Project sites: Five countries – unique habitats

Poland: The three project sites are located within the Slowinski National Park. Altogether, the three sites – Kluki, Cieminkie Brota and Wielkie Błoto – cover an area of 1,300 ha. All sites are mainly occupied by birches and pines, with small remnants of open bogs. Part of Wielkie Błoto is covered by water basins formed after past peat mining. According to the EU Habitats Directive, the most important habitat types are 7110*, 7120 and 91D0*.

Lithuania: There are four project sites distributed across nearly all regions of the country, covering 400 ha with habitat types 7120, 7140, 7150 and 91D0*. Three of the sites consist of degraded peatland, abandoned after extensive peat extraction or drainage: the southern part of Amalva mire within the Žuvintas Biosphere Reserve, the Telmological Reserve of Pūsčia, as well as Sachara peatland. The sites are in poor condition, damaged by fire, exposing areas of bare peat and plots overgrown by shrubby vegetation. The forth site is located on the edge of actively mined peatland of Aukštumala, where peat extraction is finished.

Latvia: The project sites are located within three different protected areas, where 248 ha in total will be restored: Augstroze Nature Reserve, Lake Engure Nature Park and Baltezers Mire Nature Reserve. The areas contain habitat types 7110*, 7120, 7140, 7150, 7210* and 7230. All project sites are unfavourably affected by drainage.

Estonia: The Suursoo fen is part of the Läänemaa Suursoo mire complex, forming the largest project area (3,343 ha). A mosaic of different habitat types developed: 7110*, 7140, 7230, 9010*, 9080* and 91D0*; however, alkaline fen communities (7230) are prevalent. The area was strongly altered by drainage. Tree and shrub coverage increased and typical fen mosses disappeared, as a result of lowered water level.

Germany: The German site is the smallest, amounting only to 15.5 ha. It is located within the Biesenthaler Becken Nature Reserve and owned by the NABU Foundation. Previous drainage of the site led to growth of the currently prominent species of pines and beeches, which are generally not typical in peatland habitats. The main habitat type within the project area is listed under 91D0*.

Habitat types under the EU Habitat Directive (Council Directive 92/43/EEC):
7110*: Active raised bogs
7120: Degraded raised bogs still capable of natural regeneration
7140: Transition mires and quaking bogs
7150: Depressions on peat substrates of the *Rhynchosporion*
7210*: Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*
7230: Alkaline fens
9010*: Western Taiga
9080*: Fennoscandian deciduous swamp woods
91D0*: Bog woodland

Project implementation — who and how?

Facts and Figures:
EU-Funding-Programme: LIFE Climate Action
Project Period: 2016 to 2021
Total restoration area: approx. 5,300 ha
Total budget: 6,010,517 EUR
EU-Contribution: 3,549,480 EUR (59.72%)

Project Partners:
Germany:
NABU (Coordinating Beneficiary)
Poland:
Klub Przyrodników
Latvia:
E Buvvadiba Ltd
Foundation „ELM media“
Lake Engure Nature Park Fund
University of Latvia
Lithuania:
Lithuanian Fund for Nature
Peat Producers Association
Estonia:
Tallinn University

Co-Financers:
- Barnim District Administration
- Latvian Environmental Protection Fund
- Ministry of Environment of the Republic of Lithuania
- Regional Fund for Environmental Protection and Water Management
- Baltic Sea Foundation
- Environmental Investment Center

The LIFE 2014 - 2020 Programme is divided into two sub-programmes: Environment and Climate Action. The LIFE Climate Action supports projects, which aim to develop innovative ways to respond to the challenges of climate change in Europe.

Imprint

Charitéstr. 3, 10117 Berlin, www.NABU.de

Text: Team LIFE Peat Restore
Design: Ulrike Harbot
Photo credit: Cover: M. Pakalne, P.2 top: I. Ludwichowski, bottom: Klub Przyrodników, L. Jarašius, M. Pakalne,
P.3 top: M. Pakalne, bottom: T. Kirschey, T. Penttilä, L. Jarašius,
P.4 top: P. Pawlaczyk, bottom: M. Zauft, Klub Przyrodników, M. Pakalne ,
P.5: M. Pakalne, M. Pakalne, J. Jachtner

LIFE Peat Restore

An EU peatland project
funded by LIFE Climate Change Mitigation

Peatlands in the context of climate change

Peatlands are among the key habitats contributing to climate change mitigation. Their role as permanently water-locked carbon sinks is vital to the EU's implementation of the Paris Agreement – within the United Nations Framework Convention for Climate Change (UNFCCC) – as well as to achieve the target to substantially reduce greenhouse gas (GHG) emissions until 2030.

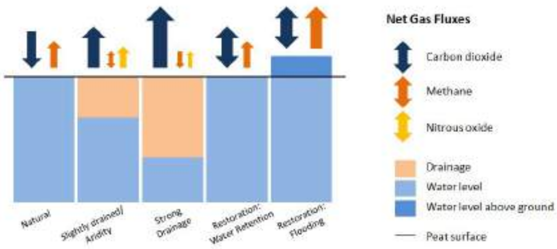
Anthropogenic degradation of peatlands for economic purposes, such as peat extraction, agriculture or afforestation, diminishes the capability of peatland habitats to store carbon dioxide (CO_2). Most importantly, it risks turning these valuable carbon sinks into GHG sources; therefore, hindering the possibility of reaching the targets set in the Paris Agreement.

The Northern and Eastern European Lowlands encompass extensive areas of much degraded peatlands. Thus, the potential to avoid large amounts of GHG emissions is exceptionally high. Nine partners from Estonia, Latvia, Lithuania, Poland and Germany came together to develop the EU Climate Change Mitigation project "LIFE Peat Restore", which started in 2016.

The project aims to reduce CO_2 emissions by restoring degraded peatlands and regenerating their function as carbon sinks; as well as to provide best practice guidelines on peatland restoration for decision-makers and land users.

Source or sink?

Although peatland habitats account for only 3% of terrestrial surfaces worldwide, they store nearly 30% of the soil carbon. This occurs because characteristic peat forming vegetation (e.g. sphagnum mosses) within healthy peatlands absorbs significant amounts of CO_2 from the atmosphere through photosynthesis. Although concurrently, aerobic mineralization and respiration, as well as anaerobic mineralization will lead to emissions of the greenhouse gases, carbon (CO_2) and methane (CH_4), respectively. The net storage of carbon still exceeds the emission rate, despite the higher Global Warming Potential (GWP) of CH_4.



Peatlands under natural conditions serve as carbon sinks. Rewetted peatlands are capable of regaining this function. Adapted from Freibauer et al. 2009.

In anaerobic conditions, the high water saturation in the soil causes incomplete decomposition of the vegetation, which will gradually lead to the accumulation of carbon through the formation of peat. Drained peatlands, exhibiting lower water tables, experience increasing CO_2 emissions by aerobic mineralization, in addition to the release of the GHG nitrous oxide (N_2O) as a side effect of mineralization. Indeed, the GWP of N_2O is more than 250 times higher than that of CO_2. Under agricultural use, such condition can be further aggravated by the use of fertilisers, which multiplies the emissions of N_2O.

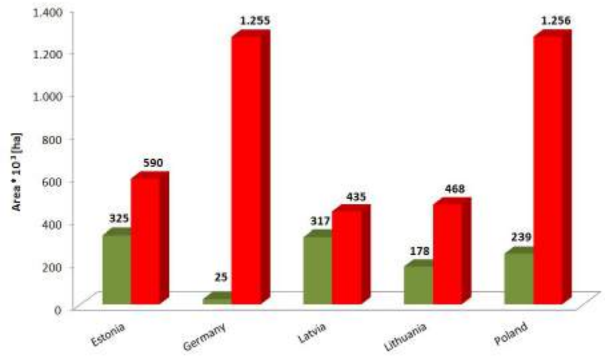


Thus, an initial carbon sink becomes a carbon source. The restoration of degraded peatlands by raising the water table – hence regaining anaerobic soil conditions – may lead to an initial increase of CH_4 emissions. However, in the long-term, restored peatlands are expected to recover its original function as carbon sinks.

Peatlands and politics

Secretariats of international conventions and organisations, such as the UNFCCC, the Convention on Biological Diversity (CBD) or the Food and Agriculture Organisation (FAO), acknowledge the relevant role peatlands play within climate change mitigation. Unfortunately, viable instruments to build on this potential have yet to be agreed on among the world community. Yet, according to the Habitats Directive, approximately 85% of EU peatland habitats (fens and bogs) are listed as threatened. In Europe, 12% of the total amount of CO_2 emissions derive from degraded peatlands, more than 60% of these emissions originate from agricultural land use, approximately 31% from forestry and 5% from peat extraction. However, European policies, including the agricultural subsidies system, are failing to account effectively for emission reductions from peatland use.

Since establishing the EU LIFE funding programme in 1992, more than 300 projects have been devoted to the conservation and restoration of mire habitats. In addition to its practical restoration measures, the LIFE Peat Restore project seeks to provide input which can lead to a more climate-friendly treatment of peatlands. Within the framework of climate change mitigation, raising awareness of the need to leave peatland habitats intact is a key objective. LIFE Peat Restore will address decision-makers, peatland land users (e.g. managers, farmers and peat extraction industry), scientists and the general public.

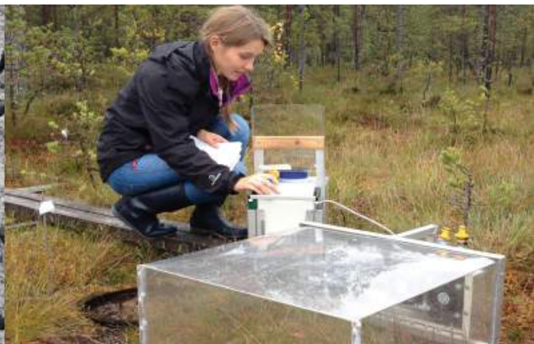


Areas of near-natural peatland (green bars) and drained peatland (red bars). According to Joosten et al. 2017.

LIFE Peat Restore – linking innovative and conventional methods

To improve the hydrological conditions of all 10 projects sites, which together reach a total area of 5,300 ha, filling ditches and building dams to block the draining ditches, is imperative. Since peatlands need constant water, rewetting is a fundamental part of the restoration measures. If necessary, shrubs and trees will be removed, in order to prevent additional evaporation that will lead to desiccation of peat surfaces, as well as to avoid excessive shading of the surface layers, which prevent the light-dependent characteristic peat-forming vegetation to regenerate.

Additionally, the re-introduction of peat-forming vegetation in some cases is crucial, as it may not recover automatically.



Since natural re-growth will not happen in all sites through natural succession, innovative methods for transplanting sphagnum mosses will be tested. Intense peat excavation in the past left many areas with bare peat or large open water bodies.

The Polish project partner Klub Przyrodników will establish artificial floating islands with peat forming vegetation and alter the shorelines on post exploitation peat water reservoirs, allowing the vegetation to spread and occupy the open water body. In Lithuania, sphagnum mosses will be reintroduced in heavily degraded peatlands to enforce faster regeneration of peatland habitats. Fragments of sphagnum will be spread and maintained in the cut-over area of Aukštumala peatland to restore the ecosystem of raised bog and serve as a demonstration site for after-use of extracted peatlands.

To estimate the contribution of peatlands to climate change mitigation, GHG will be quantified before, during and after raising the water table. The recently developed GEST (Greenhouse gas Emission Sites Types)-approach will be applied and complemented. This methodology allows a rapid and economical assessment of GHG emissions – and thus the Global Warming Potential – on the basis of vegetation mapping. Vegetation forms, integrating flora as well as environmental parameters, can be categorised as particular GEST-types.

Furthermore, annual direct GHG chamber measurements will be carried out in the field, supplementing results from the GEST-approach. Moreover, the linking of relevant data on hydrology, peat depth, pH, trophic level and land use, will enable project experts to develop and improve the present GEST-catalogue and fill existing gaps.

Practical fieldwork is accompanied by a variety of events, meetings, scientific conferences and other public relation activities aimed at different target groups. In addition to raising awareness, such activities seek to achieve 'Memorandums of wise use of peatlands' with companies from the peat industry, within the frame of Corporate Social Responsibility (CSR). Also, LIFE Peat Restore will attempt to provide robust scientific data to inform European policy, as well as to influence national regulations of the project countries, in order to allow the adoption and improvement of regulatory frameworks which can better protect endangered peatland habitats and promote its function as carbon sinks.

For further project information please visit:
www.life-peat-restore.eu

Sources graphs:

• Freibauer, A., Drösler, M., Gensior, A., Schulze, E.-D. (2009): Das Potential von Wäldern und Mooren für den Klimaschutz in Deutschland und auf globaler Ebene. Natur und Landschaft 2009: 20-25.

• Joosten, H., Tanneberger, F., Moen, A., Mires and peatlands of Europe, Schweizerbart Science Publishers, Stuttgart, 2017.

Frequent evaluation of ground water table.

To stop the drainage effect of the ditches they will blocked by dams.

Frequent vegetation mapping allows conclusions on the development of greenhouse gas emissions.