



LIFE Peat Restore

Restoring peatlands for climate

»Reduction of CO₂ emissions by restoring degraded peatlands in Northern European Lowland« – LIFE15 CCM/DE/000138



Restoring peatlands
for climate change
mitigation



EU contribution text

The report was prepared and printed with the financial support of the European Commission’s LIFE programme within the project “Reduction of CO₂ emissions by restoring degraded peatlands in Northern European Lowland” (LIFE15 CCM/DE/000138, LIFE Peat Restore, 2016-2022).

The report reflects only the authors’ views. The European Climate, Environment and Infrastructure Executive Agency (CINEA) is not responsible for any use that may be made of the information it contains.

Authors

Leticia Jurema, Jonathan Etzold, Andreas Herrmann, Māra Pakalne, Gunta Sirma, Liga Strazdins, Laimdota Truus, Mati Ilomets, Raimo Pajula, Anna-Helena Purre, Nerijus Zableckis, Jurate Sendzikaite, Leonas Jarašius, Žydrūnas Sinkevičius, Paweł Pawlaczyk, Magdalena Makowska, Katarzyna Bociąg, Izabela Chlost, Roman

Cieśliński, Krzysztof Gos, Krišjānis Libauers, Jolanta Kujawa-Pawlaczyk, Robert Stańko, Łukasz Pietruszyński, Iwona Bubak, Maria del Mar Alarcia Blanco.

Credits Cover: Mara Pakalne; Page 2: Raimo Pajula; Page 5: Aleksandra Galaks; Page 6: Raimo Pajula; Page 8: Ahead: Agniese Priede, Bottom left: Raimo Pajula, Bottom central: Leticia Jurema, Bottom right: Z. Sinkevicius; Page 9: K. Bociag; Page 10: Dacite Bekere; Page 11 (from left to right): Andreas Herrmann, Agniese Priede, Andreas Herrmann, Dacite Bekere; Page 12: Ahead: unspecified | NABU, Bottom left: Sebastian Hennigs | NABU, Bottom right: Alexej Gorin; Page 14: Leticia Jurema; Back Cover: Mara Pakalne

Editor Leticia Jurema

Layout Veronika Teichmann, studiolenz

Index

05 **Introduction**
INFO BOX // LIFE Peat Restore project

06 **Why restore peatlands?**
INFO BOX // Innovative restoration techniques in Poland

10 **Why measure greenhouse gas emissions from peatlands?**

12 **Why talk about peatlands?**
INFO BOX // Elaboration of technical books and recommendations to policymakers

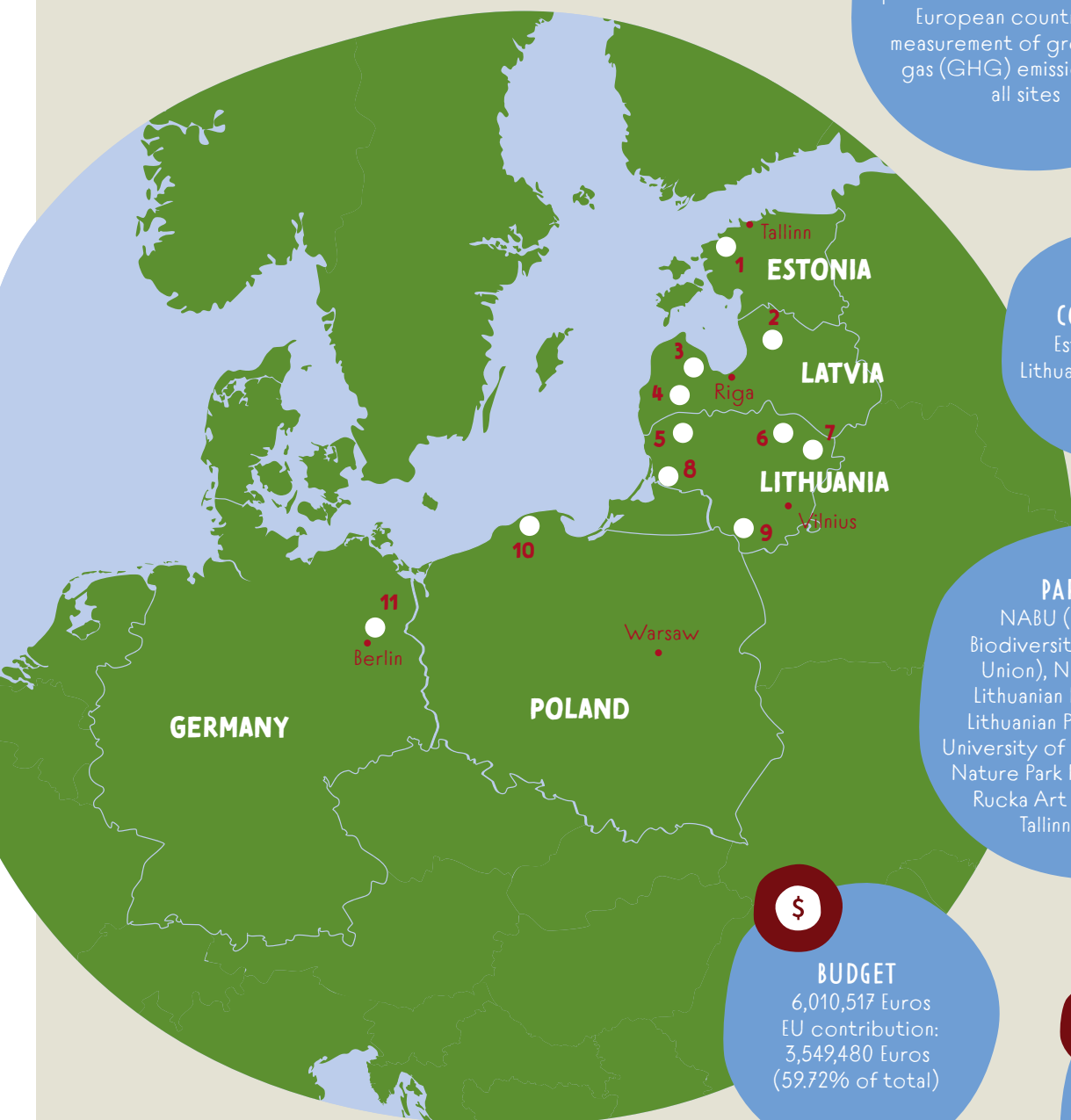
14 **The accomplishments of LIFE Peat Restore**

Project Partners



INFO BOX

LIFE Peat Restore Project



AIMS

The restoration of more than 5,300 ha of degraded peatlands across five northern-European countries and measurement of greenhouse gas (GHG) emissions from all sites



COUNTRIES

Estonia, Latvia, Lithuania, Poland and Germany



PARTNERS

NABU (Nature And Biodiversity Conservation Union), Naturalists' Club, Lithuanian Fund for Nature, Lithuanian Peat Association, University of Latvia, Lake Engure Nature Park Fund, E-Buvvadiba, Rucka Art Foundation and Tallinn University



BUDGET

6,010,517 Euros
EU contribution:
3,549,480 Euros
(59.72% of total)



DURATION

July 1, 2016, to
March 31, 2022

PROJECT SITES

- | | | |
|---|--|---|
| 1 Suursoo-Leidisoo peatland, Estonia
3,300 ha (NATURA 2000 & SPA) | 5 Amalva Peatland, Lithuania
215 ha (NATURA 2000 & RAMSAR site) | 9 Aukštumala peatland, Lithuania
10 ha (NATURA 2000 site, part of Nemunas Delta Regional Park) |
| 2 Engure Lake peatland, Latvia
20 ha (NATURA 2000, RAMSAR site & Nature Park) | 6 Pūsčia peatland, Lithuania
80 ha (NATURA 2000, Nature Reserve & part of Gražutė Regional Park) | 10 Słowiński National Park, Poland
1,350 ha (SAC, SPA, National Park & part of Słowiński Biosphere Reserve) |
| 3 Baltezers peatland, Latvia
133 ha (NATURA 2000 & Nature Reserve) | 7 Sachara peatland, Lithuania
88 ha (NATURA 2000 site) | 11 Biesenthaler Becken, Germany
15, 5 ha (NATURA 2000 & Nature Reserve) |
| 4 Augstroze peatland, Latvia
95 ha (NATURA 2000 & Nature Reserve) | 8 Plinkšiai peatland, Lithuania
69 ha (NATURA 2000 & part of Plinkšiai Biosphere Polygon) | |



Introduction

For centuries our understanding of peatlands was as a ghostly and haunted place – an infertile landscape that had to be drained to become productive for crop, forestry, and peat extraction. After centuries of misuse and destruction, little are left in natural conditions in northern Europe. In Estonia, Latvia, and Lithuania around 30-35%, in Poland about 15%, and in Germany, merely 2% of peatlands remain in a natural state.

In the 1960s, as the scientific knowledge of the value of peatlands grew, the first attempts to restore peatlands were made. We now know that healthy peatlands are critical to preserving biodiversity, providing safe drinking water, food, medicinal plants, fodder, and fibre, as well as minimising flood risk (IUCN 2021). Moreover, in the last 20 years the contribution of peatlands to climate change mitigation is finally being acknowledged. In fact, peatlands worldwide contain around 650 gigatonnes or 30% of the planet's soil carbon, twice as much as all forests on Earth (FAO 2020).

Peatlands in their natural state are one of the greatest carbon-storing ecosystems. In fact, they are the largest natural terrestrial carbon sink capable of binding carbon to the soil permanently. However, this can only occur in undrained conditions when the water level is near the surface. In contrast, if the peatland is drained and degraded, it becomes one of the most intensive sources of

carbon dioxide, responsible for approximately 5% of the global anthropogenic greenhouse gas (GHG) emissions (IUCN 2021).

Therefore, the restoration of peatlands is needed to reduce global GHG emissions and contribute to climate change mitigation. The year 2021 marked the first year of the United Nations Decade on Ecosystem Restoration, which highlights the tremendous need to keep ecosystems functional and turn back their degradation as a task for humankind of utmost importance. Countries are encouraged to include peatland restoration in their commitments to global international agreements, including the Paris Agreement on climate change. Without a doubt, to reach the goal of zero emissions in Europe by 2050, degraded and drained peatlands must be restored back to carbon accumulating ecosystems.

Peatland restoration has been proven to be cost-effective as a nature-based solution relative to other available carbon reducing technologies. It also has the added value of re-establishing the multiple benefits arising from peat-forming ecosystems (IUCN 2021).

LIFE Peat Restore is part of this ever-growing effort. Join us and let's make peatlands wet again!



Why restore Peatlands?

Peatlands must remain wet to be healthy, continue to absorb carbon from the atmosphere and avoid the release of all the carbon accumulated over thousands of years. Healthy peatlands also perform a variety of other vital ecosystem services, like filtering our water, protecting us from flood and fire risks, providing us with beautiful landscapes and a unique biodiversity, as well as nurturing our mental health by affording us great amenities areas.

» Peatlands have been drained for centuries, mainly for agriculture, forestry, and peat extraction. Degraded peatlands cause massive greenhouse gas emissions, often at 30 tons of CO₂ equivalents per hectare per year. LIFE Peat Restore is making an important contribution to the fight against the climate crisis, by achieving an estimated reduction of 14,500 tons CO₂-eq per year «

*Tom Kirschey, NABU,
Head of International Peatland and
Southeast Asia Programme*

Ecosystem services of healthy peatlands



Climate change prevention

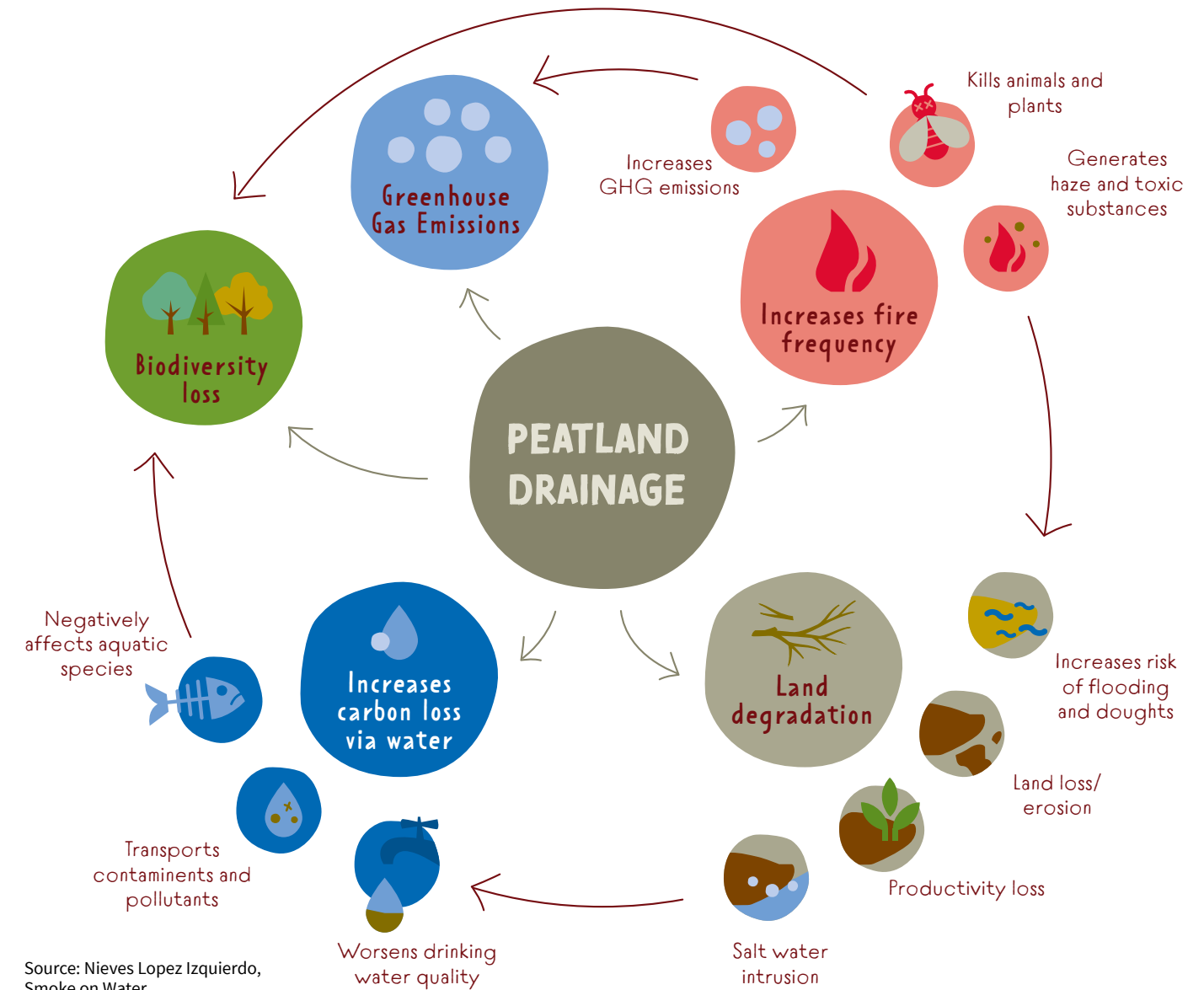
Healthy peatlands store twice as much carbon as all forests worldwide. In drained conditions the carbon is released in form of carbon dioxide (CO₂), causing global warming.



Flood control

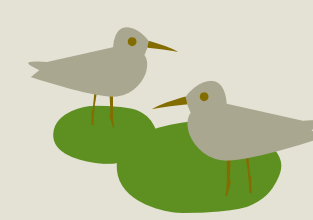
Peatlands function as the “kidneys” of landscapes, filtering the water and retaining pollutants. Peatlands absorb rainwater like a sponge, thus helping us become more resilient to floods.

Environmental and social impacts of peatland drainage



Groundwater filters

Pollutants dissolved in water are absorbed by mire plants and when the plants die, the pollutants are permanently stored within the peat.



Valuable habitat

In addition to providing a habitat for specific flora and fauna, peatlands are also important resting and breeding grounds for migratory birds.



Recreational and aesthetic value

Peatlands also provide space for recreation and engaging with nature, which can have a positive impact on mental health.

Rewetting peatlands

Restoration work on all degraded peatlands by raising the water level is necessary to stop the drainage of water from this carbon rich habitat, and subsequently, stop the release of carbon dioxide into the atmosphere.



TO REWET MORE THAN 5,300 HA OF DEGRADED PEATLANDS IN 11 PROJECT SITES ...



... WE BUILT DAMS



... WE FILLED DITCHES



... WE REMOVED WOODY BIOMASS*

*when the tree species present did not belong to the typical peatland habitat and led to further drainage of water from the sites.

INFO BOX

Innovative restoration techniques in Poland: Reshaping open post-extraction water bodies

👥 Naturalists’ Club | 📍 Słowiński National Park, Poland

LIFE Peat Restore tested innovative restoration techniques in Poland, due to the extremely degraded conditions of the site.

After the conclusion of peat extraction on the project site in Poland, the area was covered by shallow water. Wind exposure on such large water bodies prevents the establishment of peat forming vegetation. This means the greenhouse gas emissions in these areas remain very high. Due to the extremely damaged condition of the project site, a different approach to the restoration of the ecosystem was needed.

Naturalists’ Club built artificial islands with peat forming vegetation to reduce wave energy and encourage the vegetation to “spill over” the water table. This improvement of the peat forming vegetation growth conditions will lead to the reclamation of the water bodies by the peatland. In addition, Naturalists’ Club altered the shorelines by constructing a dam, solid islands and atolls, in aims of creating calm places that encourage the establishment of typical peatland vegetation.

BEFORE: Testing prototypes of floating islands



AFTER: Presence of peat forming vegetation after one winter.



Why measure greenhouse gas emissions from peatlands?

- To learn more about the effects of peatland drainage to the climate**
To gather effective data on peatland emissions and ecosystem services which can support accurate and effective legislation.
- To report in national GHG inventories**
Emissions from damaged peatlands and carbon savings from peatland restoration are eligible for national accounting under the UN Framework Convention on Climate Change.
- To assess impact of measures**
To contribute to the creation of reliable business cases and funding models and, therefore, ensure financial viability of sustainable peatland management.
- To increase financing options for peatland restoration and management**
The continued monitoring of emissions from peatlands will contribute to the development of EU-wide common, accessible standards and affordable techniques for GHG balance assessment to underpin international carbon credit schemes and effective reporting (e.g., national, and international voluntary carbon credit schemes and Payments for Ecosystem Services frameworks for peatlands). Accreditation systems should be easy, cheap, and based on GHG monitoring by direct measurements or using proxies (e.g., GEST).

The LIFE Peat Restore team measured GHG emissions from 10 sites, using transparent and non-transparent chambers.

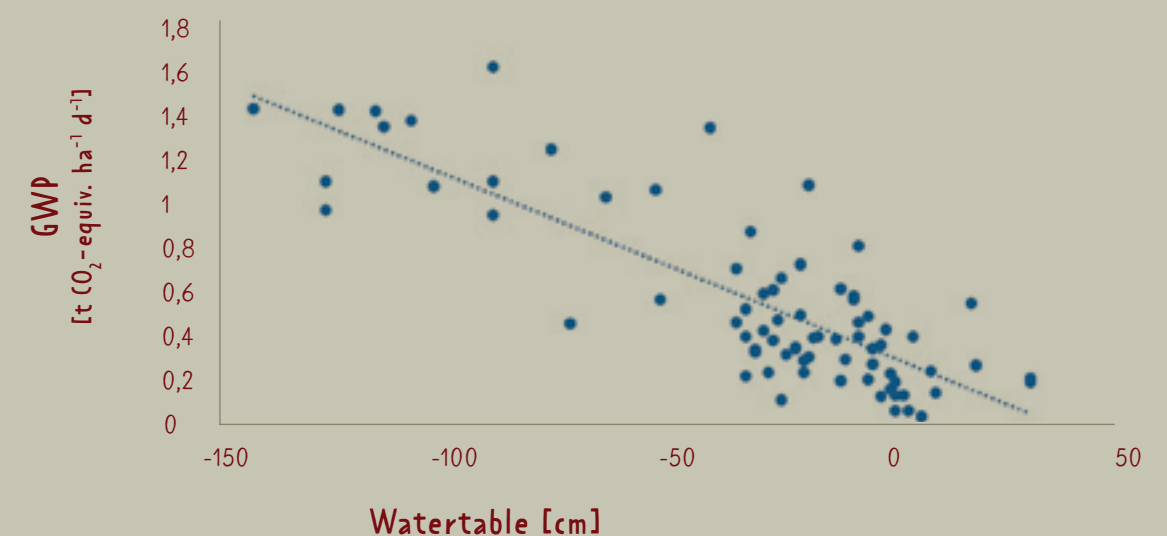


The LIFE Peat Restore team also estimated the GHG emissions from all the sites indirectly by mapping vegetation and using their characteristic GHG emission features, as well as water levels. This technique is called GEST (Greenhouse gas Emission Site Type).



GLOBAL WARMING POTENTIAL (GWP) FROM PROJECT SITES

Global Warming Potential based on the daily measured CO_2 - and CH_4 -emissions in all project sites in relation to the measured water table – negative values means a water level below the surface, positive values means above the surface. Source: LIFE Peat Restore (2022)



The results clearly demonstrate the positive impact rewetting measures have on the GWP; whereby higher water table levels will generally lead to a corresponding reduced GWP.

However, in some cases, if the water level is above the ground surface, the GWP may increase for a short period of time, due to higher methane emissions.



Why talk about peatlands?

Damaged peatlands are causing a lot of problems, especially to our climate! GHG emissions from degraded peatlands are responsible for 5-7% of the global GHG emissions. So, when they are degraded, peatlands become our greatest enemy in the fight against the climate crisis. However, restored peatlands will stop these emissions and once again function as a vital carbon sink, storing carbon for generations to come. Governments that seek to achieve the Paris Agreement goals and safeguard the climate for future generations should have an ambitious peatland restoration strategy.

By rehabilitating their vital ecosystem services, the rewetting of drained peatlands brings many benefits to communities. Therefore, it is important to engage with citizens and government officials alike to raise awareness and appreciation for such an incredible and essential ecosystem.

TAKE A LOOK AT
OUR WEBSITE

<https://life-peat-restore.eu/>

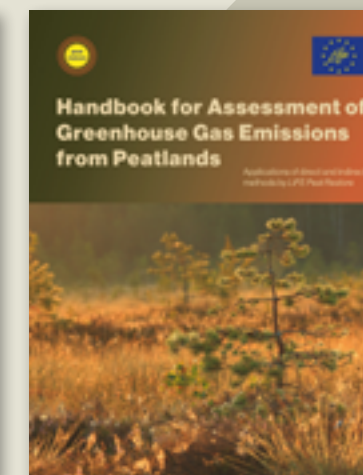


INFO BOX

Elaboration of technical books and recommendations to policymakers

Throughout the implementation of the project, the LIFE Peat Restore team gained valuable experience and learned useful lessons, which are reflected in two books: the 'Best Practice Book for Peatland Restoration and Climate Change Mitigation' (2021) and the 'Handbook for assessment of GHG emissions from peatlands' (2022). The Best Practice Book addresses the insights gained from the implementation of different restoration techniques on a variety of peatland types. Whereas the Handbook provides a general assessment and overview of the GHG monitoring techniques applied in the project – direct measurements with chambers and indirect estimation using GEST.

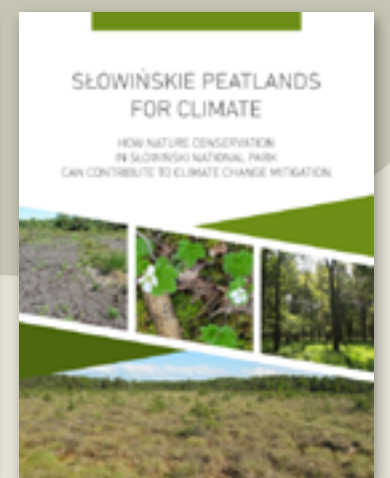
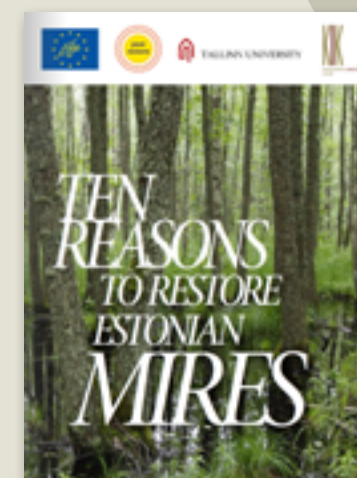
The LIFE Peat Restore team collaborated also with four European peatland projects to publish the booklet 'Peatlands across Europe: innovation & inspiration' (2021), which provides an overview of the piloting techniques, technologies, and business models to restore and sustainably manage peatlands. The booklet highlights key learnings and messages to equip future peatland practitioners and decisionmakers with state-of-the-art information.



AVAILABLE
IN THE PROJECT
WEBSITE

<https://life-peat-restore.eu/en/publications/>

More literature
to recommend





The accomplishments of LIFE Peat Restore

- More than **5,300 ha of degraded peatlands restored** (equivalent to approximately 7,420 football fields!).
- Estimated around **30% reduction of the Global Warming Potential from all sites**, amounting to 14,500 tons CO₂-eq per year, which is equivalent to the emissions of a medium-sized vehicle driving 117,886,179 km per year or around 154 times to the moon and back.
- All project partners **provided pre-restoration monitoring** (vegetation, water, peat, etc.) on all restoration sites, which served as the basis for assessing the effectiveness of restoration measures.
- The **bird species** inventories conducted in the Estonian site – Suursoo-Leidisoo – showed immediate positive impact of the rewetting measures. The number of **breeding pairs** of waders **increased from 11 to 69** pairs.
- More than **64.000 visits to the project website** from July 1, 2017, to December 31, 2021, as well as over **8.000 visits** on NABU.de and en.NABU.de until March 1, 2022.¹
- The LIFE Peat Restore project was regularly promoted via NABU's **social media channels**. The most successful post, which addressed the rewetting measures, **reached a combined 134.000 people** on Facebook (@Naturschutzbund) and Instagram (@nabu) in May 2021.
- The **photo exhibition** – Peatlands for climate – toured throughout all the project countries, highlighting the beautiful northern-European peatland landscapes, in addition to the main project activities.
- A **virtual version of the photo exhibition** is available on the project website².
- Lithuanian Fund for Nature re-established **peat-forming vegetation** in the post harvested site of Aukštumala peatland, to allow for faster regeneration of the bog eco-system. Large efforts were invested in reshaping the site, installing a water reservoir and irrigation system, providing renewable electric power and maintenance of the field.

- University of Latvia developed jointly with local stakeholders two **Management Plans** for Augstroze and Baltezers Mire Nature Reserves and one **Restoration Plan** for the Engure Nature Park.
- Lithuanian Fund for Nature elaborated and approved with local stakeholders two new NATURA 2000 **Management Plans** for the Sachara and Pūščia sites, updated the Management Plan of the Amalvas site and obtained an approval for the recultivation of the project area within the Aukštumala peat mining site.
- **8 brochures** about peatland nature reserves, ecosystem functions and policy were developed and distributed in all five project countries. The brochures are available in the project website².
- Klub Przyrodników **built bridges** (500 metres) over the swampiest sections of a trail in the Słowiński National Park, Poland.
- **Informational panels** were established on all project sites.
- Around **40 events** organised nationally and internationally to raise awareness, promote peatland education, and discuss peatland policy, including:
 - Events with **school children** in Lithuania
 - **International Wetland Day** events in the Lithuanian project areas
 - **Field camps** with volunteers in Lithuania
 - **Joint Conferences** with Estonian Fund for Nature and Tartu University during the International Wetland Day in Estonia
 - Annual events with **teachers and pupils** during the International Plant Protection Day in the Botanical Garden of the University of Latvia
 - **International panel discussions** in Germany as well as online, with **experts, government, and EU representatives**, to discuss peatland restoration policy and national government strategies (over 100 participants)
 - The online **Final Conference of the LIFE Peat Restore project** covered 2 days of scientific presentations and panel discussions, reaching an average of 700 participants from all around the world.
- Summary of outcomes of the **roundtable discussion with the peat industry** – Moving beyond peat extraction – available on the project website².
- **2 books** produced and distributed for experts:
 - **Best Practice Book** for Peatland Restoration and Climate Change Mitigation (2021)
 - **Handbook** for assessment of greenhouse gas emissions from peatlands (2022)
- **4 scientific papers** published, e.g.,:
 - First data on application of GEST approach in the Baltic region: **vegetation mapping** of pilot peatlands²
- Altogether 10 oral **scientific presentations** held at high-level international conferences
- The elaboration of '**Analyses of the legal regulatory framework of peatland exploitation, draining and restoration**' for each project country: Germany, Poland, Lithuania, Latvia, and Estonia. Available on the project website².
- **2 films** produced and distributed, available on the project website²:
 - '**The true power of peatlands**' – a 20-minute film about peatland dynamics and the many contributions they afford to society
 - '**Make peatlands wet again**' – a 20-minute film about the restoration techniques applied in the project
- An approximate total of **2.285.000 Euros** were spent on national economies:
 - In **Germany** approximately 430.000 Euros were spent on products and services
 - In **Poland** approximately 502.000 Euros were spent on products and services
 - In **Latvia** approximately 186.000 Euros were spent on products and services
 - In **Lithuania** approximately 735.000 Euros were spent on products and services
 - In **Estonia** approximately 432.000 Euros were spent on products and services
- More than **60 people employed** throughout the implementation of the LIFE Peat Restore project.

1 – <https://en.nabu.de/topics/ecosystems/life-peat-restore.html> and <https://www.nabu.de/natur-und-landschaft/moore/weltweit/life-peat-restore.html>
 2 – LIFE Peat Restore – Publications: <https://life-peat-restore.eu/>

Co-Financer





**LIFE PEAT RESTORE IS PART OF AN EVER-GROWING EFFORT.
JOIN US AND LET'S MAKE PEATLANDS WET AGAIN!**

To find out more contact us at <https://life-peat-restore.eu/en/contact/>