Peatland restoration (on private land)

"Building the European Peatlands Initiative: A Strong Alliance for Peatland Climate Protection in Europe"

A project formed under the European Climate Initiative (EUKI), aims to strengthen pan-European collaboration for the protection, restoration, and sustainable use of peatlands. The project helps to support the adoption of peatland strategies and policies based on up-to-date data and enhances multi-stakeholder collaboration on the topic of peatlands. Moreover, it aims to share peatland restoration practices and foster multi-national collaboration between countries to successfully mitigate climate change on a European level.

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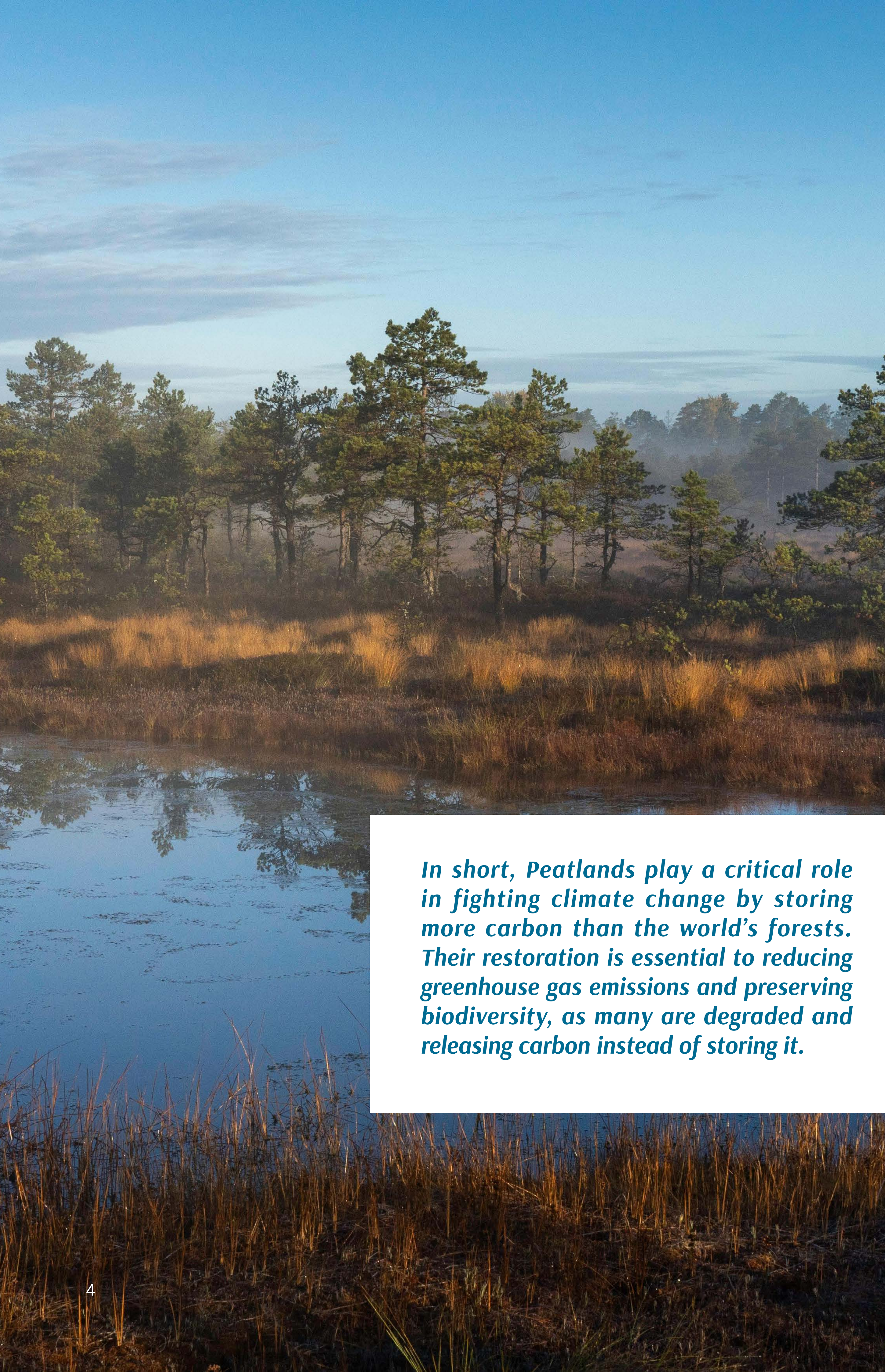


In short, Peatlands play a critical role in fighting climate change by storing more carbon than the world's forests. Their restoration is essential to reducing greenhouse gas emissions and preserving biodiversity, as many are degraded and releasing carbon instead of storing it.

Peatlands: Why Should You Care?

In short, Peatlands play a critical role in fighting climate change by storing more carbon than the world's forests. Their restoration is essential to reducing greenhouse gas emissions and preserving biodiversity, as many are degraded and releasing carbon instead of storing it.

Peatlands are found in nearly every country and are emerging as one of the most valuable nature-based solutions for combating climate change. Their conservation and restoration offer a powerful opportunity to mitigate CO_2 emissions by preserving carbon sinks that are otherwise irrecoverable. At the same time, they serve as crucial refuges for a wide variety of plant and animal species.

Europe alone has approximately 59 million hectares of peatlands, of which around 46% are degraded. These degraded areas emit an estimated 582 million tons of CO_2e annually[1]. Despite covering only 3-4%[2,3]— twice the amount stored in the world's forest biomass and equivalent to 50-75%[4] of the carbon currently in the atmosphere. Peatlands are Earth's largest terrestrial carbon store despite their relatively small area. Beyond their role in carbon sequestration, they also provide vital ecosystem services, such as biodiversity support, water regulation, and flood prevention.

59M ha of peatlands in Europe

- 46% degraded peatlands
- 54% healthy peatlands

582M tons of CO_2e are emitted annually by degraded peatlands

3-4% of Earth's land surface is covered by peatlands

50-75% of the carbon currently in the atmosphere is stored in peatlands

1. Numbers according to: UNEP (2022) Global Peatlands Assessment https://www.unep.org/resources/global-peatlands-assessment-2022 p. 157 and p. 66

2. Numbers according to: UNEP (2022) Global Peatlands Assessment https://www.unep.org/resources/global-peatlands-assessment-2022 p. 33

3. Numbers according to: UNEP (2022) Global Peatlands Assessment https://www.unep.org/resources/global-peatlands-assessment-2022 p.7

4. NASA Pinpoints Cause of Earth's Recent Record Carbon Dioxide Spike – NASA The figure in 2017 was 850 Gigatonnes.

What Is the Problem?

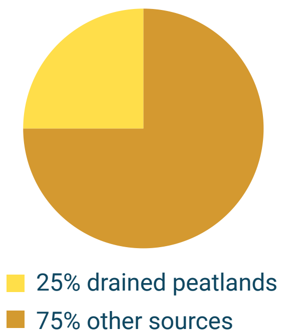
Summarised: Drained and degraded peatlands are major carbon emitters, contributing to global CO2 levels and exacerbating biodiversity loss, water pollution, and environmental instability.

Peatlands are severely impacted when drained, often for agriculture, tree plantations, or development. When a peatland's water level drops, or its natural vegetation is removed, it shifts from a carbon sink to a significant emitter of carbon and other nutrients. Degraded and drained peatlands are responsible for over 4%[5] of global human-caused CO_2e emissions—more than emissions from the aviation and shipping industries combined. In the EU, drained peatlands account for 25% of agricultural greenhouse gas emissions, even though they represent only 3%[6] of the region's agricultural land.

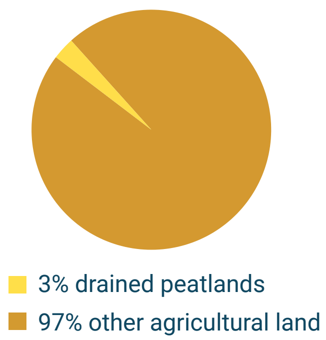
Peatland degradation has far-reaching consequences. It accelerates biodiversity loss and exacerbates flooding, droughts, and fires. It diminishes the quality of drinking water in local communities and contributes to the eutrophication of open waters, which leads to harmful algae blooms. Additional drivers of degradation include peat extraction for fuel and horticulture, overgrazing, and wildfires.

4% of global CO2e emissions are caused by degraded peatlands

Sources of Agricultural GHG emissions in the EU



Representation of Peatlands in the Region's Agricultural Land



5. Numbers according to: UNEP (2022) Global Peatlands Assessment https://www.unep.org/resources/global-peatlands-assessment-2022 p.13

6. Numbers according to: UNEP (2022) Global Peatlands Assessment https://www.unep.org/resources/global-peatlands-assessment-2022 p.140

Why Peatland Conservation Matters

Protecting peatlands helps mitigate climate change, maintain biodiversity, and improve ecosystem services like water regulation. However, restoration is complex and involves multiple stakeholders.

Protecting, restoring, and sustainably managing peatlands is essential for addressing climate change and preserving biodiversity. However, restoring peatlands is a complex process involving multiple stakeholders, landowners, and land users. It requires much more than simply raising water levels on drained peatlands—it involves a comprehensive approach that integrates ecological, social, and economic factors.

Who Should Do the Work?

The EU has traditionally relied on national governments to establish and manage natural areas to meet its biodiversity targets. However, it has become clear that this approach alone is insufficient. An evaluation of the EU Biodiversity Strategy for 2020 revealed that 77% of habitats still had an unfavorable conservation status, underscoring the need for a significant effort.

Peatlands often involve complex ownership structures and land use rights. Coordinating restoration efforts within a hydrological basin can be challenging due to the involvement of multiple landowners. A single stakeholder in a small area can potentially block or undo an entire restoration process[7]. Familiar sources of conflict between neighboring landowners include conflicting interests, historical disputes, poor communication, lack of an effective working structure, or resistance to additional responsibilities. Aligning these diverse interests is an ongoing challenge, with education playing a crucial role. However, once a balance is achieved, there is often room for productive cooperation. Together, more significant progress can be made.

7. https://sites.google.com/view/c-toolbox/components-of-the-toolbox/policy-recommendations?authuser=0

The "Private Land Conservation" (PLC) concept offers programs and agreements that support private landowners in conserving and restoring nature. PLC complements regulatory conservation measures but is not a substitute for them. It typically occurs through the initiative of the landowner or manager.

Pilot programs within and outside the EU have demonstrated that frameworks encouraging voluntary action are effective and should be further promoted by making such tools more widely available in the EU. However, despite the availability of new tools to meet nature conservation targets on private land, Europe's current legal framework still limits the recognition of these voluntary actions. Expanding the use and recognition of PLC tools across Europe would significantly enhance peatland conservation efforts on private lands.

How You Can Help as a Private Landowner

Assess Your Land

Review the soil, topography and water levels to determine if you have peatland on your property. If unsure, consult with a peatland expert.

Start Small

Begin with simple steps like stopping drainage, creating buffer zones to prevent agricultural runoff, and removing invasive species.

Explore Financial Opportunities

Research grants, carbon credits, or eco-tourism potential to fund restoration projects. Check government incentives for peatland conservation.

Join a Program

Sign up for local or European-wide conservation programs.

Peatland Restoration: Where to Start

Unless stated otherwise, the information in this section is derived from the *Convention on Wetlands* (2021). *Global Guidelines for Peatland Rewetting and Restoration*, Ramsar Technical Report No. 11. Gland, Switzerland: Secretariat of the Convention on Wetlands. Available here.

Other valuable resources for peatland restoration can be found in the C-Toolbox: - a toolbox based on the learnings of five European projects, which are dealing with peatland restoration by providing landowners and farmers alternative income sources without damaging the environment.

C-Toolbox.

The following steps can be summarised from the FAO's decision support system for ease and practicality.[8]

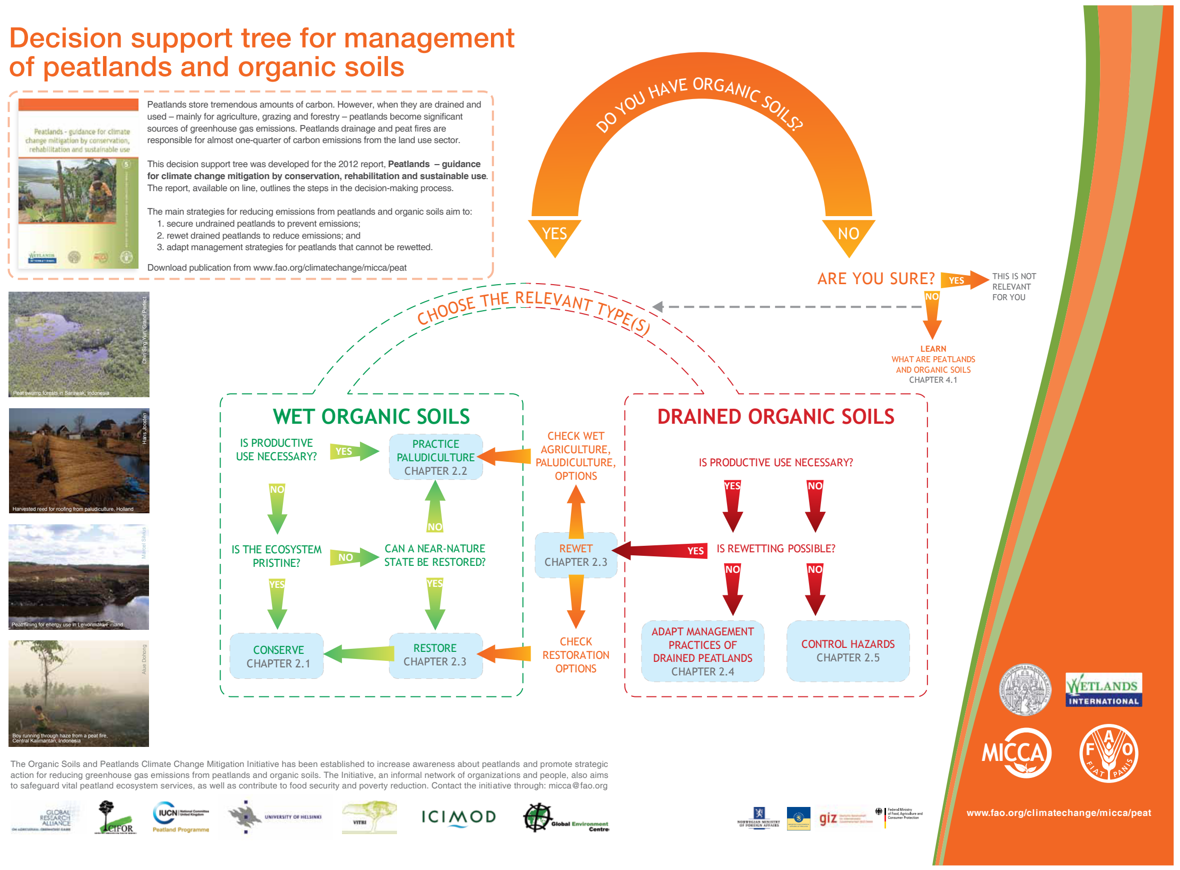


Figure 1: Decision support tree for management of peatlands and organic soils. Source: FAO

8. DSS of FAO https://www.fao.org/climatechange/34960-08c70f03f8778c5390f275ff33ab1816f.pdf

STEP 1:
Site Assessment

First of all, do I have a peatland?

Awareness of peatlands is still limited. What was once a wetland drained for human activity could have been a peatland. Because many of these landscapes were altered decades to centuries ago, often without proper records, the historic extent of mires is partly unknown. Therefore, identifying whether peatland exists on the land may not be straightforward. Understanding your land's topography is a helpful first step.

What does my peatland look like?

The first step in setting your restoration goals is to determine the specific type of peatland you have. Peatlands typically fall into two main categories: **bogs** and **fens**.

- **Bogs** rely solely on precipitation for water supply and are disconnected from other water sources. As a result, they are nutrient-poor and strongly acidic.
- **Fens**, conversely, are fed by water that was in contact with mineral soils or bedrock, making them more nutrient-rich and either weakly acidic or alkaline.

Not all peatlands fit neatly into these categories. Transitional mires may display characteristics of both bogs and fens. Understanding the pre-drainage hydrology of your peatland is also essential for planning effective restoration.[9] It's essential to assess the water tables in adjacent areas to see if they are stable or fluctuating and to take appropriate measures. The surrounding water quality also matters, as mire-specific vegetation often depends on acidic and nutrient-poor (oligotrophic) conditions, which is essential for the survival of certain plants and animals. Runoff from agricultural areas can disrupt this balance, and buffer zones may be required to protect the peatland from low-quality water.

9. Hydrology is the study of the distribution, movement, and properties of water on Earth, including its interaction with the environment—especially about the water cycle, surface, and groundwater, and its impact on ecosystems.

Therefore, in addition to bogs and fens, it can be beneficial to identify the original **hydrogenetic mire type** of the land. That is a type of peatland classified based on its water source and the way water moves through the system, influencing the mire's hydrology, vegetation, and peat formation:

- In a **horizontal mire**, the water table remains level, allowing peat to form up to the surface. If the water level does not rise, new peat cannot form.
- An **inclining mire** has a slightly sloped water table, causing horizontal water movement that is slowed by peat and dense vegetation, gradually raising the water table. These mires can self-regulate but are more vulnerable to disturbances, which can lead to rapid erosion.

What does my peatland look like?

After identifying the peatland type, the next step is to assess the level of degradation.

- **Minimally or slightly degraded sites**: These areas may have lost some peatland-specific vegetation, but the hydrology remains largely intact. In such cases, halting the disturbance may allow natural recovery. Restoration efforts can be supported by removing any disruptive materials and encouraging vegetation regrowth through seeding, planting, or allowing spontaneous reestablishment. When seeding or planting, it is beneficial to consider using native plant materials, as this can help minimize the risk of introducing or spreading invasive species.
- Restoration in these areas requires minimal effort but typically results in low reductions in greenhouse gas (GHG) emissions.
- **Moderately degraded sites**: These peatlands have been recently drained and can be restored relatively quickly by halting drainage in the peatland and surrounding areas. In some cases, nutrient-rich water from nearby areas must be prevented from entering the peatland to help reestablish native vegetation.
- **Severely degraded sites**: These areas have undergone significant hydrological changes over a long period, leading to increased peat decomposition. Peatlands used for peat extraction, where only highly decomposed peat remains, fall into this category. The remaining peat has lost much of its ability to store water, making restoration challenging. However, rewetting can eventually lead to new peat accumulation, improving hydrological conditions.

STEP 2:
Set Your Restoration Goals

After identifying the peatland type and assessing its level of degradation, the next step is to establish clear and achievable restoration goals. These goals should be ambitious yet realistic, factoring in the level of degradation, technical feasibility, and any legal, economic, or societal constraints.

Restoration, particularly rewetting, can be financially demanding, but the long-term benefits—such as enhanced ecosystem services, improved biodiversity, and potential financial rewards—can significantly outweigh the costs. Opportunities like eco-tourism, carbon credits, and environmental subsidies can help offset financial burdens, making restoration a sound investment.

Once your goals are clearly defined, you can choose the best restoration methods to achieve those outcomes.

Key Restoration Goals

Rewetting is essential for most peatland restoration efforts. However, the process is often complex, especially when financial interests conflict with conservation needs. Restoration works in cycles, where progress toward one goal can help achieve others. Below are the main categories of restoration goals:

Ecological Goals:

- Restore habitats for rare and threatened plant and animal species
- Control or eliminate invasive, non-native species
- Re-establish natural water tables to reduce flood risks and improve water quality
- Stabilize soil to prevent erosion
- Enhance carbon sequestration for climate change mitigation and adaptation, boosting the landscape's resilience to environmental changes

Economic Goals:

- Explore financial opportunities such as eco-tourism and wildlife photography
- Qualify for subsidies, or other financial incentives linked to conservation and climate action

Aesthetic Goals:

- Enhance the visual appeal of the landscape by restoring natural vegetation and water features, creating scenic vistas

Recreational Goals:

- Develop outdoor recreation opportunities such as hiking, birdwatching, and educational programs

Unlocking Financial Benefits Through Peatland Restoration

Restoring peatlands offers a unique blend of environmental benefits and financial gains, making it an ideal investment for landowners. Here's how you can capitalise on this opportunity:

Carbon Credits: A Revenue Stream for Carbon Sequestration

Peatlands are powerful carbon sinks. By restoring and preserving peatlands, you not only prevent further CO_2 emissions but also actively capture and store carbon, creating an opportunity to earn carbon credits. These credits can be sold on carbon markets, providing a recurring revenue stream as demand for carbon offsetting grows. With climate action increasingly prioritized by businesses and governments, the market for carbon credits is robust and growing, making peatland restoration a highly profitable endeavor. For example:

- **MoorFutures (Germany):** Credits sold at €40–60 per ton of CO_2 equivalent.
- **Peatland Code (UK):** Credits range from €6–10 per ton for bog restoration.
- **MaxMoor (Switzerland):** Credits for high-marsh restoration priced around €110 per ton due to the high cost of restoration.

Eco-Tourism: Turning Nature into a Sustainable Business

Restored peatlands are rich ecosystems, often attracting diverse wildlife, rare bird species, and unique flora. This natural beauty can transform your land into an eco-tourism destination, offering activities like birdwatching, hiking, and guided nature tours. In addition to enhancing local biodiversity, eco-tourism generates steady income, providing an ongoing incentive to maintain and protect your restored peatland.

Funding and Grants: Financial Support for Your Restoration Efforts

Numerous funding opportunities are available to support peatland restoration projects. Government agencies, environmental organizations, and the European Union frequently offer subsidies, grants, and incentives to encourage restoration efforts. Accessing these funds can help cover restoration costs and boost financial returns, making it easier to embark on or expand your restoration work without substantial upfront expenses. For example:

1. Eco-Schemes under the Common Agricultural Policy (CAP) 2023–2027

Overview:

Eco-schemes are payments conditioned on environmentally friendly farm practices, which may include peatland rewetting and paludiculture, depending on the national or regional strategic plans.

Country-Specific Examples:

- *Netherlands*: Supports paludiculture under eco-schemes.
- *Germany*: Funds management of Natura 2000 sites and extensive grazing.
- *France, Belgium, Ireland*: Currently focus on other eco-schemes, such as extensive grazing without specific peatland restoration provisions.

2. Agri-Environment-Climate Measures (AECM)

Overview:

Provides financial assistance for sustainable land management, often through 1–5-year contracts, supporting environmentally friendly practices on peatlands.

Country-Specific Examples:

- *France*: Regional agri-environment projects in areas like the "Marshes of Grand Lieu" subsidize extensive grazing and controlled fertilization (subsidies range from €120–265 per hectare).
- *Ireland*: The Green Low-Carbon Agri-Environment Scheme (GLAS) will be replaced by a new AECM that incentivizes raising water table levels on drained peatlands.
- *Germany*: Offers subsidies for peatland restoration under environmental commitments.
- *Wallonia*: Provides funds for hydrological restoration under non-productive agricultural and forestry investments.

3. LIFE Program

Overview:

This EU program funds projects that support climate and environmental protection, including peatland restoration.

Example:

The LIFE "Tourbière du Jura" in France, which supported the restoration of 55 peatlands across Natura 2000 sites, funded through the LIFE-Nature and Biodiversity subprogram.

4. Green Financing and Borrowing Options

Green Bonds:

Large-scale projects can attract investors by issuing green bonds that fund environmentally positive impacts. The project proponent must demonstrate environmental benefits and report progress.

Participatory Loans:

Through platforms like *Agrilend* and *Miimosa* in France, small-scale investors can fund agricultural projects, providing accessible loans with favorable terms for restoration projects.

Peatland restoration can thus be financially supported through a mix of carbon credit sales, CAP subsidies, and various grant programs, each tailored to incentivize sustainable land use practices that enhance biodiversity and reduce carbon emission.

STEP 3: Restoration Monitoring

Monitoring is vital to any peatland restoration project, as it helps ensure your efforts are on the right track. By setting up a comprehensive monitoring plan, you can measure the impact of your actions, validate successes, and make informed adjustments to achieve your goals. The results are also necessary to unlock financial benefits through carbon credits and payments for ecosystem services, reinforcing the long-term value of your restoration efforts.

Establishing a Baseline

To track improvements—such as reductions in greenhouse gas (GHG) emissions or enhancements in other ecosystem services—it's essential first to establish a baseline or reference point. This baseline reflects the current status of your peatland before restoration begins. From there, you can clearly define the expected changes and benefits, allowing you to measure progress over time. By comparing future data to the baseline, you'll have tangible proof of success that can support funding applications, ecosystem service payments, or carbon credits.

Long-Term Monitoring with Reference Areas

For projects that allow for more detailed study, long-term monitoring of a **reference area** can be highly informative. This approach compares a restored area with a nearby peatland that remains unrestored, providing valuable insights into the effectiveness of your restoration efforts. While this method can be more costly and requires the reference area to remain stable, the results can be precious in demonstrating the positive impacts of rewetting and peatland recovery.[10]

Practical Tools for Monitoring

Monitoring doesn't have to be overly complex. The **Site Emissions Tool (SET)**, developed through the European Carbon Connects project, is designed to help landowners, farmers, and policymakers estimate GHG reductions and potential carbon credits from restoration projects. *Note, only in parts of temperate Europe*. User-friendly and accessible to non-specialists, SET provides reliable calculations based on the GEST database. It helps you estimate the environmental and financial benefits of restoration .

For more on peatland monitoring methods, visit this resource.[11]

10. Joosten, H., Brust, K., Couwenberg, J., Gerner, A., Holsten, B., Permien, T., ... & Wahren, A. (2015). *MoorFutures®: integration of additional ecosystem services (including biodiversity) into carbon credits-standard, methodology and transferability to other regions.* Deutschland/Bundesamt für Naturschutz.

11. https://sites.google.com/view/c-toolbox/components-of-the-toolbox/peatland-monitoring?authuser=0#h.eu66sxaw56rr

Download the Site Emissions Tool

You can access the SET tool and user manual to estimate GHG emission reductions and carbon credits for your peatland restoration project.

The Site Emissions Tool (SET) was developed within Carbon Connects to help non-specialists to estimate the GHG emission reductions and resulting C-credits for a project. It is meant to be sufficiently easy to use to be useful for interested farmers, landowners or policy makers. SET can calculate most of the numbers included in a typical scenario-based estimation of a project's GHG emission effects. The calculations are based on the GEST database and IPCC tier 1 calculation and are thus IPCC-proof. See the user manual for more details.

DOWNLOAD THE SITE EMISSIONS TOOL HERE[12]

Example from the Field - Nature Reserve 'De Wijers', Belgium

De Wijers is a remarkable nature reserve located in the northeastern province of Limburg, Belgium. Its elevation averages 25 meters above mean sea level. Two major lowland rivers run from northeast to southwest. Historically, extensive drainage through a network of ditches altered the landscape, with many watercourses deepening and straightening over time.

Until the mid-19th century, De Wijers was predominantly heathland, with fens in the wettest areas documented as early as the 15th century. Over the centuries, parts of the fens were exploited for peat and iron extraction, after which these shallow pits were repurposed as fish ponds. From the 19th century onward, large heath areas were afforested or transformed into pastures and arable land while fish farming activities intensified. This resulted in a diverse landscape of ponds, reed beds, streams, fens, meadows, and forests, creating a mosaic rich in ecological diversity due to varied wet-dry gradients.

12. https://www.google.com/url?q=https%3A%2F%2Fwww.nweurope.eu%2Fprojects%2Fproject-search%2Fcconnects-car-bon-connects%2F%23tab-6&sa=D&sntz=1&usg=AOvVaw2wpj4IzDVXhdzuD0eAwPZy%22%20\t%20%22_blank

Despite its ecological richness, De Wijers faced significant challenges:

1. Many habitats and species were not in favorable conservation status.
2. The area was highly fragmented, with land ownership split among numerous private stakeholders.

Recognizing the area's potential for restoration, private landowners collaborated with public authorities and nature conservation organizations to launch the **3WATER project**, led by the European Landowners' Organisation (ELO). Supported financially by the European Commission, this initiative has played a crucial role in conserving European plant and animal species (biodiversity) in the Central Limburg Pond area.

Restoration efforts focused on enhancing ponds, pools, forests, heathland, and wet grassland to promote a more open landscape.

Key achievements included:

- Create 16.7 hectares of new ponds and pools and improve 140 hectares of existing wetlands.
- Reopening of 6 kilometers of canals to restore natural water flow.
- Establishment of over 10 hectares of new heathland and improvements to 30 hectares of existing heathland.
- A targeted increase in local fauna, including ten additional breeding pairs of bitterns and approximately 1,000 more male tree frogs

Much of the restoration work occurred on private land and remains accessible only by permission. However, guided walks, site visits, and informational boards along footpaths invite the public to engage with the landscape.

Enhancements such as an additional car park, new footpaths, lookouts, and webcams allow visitors to explore and appreciate De Wijers even more. The project's social relevance is an excellent example of balancing ecological, economic, and educational interests. Various outreach efforts, including brochures, a dedicated website, newsletters, and a high-profile documentary, have helped to share the project's successes with the public.

After the European Commission funded the project period, private landowners established the **Vijvers Midden-Limburg Nature Reserve Association**. They remain actively involved in managing the area, working closely with municipal authorities, and utilizing their financial resources. Today, part of the private land has gained formal status as a nature reserve, highlighting the long-lasting impact of collaborative conservation efforts.

The Way Forward: Balancing Ecology, Economy, and Education

Integrating three fundamental pillars—**ecology, economy, and education—is essential to ensuring the long-term success of nature restoration projects**. This **Triple E** approach fosters a healthy, sustainable society that values and benefits from its natural environment.

Ecology

At the heart of any nature restoration project is prioritizing ecological health. But what does "nature" encompass in this context? What improvements are we striving for, and why?

A primary objective of many restoration initiatives is the conservation of specific endangered species outlined in European or national conservation action plans. Each species requires its favorable habitat for survival and growth.

For example, restoration efforts must focus on creating open, contiguous ponds rich in reeds to support the bittern, ensuring a sufficient food supply of appropriately sized fish, maintaining clear water, and providing safe, undisturbed nesting sites. Similarly, the **tree frog** thrives in sunny, fish-free pools adjacent to moist grasslands with some shrubs or bushes. Maintaining the integrity of wet and dry heaths is also crucial; these areas must remain sufficiently open to allow sunlight and warmth to penetrate while minimizing leaf litter accumulation for the benefit of specialized plants, insects, reptiles, and ground-nesting birds.

When focusing on a species' conservation, it's important to remember that these species are not isolated from their environment. While enhancing habitat quality for one species often benefits others, be aware that it can sometimes make the habitat less suitable for species with differing requirements. . As we improve the environment, we simultaneously bolster species populations. Rare species, often more vulnerable and with higher habitat demands, serve as indicators of ecological health. Evidence increasingly shows that nurturing high-quality ecosystems not only benefits biodiversity but also enriches human communities and society at large.

Economy

Sustainable restoration projects must strive to balance costs and benefits within the area. Effective management of natural spaces incurs expenses, and restoration or conservation initiatives should align with the economic value they provide to people, society, and ecosystem services. By highlighting the financial benefits of healthy ecosystems—such as improved water quality, increased tourism, and enhanced agricultural productivity—stakeholders can better justify investment in restoration efforts. In addition, other sources of income, such as carbon credits, can also finance restoration activities.

Education

Education is fundamental to successful peatland restoration, offering opportunities to deepen understanding and kick-start action. Monitoring and research not only track the recovery of species, habitat health, and water quality but also serve as key learning tools. Tools that reveal how peatlands adapt to climate change, highlighting effective restoration methods and adaptive practices for all to consider.

By engaging in networks and conferences at local, national, and European levels, stakeholders gain exposure to the latest research and innovative techniques, which enrich knowledge and attract new investment and partnerships. Landowners dedicated to conservation become powerful educators within their communities, sharing insights on biodiversity's value and motivating others to participate in and support restoration efforts. Through education, peatland restoration extends beyond immediate impacts, fostering a culture of environmental stewardship and knowledge sharing.

By embracing the **Triple E** approach—balancing ecology, economy, and education—nature restoration projects can achieve lasting success, benefiting both the environment and society.

Every site is unique, making collaboration essential among site managers, landowners, scientists, and decision-makers to determine the most suitable local solutions.

Keeping in mind the following recommendations for success will help ensure effective nature restoration and conservation efforts:

- **Integrate Economic and Social Factors**: A well-designed and sustainable nature conservation project should incorporate economic and social considerations, enabling landowners to adopt and sustain initiatives over the long term. This holistic approach is critical for ensuring lasting conservation impacts.
- **Recognize the Role of Private Landowners**: The significant contributions of private landowners to restoration and conservation must be acknowledged at all levels, from local communities to the European Union. Their involvement is crucial in driving positive environmental change.
- **Monitor Progress**: It is vital to monitor progress toward well-defined conservation outcomes regularly. Effective monitoring helps evaluate the success of restoration efforts and allows for adjustments to be made as necessary.
- **Be Patient with Natural Processes**: Conservation efforts are often subject to the slow pace of natural processes. Results may take time, following the cycles of vegetation, reproduction, and natural succession. Patience and persistence are essential as ecosystems gradually recover.

Take Action Today

Peatlands' successful conservation and restoration rely on a balanced approach that integrates ecological, economic, and educational factors. Using the **Triple E** strategy, stakeholders can foster collaboration among site managers, landowners, farmers, scientists, and decision-makers to develop tailored solutions that address local needs and challenges. Recognizing the importance of private landowners in conservation efforts, alongside a commitment to monitoring progress and patience with natural processes, will enhance the sustainability and effectiveness of these initiatives. These principles create a strong foundation for protecting and restoring valuable ecosystems for future generations.

Peatland restoration starts with you. Here's how you can make a difference:

- **Sign Up for a Program**: Join a local Private Land Conservation programs.
- **Visit the Website**: Learn more about restoration methods, grants, and tools for private landowners at www.enplc.eu.
- **Attend a Workshop**: Participate in hands-on workshops and trainings that will guide you through the restoration process.
- **Start Restoring Now**: Begin simple actions like rewetting drained areas and planting native vegetation. Every small step contributes to the greater goal.

The project "Building the European Peatlands Initiative: a strong alliance for peatland climate protection in Europe" is part of the European Climate Initiative (EUKI). EUKI is a project financing instrument by the German Federal Ministry for Economic Affairs and Climate Action (BMWK). The EUKI competition for project ideas is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. It is the overarching goal of the EUKI to foster climate cooperation within the European Union (EU) in order to mitigate greenhouse gas emissions.

Annex 1:

EU Peatland-Related Habitats and Their Management

This section provides an overview of the key peatland habitats that are protected under the EU Habitats Directive. For each habitat type, we include the official classification codes, definitions based on the **Interpretation Manual of European Habitats (EUR28 version)**, and practical management guidelines sourced from existing **European Commission manuals** and **scientific research**.

These guidelines offer landowners and stakeholders clear steps to ensure the effective conservation and sustainable management of these vital ecosystems. By following these recommendations, you can contribute to maintaining biodiversity and supporting peatland restoration efforts across Europe.

3110 Standing water

Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)

Shallow oligotrophic waters with few minerals and base poor, with an aquatic to amphibious low perennial vegetation belonging to the *Littorelletalia uniflorae* order, on oligotrophic soils of lake and pond banks (sometimes on peaty soils). This vegetation consists of one or more zones, dominated by *Littorella, Lobelia dortmana or Isoetes*, although not all zones may not be found at a given site.

Kolada, A., Piotrowicz, R., Wilk-Woźniak, E., Dynowski, P., & Klimaszyk, P. (2017). **Conservation status of the Natura 2000 habitat 3110 in Poland: Monitoring, classification and trends.** Limnological Review, 17(4), 215-222.

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3160 Standing water

Natural lakes and ponds with brown tinted water due to peat and humic acids, generally on peaty soils in bogs or in heaths with natural evolution toward bogs. pH is often low, 3 to 6. Plant communities belong to the order *Utricularietalia.*

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3180 Standing water - Turloughs

Temporary lakes principally filled by subterranean waters and particular to karstic lime stone areas. Most flood in the autumn and then dry up between April and July. How ever, some may flood at any time of the year after heavy rainfall and dry out again in a few days; others, close to the sea, may be affected by the tide in summer. These lakes fill and empty at particular places. The soils are quite variable, including limestone bedrock, marls, peat, clay and humus, while aquatic conditions range from ultra oligotrophic to eutrophic. The vegetation mainly belongs to the alliance L*olio-Potentillion anserinae* Tx. 1947, but also to the *Caricion davallianae* Klika 1934.

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4010 Temperate heath and scrub - Northern Atlantic wet heaths with Erica tetralix

Humid, peaty or semi-peaty heaths, other than blanket bogs, of the Atlantic and sub-Atlantic domains

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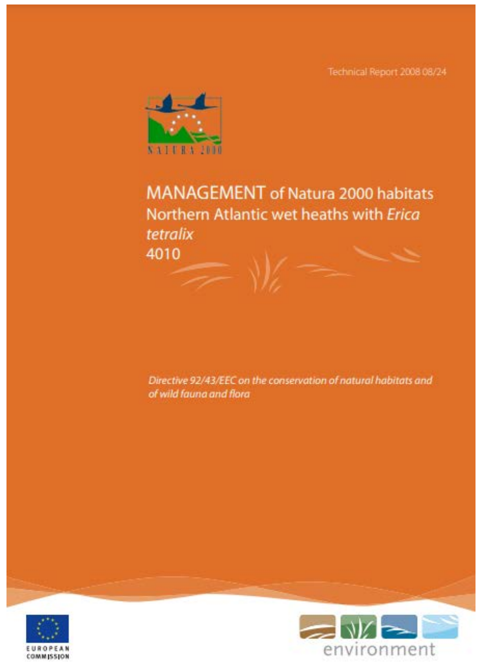

4020 Temperate heath and scrub - Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix

Hygrophilous heaths of areas with a temperate oceanic climate, on semi-peaty or dried-out soils, with surface minerals in the case of peaty soils (*hydromor*), with vegetation of the alliances Genistion micrantho-anglicae and Ulicion minoris: *Ulici mino ris-Ericetum ciliaris, Ulici gallii-Ericetum mackaianae, Ulici minoris-Ericetum tetralicis* (Schwickerath 33 Tuxen 37), *Cirsiof ilipenduli-Ericetum ciliaris*.

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6410 Semi-natural tall-herb humid meadows - Molinia meadows on calcareous, peaty or clayey-siltladen soils *(Molinion caeruleae)*

Molinia meadows of plain to montane levels, on more or less wet nutrient poor soils (nitrogen, phosphorus). They stem from extensive management, sometimes with a mowing late in the year or, they correspond to a deteriorated stage of draining peat bogs. Sub-types : 37.311: on neutro-alkaline to calcareous soils with a fluctuating water table, relatively rich in species (Eu-molinion). The soil is sometimes peaty and becomes dry in sum mer. 37.312: on more acid soils of the Junco-Molinion (*Juncion acutiflori*) except species-poor meadows or on degraded peaty soils.

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7110 Sphagnum acid bogs - Active raised bogs

Acid bogs, ombrotrophic, poor in mineral nutrients, sustained mainly by rainwater, with a water level generally higher than the surrounding water table, with perennial vegetation dominated by colourful Sphagna hummocks allowing for the growth of the bog (*Erico-Sphagnetalia magellanici, Scheuchzerietalia palustris p., Utricularietalia inter medio-minoris p., Caricetalia fuscae p.*).

The term "active" must be taken to mean still supporting a significant area of vegetation that is normally peat forming, but bogs where active peat formation is temporarily at a standstill, such as after a fire or during a natural climatic cycle e.g., a period of drought, are also included.

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7120 Sphagnum acid bogs - Degraded raised bogs still capable of natural regeneration

These are raised bogs where there has been disruption (usually anthropogenic) to the natural hydrology of the peat body, leading to surface desiccation and/or species change or loss. Vegetation on these sites usually contains species typical of active raised bog as the main component, but the relative abundance of individual species is different. Sites judged to be still capable of natural regeneration will include those areas where the hydrology can be repaired and where, with appropriate rehabilitation management, there is a reasonable expectation of reestablishing vegetation with peat-forming capability within 30 years. Sites unlikely to qualify as SACs are those that consist largely of bare peat, that are dominated by agricultural grasses or other crops, or where components of bog vegetation have been eradicated by closed canopy woodlands

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7130 Sphagnum acid bogs - Blanket bogs

Extensive bog communities or landscapes on flat or sloping ground with poor surface drainage, in oceanic climates with heavy rainfall, characteristic of western and northern Britain and Ireland. In spite of some lateral water flow, blanket bogs are mostly ombrotrophic. They often cover extensive areas with local topographic features supporting distinct communities (*Erico-Sphagnetalia magellanici: Pleurozio purpureae-Ericetum tetralicis, Vaccinio-Ericetum tetralicis p.; Scheuchzerietalia palustris p., Utricularietalia intermedio-minoris p., Caricetalia fuscae p.*). Sphagna play an important role in all of them but the cyperaceous component is greater than in raised bogs. The term "active" must be taken to mean still supporting a significant area of vegetation that is normally peat forming. Sub-types in the British Isles 52.1 – HyperAtlantic blanket bogs of the western coastlands of Ireland, western Scot land and its islands, Cumbria, Northern Wales ; bogs locally dominated by sphagna (S*phagnum auriculatum, S. magellanicum, S. compactum, S. papillosum, S. nemore um, S. rubellum, S. tenellum, S. subnitens*), or, particularly in parts of western Ireland, mucilaginous algal deposits (*Zygogonium*). 52.2 – Blanket bogs of high ground, hills and mountains in Scotland, Ireland, Western England and Wales

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7140 Sphagnum acid bogs - Transition mires and quaking bogs

Peat-forming communities developed at the surface of oligotrophic to mesotrophic waters, with characteristics intermediate between soligenous and ombrogenous types. They present a large and diverse range of plant communities. In large peaty systems, the most prominent communities are swaying swards, floating carpets or quaking mires formed by medium-sized or small sedges, associated with sphagnum or brown mosses. They are generally accompanied by aquatic and amphibious communities. In the Boreal region this habitat type includes minerotrophic fens that are not part of a larger mire complex, open swamps and small fens in the transition zone between water (lakes, ponds) and mineral soil. These mires and bogs belong to the Scheuchzerietalia palustris order (oligotrophic floating carpets among others) and to the *Caricetalia fuscae* order (quaking communities). Oligotrophic water-land interfaces with *Carex rostrata* are included.

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7150 Sphagnum acid bogs - Depressions on peat substrates of the Rhynchosporion

Highly constant pioneer communities of humid exposed peat or, sometimes, sand, with *Rhynchospora alba, R. fusca, Drosera intermedia, D. rotundifolia, Lycopodiella inun* data, forming on stripped areas of blanket bogs or raised bogs, but also on naturally seep- or frost-eroded areas of wet heaths and bogs, in flushes and in the fluctuation zone of oligotrophic pools with sandy, slightly peaty substratum. These communities are similar, and closely related, to those of shallow bog hollows (51.122) and of transition mires (54.57) Hydrology and ecology: how Natura 2000 and Military use can match. Ecological Questions, 21, 79-85.

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7160 Sphagnum acid bogs - Fennoscandian mineral-rich springs and springfen

Springs and spring fens are characterized by continuous flow of ground-water. The water is cold, of even temperature, and rich in oxygen and minerals, due to the rapid percolation. Springs may have a basin where the water wells up and an adjacent out f low with typical vegetation. In spring fens the water seeps up through the ground and the accumulated peat, enhancing the growth of specialized vegetation. Since the water originates from deeper layers, these springs often have running water during the winter even if the surrounding areas are frozen and snow-covered. The invertebrate fauna is often very specific to this habitat and the flora rich in northern species.

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7210 Calcareous fens - Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*

Cladium mariscus beds of the emergent-plant zones of lakes, fallow lands or succession stage of extensively farmed wet meadows in contact with the vegetation of the Caricion davallianae or other Phragmition species [Cladietum marisci (Allorge 1922) Zobrist 1935].

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7220 Calcareous fens - Petrifying springs with tufa formation (*Cratoneurion*)

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7230 Calcareous fens - Alkaline fens

Wetlands mostly or largely occupied by peat- or tufa-producing small sedge and brown moss communities developed on soils permanently waterlogged, with a soligenous or topogenous baserich, often calcareous water supply, and with the water table at, or slightly above or below, the substratum. Peat formation, when it occurs, is infra-aquat ic. Calciphile small sedges and other Cyperaceae usually dominate the mire commu nities, which belong to the *Caricion davallianae*, characterised by a usually prominent "brown moss" carpet formed by *Campylium stellatum, Drepanocladus intermedius, D. revolvens, Cratoneuron commutatum, Acrocladium cuspidatum, Ctenidium mollus cum, Fissidens adianthoides, Bryum pseudotriquetrum* and others, a grasslike growth of *Schoenus nigricans, S. ferrugineus, Eriophorum latifolium, Carex davalliana, C. f lava, C. lepidocarpa, C. hostiana, C. panicea, Juncus subnodulosus, Scirpus cespi tosus, Eleocharis quinqueflora*, and a very rich herbaceous flora including *Tofieldia calyculata, Dactylorhiza incarnata, D. traunsteineri, D. traunsteinerioides, D. russowii, D. majalis ssp.brevifolia, D. cruenta, #Liparis loeselii, Herminium monorchis, Epipac tis palustris, Pinguicula vulgaris, Pedicularis sceptrum-carolinum, Primula farinosa, Swertia perennis*. Wet grasslands (*Molinietalia caerulaea, e.g. Juncetum subnodu losi & Cirsietum rivularis,* 37), tall sedge beds (*Magnocaricion*, 53.2), reed formations (Phragmition, 53.1), fen sedge beds (*Cladietum mariscae*, 53.3), may form part of the fen system, with communities related to transition mires (54.5, 54.6) and amphibious or aquatic vegetation (22.3, 22.4) or spring communities (54.1) developing in depressions.

The subunits below, which can, alone or in combination, and together with codes selected from the categories just mentioned, describe the composition of the fen, are understood to include the mire communities sensu stricto (*Caricion davallianae*), their transition to the Molinion, and assemblages that, although they may be phytosocio logically referable to alkaline Molinion associations, contain a large representation of the Caricion davallianae species listed, in addition to being integrated in the fen sys tem; this somewhat parallels the definition of an integrated class *Molinio-Caricetalia davallianae* in Rameau et al., 1989. Outside of rich fen systems, fen communities can occur as small areas in dune slack systems (16.3), in transition mires (54.5), in wet grasslands (37), on tufa cones (54.121) and in a few other situations. The codes below can be used, in conjunction with the relevant principal code, to signal their presence. Rich fens are exceptionally endowed with spectacular, specialised, strictly restricted species. They are among the habitats that have undergone the most serious decline. They are essentially extinct in several regions and gravely endangered in most.

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7240 Calcareous fens - Alpine pioneer formations of Caricion bicoloris-atrofuscae

Alpine, peri-Alpine and northern British communities colonising neutral to slightly acid gravely, sandy, stony, sometimes somewhat argilous or peaty substrates soaked by cold water, in moraines and on edges of springs, rivulets, glacial torrents of the alpine or sub-alpine levels, or on alluvial sands of pure, cold, slow-flowing rivers and calm backwaters. A permanent or continuous soil frost over a long period is essential for the existence of this habitat type. Low vegetation composed principally of species of Carex and Juncus (*Caricion bicoloris-atrofuscae*)

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7310 Boreal mires - Sandbanks which are slightly covered by sea water all the time

Mire complexes in southern, middle and northern boreal zones characterised by min erotrophic fen vegetation in the central parts of the complexes. Hydro-topographical mire-units are: mixed mires, string-fens, flark-fens, unraised Sphagum fuscum-bogs, unpatterned topogenous or soligenous lawn-, carpet or mud-bottom fens. Poor Sphagum fens are the most common vegetation types whilst brown moss fens can be common in some regions. In prealpine areas in Sweden and in hill regions of Kainuu and Kuusamo in eastern Finland, sloping fens (>5 grades) are typical variants of aapa mires. They occur rarely also in the Suomenselkä water divide region in western Fin land as well in Lapland. In the mire margins, pine mires and spruce swamps and mires on thin peat of different types dominate. In some limited areas with calcareous bedrock ich fens dominate in the complexes.

Tucker, G. (2023). **EuropeTs Nature and Conservation Needs. Nature Conserva tion in Europe: Approaches and Lessons**, 13

7320 Boreal mires - Palsa mires

Mire complexes in the northern boreal, orohemiarctic and alpine regions, where the climate is slightly continental and the mean annual temperature is below -1°. The mires are mainly minerotrophic, excluding the palsas, which are peat mounds with sporadic permafrost. The palsas are usually 2-4 metres high, but up to 7 metres high palsas have been found in Finland and Sweden.

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9080 Forests of Boreal Europe - Fennoscandian deciduous swamp woods

Deciduous swamps are under permanent influence of surface water and usually flood ed annually. They are moist or wet, wooded wetlands with some peat formation, but the peat layer is usually very thin. Ash (*Fraxinus excelsior*) in the hemiboreal zone and black alder (*Alnus glutinosa*) reaching the middle boreal zone are typical tree species. Gray alder (*Alnus incana*), silver birch (*Betula pubescens*) and willows (*Salix spp.*) are also common. A mosaic of patches with different water level and vegetation is typical for the type. Around the tree stems are small hummocks, but wet flooded surfaces are dominant. Deciduous swamp woods are most common in Finland in the southwestern archi pelago and other coastal areas. On the mainland they are rare. In Sweden they are common throughout the whole region.

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91D0 Forests of temperate Europe - Bog woodland

Coniferous and broad-leaved forests on a humid to wet peaty substrate, with the wa ter level permanently high and even higher than the surrounding water table. The water is always very poor in nutrients (raised bogs and acid fens). These communi ties are generally dominated by *Betula pubescens, Frangula alnus, Pinus sylvestris, Pinus rotundata and Picea abies*, with species specific to bogland or, more generally, to oligotrophic environments, such as Vaccinium spp., Sphagnum spp., Carex spp. (*Vaccinio-Piceetea: Piceo-Vaccinienion uliginosi (Betulion pubescentis, Ledo-Pinion) i.a.)*. In the Boreal region, also spruce swamp woods, which are minerotrophic mire sites along margins of different mire complexes, as well as in separate strips in valleys and along brooks

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