **Best Practice Book** on peatland restoration experience for GHG emission reduction
- New knowledge on peatland restoration for CCM, including certain rewetting methods and techniques tested at the Project pilot sites in Latvia and Finland.
- The Project will also develop **innovative restoration** success **monitoring methods**.
- The **Ecosystem model** of the project sites will be used for **upscaling to country** level.


Project locations in Latv
Sudas-Zviedru Mire
Cena Mire
Melnais Lake Mire
Pelecare Mire

Project sites

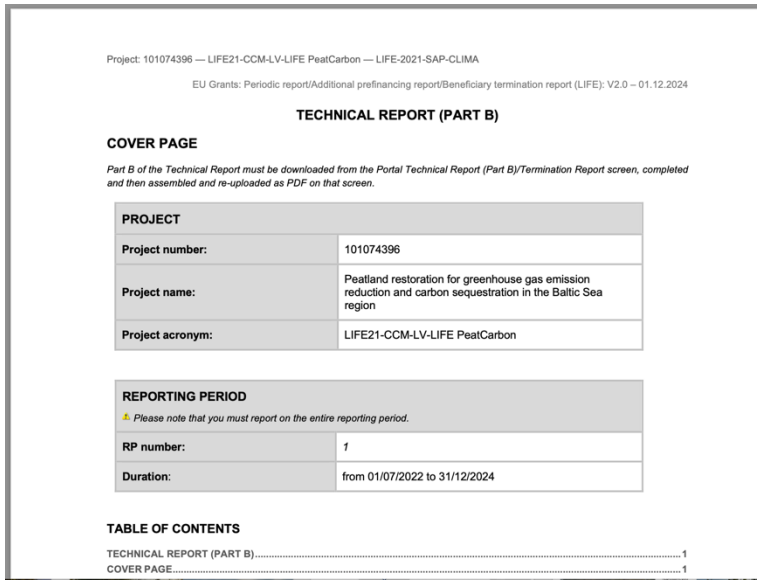
Project work packages

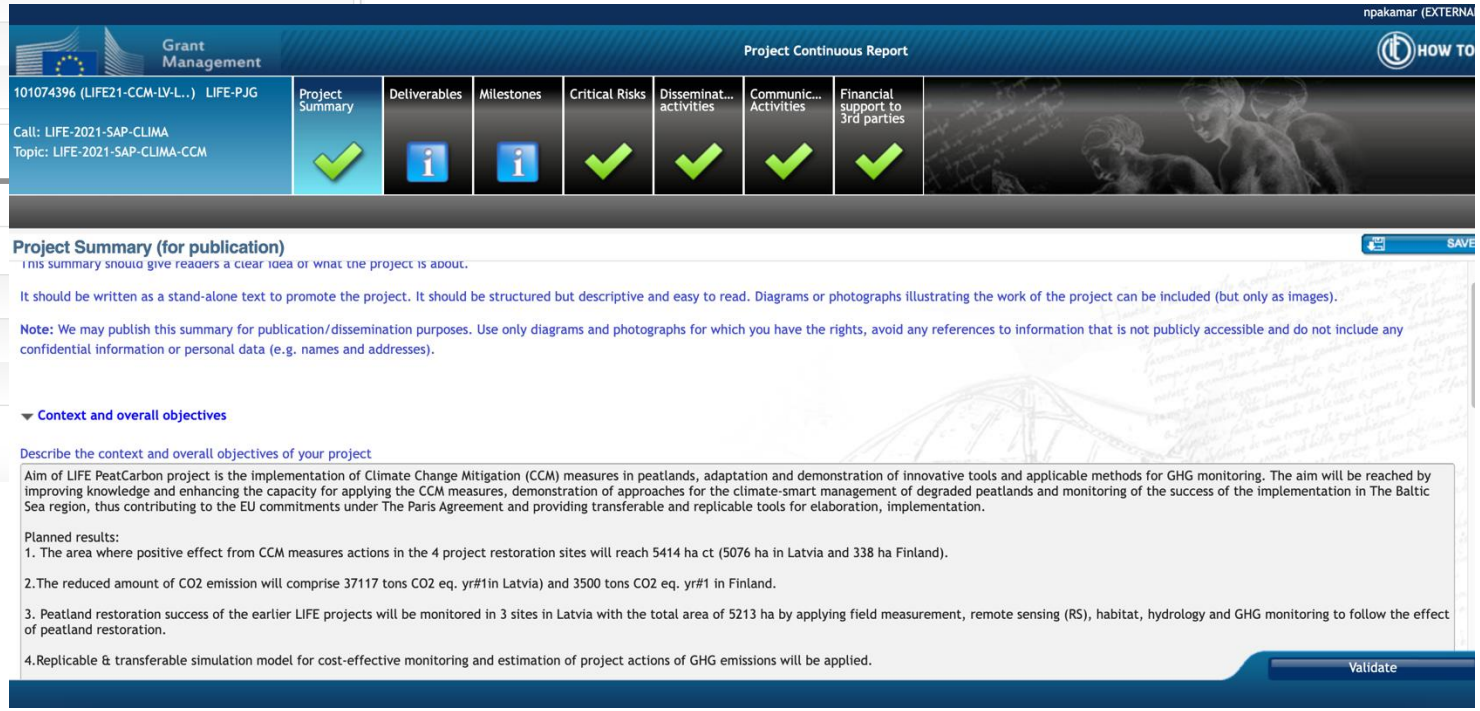
WP 1	• Project management and coordination
WP2	• Initial studies, elaboration of documentation,implementation of selected CCM peatland restoration measures
WP3	• Monitoring of peatland GHG emissions, vegetation and hydrology to evaluate the success of CCM measures
WP4	• Monitoring the impact of project actions
WP5	• Dissemination and communication
WP6	• Sustainability, replication and exploitation of the project results

WP1.1. Project management and coordination

Regular online project team meetings are held, for example concerning the Periodic meeting to EC or remote sensing.

WP1.2. Reporting to EU





EC monitoring expert visits

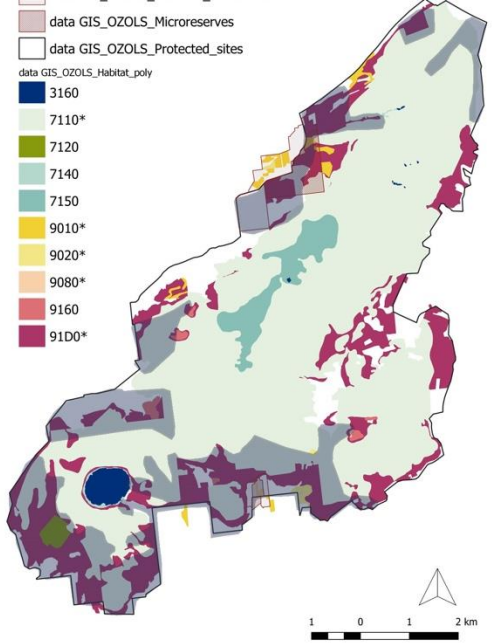
- Cenas Mire October 31, 2024
- January 27, 2025 meeting the project team, submitting information to EC and financial Report

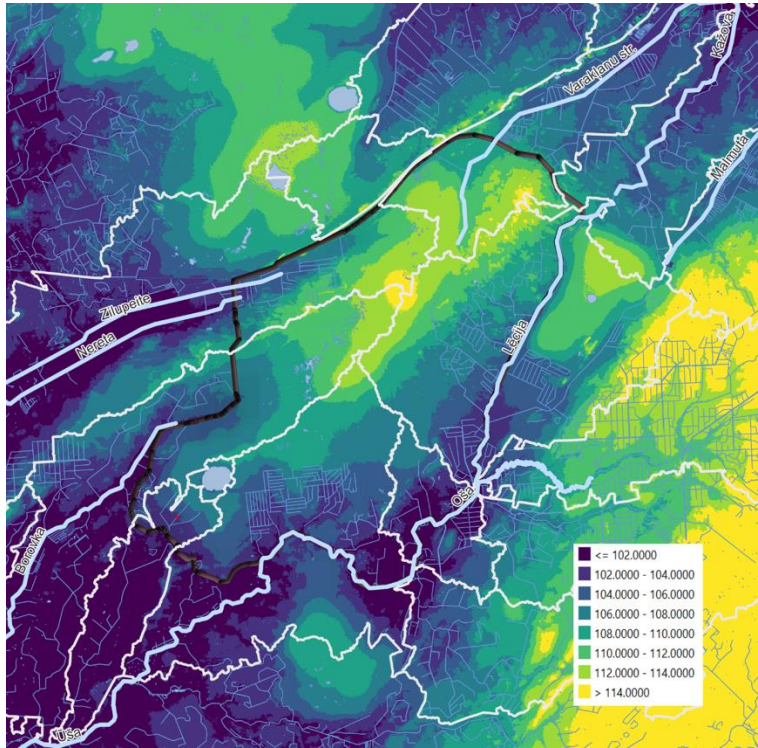
Restoration area in Cenas Mire Nature Rereserve

WP2.1. Hydrological, land use, geological studies and hydrogeological modeling in the peatland restoration sites

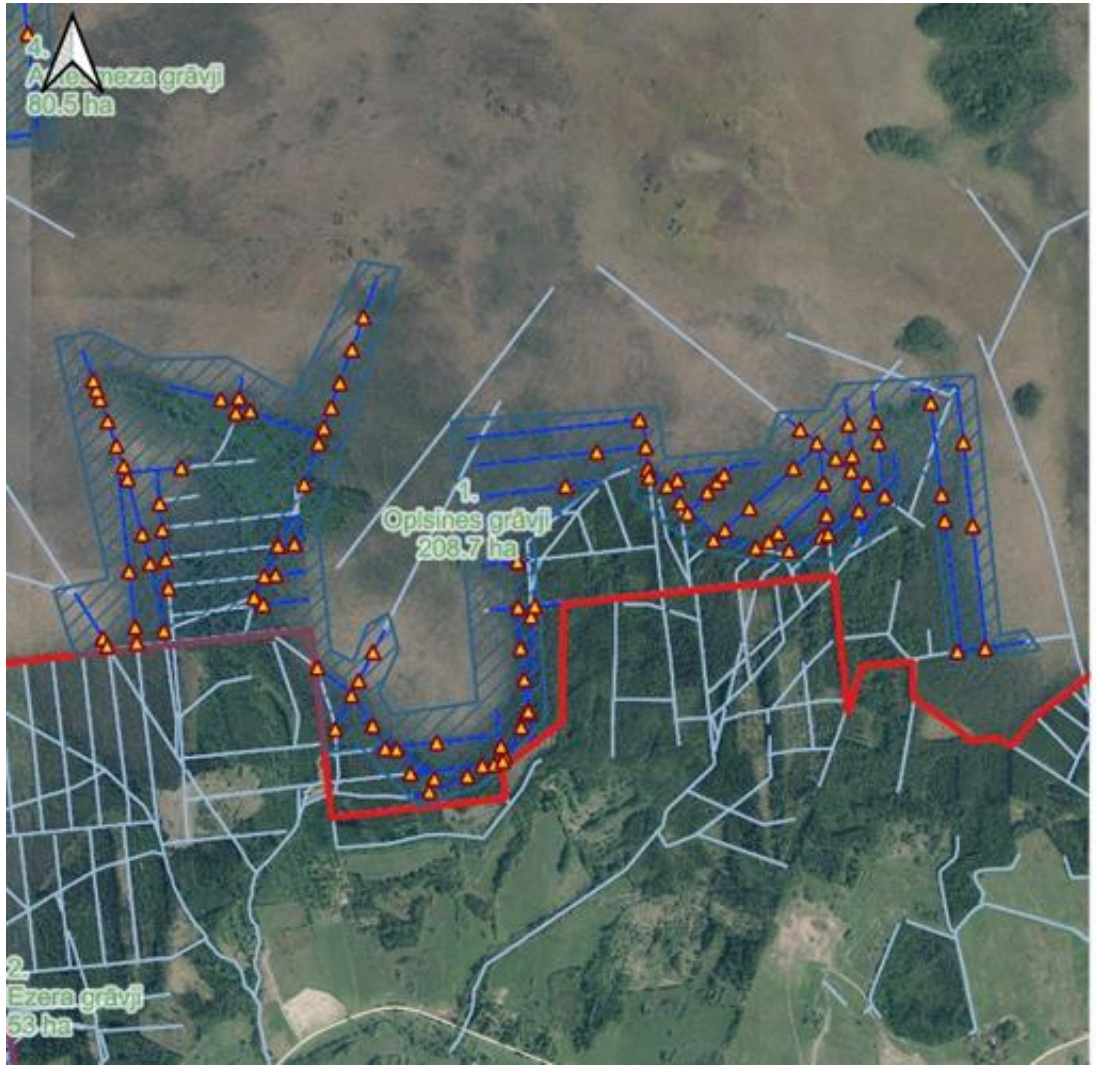
WP2.1. Hydrogeological studies and modeling of the project sites

Lielais Pelečāre Mire



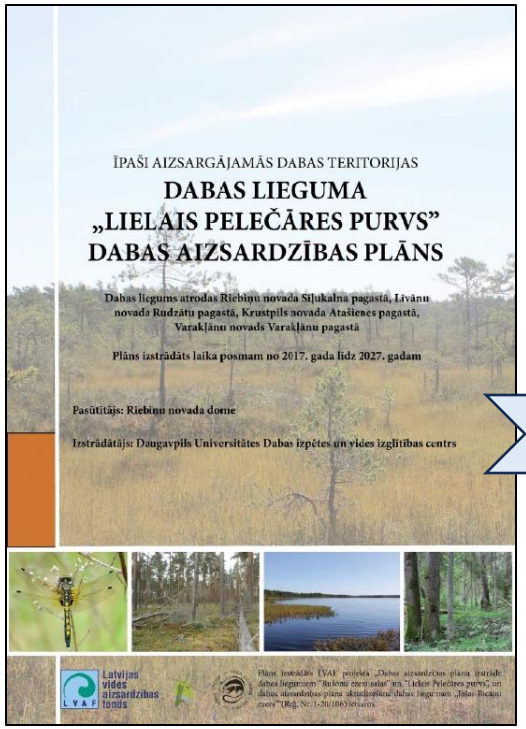


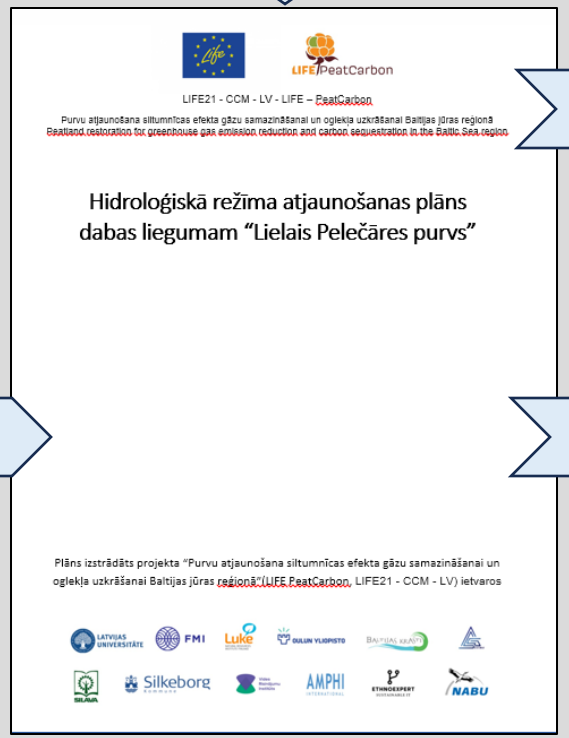
Peatland restoration areas in Lielais Pelečāres Mire



WP2.2. Elaboration of Peatland Restoration Plans

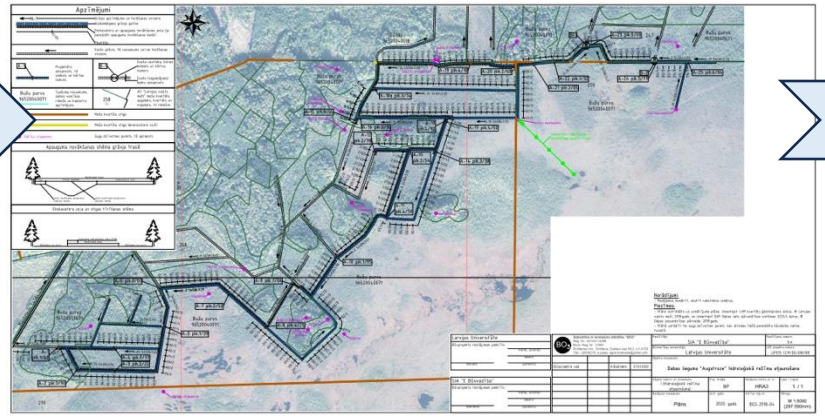
Field studies
Direct measuewments
Monitoring
Hydrogeological modeling





Initial impact assessment

Building permits



2025

LIFE21 - CCM - LV - LIFE – PeatCarbon

Purvu atjaunošana siltumnīcas efekta gāzu samazināšanai un oglekļa uzkrāšanai Baltijas jūras reģionā
Peatland restoration for greenhouse gas emission reduction and carbon sequestration in the Baltic Sea region

Hidroloģiskā režīma atjaunošanas plāns dabas liegumam "Cenas tīrelis"

Plāns izstrādāts projekta "Purvu atjaunošana siltumnīcas efekta gāzu samazināšanai un oglekļa uzkrāšanai Baltijas jūras reģionā"(LIFE PeatCarbon, LIFE21 - CCM - LV) ietvaros

wwwhttps://www.peatcarbon.lu.lv/en/publications

WP2.4.Peatland rewetting fot the implementation CCM measures in the project sites

Building of dams in Melnais Lake Mire in 2012

WP2.5. Initial Impact Assessment

LIFE21 - CCM - LV - LIFE – PeatCarbon

Purvu atjaunošana siltumnīcas efekta gāzu samazināšanai un oglekļa uzkrāšanai Baltijas jūras reģionā
Peatland restoration for greenhouse gas emission reduction and carbon sequestration in the Baltic Sea region

Iesniegums ietekmes uz vidi sākotnējam izvērtējumam Eiropas nozīmes īpaši aizsargājamā dabas teritorijā *(Natura 2000)*

2023. gada novembrī Rīgā

1. Ierosinātāja nosaukums, reģistrācijas numurs, juridiskā adrese, tālruņa numurs un elektroniskā pasta adrese:

Latvijas Universitāte, LV 90000076669, Raiņa bulvāris 19, Rīga, LV-1586, +371 29511001, mara.pakalne@lu.lv;

SIA "AGS Sistēmas", LV 44103121243, "Dozītes", Mazsalacas pagasts, Valmieras novads, LV-4215, +371 29961595, gints@agssistemas.lv.

2. Ierosinātāja kontaktadrese (adrese un tālruņa numurs), juridiskai personai arī rekvizīti:

Māra Pakalne, Latvijas Universitātes Botāniskais dārzs, Kandavas iela 2, Rīga, LV-1083, +371 29511001

3. Paredzētās darbības (objekta) nosaukums:

Hidroloģiskā režīma stabilizēšana dabas liegumā "Cenas tīrelis"

4. Paredzamā ietekme uz īpaši aizsargājamām dabas teritorijām, īpaši aizsargājamām sugām, īpaši aizsargājamiem biotopiem un mikroliegumiem:

4.1. *Natura 2000* teritorijas apraksta kopsavilkums:

4.1.1. atrašanās vieta, platība, kods un karte (atbilstošā mērogā), kurā uzskatāmi attēlota Natura 2000 teritorija;

Objekts atrodas dabas liegumā, *Natura 2000* teritorijā "Cenas tīrelis" Mārupes novada Mārupes un Babītes pagastā un Olaines novada Olaines pagastā, 19 km uz DR no Rīgas. Dabas lieguma centra koordinātes LKS-92 sistēmā ir 490804, 301512. Teritorija aizņem 2295,79 ha. Vietas kods LV0519800.

WP3. 4.
GHG monitoring in Melnais Lake Mire and other project sites

Building of dams in Cena Mire in 2006

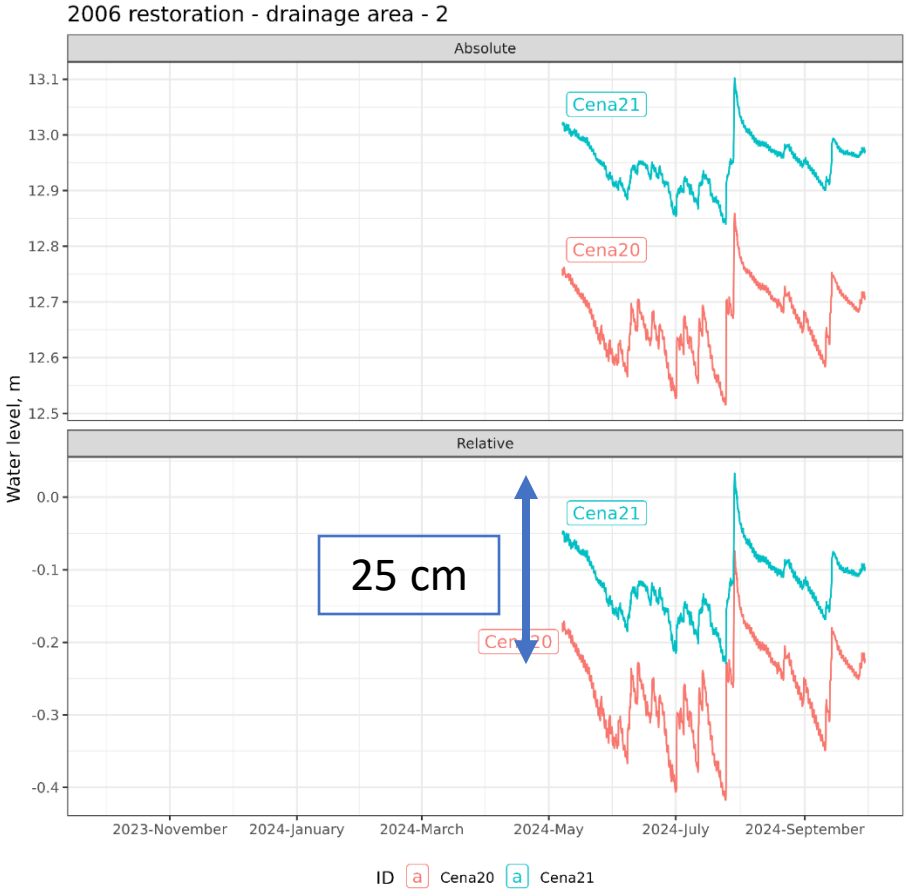
GHG monitoring in Cenas Mire in2024. near the dams built in 2006

WP3.2. Vegetation monitoring in the project sites

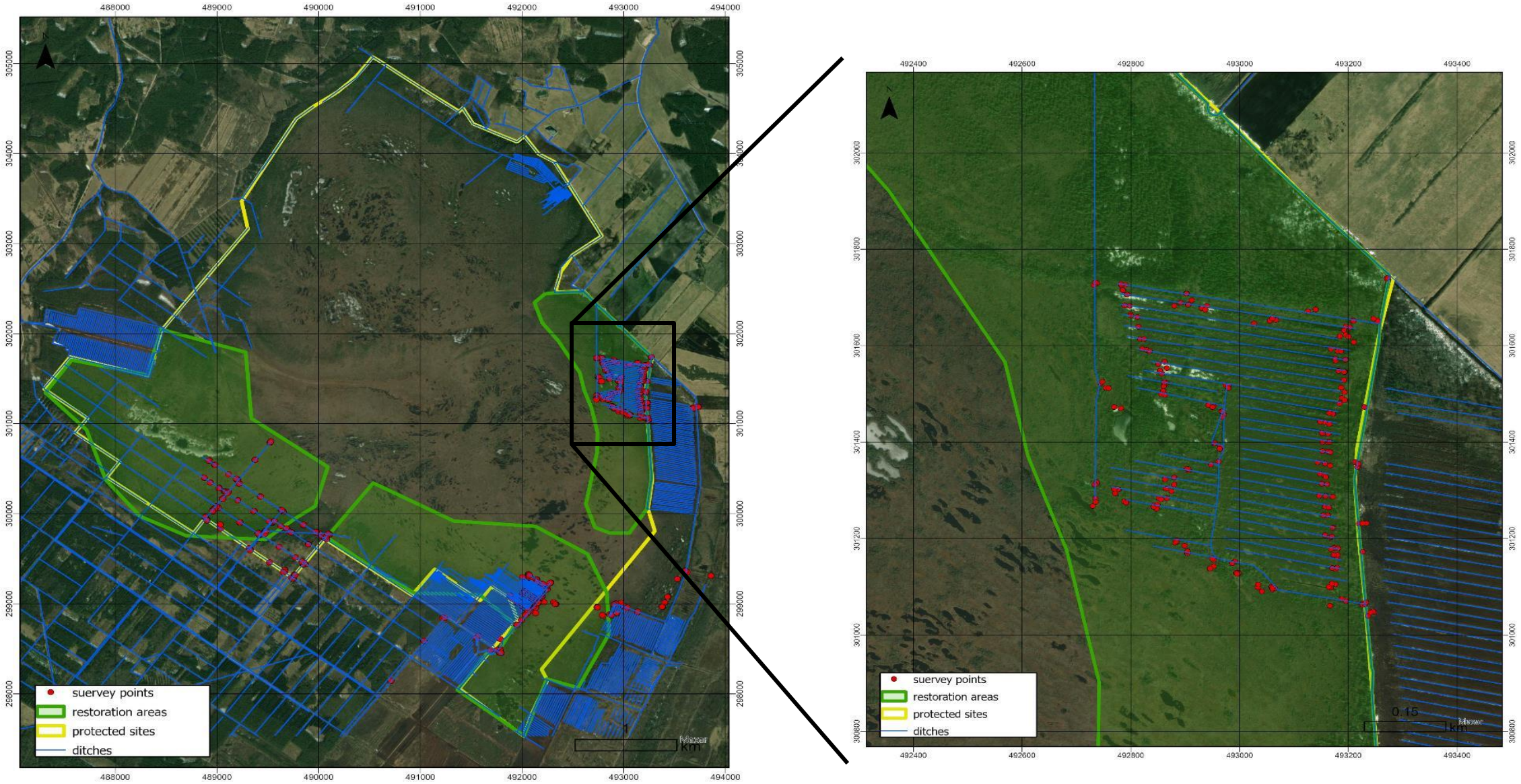
Vegetation development in Melnais Lake Mire in 2024

The 2006 restoration area in Cena Mire near Skaists Lake. Die-off of pine trees after raising of water level can be observed. The positive impact is far behind the direct influence zone.

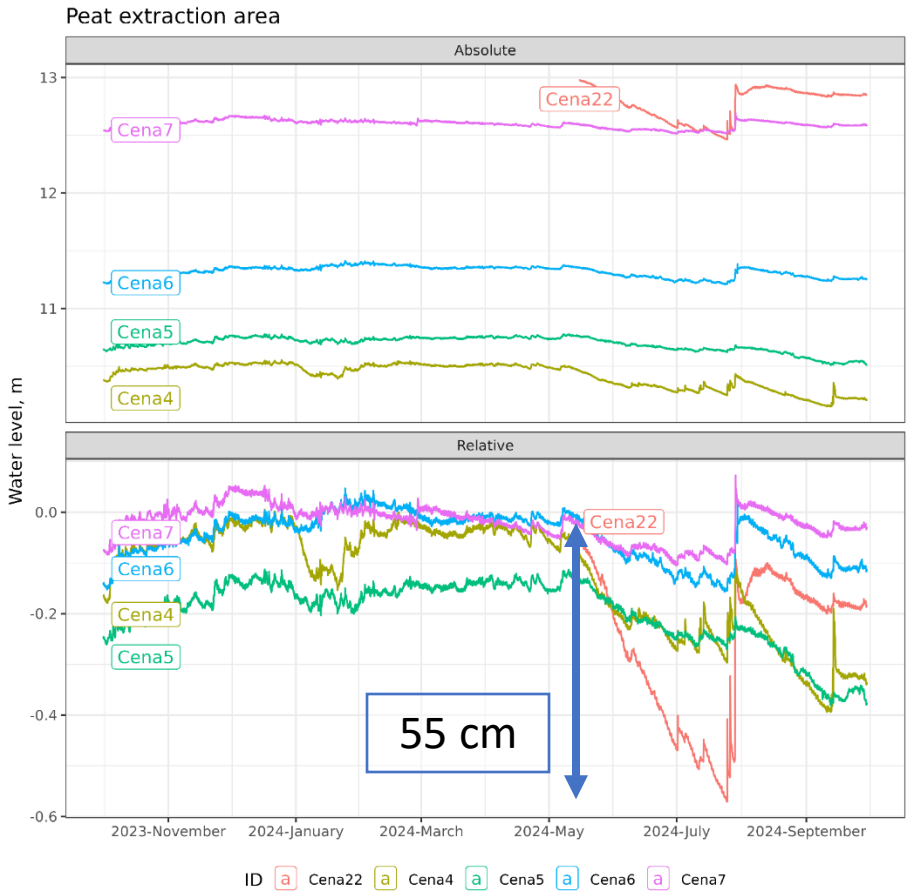
Hydrological monitoring in Cenas Mire restored in 2006



Monitoring in Cena Mire Nature Reserve



Cenas Mire new restoration site



Monitoring restoration results in Sudas-Zviedru Mire

2017

2023

2018

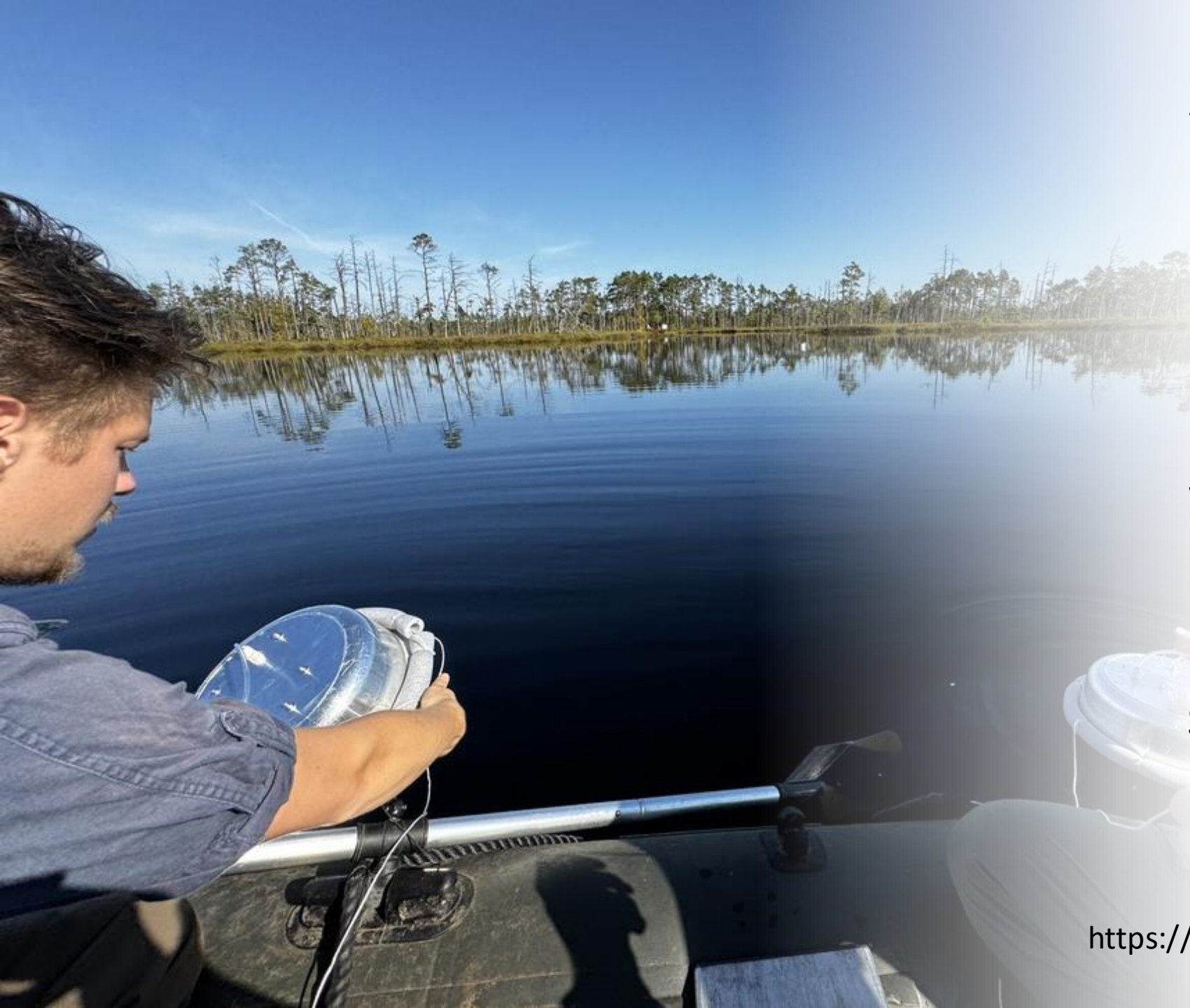
2024

Hydrological, vegetation, greenhouse gas and GEST monitoring in project sites in Latvia

2nd Monitoring Report

Image: © J.Dzilna

December 2024



WP3.5. Application of innovative methods for GHG measurement in the ditches and open water

Presentation at the 83rd University of Latvia Scientific Conference, February 2025

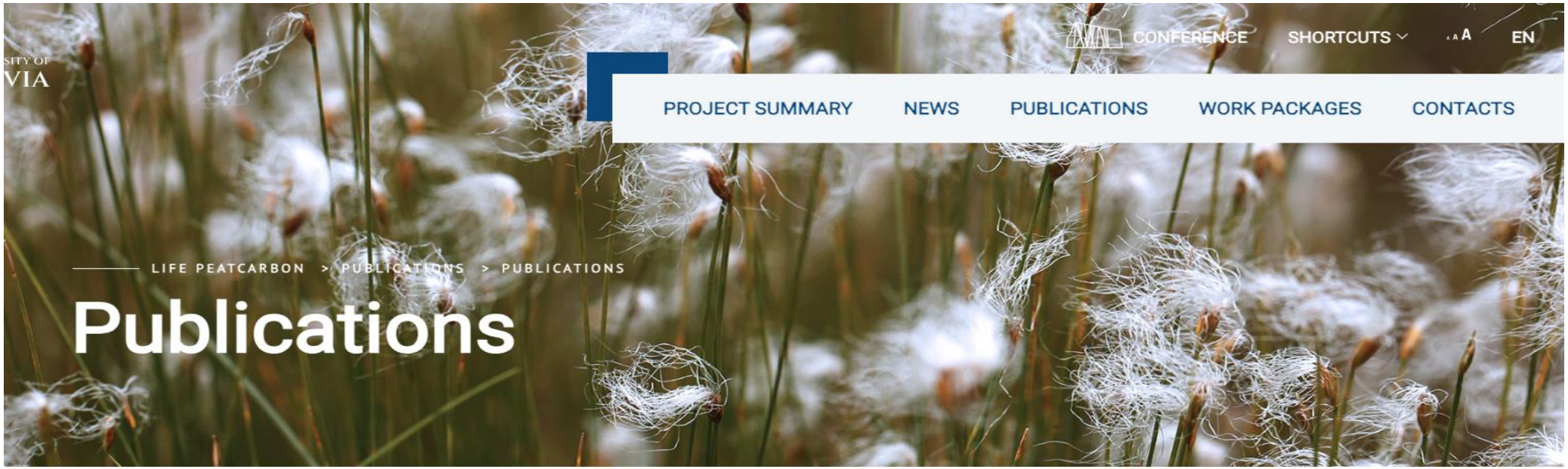
https://www.peatcarbon.lu.lv/en/news/news/

WP4.1 Monitoring the project performance

WP5. Dissemination and communications actions of the project

WP5.2.Project web page

www.peatcarbon.lu.lv



Reports →

Brochures →

Photo exhibition →

Peatland posts →

Materials and publications

Meeting with “Riga forests”

https://www.peatcarbon.lu.lv/en/news/news/

WP5.4. Transportable photo exhibition

- In Latvia opening on February 24, 2025
- In Germany May 22, 2025
- In Finland June 10, 2025

https://www.peatcarbon.lu.lv/en/news/news/

WP5.4. Photo exhibition

- 36 billboards
- 156 pohotos
- 21 author

Jack Chapman

LV

Matorovansuo purvs atrodas Somijas ziemeļos, ielejā starp Matorova un Aittavaara-Lusmavaraa pakalnu formējumiem. Purvam ir mozaīkveida struktūra ar pārmitru zāļu purva veģetāciju, kurā dominē grīšļi. Teritorijā ir arī minerālzemes salas. Koki aug pārejas purva daļā, kā arī gar caurtekošu 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. Skarbā klimata dēļ apmežošana gan ir bijusi lēna.

Meliorācijas pasākumi samazināja ūdens iepludumus no apkārt esošajiem kalniem un ir ietekmējuši zāļu purvu hidroloģisko režīmu. Grāvji 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-Lusmavaara. This groundwater-fed mire has a mosaic structure of wet open sedge fens, typical of northern aapa mires, and patches of thin-peated treed 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 treed 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*.

MATOROVANSUO SOMIJA

Māra Pakalne

LV

Dabas liegums "Melnā ezera purvs" vēsturiski ir daļa no kādreizējā 10 000 ha lielā Cenas tīreļa. 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 slīkšņas 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 mīt mitrummīlošas sugas un mazāk ietekmētajā daļā ir sastopamas purviem raksturīgi augi, kā sfagni, rasenes, spilves un grīšļi. Dabas liegumā ir konstatētas 17 putnu sugas, kas iekļautas Eiropas Padomes Putnu direktīvas I pielikumā, piemēram, ūpis.

Eiropas Komisijas projekta "LIFE Augstie purvi" (LIFE08 NAT/LV/000449) ietvaros Melnā ezera purvā 2012. gadā uzbūvēti 54 kūdras aizsprosti, kas veiksmīgi paaugstinājuši purva gruntsūdens līmeni un stabilizējuši hidroloģisko režīmu, veicinot purva veģetācijas atjaunošanos.

LIFE PeatCarbon projektā tiek veikts veģetācijas, hidroloģiskais un siltumnīcefekta gāzu monitorings, lai novērtētu senāk veikto 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 Cena Mire with area of 10 000 ha.

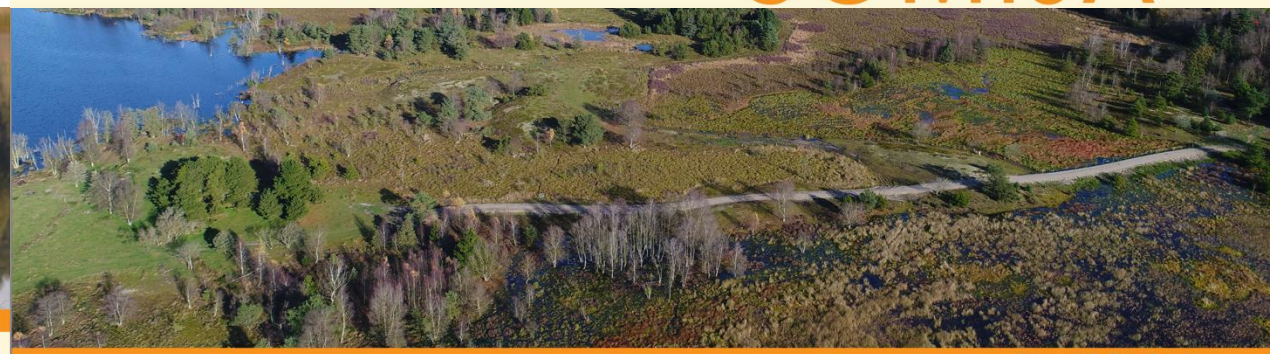
In total, six different habitats of EU importance can be found here. Active raised bogs, transition mires and quacking bogs, and degraded raised bogs still capable of natural regeneration takes the largest area. Two protected forest habitats are also here, i.e. bog woodland and western taiga, as well 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.

MELNĀ EZERA PURVS LATVIJA



Silkeborgas pašvaldība (Silkeborg Municipality)

LV

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

LIFE PeatCarbon projekta komanda devās pieredzes apmaiņas braucienā iepazīt Dānijas purvu atjaunošanas piemērus vairākās mitrāju teritorijās un diskutēt ar dāņu kolēģiem par dažādām purvu apsaimniekošanas iespējām un metodēm.

Stenholt Mose purvā hidroloģiskā režīma atjaunošanai pielieto ģeomembrānu. Šādas metodes pozitīvais efekts uz purva ekosistēmu, kavējot bērzu ieviešanos, novērojams arī Hals Mose un Store Vildmose purvos. Savukārt Lille Vildmose purvā apsaimniekošana nepieciešama, noganot lieko veģetāciju, tam izmanto lielos zālēdājus.

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 Hals 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.

DĀNIJA

From March 31, 2025 to May 12, photo exhibition in the Salaspils Botanical garden

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

Project aim:

Implementation of Climate Change Mitigation (CCM) measures in peatlands, adaptation and demonstration of innovative tools and applicable methods for GHG monitoring.

Participating nations:

Latvia, Finland, Denmark, Germany.

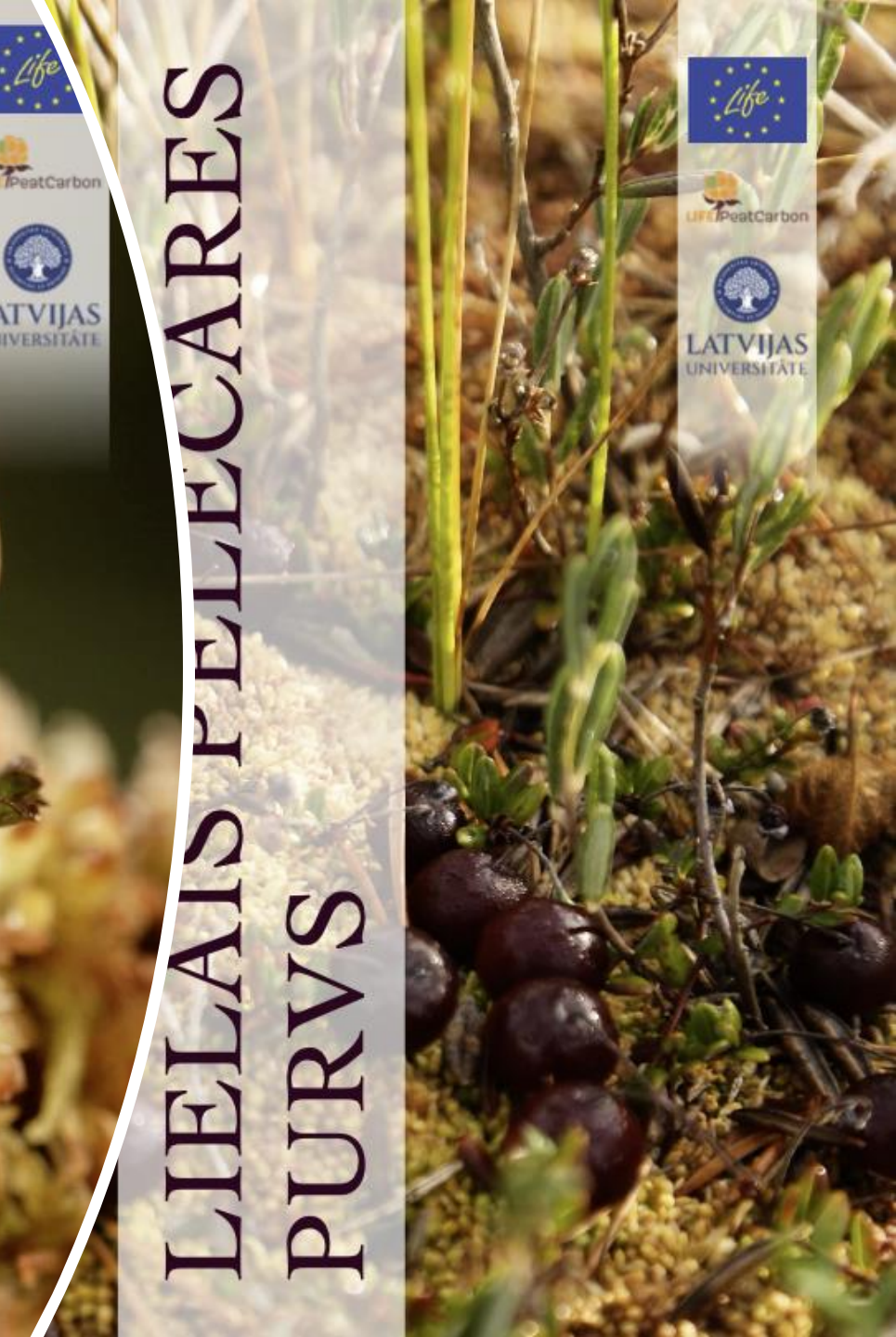
Peatlands are unique ecosystems that play an important role in nature and in people's lives. Natural raised bogs are oases of biological diversity and excellent regulators of the water cycle. At the same time, on a global scale, peatlands store more carbon than forests. Drainage of peatlands is one of the factors contributing to climate change, releasing greenhouse gases into the atmosphere (carbon dioxide, methane) which "warm" the globe. Most of Europe's peatlands have been altered by human activity. Many peatlands have been lost irreversibly. As a result of drainage and peat extraction, peatlands have gone from being sinks of greenhouse gases to sources of emissions. In Latvia, peatlands have also been heavily exploited by human activities.

1. GHG measuring using chamber method in Finland
2. Eddy covariance for measurements of vertical turbulent fluxes in atmospheric boundary layers in Finland
3. Vegetation monitoring for remote sensing data analysis
4. Peat dam construction to stabilize the hydrological regime
5. Active raised bog with bog pool complex in Cena Mire
6. Peat extraction field in Cena Mire

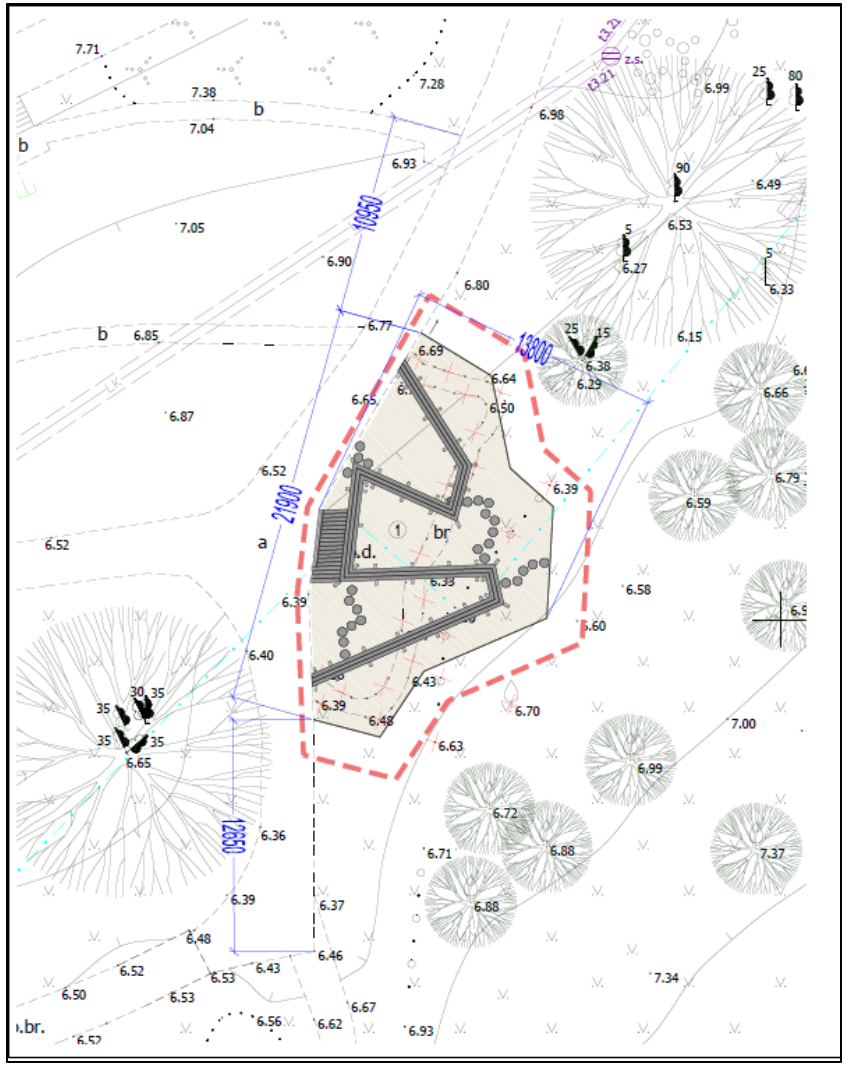
Research shows that the condition of natural peatland ecosystems continues to deteriorate. There is a need for active and immediate protection and restoration of bog ecosystems to reduce greenhouse gas emissions. The LIFE PeatCarbon project is working towards these goals by restoring peatland ecosystems and using nature-based solutions to reduce greenhouse gas emissions at 4 project sites in Latvia – Cena Mire, Lielais Pelečāre Mire, Melnais Lake Mire and Sudas-Zviedru Mire, and 2 sites in Finland – Mātorovansuo and Välisuo Mires.

Project booklets

www.peatcarbon.lu.lv



WP5.7. Development of Peatland exposition in the Botanical Garden of University of Latvia



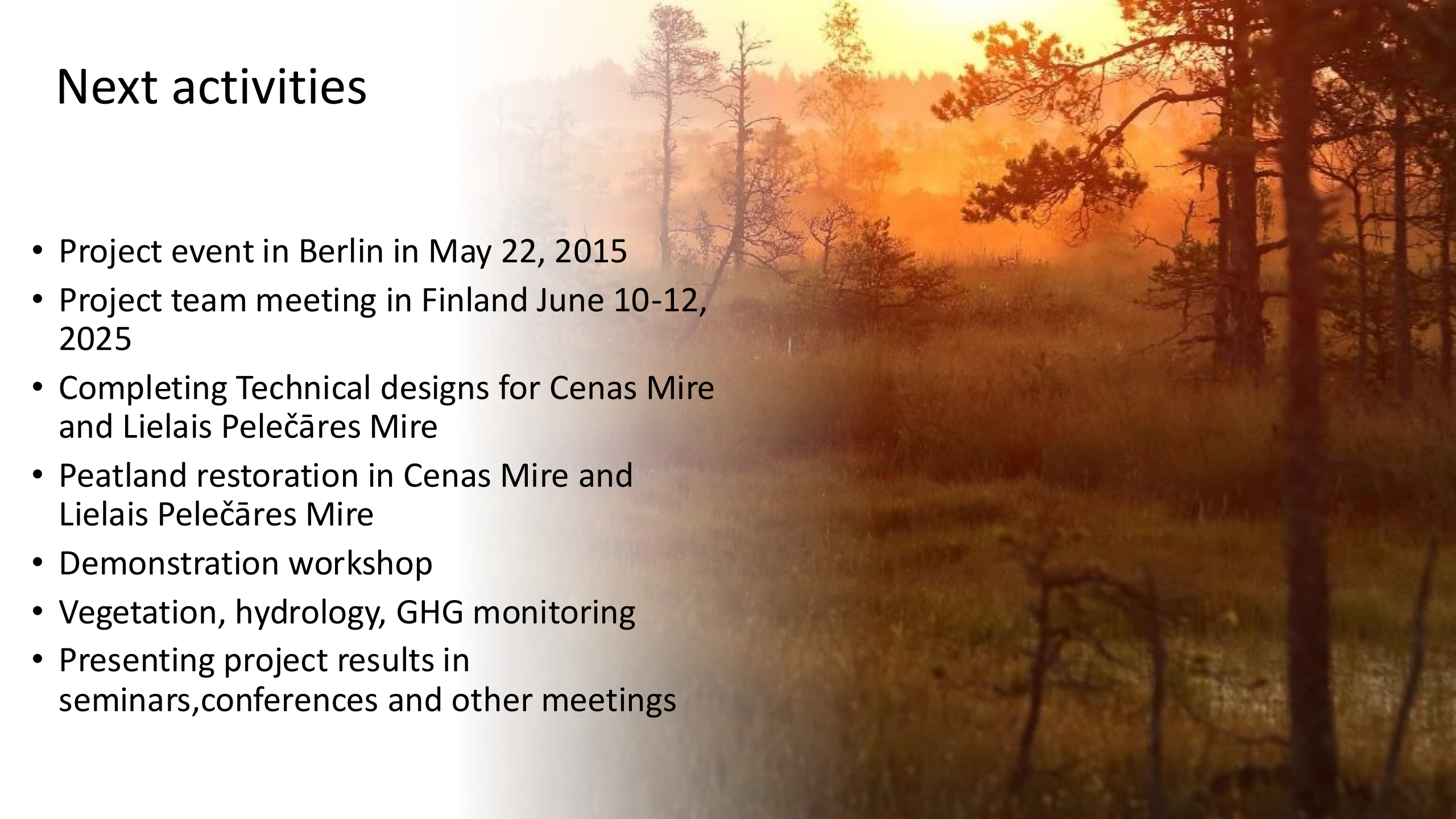
WP5.T.8.Networking

- Article is being prepared for the summer 2025 issue of EU Research that will be published in June 2025. The subject is Climate change.

- It is EU Research is a dissemination journal focusing on pioneering frontier research. It gets published quarterly and distributed throughout 33 countries in Europe to over 52,000 readers.
-
- The aim of the journal is to promote research projects to a relevant audience in government, the private sector as well as academia. In turn this will lead to enquiries of interest, global exposure and dissemination for the projects involved.
- It is hosted online indefinitely reaching a global web audience with over 300,000 reads per issue. It is read by the key people in national and European governments that control policy and research funding, leading scientific research institutes and major companies across a Industries in the private sector. I have attached a PDF detailing the distribution.

.

Next activities



- Project event in Berlin in May 22, 2015
- Project team meeting in Finland June 10-12, 2025
- Completing Technical designs for Cenas Mire and Lielais Pelečāres Mire
- Peatland restoration in Cenas Mire and Lielais Pelečāres Mire
- Demonstration workshop
- Vegetation, hydrology, GHG monitoring
- Presenting project results in seminars,conferences and other meetings

Thanks for the attention!

Web page
www.peatcarbon.lu.lv

Contact: Dr.biol. Māra Pakalne
mara.pakalne@lu.lv