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# Peatlands in the EU Regulatory Environment



# **Peatlands in the EU Regulatory Environment**

**Survey with case studies on Poland and Estonia**

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**Abbreviations:**

AAP	Advisory Assistance Programme
AES	Agri-Environmental (Climate) Schemes
BfN	Bundesamt für Naturschutz (German Federal Agency for Nature Conservation)
BMUB	Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit (Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety)
CAP	Common Agricultural Policy
CF	Cohesion Fund
DEFRA	Department for Environment, Food and Rural Affairs of the Government of the United Kingdom
EAFRD	European Agricultural Fund for Rural Development
EEG	Erneuerbare-Energien-Gesetz (German Renewable Energy Act)
EIA	Environmental Impact Assessment
EJC	European Court of Justice
ERDF	European Regional Development Fund
ESD	Effort Sharing Decision
ESF	European Social Fund
ETS	Emissions Trading System
EU	European Union
FAO	United Nations Food and Agriculture Organisation
FFH	Fauna-Flora-Habitat
GAEC	Good Agricultural and Environmental Condition
GDOŚ	Generalna Dyrekcja Ochrony Środowiska (Polish Directorate General for Environmental Protection)
GHG	Greenhouse gases
GI	Green Infrastructure
GNI	Gross National Income
ILUC	Indirect land use change
IMCG	International Mire Conservation Group



IPCC	Intergovernmental Panel on Climate Change
IPS	International Peatland Society
JRC	Joint Research Centre
LULUCF	Land Use, Land-Use Change and Forestry
MFF	Multiannual Financial Framework
Mio	Million
MSF	Michael Succow Foundation for the Protection of Nature
NDVI	Normalized Differenced Vegetation Index
NIS	National Inventory Submission to the UNFCCC
RBMP	River Basin Management Plans
RDOŚ	Regionalna Dyrekcja Ochrony Środowiska (Polish Regional Directorate for Environmental Protection)
RDP	Rural Development Programmes
RED	Renewable Energy Directive
REFIT	Regulatory Fitness Programme
RPP	Responsible Produced Peat
SAC	Special Areas of Conservation
SEA	Strategic Environmental Assessment
SPA	Special Protection Area
UBA	Umweltbundesamt (German Environment Agency)
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
WDR	Wetland Drainage and Rewetting
WFD	Water Framework Directive
WP	Work Plan

## **1 Preamble**

The survey “Peatlands in the EU Regulatory Environment: Case studies for Poland and Estonia” has been funded by the German Environment Ministry’s Advisory Assistance Programme (AAP) and was implemented in cooperation with the Polish Directorate-General for Environmental Protection (Generalna Dyrekcja Ochrony Środowiska, GDOŚ) and the Ministry of Environment of Estonia (Keskkonnaministeerium).

The views expressed in this survey are those of the authors and do not necessarily represent the position of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), of the German Federal Agency for Nature Conservation (BfN), of the German Environment Agency (UBA), of the Ministry of Environment of Estonia, or of GDOS.

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## **2 Key Findings and Recommendations**

The state of Europe's peatland has long been in decline. Centuries of large-scale drainage, basis for non-sustainable agricultural and forestry use, as well as peat extraction for energy and other purposes (such as substrates for horticulture) have left a patchwork of what was once a rich Northern European belt of intact natural mires ranging from Ireland in the West to Russia in the East. Today the value of peatlands for a healthy environment, fertile soils, biodiversity, freshwater supply, flood prevention, and – a matter of high importance in an age of global warming – as a massive store of carbon is undisputed. Yet, in practice, peatland degradation and habitat loss across Europe is ongoing. The European Commission recently found that “much stronger efforts are needed” to reach the EU Biodiversity Strategy for 2020, namely to “[halt] the loss of biodiversity and the degradation of ecosystem services in the EU”. 70% of EU species are threatened by habitat loss, with species linked to fragile freshwater, coastal and agricultural ecosystems, in particular on the decline. The conclusion was drawn against the backdrop of a close regulatory network of EU conservation policies, subsidies and incentives which the EU legislator has created to stimulate conservation and restoration measures.

This study attempts to portray the main peat-focused or peat-sensitive EU policies, but also to highlight those EU regulatory regimes, which have, or risk to cause a negative impact on peatland conservation and restoration in Europe. The study is ultimately meant to show to what extent the legislator has created a conflict of objectives which may explain the mixed results in regulatory effectiveness, but also to identify regulatory gaps, oversights and missed opportunities, which to tap into may prove viable without incurring too much in economic or political costs.

The assessment includes case studies on peatland parameters in Poland and Estonia, two peat-rich EU Member States, which have joined the EU fairly recently (in 2004) and, thus, provide a ‘fresh’ view on the relevance and impact of EU policies.

As part of the study, we surveyed different EU policy regimes with an impact on peatland conservation or restoration, whether positive or negative, and traced the implementation of the policies concerned in both Poland and Estonia. The main assessment areas have been nature protection (Natura 2000) and infrastructure planning, EU water policy, agriculture (Common Agricultural Policy), rural development and structural funds, and LIFE energy policy, and climate change regulations. The key findings and recommendations drawn from the survey led from the start in a consultative and participatory manner, are summarised below:

### **2.1 Nature conservation and infrastructure planning**

‘Natura 2000’ stands for a network of rare (semi-)natural habitats and important breeding and resting sites for sparse and threatened species. It stretches across the 28 EU Member

States, both on land and at sea, covering 18% of the Union's land area and almost 6% of marine territory. Peatlands and other wetlands feature prominently.

The policy has a strong positive impact on biodiversity and habitat protection of natural and semi-natural peatlands with a relatively good status. Natura 2000 management and species action plans – required under relevant legislation – are in place for most sites offering comprehensive details on conservation status and needs. They create a knowledge space on conservation and restoration, but strategies how to deal with potential conflicts between e.g. as-is biodiversity, on the one hand, and restoration and climate mitigation goals, on the other hand are largely missing. Impact on restoration has proved limited as the Natura 2000 largely works without a sufficient layer of finance.

Historically, overland infrastructure planning has had a major negative impact on peatlands across Europe. Today, the EU Environmental Impact Assessment (EIA) Directive obliges Member States to lead mandatory environmental assessments for a number of land interventions prior to their implementation. The projects include infrastructure developments (railway lines, motorways, airports, etc.), certain trans-boundary interventions and the use of uncultivated land for intensive agricultural purposes as well as afforestation, land reclamation for different land-use and peat extraction above 150 ha. While planning remains in the competence of Member States, the European Commission, in 2013, issued its blueprint for a Green Infrastructure (GI), which attempts to address climate change and biodiversity concerns in particular. Peatlands, especially rewetted agricultural lands, can play an important role as part of GI providing various ecosystem services and fertile grounds for paludiculture (agriculture on wet peatlands) to produce high-quality biomass.

#### *Recommendations*

It is suggested to integrate the Natura 2000 network, and the underlying protection and management regime, better across policy regimes. Intensified agriculture and peat extraction in the immediate proximity or even within Natura 2000 sites and LIFE Nature project sites (on those see below) – an example is the Friedländer Große Wiese in Germany – collides with the conservation goals of the sites concerned, without a clear regulatory instrument available to mitigate the conflict.

It is further suggested to reflect climate change policy objectives better in Natura 2000 network management. While the main purpose of Natura 2000 – creating a safe and informed haven for nature and biodiversity conservation – should not be diluted or overburdened with secondary goals (co-benefits), a mapping exercise of the Natura 2000 network and each of their peatland-relevant sites against EU mitigation and adaptation needs should be carried out to highlight both potential synergies (win-win situations) and opportunities as well as programmatic differences. The findings of this mapping exercise should be widely shared. Where synergies are confirmed, Natura 2000 management plans can be revised for specific guidance on win-win implementations.

To fulfil the obligations for conservation and management, but also restoration in Natura 2000 sites, sufficient funding should be made available in EU's budget to the Member States via Structural and Cohesion Funds, Agricultural funds or LIFE measures.

New agricultural strategies to address the ecological and climate change need for restoring peatlands and to switch to paludicultures should be tested and promoted as part of the EU's Common Agricultural Policy (CAP) and its green infrastructure, rather than in its nature conservation flagship policy. Paludiculture may exceptionally be used for management purposes on drained peatlands in Natura 2000 sites if the partial conversion of agricultural lands clearly benefits the conservation and restoration targets of the areas.

On the side of EIAs, it is recommended that the EU strengthens its oversight and continues to use its enforcement powers to facilitate strict and robust application of environmental rules across the Union. It is further recommended that the legislative 150 ha threshold is lifted to allow for comprehensive screening of interventions that may threaten peatlands.

## **2.2 Common Agricultural Policy**

The EU's Common Agricultural Policy (CAP) is arguably the single most important policy instrument in the context of peatland degradation and conservation across the EU. Good agricultural practice and cross-compliance obligations exist – recipients of CAP subsidies must comply with a range of laws; otherwise the subsidies are reduced – but references to protection needs of organic soils (as opposed to mineral soils) are few; climate change considerations are vague; and the Water Framework Directive (WFD) does not qualify as a cross-compliance law (see above). The 2013 CAP reform introduced an additional 'greening' layer (linked to direct payments) which equally lacks references to special requirements of organic soils.

### *Recommendations*

It is suggested that the WFD compliance and compliance with a climate change standard – itself to be developed – be included into the cross compliance and greening mechanism.

It is further suggested that good agricultural practice should serve as the key corrective to mitigate ubiquitous drainage and other practices causing peatland degradation. Good Agricultural and Environmental Conditions (GAEC) need to integrate emission from soils (including an obligatory greenhouse gases (GHG) audit) and target mitigation activities tailored to organic soils, including rewetting and paludiculture techniques, while incentivising raise of water levels and strictly penalising drainage-based agriculture with a substantial reduction in CAP funding.

Furthermore, paludiculture should be seen as a valuable alternative agricultural practice which should receive direct payments from the CAP's 1<sup>st</sup> pillar with long-term guarantees after rewetting and establishment of cultivation. Knowledge among agricultural administrations and farmers should be improved. Implementation, in this context, should

focus on arable land and degraded grasslands, not on protected areas (see also above, Natura 2000).

Finally, in this context, the CAP rules should allow – within limits – the conversion from permanent grassland on organic soils to paludicultures, e.g. cultivation of reed, cattail or peat moss (grasslands with high biodiversity values should be excluded from conversions). For further information in the scope of paludiculture see also chapter 5.3.

### **2.3 Rural Development Funding**

The EU's rural development policy aims at helping the rural areas of the EU to meet economic, social and environmental challenges. As the “second pillar” of the CAP, it complements the so called “first pillar” of direct payments to farmers. It is funded through the European Agricultural Fund for Rural Development (EAFRD).

The EU's rural development policy rests on the approach that it is up to the Member States to define their rural development programmes (RDPs) and that the central (EU) level formulates broad areas only – among them “restoring, preserving and improving ecosystems related to agriculture and forestry” and “promoting resource efficiency and supporting the shift towards a low-carbon and climate resilient economy in the agricultural, food and forestry sectors” – while providing funding for Member States to hand out under the so called agri-environmental climate schemes (AES). Payments are granted to farmers who (voluntarily) subscribe to environmental commitment that go beyond legal obligations proper.

Several MS (including Poland) make ample use of AES to manage valuable peatland habitats and extensified use, but not to raise water level. By contrast, many Member States also allow funding to go into refurbishing drainage systems (“amelioration systems”) which continues peatland degradation.

#### *Recommendations*

It is suggested to prioritise AES for peatland related measures further. A separate focus area for wetlands should be installed at the EU level, and it should be made financially viable for farmers to raise water levels and secure permanent rewetting, which from the perspective of ecological and climate change purpose clearly exceeds the benefits of extensive farming. Financial compensation for production loss needs to be available; co-financed, if feasible, through national remuneration schemes that pays for the environmental services involved, namely carbon storage, nutrients, water retention, and space for flooding in river catchments. Long-term guarantees should be given in EU policies (and at national level) to encourage farmers to join programmes; drastic changes from one programming period to another need to be avoided.

Funding for renewal of drainage (“amelioration”) systems should not be available under EAFRD, and EU guidelines should make this explicit.

At a practical level, 2<sup>nd</sup> pillar mechanisms are burdensome bureaucratic processes. Therefore, a simplification of procedures, without weakening control, should be made a priority. Throughout the application and implementation process, farmers should be effectively supported by European agencies, research institutes and independent advisory services.

## **2.4 Water Framework Directive (& Floods Directive)**

The Water Framework Directive (WFD) generally promotes the importance of peatlands as buffer habitats, and peatlands management and restoration are areas for consideration when formulating the legally required River Basin Management Plans (RBMPs). Peatlands are not recognised as water bodies in their own right, however. While water bodies have to be treated jointly with their accompanying mires and peatlands in spatial planning, this goal is still largely neglected by water managers. Often, water engineering and construction follow old paradigms and patterns and are administered at lower levels of government, where the capacity to see the negative impact of peatland degradation for whole river basins often remains overlooked.

Agricultural planning, for its part, is mostly unconcerned with water body resilience and flood prevention controls. The cross-compliance mechanism under the CAP integrates the compliance with a range of legislative acts and formulates sanctions for non-compliance; however, compliance with the Water Framework Directive (WFD) is not among the legislative acts in question.

Next to water, the lack of an EU regulatory framework for soil is remarkable. Over recent decades, several Member States have adopted regulatory regimes to control the use of soil, combat contamination and promote sustainable use. The European Commission, in 2006, issued a Soil Thematic Strategy (COM(2006) 231 of 22 September 2006). The EU's Seventh Environment Programme recognises soil degradation as a serious challenge. The ES proposed a Soil Framework Directive in 2006 but as no consensus was found by the MS in the EU Council to approve such a directive the EC withdrew the directives proposal to encourage new approaches in the future.

### *Recommendations*

It is recommended to boost knowledge on the existing legislative framework and its ratio and to create capacity and coordination platforms across the EU, with a particular focus on lower government levels as well as on cross-border catchment exchanges. EU institutions and Member States should consider a new initiative to formulate a European soil protection framework. The legal regime should recognise the specific value of organic soils and establish rules on sustainable use. Together with the WFD, such rules would, for the first time, address peatland bodies in a holistic way.

It is further recommended to better integrate the objectives of the WFD into the CAP, and vice versa. As drainage-based agriculture is largely responsible for nutrient-rich water inflow into river basin adding to an overall negative ecological state, such practices should be sanctioned under CAP rules.

Ultimately, strengthening the status of peatlands at the level of the WFD through defining it as a proper water body would further enhance the status of peatlands in water planning and beyond.

At the level of project support, specific incentives could be built into the CAP second pillar or the cohesion policies to address peatland restoration measures as part of River Basin Management Plans.

## **2.5 Climate Policy**

Peatlands represent a massive store of soil carbon. If drained or burned, these are released to the atmosphere. From drainage alone, the EU's peatland-related emissions – amounting to about 270 Mt CO<sub>2</sub>-eq. per year – are second only to Indonesia's. The sector has not received much attention in the past. However, in 2013, an EU decision was adopted to gradually oblige GHG accounting of peatlands, provided they are used as forest land, cropland or grazing land. In July 2016, the European Commission adopted a legislative proposal that will, for the first time, set a GHG emissions cap for the Land Use, Land-Use Change and Forestry (LULUCF) sector (“LULUCF Proposal”). Most peatlands will be covered by that cap. However, given that virtually all peat-rich MS can rely on substantial GHG sink activities from forestry activities, which will be credited against (peat) emissions, and that the cap is set – generously – at zero rather than in negative terms (“no-debt-rule”), the incentives for reducing emissions from peatlands will be minimal at best.

### *Recommendations*

It is suggested to strengthen the LULUCF Proposal in the legislative process to incentivise action in this field. This could happen either in setting a negative cap on the sector's accountable emissions to account for strong sink performance, or in coming up with separate targets for the non-forestry sub-sectors including peatlands.

It is further suggested that the Council and Parliament, when negotiating the LULUCF Proposal with the European Commission, should argue in favour of a specific and robust project-based mechanism to target (exclusively or among others) peatland-related emissions. Whether or on what terms such mechanism should be linked, for compliance purposes, to the Effort Sharing framework outside the global LULUCF flexibility should be separately assessed.

It is further suggested that MS, in case no agreement on project-based activities can be achieved at EU level in this area, set up separate platforms for peatland rewetting mechanisms, linked to a voluntary or regulated emissions trading mechanism.



## **2.6 Energy**

The EU biofuel and biomass policies have increased the pressure on agricultural organic soils with negative impacts on peatland GHG emissions. The expansion of biomass production on drained peatlands (mainly maize and rapeseed) can result in higher rather than lower GHG emissions compared to fossil fuels, due to both direct and indirect impacts. At the same time, there are no or very limited economic support for energy fuels from paludiculture at stage which could be alternative biofuels from rewetted peatlands. No clear regulatory framework for energy use from peat and its limits is in place.

### *Recommendations*

The sustainability criteria for biofuels should be strengthened and extended. Biomass grown on organic soils should not qualify as eligible under the targets of the Renewable Energy Directive (just as it should not be eligible for subsidies under the CAP (see above) or Member States schemes such as the German Renewable Energy Act.)

Furthermore, incentives and preferential benefits for biomass grown on rewetted peatlands (paludiculture) need to be created. These could also incentivise the use of cut-over peatlands without after-use strategies from Soviet time for paludiculture. Peatland areas valuable for natura conservation or with respective after-use obligations should not be touched. The framework conditions for the production and for application of renewables (incl. real biofuels) from paludiculture to replace fossil resources for construction materials and fuels need to be established.

Another target should be to phase out peat-from-energy use across the EU. As energy policies are in hands of Member States, national strategies have to be taken into account. Every country has to take responsibilities to reach climate goals agreed on in Paris Agreement, so beside coal combustion also peat fuel has to fade out until 2050.

## **2.7 Horticulture**

Peat is widely used in both professional and hobby horticulture. Particular EU provisions on extraction (beside general EIA and except when in Natura 2000 sites), processing, marketing or use do not exist. A number of large-scale producers apply the voluntary European eco-label standard and the certification system of “Responsible Produced Peat” (RPP).

### *Recommendations*

It is suggested that the EU establishes a Peat, Peat Extraction and Horticulture Framework that integrates a range of activities ranging from GHG accounting to incentive schemes for paludiculture (excluding conservation sites).

Currently, there is no comprehensive scheme for the accounting of GHG emissions from peat extraction and, importantly from (abandoned) peat extraction sites. The proposed LULUCF Regulation (see below) does not cover the related emissions, and industrial and

agricultural productions only cover certain aspects of it. The regulation should make provision for it.

Professional horticulture may still rely on peat to avoid fluctuation in content. It only accounts for 30% of overall consumption, however. For the hobby gardening sector, a rich set of alternative materials exists, and the EU regulator should regulate the use similar to its interventions in the context of the Eco-Design Directive.

More research is needed, including with respect to the use and replacement of peat in professional horticulture. A good example for cooperation between substrate and horticultural cooperates, researchers, politics, and civil society organisations to find solutions to gradually reduce utilization of peat in gardening is the Peat replacement forum (Torfersatzforum) established by the German state government of Lower-Saxony (Ministry of Agriculture).

## **2.8 EU Structural Funds and LIFE**

Beyond the CAP, the EU Structural Funds are of particular importance for environment-focused investments in rural areas. The European Regional Development Fund (ERDF) aims at strengthening the economic and social cohesion in the EU by correcting regional imbalances and diminishing gaps between the levels of development. It allows funding to go into or be linked to environmental interventions. In fact, between 12% (less developed regions) and 20% (more developed regions) of ERDF funding must be channelled towards low-carbon economy projects.

The Cohesion Fund, part of the wider EU Cohesion Policy, aims at Member States with a Gross National Income (GNI) per inhabitant of less than 90% of the EU's average in order to reduce economic and social disparities and promote sustainable development. Funding is also available for environmental purposes like restoration, and several Member States make use of it.

LIFE Nature projects have considerable impact for on-the-ground restoration in the specific project sites. But the larger-scale restoration effect is limited as the scheme seeks innovative interventions and is less suitable for replication activities, something drained peatlands are in dire need of across countries. Funding scale is also limited. Nevertheless, pilot projects can be envisaged and used to raise awareness, public participation and education on peatland issues.

LIFE Climate has not yet been used in practice for ecosystem-based mitigation and adaptation. A particular barrier is the comparably high co-funding requirements for Member States or private initiatives.

### **Recommendations**

It is recommended to promote the use of the EU Structural Funds for peatland rewetting and paludiculture development. What may prove a barrier under CAP funding options – e.g.

insuring machinery use or the hedging of marketing risks for paludiculture products – could be adequately addressed under the EU Cohesion Policy.

LIFE Climate should lower co-funding thresholds for predefined particularly valuable ecosystem-based interventions; the pre-defined list should include rewetting of peatlands.

Specific EU funding should be provided to help Member States make use of consistent, comparable calculations for GHG emissions from peatlands using the 2013 IPCC Wetland supplement, preferably with Tier-2 approaches. Existing research programmes, schemes and support facilities – including Horizon 2020 and the Joint Research Centre – should be mobilised to develop and use Tier 2 and Tier 3 approaches for GHG emissions and removals measurements and for reliable and comprehensive inventories of peatlands.

## **2.9 Case study findings**

Additional to the general findings and recommendations highlighted above, some points are specific to the case study countries Poland and Estonia. More general findings from the case studies have been covered in the respective policy. The EU's nature conservation and incentive framework has created a dense network of protected areas, knowledge and capacity on habitats, as well as funding for restoration and peatland management in Poland and in Estonia. In both countries, more awareness is needed to understand and recognise the drivers of peatland degradation and restoration, and to tap into opportunities for conservation and rewetting, linking activities to existing policy instruments concerning the environment, climate change and ecosystem services. Governments need to be supported in building an accurate inventory of peatland GHG emissions according to recent accounting guidelines to take science-based decisions in order to see peatland rewetting as cost-effective mitigation measure.

Poland makes ample use of AES to manage valuable peatland habitats and extensified use, but not to raise water level. AES help slow down the trend of abandonment of semi-natural fen areas in the Eastern part of the country but do not bring it to a halt. On deeply drained organic soils, EU CAP direct payments set incentives for the intensification of agriculture on peatlands.

Estonia currently funds most of its peatland restoration activities mainly on bogs through the ERDF and the Cohesion Fund. The Estonian practice to use Cohesion Fund monies for peatland restoration should be highlighted and featured in best practice guidance across the EU. Fen and heavily degraded areas are largely underrepresented among restoration sites as CAP payments stimulate further use and renewal of drainage. AES schemes for these sites are only focusing on secure permanent grasslands but do not integrate rising of water levels. On the other hand, abandoned cut-over peat sites (10,000 ha) are emitting GHG emissions without any utilisation, and incentives are so far missing to rewet these areas to stop emissions. As a consequence, the climate change mitigation effect of restoration and agricultural measures remains low.

### 3 Introduction

The importance of peatlands and intact for the stability of water systems, biodiversity and the 'green infrastructure' as a whole, as well as with respect to GHG emissions mitigation to combat global warming is undisputed. So is the European Union's commitment to effective peatland protection. Peatlands are distributed all over the EU with a concentration on Northern, Central, and Eastern Europe (Ireland, United Kingdom, Netherlands, Germany, Poland, Nordic and Baltic countries) (Figure 1). A wide range of official policy research, political appraisals, and hard legislative provisions recognize the protection need and vulnerability status, respectively, of these wetlands and soils. Yet, in practice, degradation mainly due to drainage for agriculture and forestry as well as for peat extraction is continuing across the European Union.

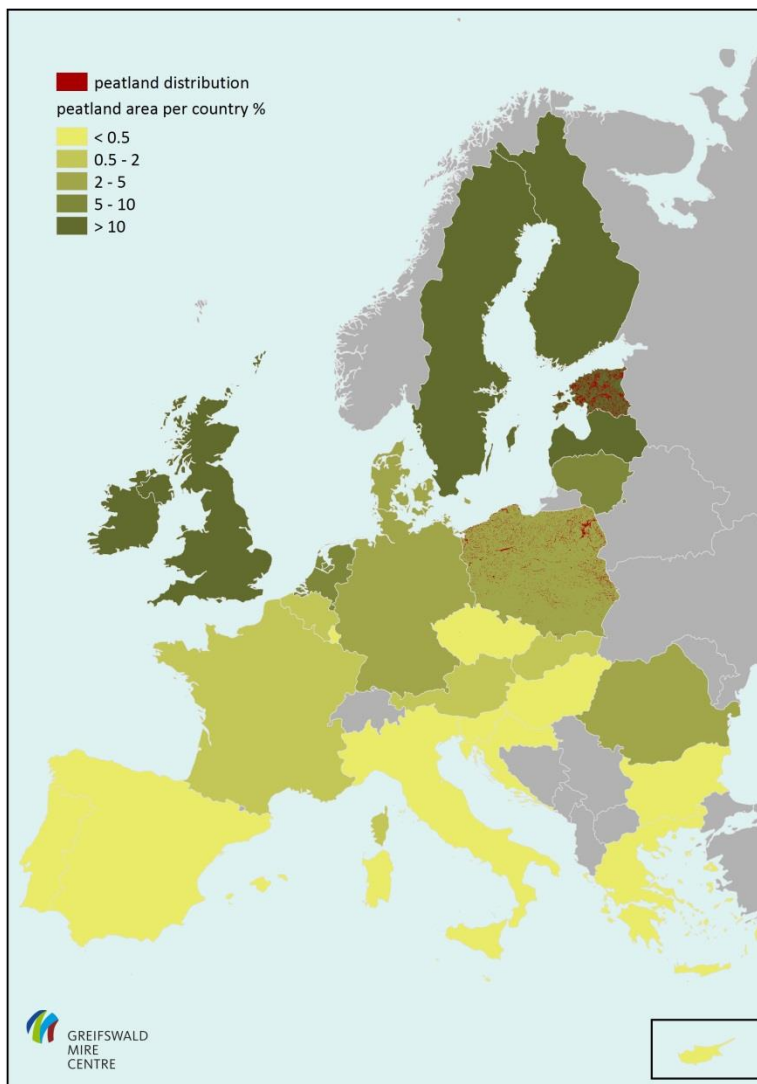


Figure 1: Distribution of peatlands in Member States of European Union with details for Estonia and Poland (data: Global Peatland Database (GPD) at the Greifswald Mire Centre, 2017; map: C. Tegetmeyer).

While large-scale peatland degradation goes back to the Middle Ages if not before, the 20<sup>th</sup> century and, in particular, the period of post-war European integration, has accelerated the process incrementally. According to general estimates, between 1950 and 1985 the Netherlands lost 55% of its wetlands, Germany 57% and Greece and France a staggering 63% and 67%, respectively (SILVA et al. 2007). Ecologically intact peatlands have become a rarity. In Germany, they amount to little more than 1% of classified peatlands; in the Netherlands the estimated share is 5%.

The situation in northern and eastern Europe is considerably better, if mostly at an overall low scale. In Poland the share of ecologically intact peatlands is in the order of 16%; in the Baltic it ranges from 25% (Lithuania) to 35% (Estonia, Latvia). The Nordic countries still have a good share of intact mires on their territories; Finland with roughly 30%, Sweden even with almost 80% (JOOSTEN et al. 2017., see Table 1). This notwithstanding, degradation continues across the Union mainly due to agricultural activities, forestry, and peat extraction.

Peatland restoration is recognized as a valuable measure to conserve unique habitat for endangered species across the EU and raises more and more attention in the last years as a cost-effective tool for climate change mitigation. Nevertheless, the extend of restored areas in the Member States remains very limited in comparison to the degraded areas (Table 1).

Table 1: Comparison of peatland area, intact and degraded areas and restoration efforts in selected EU countries (different sources, see footnotes).

Country	Total peatland area (km <sup>2</sup> )	Mire area (km <sup>2</sup> )	Degraded peatland area (km <sup>2</sup> )	Restored peatland area (km <sup>2</sup> ) <sup>1</sup>
Estonia	9,150 <sup>2</sup>	3,250 <sup>2</sup>	5,900 <sup>2</sup>	2.5 <sup>2</sup>
Finland	90,000 <sup>2</sup>	25,069 <sup>4</sup>	64,930 <sup>4</sup>	200 <sup>2</sup>
Germany	12,800 <sup>2,3</sup>	250 <sup>2</sup>	12,550 <sup>2</sup>	250 <sup>2</sup>
Latvia	9,232 <sup>4,5</sup>	3,165 <sup>2</sup>	6,066 <sup>4,5</sup>	10 <sup>6</sup>
Lithuania	6,460 <sup>2</sup>	1,781 <sup>2</sup>	4,679 <sup>2</sup>	64 <sup>7</sup>
Netherlands	2,733 <sup>2</sup>	150 <sup>2</sup>	2,583 <sup>4</sup>	100g <sup>8</sup>
Poland	12,550 <sup>2</sup>	2,020 <sup>2</sup>	10,530 <sup>4</sup>	7.5h <sup>9</sup>
Sweden	66,450 <sup>2</sup>	50,992 <sup>5</sup>	15,458 <sup>4</sup>	28 <sup>2</sup>

<sup>1</sup> only hydrologically restored areas (i.e. areas with only vegetation management excluded)

<sup>2</sup> from Joosten, H., Tanneberger, F. & Moen, A. (eds.) (2017) Mires and peatlands of Europe: Status, distribution, and nature conservation. Stuttgart: Schweizerbart Science Publishers.

<sup>3</sup> In Germany's UNFCCC National Inventory Submission 2016, the total reported area of organic soils is 18,238 km<sup>2</sup>. Germany interpreted the definition of organic soil in the 2013 IPCC guidelines as all organic soils with >10 cm depth need to be included. IPCC guidance intended with this definition to enable all countries to integrate their national data with country specific organic layer depths. The deviation of the Global Peatland Database estimate is based on setting the peatland threshold of >30 cm.

<sup>4</sup> from respective countries' UNFCCC National Inventory Submissions 2014

<sup>5</sup> estimates based on the Global Peatland Database (<http://www.greifswaldmoor.de/global-peatland-database.html>), pers. comm. A. Barthelmes 04/2016

<sup>6</sup> pers. comm. M. Pakalne 04/2016

<sup>7</sup> pers. comm. J. Sendžikaitė 04/2016

<sup>8</sup> pers. comm. A. Grootjans 04/2016

<sup>9</sup> pers. comm. W. Kotowski/L. Kozub 04/2016

Despite the continued efforts of EU Member States and policymakers to reverse the trend and protect and restore peat- and other wetlands, rather than continue with drainage and degradation, there is scarce research on the direct effectiveness of the numerous interventions and their cross-sectoral impact. While EU environmental law and dedicated EU incentive schemes, linked in particular to the Natura 2000 framework, have established a strong protection regime for peatlands, other legislative frameworks, including the Common Agricultural Policy (CAP) and also the Union's renewable energy policy, have arguably yielded opposite effects. Specific effects of EU climate policy frameworks on peatlands have not been addressed in depth so far.

### **3.1 Distribution of peatlands in Poland**

Poland is situated in eastern Central Europe; the temperate climate is transitional between atlantic and continental, with continentality increasing in a south-easterly direction. Poland has 1,255,000 ha of peatlands which amounts to 4% of the territory. 92.4% of these are fens, 3.3% transitional mires and only 4.3% bogs (DEMBEK et al. 2000). After joining the EU in 2004, mire habitat types have been incorporated into the seven mire-related Natura 2000 habitat types occurring in Poland (WOŁEJKO et al. 2005 ): 7110\* (Active raised bogs), 7120 (Degraded raised bogs), 7140 (Transition mires and quaking bogs), 7150 (Depressions on peat substrates (Rhynchosporion)), 7210\* (Calcareous fens with *Cladium mariscus* and *Carex davalliana*), 7230 (Alkaline fens), and 91D0\* (Bog woodland) (WOŁEJKO et al. 2005).

Most of peatlands in Poland are used for hay meadows or as grazing lands (70%), forest grows on 12%, on 4% peat has been extracted and 0.5% are used as arable land (after DEMBEK et al. 2000). 84% of peatlands in Poland are degraded and only 16% (201,938 ha) show recent peat growth (KOTOWSKI & PIÓRKOWSKI 2003).

### **3.2 Distribution of peatlands in Estonia**

Estonia is the northernmost Baltic country, it is situated in the northern edge of the temperate climate zone and in the transition zone between maritime and continental climate (ILLOMETS 2015). It harbours 915,000 ha of peatlands and organic soils which is around 22.3% of its territory (ILLOMETS 2015). Estonia therefore holds the second position in relative peatlands cover in Europe after Finland where peatlands cover 30% of the territory (LAPPALAINEN 1996). 240,000 -250,000 ha are natural open mires and approximately 85,000 ha wet bog forests. PAAL & LEIBAK (2011) distinguished seven main mire types in Estonia: species-rich fens, spring fens, floodplain fens, poor fens, transitional fens/bogs, heath moors and ombrotrophic bogs. Some of these mire types are priority sites according to the classification made in the EU Habitats Directive). Species-rich fens with shallow peat layers are mainly found on calcareous bedrock in the north-western coastal parts (7210\* - calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*). Spring fens occur sparsely in Estonia, they are concentrated on marginal slopes of uplands (7220\* - petrifying springs with tufa formations). Floodplain fens can be found in the lowermost parts of the river valleys in

western and south-western Estonia and in eastern and south-eastern Estonia (9080\* - deciduous swamp woods) (ILLOMETS 2017). Poor fens have their major occurrence in eastern Estonia. Transitional fens/bogs are distributed around lakes, large ombrotrophic bogs in western, central and north-eastern Estonia (91D0\* -bog woodlands). Heath moors lay in depressions between sandy dunes on the western coast and on Hiiumaa Island, and between old dunes far from the recent coastline. The larger ombrotrophic bogs are located in the western, central and north-eastern parts of the Estonian mainland (7110\* –active raised bogs) (BARTHELMES et al. 2015). They sum up to almost 2/3 of all peatlands in Estonia.

More than 50% of Estonian mires are drained or negatively affected by drainage. Small-scale exploitation of peatlands for peat fuel and agriculture already began in the 17th century (VALK 1988). Larger drainage took place between First and Second World War (1918–1940) when more than 350,000 ha of organic soils were drained for agriculture; 15,000 ha for forestry (ILOMETS 2017). Drainage activities continued under Soviet power, and until 1990 an estimated area of 250–300,000 ha of mires has been drained for agriculture (ILOMETS 2017), including about 120,000 ha fens with a peat layer thicker than 40 cm (VALK 1988). According to ILOMETS et al. (2010) and ILOMETS (2017), almost all fen types are affected by drainage for agriculture today. Some 460,000 ha in total of peatlands and other wetlands have been drained for forestry purposes (PAAVILAINEN & PÄIVÄNEN 1995).

### **Box 1: Definitions**

**Peat** is sedentarily accumulated material consisting of at least 30% (dry mass) of dead organic material. This criterion is consistent with common definitions. In various inventories, other (mostly higher) percentages of organic material are used. Higher percentages exclude sedentates with a high proportion of clastic material or carbonates, like in flood mires (incl. mangroves and salt marshes) and calcareous spring mires. (JOOSTEN & CLARKE 2002)

**Peatlands** are areas with a naturally accumulated peat layer at the surface. To provide a uniform standard, the data concern peatlands with a minimum peat depth of 30 cm (historically based on ploughing depth). (PATTERSON & ANDERSON 2000)

**Organic soils** are soils with a substantial layer of organic matter at or near the surface. According to the 2006 IPCC Guidelines, soils are organic if they satisfy requirements 1 and 2, or 1 and 3 below:

1. The thickness of the organic horizon greater than or equal to 10 cm. A horizon of less than 20 cm must have 12 percent or more organic carbon when mixed to a depth of 20 cm.
2. Soils that are never saturated with water for more than a few days must contain more than 20 percent organic carbon by weight (i.e., about 35 percent organic matter).
3. Soils are subject to water saturation episodes and have either:
  - a) at least 12 percent organic carbon by weight (i.e. about 20 percent organic matter) if the soil has no clay; or
  - b) at least 18 percent organic carbon by weight (i.e., about 30 percent organic matter) if the soil has 60 percent or more clay; or
  - c) an intermediate proportional amount of organic carbon for intermediate amounts of clay.

**Mires** are peatlands where peat is currently being formed and accumulating (JOOSTEN & CLARKE 2002). It supports at least some vegetation which is normally peat forming (LINDSAY & IMMIRZI 1996). Mires in their natural state support very distinctive wildlife communities including many specialist species. They can be divided on the basis of their source of water and nutrients into fens and bogs.

**Fens** receive rainwater and also water flowing from surrounding land as surface run-off or flow through soil or rocks. Fens vary widely in base and nutrient status according to their position and the local geology. They therefore support a wide range of ecosystems with distinctive conservation needs (SUCCOW & JOOSTEN 2002).



## **4 Methodology**

### **4.1 Analytical Framework: Peatlands in the EU legislation and policy-making**

In a first step, this study investigates the status of peatlands in the EU's regulatory architecture as well as the direct and indirect EU regulatory impact on peatlands (for the term's concept, see box 1, surveying EU nature protection law, agricultural policy, water policy, rural development and cohesion policy, renewable energy law and climate policy. The study attempts to highlight key substantial provisions, general implementation and enforcement, as well as institutional responsibilities, with a view to distinguishing policies with a positive impact on peatlands (conservation and restoration) from those with a negative impact (increasing the pressure to drain and/or deplete) and from those that are ambiguous or include both positive and negative impacts.

### **4.2 National legal implementation (Poland and Estonia)**

In a second step, the study examines, in a cursory way, specific implementation details of the EU regulatory areas identified for the two study countries, Poland and Estonia. The findings will be presented in country-dedicated boxes arranged alongside the regulatory chapters (4.1).

### **4.3 Case studies from Poland and Estonia and project regions**

In a third step, the survey includes a case study proper, retracing the positive and negative impacts and effects of EU law and policy on specific peatland areas, focusing on Poland and Estonia. Both countries share a rich experience of peatland drainage, on the one hand, and restoration efforts, on the other hand. Given their comparably recent accession to the EU in 2004, the exercise also permits a fresh assessment of the particular changes and trajectories membership to the EU has brought about. Both, fens and raised bogs were selected because of their environmental and usage differences. For the case studies, in each of the two countries a peatland rich region was identified which harbours both intact and degraded peatland. In Poland, the fen rich Lublin-Polesie region in the eastern part of the country was chosen due to the mosaic of well protected areas of high naturalness and intensively used agricultural drained peatlands sites; in Estonia, the Pärnu region characterized by Baltic raised bogs which are either under protection or used for peat extraction or forestry. In both countries, core peatland areas are protected under national law and/or the Habitats Directive. But also adjacent not protected peatlands are included in the analysis. Based on a detailed analysis of the situation on site and the involvement of all relevant stakeholders the concrete effects of EU legal system, funding mechanisms, and their regional design on peatlands are presented.

### **4.4 Recommendations**

In conclusion, regulatory opportunities are identified and options for policy action are presented, with the objective to address gaps, synchronise existing policies and enhance

incentive schemes, rather than create new instruments, whether control-and-command inspired or subsidy-based. For ease of reading, the Recommendations section is presented together with the section on Key Findings.

#### **4.5 Workshops and Interviews**

To collect and analyse information on the current situation of peatlands in the case study countries and the implementation of EU legislation and its effects on peatlands from different actors workshops were conducted in Warsaw (1<sup>st</sup> July 2015) and in Tallinn (25<sup>th</sup> February 2016). Beside these workshops, meetings were held in the capitals and in the case study regions, and expert views, including on domestic law, were gathered in both Estonia and Poland. Project representatives also took part in the Wetlands' Day Conference 2016 dedicated to peatland restoration within Life-projects 1<sup>st</sup> - 2<sup>nd</sup> of February 2016 in Tartu, Estonia to present the project, make contacts, and gather background information. For final discussion of results and initial recommendations a policy workshop was organised on 19<sup>th</sup> April 2016 in Brussels. Representatives of the case study countries Poland and Estonia, of the Directorate-Generals (DGs) for the Environment, Agriculture and Rural Development, and Climate Action, of German governmental bodies and various several civil society and cooperate representatives joint the meeting.

Several stakeholders and further experts have been interviewed in a semi-structured way within this project ranging from small- and large-scale farmers, foresters, peat industry, agricultural advisory services, conservationists, researchers, to water, agriculture and nature conservation authorities and protected area administrations. The interviewees represented the national, regional and local level; in Poland with focus on Polesie Lubelski in Lublin region and in Estonia with focus on Pärnu county. A full list of interviewees and organisations in each country and the interview questionnaire you find in the Annex.

#### **4.6 Land-use change**

To analyse the land use change in the case study member states Estonia and Poland after joining EU, we used the data set from the VOLANTE project ([www.volante-project.eu](http://www.volante-project.eu), ESTEL et al. 2015) merged with peatland layers from both countries in GIS distinguishing fens, bogs and transitional mires (GIS Mokradła (PIÓRKOWSKI et al. 2007)). The VOLANTE dataset comprises time series for the period 2001 to 2012 of utilised and fallow land using Normalized Differenced Vegetation Index (NDVI) derived from MODIS satellite imagery across European countries (ESTEL et al. 2015). The dataset has a high accuracy and reliability as it was tested with geographically well-distributed training datasets across Europe to classify utilised and fallow farmland annually and validated by using independent field observations and high definition satellite images. The dataset includes only agriculturally cultivated or fallow lands (land potentially available for agriculture); forests, urban areas, and barren land are excluded. We counted how often a respective pixel within a peatland area in the dataset was counted as fallow and calculated the annual abandonment or recultivation.

We divided the full period into two parts of equal length; first starting 2001 till 2006, second 2007 till 2012. We did not take 2004 as the dividing year a) for the reason that we assume that land use changes did not take place immediately after joining the EU but in a continuous process in the following years and b) for practical reasons as we wanted to follow the original methodology of ESTEL et al. (2015) and use two equally long periods for clear comparison.

FAO (2014) and POINTEREAU et al. (2008) defines abandonment when a minimum of four years in five consecutive years are described as fallow or uncultivated. Following that definition we labelled a field abandoned if it shows at least four years of cultivation in the first 6 years period and at least 5 of 6 years unused status in the second period. Recultivation, we defined in a reverse manner if areas had at least five fallow years in 2001 to 2006 and at least four active years in 2007 to 2012.

#### **4.7 Options for action**

In the final part, regulatory opportunities are identified and options for policy action are presented, with the objective to address gaps, synchronise existing policies and enhance incentive schemes, rather than create new instruments, whether control-and-command inspired or subsidy-based. This section will be informed both by the analysis, the work with local stakeholders in Poland and Estonia, as well as the consultation with policy experts at a workshop held in Brussels in April 2016.

## 5 Peatland Protection in EU Environmental Law

Peatlands together with other wetlands enjoy a high level of attention from EU policymakers. The EU Biodiversity Strategy 2020 includes the headline target of “halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them so far as feasible, while stepping up the EU contribution to averting global biodiversity loss”.<sup>10</sup>(EUROPEAN COMMISSION 2011) Measured against this target, the achievements so far have been modest though. In its mid-term review of 2015, the European Commission found that “no significant progress” has been made and that “much stronger efforts are needed” (EUROPEAN COMMISSION 2015a). 70% of EU species are threatened by habitat loss, with species linked to fragile freshwater, coastal and agricultural ecosystems, in particular on the decline. The 2015 European Environment Report (EUROPEAN COMMISSION 2015e) notes that significant improvements in terms of knowledge on the status of and trends for protected species and habitats have been made and decent results of recovery of biodiversity have been reported for a number of habitat types and regions (including for Atlantic peatlands in Western Europe). However, the overall results are dismal. Grasslands and wetlands have the highest proportion of habitats in ‘unfavourable – bad’ conditions. Deteriorating trends are strongest for freshwater habitats, such as rivers, lakes and wetlands; the latter consistently show poorest marks. The European Commission notes (EUROPEAN COMMISSION 2015e) that detrimental practices such as changes in agricultural and forest management use, peat extraction, and continuing changes in hydrological conditions, as well as over-exploitation and pollution of the marine environment, are still widespread. 20% of the continued pressure on ecosystems stems from agriculture alone.

Against these findings, the effectiveness of EU law to implement the Biodiversity Strategy needs careful assessment (for an overview see Figure 2). In the following sections, we present the main EU policy frameworks with a direct impact on the EU’s peatlands.

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<sup>10</sup> COM(2011) 244 final.



Figure 2: Overview of peatland relevant EU legislation and policies.

### 5.1 Natura 2000

‘Natura 2000’ stands for a network of rare natural habitats and important breeding and resting sites for sparse and threatened species. It stretches across the 28 EU Member States, both on land and at sea, covering 18% of the Union’s land area and almost 6% of marine territory. Peatlands and other wetlands feature prominently (VASANDER et al. 2003).

The network was introduced in 1992 through the adoption of the Habitats Directive<sup>11</sup> with the aim of maintaining the EU’s biodiversity through “the conservation of natural habitats and of wild fauna and flora in the European territory of the Member States” while taking into account the “economic, social and cultural requirements and regional and local characteristics” (Art. 2). It includes sites harbouring natural habitat types (listed in Annex I) and habitats of particular species (listed in Annex II) –classified as Special Areas of Conservation (SAC).

<sup>11</sup> Directive 92/43/EEC.

Through a cross-reference (Art. 3.2), the network also integrates Special Protection Areas (SPA) as defined and classified by the Birds Directive of 1979.<sup>12</sup> Peatland habitats are covered directly (“raised bogs and mires and fens” are among the habitat types listed in Annex I of the Habitats Directive) and indirectly (a range of protected species as per Annex II and as per the Birds Directive are native to peatlands).

Sites were selected on the basis of pre-defined criteria and in coordination between Member States and the European Commission. In Poland, 887 raised bogs and mires and fens type (next to 794 freshwater habitats and 18 coastal and halophytic habitats) are covered either as SAC or SPA.<sup>13</sup> In Estonia, 35,000 ha of protected mires have been added to protected areas during Natura 2000 process.

### **Box 2: Peatlands and biodiversity**

Peatlands hold unique features in regard to their type of ecosystem. Even though considered freshwater ecosystems, they also share many features of terrestrial ecosystems. In their natural state, peatlands are home to a unique extend of biodiversity, including a range of rare, threatened and declining habitats, plants and animals. They are of global importance for biodiversity conservation on all biodiversity levels, including genetic, species and ecosystem level (PARISH et al. 2008). Often being the last remaining natural areas on degraded landscapes, peatlands mitigate landscape fragmentation and support adaption by providing habitats for endangered species and at the same time constitute explicit examples of ecosystem biodiversity caused by a high level of self-organisation and autonomy. Even though their total species richness is rather low (with exception of alpine fens), peatlands host many characteristic species for which they are the only available habitats within a biogeographic region and even globally. Organisms, forms and species in peatlands are closely dependent upon each other in terms of food supply, reproductive mechanisms and shelter, thus the loss of one species will lead to the loss of other dependant ones (LITTLEWOOD et al. 2010).

<sup>12</sup> Directive 2009/147/EC - codified version of Directive 79/409/EEC as amended

<sup>13</sup> <http://natura2000.eea.europa.eu/#>

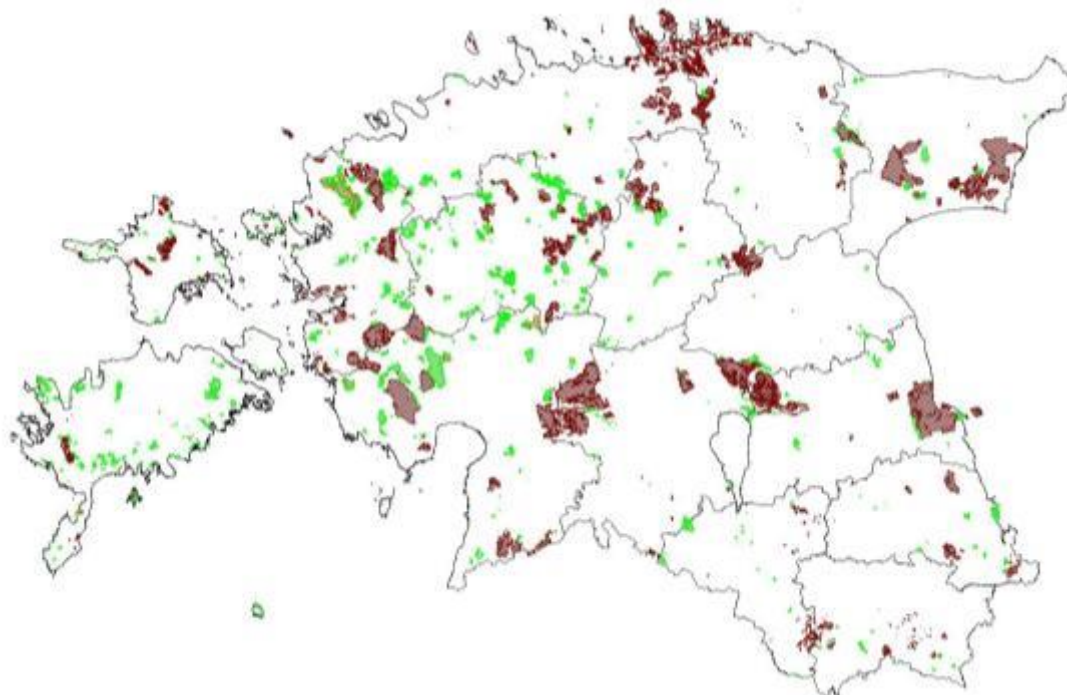


Figure 3: National protected areas (red) and established NATURA 2000 sites (green) on peatlands in Estonia (Estonian Ministry of Environment)

### Natura 2000 in Poland

#### *Legal Basis:*

The Nature Conservation Act<sup>14</sup>, Art 6(3) and 6(4) of the Habitats Directive transposed by the EIA Act<sup>15</sup>

#### *Key requirements:*

- The Nature Conservation Act of 2004 is the implementing act of both the Habitat Directive and the Birds Directive.
- According to the statistical data of 2015 the number of Natura 2000 areas designated in Poland was equal to 845 'habitat areas' and 145 'bird areas' covering 68,296 km<sup>2</sup> (of which 61,059 km<sup>2</sup> are terrestrial areas) or 19.5% of the country's land area<sup>16</sup>
- Protected area of different regime categories in Poland such as National Parks and Nature Reserves, regulated by the Nature Protection Act of 2004, may overlap, leading to the possibility of an area having the status of different designations at the same time (e.g. Art. 25 (2) of the Nature Conservation Act of 2004).
- Procedures and competences relating to the designation of sites protected under Natura 2000 regime, as well as the preparation and adoption of different protection plans for Natura 2000 areas are regulated in Articles 26 to 32 of the Act. The key

<sup>14</sup> Ustawa z dnia 16 kwietnia 2004 r. o ochronie przyrody (in Polish)  
<http://isap.sejm.gov.pl/DetailsServlet?id=WDU20040920880>

<sup>15</sup> Ustawa z dnia 3 października 2008 r. o udostępnianiu informacji o środowisku i jego ochronie, udziale społeczeństwa w ochronie środowiska oraz o ocenach oddziaływania na środowisko  
<http://isap.sejm.gov.pl/DetailsServlet?id=WDU20130001235>

<sup>16</sup> Environment 2015, Central Statistical Office, Warsaw 2015, p. 38, 289 – 300, stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/ochrona-srodowiska-2015,1,16.html

authorities responsible for the network management are the General Directorate for Environmental Protection (it maintains the data registry for all measures concerning sites conservation and restoration; it also overlooks the implementation of management plans and conservation measures plans for Natura 2000 sites) as well as regional directorates for environmental protection (supervising and coordinating the functioning of Natura 2000 sites within their areas of responsibility).

- The main tools serving the purpose of the management of Natura 2000 sites are the Environmental/Habitat Impact Assessments and protection planning, encompassing planning documents in the form of a conservation measures plan or a management plan, prepared mainly by the Minister for the Environment, Regional Directorates for Environmental Protection and National Parks.
- The protection regime as set by the Article 6 of the Habitat Directive is transposed mainly through the Habitat Impact Assessments (see Articles 33 and 34 of the Nature Protection Act of 2004) with the exception of planned projects requiring so called “environmental decision” (regulated by the EIA Act, see Art. 59 – 95) or the consent of Regional Director for Environmental Protection (regulated by the EIA Act, see. Art. 96 - 103).
- Note also the Environmental Impact Assessment Act (2008), which imposes the obligation on the developer to lead an impact assessment for any construction or other activities that may potentially and significantly affect a Natura 2000 site, whether or not the planned activity is taking place within or outside the protected area (it is called “Natura 2000 assessment”). Certain exceptions apply, however.

#### *Impacts:*

- 221,610 ha of peatlands are protected in protected area under national legislation (national parks, nature reserves, nature parks). The protection regime was mainly implemented before Poland’s accession to the EU in 2004. From 2004 till today Poland designated 527,371 ha of Natura 2000 sites on peatlands, approximately 300,000 ha are additional to the mire areas already protected under a national regime (OKRUSZKO 1996, DEMBEK et al. 2000, GIS Mokradła (PIÓRKOWSKI et al. 2007). The protection status of peatlands most valuable for biodiversity therefore improved considerably with EU membership.
- The establishment of the Natura 2000 network in Poland significantly contributed to the protection of water-dependent ecosystems (such as peatlands and peats) through better planning and development processing and financial support and in terms of capacity building.

#### *Gaps:*

- In practice, many threats to peatland are caused by minor activities taking place without proper notice and follow-up by the competent authorities;
- Ongoing drainage continues without a clear obligation or roadmap to phase out drainage over time and restore the natural habitat;
- Field abandonment is widespread and often leads to overgrowth of areas (as drainage continues);
- There is a tendency to perceive water covered areas such as peatlands as non-productive and thus requiring drainage.<sup>17</sup>
- Another danger is the abandonment of traditional forms of agriculture (also due to insufficient financial support directed at this sector) that may lead to the overgrowing of the peatlands.

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<sup>17</sup> e.g. <http://www.zgf.uni.wroc.pl/dydaktyka/przedmioty/Antropopresja/01-Rolnictwo.pdf;pracownia.org.pl/dzikiel-zycie-numery-archiwalne,2204,article,3730>



## Natura 2000 in Estonia

### *Legal Basis:*

Nature Conservation Act;<sup>18</sup> Art 6(3) and 6(4) of the Habitats Directive transposed in the EIA Act<sup>19</sup>

### *Key requirements:*

- Natura 2000 sites (SPAs and SCIs) have different protection regimes. Sites are divided in the following zone types:
  - a) (stricter) conservation zones, where economic activity and construction works are prohibited as a rule. Only maintenance work of existing land improvement (melioration) systems is allowed;
  - b) limited management zones, where construction of new land improvement systems is also not allowed “by default”, but derogations can be made in the protection rules.
- If deemed necessary for the restoration of habitats/protection of species,<sup>20</sup> existing melioration systems may be undone. Exact rules applicable in a specific protected area are provided in the protection rules (issued as binding Regulations of the Government of the Republic).
- Limited-conservation areas do not have specific, location-based rules; the restrictions in such areas are listed in the Nature Conservation Act (art 32 and 33). Main requirement is to notify the Environmental Board before conducting certain activities, including construction and reconstruction of land improvement systems. Based on the notifications, impacts of the project to conservation objectives and its permissibility will be assessed (so-called appropriate assessment, Art 6(3) and (4) of the Habitats' Directive).
- All activities taking place inside or outside of the Natura 2000 areas that may affect the conservation objectives of the area must undergo the so-called appropriate assessment and any activity may only be allowed in case it would not adversely impact the integrity of the site. For example, impacts of melioration works that take place right next to a wetland protected as a SCI have to be assessed and the project may be refused.

### *Impacts:*

- Implementation of the EU Nature Directives provides a set of effective tools to protect the wetlands and peat soils that are included in the Natura 2000 network.
- Most straightforward rules apply in conservation zones of protected areas. In other areas, the impacts are somewhat dependent on the authorized activities (a significant degree of discretion is awarded). The discretion is considerably limited in cases where the habitats/species related to wetlands are the conservation objectives of an area.

### *Gaps:*

- The regime suffers from limited spatial applicability: only activities that take place in the Natura 2000 network areas or close vicinity are subject to the requirements

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<sup>18</sup> Looduskaitse seadus: <https://www.riigiteataja.ee/akt/123032015122?leiaKehtiv> (in Estonian, dynamic link), <https://www.riigiteataja.ee/en/eli/ee/517062015004/consolide/current> (in English, dynamic link).

<sup>19</sup> Keskkonnamõju hindamise ja keskkonnajuhtimissüsteemi seadus <https://www.riigiteataja.ee/akt/130122015018?leiaKehtiv> (in Estonian, dynamic link), <https://www.riigiteataja.ee/en/eli/ee/509022016002/consolide/current> (in English, dynamic link)

<sup>20</sup> This has been planned in many site management plans, and the Estonian Fund for Nature is currently carrying out a LIFE-project especially aimed at it: <https://soo.elfond.ee/projektist/ulevaade/>.

described above, which leaves many important ecosystems without specific protection.

Natura 2000 protection does not mean that the sites concerned have strict nature reserve or sanctuary status. Rather, most of the land included in the network is privately-owned and remains in economic (often agricultural) use. The network is not so much about “setting aside islands of wilderness” but instead about “co-managing areas within biologically diverse landscapes in which humans play an integral part” (RAUSCHMAYER et al. 2009). It represents a model of participatory governance, structured along a set of rules on oversight and legal protection as well as technical and financial support.

The Habitats Directive obliges Member States to “establish the necessary conservation measures” (Art. 6.1) such as management plans and contractual measures and “avoid damaging activities that could significantly disturb these species or deteriorate the habitats of the protected species or habitat types” (Art. 6.2). Member States must also continuously monitor the habitats and species listed in the above mentioned annexes (Art. 11) and report the implementation of the Directive and the assessment of conservation status of habitats and species targeted to the European Commission every six years (Art. 17). The European Commission then – no later than two years after the receipt of the Member States’ national reports – pools all the data together in a composite report in order to evaluate the progress achieved across the EU.

In accordance with the principle of subsidiarity, it is left to Member States to decide on the exact scope of intervention and institutional arrangements (often Member States delegate conservation management to regional governmental bodies) as well as compliance and enforcement. This notwithstanding, the European Commission has brought a range of infringement proceedings against Member States.

In relation to Article 6.1 of the Habitats Directive the European Court of Justice (ECJ) ruled that Member States are obliged to take the necessary conservation measures, excluding therefore any discretion on this regard on their part.<sup>21</sup> Likewise, on Article 6.2, the ECJ ruled that Member States have to ensure a sufficient protection regime and protect sites from passive as well as active man-induced deterioration and disturbance.<sup>22</sup>

Member States are free to propose and select sites in the first place, but their choice “must (...) reflect the ecological variety (...) of the natural habitats and species present within its territory”.<sup>23</sup> On that ground, the European Commission won a case against Ireland because the Irish government had failed to present a representative list of ecological sites present in

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<sup>21</sup> Case C-508/04, *Commission v Austria*, Case C-90/10, *Commission v Spain*

<sup>22</sup> Case C-6/04, *Commission v UK*

<sup>23</sup> ECJ, Case C-67/99, para 29 (*Commission v. Ireland*).

the country.<sup>24</sup> The Irish list was also notable for its absence of peatlands and other wetlands, even though Ireland is historically rich of those habitats.

Natura 2000 management requires substantial funding – the annual costs of maintenance and restoration are estimated in the range of 6 billion € (KETTUNEN et al. 2014). The Habitats Directive addresses the option of EU (co-)funding sources (Art. 8) with several funds and programmes providing particular opportunities (see chapter 6). It is estimated that between 10 and 20% of annual funding needs are covered by the EU budget.<sup>25</sup>

The recent stock-taking exercise – the Fitness Check – showed that support for the Natura 2000 framework is generally high<sup>26</sup> and also that Member States have made considerable progress over the years in developing and implementing Natura 2000 management site plans (MILIEU et al. 2015). Improvements have particularly been made in the identification and designation of protected areas, procedural safeguards (notably concerning Article 6.3 and 6.4 on impact assessments and compensation), monitoring and research. As the relevant evaluation paper<sup>27</sup> states, progress has been “less significant” when it comes to designing conservation measures, establishing adequate financing mechanisms, and managing landscape features to improve the coherence of Natura 2000 sites.

#### *Overall assessment*

In practice, the nature conservation policies have had a strong positive impact on biodiversity and habitat protection of natural and semi-natural peatlands with a relatively good status. The Natura 2000 management and species action plans are mostly developed and provide comprehensive details on conservation status and needs. They create a knowledge space on conservation, restoration, and strategies how to deal with potential conflicts between e.g. biodiversity and restoration or climate targets. Impact on restoration is limited as funding has to be channelled through other pathways which needs the political will within Member States governments. In our case studies we saw good results especially in Estonia.

The possible synergies between the Natura network and other regulatory frameworks (see below) are not fully used across Member States and sectors (nature protection, agriculture, climate, energy, etc.) (FREHLI-LARSEN 2014). The influence of intensified agriculture and peat extraction neighbouring or even within Natura 2000 sites and LIFE Nature project sites is counteracting goals of conservation policies; an example is the peatland Friedländer Große Wiese in NE-Germany which is designated as Natura 2000 site (SPA and FFH), but is deeply drained and intensively used grassland, in parts even cultivated with corn. The Natura 2000 framework does not include climate change targets. Nevertheless, recent studies show that

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<sup>24</sup> Ibid.

<sup>25</sup> Ibid.

<sup>26</sup> The Ministers of Environment of Germany, Croatia, France, Italy, Luxembourg, Poland, Romania, Slovenia and Spain on 26 October 2015 issued a joint support letter (with the authors); the rapporteurs within the European Parliament issued a similarly strong support note on 27 October 2015 (with the authors).

<sup>27</sup> Ibid.

various conservation measures in protected areas, especially in peatland sites, could have a positive climate change mitigation effect with a good cost-benefit range (DRÖSLER et al. 2012). On the other hand, Natura 2000 is per se an instrument for nature conservation and should not carry too much burden of climate change mitigation as some objectives of nature and biodiversity conservation contradict climate targets e.g. the conservation of specially protected wet meadow plant species on drained fens (SSYMANK et al. 2015). Therefore climate aspects should be integrated into Natura 2000 management plans with clear guidance how to deal with conflicts and synergies between climate and biodiversity targets. Possible synergies with clear targets and site selection criteria for rewetting and restoration should be better used in a way that resources for climate measures are cost-effectively applied for ecosystem-based mitigation and adaptation and co-benefit nature conservation objectives. But as resources for biodiversity are limited they should not hold responsibility for climate change and pitfalls should be avoided. In a careful case by case balance, priorities should be put on biodiversity targets and win-win situation identified (SSYMANK et al. 2015). Incentives for nature managers should be evolved to include climate aspects into their management. The exchange of knowledge and experiences on these win-win cases should be incentivized across MS and stakeholders e.g. via the Natura 2000 Biogeographical region programmes<sup>28</sup>.

## **5.2 Environmental Impact Assessment Directive**

Directive 2011/92/EU and Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment (“Environmental Impact Assessment Directive” or “EIA Directive”), which revised an earlier directive in place since 1986,<sup>29</sup> obliges Member States to lead mandatory environmental assessments for a number of land interventions (“projects”) prior to their implementation. The projects include infrastructure developments (railway lines, motorways, airports, etc.), certain trans-boundary interventions and the use of uncultivated land for intensive agricultural purposes as well as afforestation, land reclamation for different land-use and peat extraction above 150ha (Art. 4.1 in conjunction with Annex I). Below the threshold of 150ha Member States are merely required to apply an environmental ‘screening’ (Article 4.2 in conjunction with Annex II). All projects and programmes co-financed by the EU (Cohesion, Agriculture and Fisheries Policies) must complete an EIA assessment as part of their approval process.

The EIA Directive recognizes the effects of certain measures on the climate (Art. 3.1.c), the risk of major accidents and disasters caused by climate change and the potential impact of a project on climate, mentioning GHG emissions as an example (Annex IV).

Since 2001, the EU also has in place an impact assessment tool designed to prepare future projects (“upstream”), the Strategic Environmental Assessment Directive (“SEA Directive”).<sup>30</sup>

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<sup>28</sup> Building the Natura 2000 network [http://bd.eionet.europa.eu/activities/Natura\\_2000/](http://bd.eionet.europa.eu/activities/Natura_2000/)

<sup>29</sup> Council Directive 85/337/EEC of 27 June 1986.

<sup>30</sup> Directive 2001/42/EC.

It applies – among others – to plans in the fields of, agriculture, forestry, fisheries, energy, industry, transport, tourism and local planning. Climate change is not specifically addressed in the SEA Directive, but it is reported that several Member States developed dedicated methodologies to measure the potential GHG impact from public planning.<sup>31</sup> (EUROPEAN COMMISSION 2009)

#### *Overall assessment*

The implementation record of the EIA Directive and SEA Directive has been mixed: The European Commission led a number of infringement proceedings for the lack of transformation of the directive into domestic law. The EIA Directive, for its part, by 2012 represented a staggering 12% of infringement proceedings in the area of EU environmental law.<sup>32</sup> The European Commission found a number of weaknesses in implementation, ranging from the poor quality of reporting to uneven application and wide inconsistencies in the assessment process, but also concerning legislative clarity and a lack of public participation.<sup>33</sup>

In Estonia, independent, a priori effective EIA procedure for large infrastructure projects, including rail (Rail Baltica), power lines, and overland roads (some of them certainly (co-)funded by EU), is not consistently implemented. EIA framework should be resilient enough to counteract infrastructure projects which involve crossing pristine peatlands and wet forest and destroying green corridors for wildlife. EIA should be obligatory for any size of area, onsite as well as offsite impacts have to be integrated in EIA.

However, the EIA Directive is not toothless, and the European Commission has brought a number of cases before the European Court of Justice (ECJ). An important case before the ECJ concerned the Irish practice to apply certain thresholds under Art. 4.2 and Annex II of the EIA Directive to the effect that below the threshold, an EIA screening would not occur. One of the thresholds at issue was a 50 ha threshold for peat extraction sites below which the authorities would not require operators to conduct an EIA. The Court found that setting such thresholds was contrary to the law.<sup>34</sup> (EUROPEAN COMMISSION 2012).

Overall, implementation has a rough record, and it remains to be seen whether the 2014 revision will improve the overall effectiveness and efficiency.

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<sup>31</sup> European Commission, On the application and effectiveness of the Directive on Strategic Environmental Assessment (Directive 2001/42/EU), COM(2009) 469, final.

<sup>32</sup> European Commission, Summary Impact Assessment for the revised EIA Directive, SWD(2012) 354 final.

<sup>33</sup> Ibid; European Commission, On the application and effectiveness of the EIA Directive, COM(2009) 378 final.

<sup>34</sup> ECJ, C-392/96 (Commission v. Ireland).

### **5.3 Cross-Compliance and Greening under the Common Agricultural Policy (CAP)**

Around half of the EU's territory is farmed. In 2005, the Common Agricultural Policy (CAP), arguably the single most important policy instrument in the context of peatland degradation and conservation across the EU and long associated with the intensification of farming practices, monocultures, overproduction of agricultural products and increasing habitat degradation (BIGNAL et al. 2001) underwent a transformational shift away from product and price support to producer support. Since then, farmers have received so called "single farm payments", which are reduced if farmers do not comply with a set of EU directives.

This so-called cross-compliance mechanism, originally designed as optional under the Agenda 2000, became compulsory in 2005 as part of the CAP reform package initiated in 2003.<sup>35</sup>

It represents one of the main instruments for mainstreaming environmental concerns into the EU agricultural policy by linking the principle of direct payments to compliance with European environmental legislative standards – among them the Birds and Habitats Directives, but not the Water Framework Directive (see chapter 6.4). It also lays out the so-called good agricultural and environmental condition (GAEC) – good-practice principles requiring Member States' action to issue implementing legislation.

The CAP reform of 2013, while reconfirming the cross-compliance mechanism as a basic principle applicable to all payments made to EU farmers, introduced the concept of 'greening' to further improve the sector's resource efficiency and environmental performance.<sup>36</sup> Farmers who use farmland more sustainably and care for natural resources benefit financially. These benefits are of substantial size – as a whole, they account for 30% of the EU countries' direct payment budgets. Nevertheless, first analyses of its implementation indicate that the ecological and environmental benefit of the Greening scheme in general is rather low (HART et al. 2016). It is criticized that especially peatlands which are among the habitats under highest pressure (EUROPEAN ENVIRONMENT AGENCY 2010) still suffer under intensive drainage and the decline of farm biodiversity is continuing with full force. Good agricultural practices and Cross-compliance (mandatory since 2005) have few references to protection of organic soils, e.g. methodologies for balancing humus contents in mineral soils are not applicable for organic soils. The CAP has much broader influence on ecosystems across the EU than environmental and biodiversity policies – especially when it comes to finances (PE'ER et al. 2014).

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<sup>35</sup> Regulation (EC) No. 1782/2003 repealed by Council Regulation (EC) No. 73/2009.

<sup>36</sup> Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No 637/2008 and Council Regulation (EC) No 73/2009.

Greening actions target the diversification of crops as well as the maintenance of permanent grasslands and the holding of 5% of each farmlands arable land as 'ecological focus areas', references to special requirements of organic soils are still missing. The objective of maintaining permanent grassland calls on the Member States to designate grassland areas in Natura 2000 sites which they deem "environmentally sensitive" (Article 45.1 lists "peat and wetlands") and which consequently fall under a ban of land conversion and ploughing. Often, all permanent grassland areas in Natura 2000 sites are designated as environmentally sensitive (e.g. Germany and UK).

Outside Natura 2000 sites, there is no obligation for Member States to designate "environmental sensitive" (no-plough) areas. Instead, Member States are given discretion, with the limitation that the total permanent grassland area must not fall below 5% of the reference year. Germany, for instance, chose to impose a permit obligation (i.e. farmers must ask for a permit if they wish to convert permanent grassland area) and to make the granting of a permit, as a general rule, conditional on a compensation land conversion into permanent grassland within the same region (BUNDESMINISTERIUM FÜR ERNÄHRUNG UND LANDWIRTSCHAFT 2015).

Note that EU rules do not allow the accumulation of subsidies under the (first pillar) greening provisions of Regulation 1307/2013 and the (second pillar) rural development provisions (agri-environmental schemes, see chapter 6.1).

### **CAP Greening Rules in Poland**

#### *Legal basis:*

- Act dated 5 February 2015 on the direct payments<sup>37</sup>
- Regulation dated 12 March 2015 of Minister for the Agriculture on the direct payments<sup>38</sup>
- Regulation dated 9 March 2015 of Minister for the Agriculture on the identification of the ecological focus areas<sup>39</sup>
- Regulation dated 11 March 2015 of Minister for the Agriculture on the ecological focus areas<sup>40</sup>
- Notification dated 27 November 2015 of Minister for the Agriculture on the ratio of the permanent grasslands to the total arable land in comparison to the reference year 2015.<sup>41</sup>

#### *Key requirements:*

- All farmers eligible under the Single Area Payment Scheme are obliged to conduct a "greening" exercise. Depending on the amount of arable land on the farm and the proportion of the permanent grassland, they are required to comply with one, two or three practices of greening, which might be accomplished by:

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<sup>37</sup> <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20150000308> (in Polish)

<sup>38</sup> <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20150000351> (in Polish)

<sup>39</sup> <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20150000348> (in Polish)

<sup>40</sup> <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20150000354> (in Polish)

<sup>41</sup> <http://isap.sejm.gov.pl/DetailsServlet?id=WMP20150001164&min=1> (in Polish)

- a) crop diversification,
- b) maintaining permanent grassland,
- c) maintenance of ecological focus areas<sup>42</sup> such as fallow land, field margins, hedges and trees, terraces, landscape features, buffer strips and afforestation areas with a minimum area set at 5% of arable land starting from 2018.<sup>43</sup>
- Payments are made for agricultural land, whereby landscape elements such areas as ditches up to 2 m wide and ponds of a total area inferior to 100 m<sup>2</sup> are included;
- According to the Ministry of the Agriculture, for the financing under this scheme, approximately 30% of the national financial budget is dedicated. This equals one billion € per year with the estimated rate of payment for greening being approx. 74 €/ha.
- Given the significant contribution of Polish agricultural and natural protection policies on grassland to the preservation of biodiversity and the absorption of carbon dioxide, several related obligations have been established, such as the prohibition of conversion or ploughing of valuable permanent grassland, including peat soils and wetlands covered by the Natura 2000 network. These obligations have been established under national legislation scheme, namely the Act concerning payments in a direct support scheme dated 5<sup>th</sup> February 2015 that sets rules and tasks for pertinent bodies and organizational units dealing with direct payments in line with EU directives as well as rules and procedure of granting farmers direct payments. However, the related provisions include direct reference to the Art. 45 (1.1) of EU Regulation 1307/2013 dated 17<sup>th</sup> December 2013 on direct payments. These obligations apply in a general manner to the farmers and their breach may result in a reduction of the payment and re-transformation of the areas concerned into permanent grasslands. The areas affected by greening rules might be covered by the protection regime of Natura 2000 at the same time as well as the sites indicated in the Regulation of the Minister for the Agriculture dated 9<sup>th</sup> March 2015.
- Furthermore, a general prohibition of transformation of these areas into arable lands has been introduced for the entire territory of the country in order to counter-act the decline of grassland. The indicative goal is to limit the transformation of the ecological focus areas referred to in the Art. 45 para 3 of the EU Regulation 1307/2013 dated 17<sup>th</sup> December 2013 on direct payments below 5% compared to the reference year 2015. Provided this aim is not achieved, corrective actions might be imposed on the farmers such as re-installment of the original land cover.

*Impacts:*

- CAP greening rules may have a limited positive impact on the peat soil, requiring the preservation of some areas as permanent grasslands. However, according to the Notification dated 27<sup>th</sup> November 2015 of the Minister for the Agriculture on the ratio of the permanent grasslands to the total arable land in comparison to the reference year 2015, the ratio has declined by 1,65%; whether the revisions of the rules will reverse the trend, remains to be seen.

*Gaps:*

- There is a notable lack of sufficient focus on peat soils located outside protected areas, especially when not protected under Natura 2000 scheme.

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<sup>42</sup> defined by reference to Art 45 (1.1) of the EU Regulation 1307/2013 (17.12.2013) on direct payments, <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20150000348>; <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20150000354>

<sup>43</sup> [http://ec.europa.eu/agriculture/direct-support/greening/index\\_en.htm](http://ec.europa.eu/agriculture/direct-support/greening/index_en.htm)d



- *CAP Greening Rules in Estonia*

*Legal basis:*

Regulation No 32 of the Minister for Rural Affairs of 17 April 2015 on direct payments<sup>44</sup>

*Key requirements:*

- Farmers applying for direct payments may not reduce the total area of permanent grassland (5 years grassland) they hold<sup>45</sup>. A farmer-based approach to preservation of permanent grasslands is therefore applied.
- Another important requirement is the prohibition of ploughing and change of use of “environmentally sensitive” grasslands. In the Estonian context, only areas within Natura 2000 areas where the soil is 100% peat soil are considered “environmentally sensitive”<sup>46</sup>.
- As a third rule, farmers with more than 15 ha of arable land must have at least 5% of their land covered by so-called “ecological focus areas”.

*Impacts:*

- CAP greening rules have a limited positive impact on the peat soil, requiring the preservation of some areas as permanent grasslands.
- On the other hand, the fact that drainage ditches are considered “ecological focus areas” gives an additional incentive to preserve them.

*Gaps:*

- The main gap is the limited approach taken to what constitutes “environmentally sensitive” grasslands. Grasslands with peat soil outside the Natura 2000 areas are not directly protected by the “greening rules” nor are the areas inside Natura 2000 areas, where the soil is not 100% peat soil, but mixed.
- The definition of “ecological focus area” leaves room for ambiguities: According to rules applicable in Estonia,<sup>47</sup> drainage ditches are considered to be a recognized type of an ecological focus area.

*Overall assessment*

The various instruments to balance the pro-cultivation bias with support for conservation measures can mitigate the pressure, but hardly reverse the trend. Despite the new greening rules, the EU's Common Agricultural Policy (CAP) is largely incentive-driven. Farmers receive public funds (from the EU budget) per area of cultivated land. This approach translates into an overall pressure on soils, including peatland areas, to become, or continue functioning as, cultivated land areas. Indeed, peatlands are among the habitats under highest pressure (PE'ER et al. 2014).

From a climate change perspective (see further below), CAP principles (good agricultural practice, cross-compliance, greening) and payments take little attention to GHG emissions from land use practices on organic soils and peatlands; high emission drainage-based

<sup>44</sup> <https://www.riigiteataja.ee/akt/122042015027> (in Estonian, dynamic link)

<sup>45</sup> Previous, § 12(1)

<sup>46</sup> Previous, § 12(4)

<sup>47</sup> Previous, § 13(2)

agriculture is highly subsidised, climate-smart rewetting / paludiculture loose CAP payments (WICHTMANN et al. 2016).

To mitigate the consequences, good agricultural practice should serve as the key corrective to mitigate ubiquitous drainage and other practices causing peatland degradation. WFD and climate compliance needs to be included into the cross compliance /greening mechanism. GAEC needs to integrate emission from soils (including an obligatory GHG audit) and target mitigation activities tailored to organic soils, including rewetting and paludiculture techniques, while incentivising raise of water levels and strictly penalising drainage-based agriculture with a substantial reduction in CAP funding.

Paludiculture should be seen as a valuable alternative agricultural practice (FRELIIH-LARSEN et al. 2014), knowledge among agricultural administrations and farmers need to be improved. Implementation should focus on arable land and degraded grasslands, not on protected areas. At least an equal or better preferential treatment of paludiculture compared to drainage-based peatland agriculture needs to be introduced regarding CAP payments. CAP does not secure future farmer's income for fundamental changes; therefore (large-scale) pilots to showcase paludiculture practices and machinery but also develop value chains for biomass are needed (FRELIIH-LARSEN 2014). Long-term guarantees and investment support should be granted by EU payments. Paludiculture could become own supporting scheme under CAP similar to organic farming, treatment for paludiculture must be preferential instead of equal to incentivize farmers to change. The funding for renewal of amelioration systems via EAFRD (see chapter 6.1) needs to be cut (FRELIIH-LARSEN et al. 2014) and a premium layer for rewetting / paludiculture on 2013 greening mechanism could be added. Generally allow conversion from EU protected permanent grassland on organic soils to paludicultures, e.g. cultivation of reed, cattail or peat moss.

Measures to protect permanent grassland for biodiversity in and outside Natura 2000 sites are in conflict with rewetting and paludiculture which benefits climate, ecosystem services, and site-specific biodiversity. The strict no-plough rule only applies for pure peat soil areas within Natura 2000 areas but not to mixed soils or lands outside the protected areas. One of the most controversial choices enabled by the EU – utilised in Estonia – is counting drainage ditches as one type of 'ecological focus areas' which gives an additional direct incentive to maintain existing ditches or even establish new ones.

Paludiculture, the cultivation of wet and rewetted peatlands, is the only long-term sustainable and climate-friendly form of agriculture on organic peat soils (WICHTMANN et al. 2016). Under the current agricultural legislation, the receipt of direct payments (CAP, First Pillar) and funding for rural development (CAP, Second Pillar) seems impossible for reed and cattail dominated paludicultures (WICHTMANN et al. 2016) unless paludiculture measures have been implemented within WFD. This is an alternative option to receive direct payments for those rewetted peatlands which gave a right to direct payments in 2008 but are no longer suitable for agricultural use, i.e. as permanent cropland, grassland or arable land, due to the

application of the Water Framework Directive<sup>48</sup>. When considered as permanent crops, the establishment of paludicultures on permanent grassland can be hampered by the rules protecting permanent grassland (WICHTMANN et al. 2016).

#### **5.4 Water Framework Directive**

The key regulatory instrument aiming at the protection of inland surface water is Directive 2000/60/EC of the European Parliament and the Council (“Water Framework Directive” or WFD), which entered into force on 22 December 2000. It lays out the comprehensive target for Member States to prevent the deterioration of all surface waters and to achieve an overall good water status by 2015 (Art. 4), meaning that both chemical and ecological status are good (Art. 2, No. 18). As this can only be achieved through a significant reduction of nutrient load in surface and coastal water bodies, the directive implies a transformative change of water management across Europe (TREPPEL 2010).

It links to a number of other EU directives (Art. 10), including the Urban Wastewater Directive, the Birds Directive, the Habitats Directive, the Bathing Water Directive, the Nitrates Directive and the Directive on Integrated Pollution Prevention and Control by calling for Member States to ensure their implementation within a set timeframe.

A key component of the WFD is the Member States’ obligation to set up River Basin Management Plans (RBMPs) (Art. 13) in order to safeguard each of the 110 river basin districts (RBDs) that have been established according to Article 3 of the WFD as the main units for the management of river basins across the EU and reach the WFDs objectives. Since the basins affected by the Directive often are trans-boundary ones, many of these plans have to be internationally coordinated. How exactly this coordination should be achieved is not prescribed by the WFD as it is the case with how Member States should ensure the active involvement of all interested parties as stated in Article 14 of the Directive.

Implementation of the WFD was to follow a strict schedule with deadlines for completion of certain key tasks, such as the production of the RBMPs by the end of 2009 (Art. 11). Few states transposed the Directive into national legislation by the deadline, yet compliance grew over time; and the completion of RBDs and the designation of competent authorities in the Member States have proved important milestone achievements.

The WFD makes few references to peat- and other wetlands The Preamble (No. 8) includes a cross-reference to a Communication to the European Parliament by the Commission on the wise use and conservation of wetlands.<sup>49</sup> It also mentions the necessity of wetland protection as part of the act’s common principles (No. 23). Article I (a) of the WFD, then, states that

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<sup>48</sup> WFD (EC) 60/2000, Art. 32 Section 2 b i Regulation (EU) 1307/2013

<sup>49</sup> COM (95), 189 final, 29 May 1995.

the purpose of this Directive is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which:

*prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems.*

It promotes the importance of peatlands as buffer habitats for water purification holding back nutrients in water flows (TETZLAFF et al. 2015). Finally, the recreation and restoration of wetlands is also mentioned as a supplementary measure Member States might chose in order to achieve the WFDs objectives (Part B, (vii)).

#### *Overall assessment*

The WFD's record for EU-wide peatland protection has been mixed (TREPPEL 2010). The act aims at a holistic, cross-sectoral and cross-country water planning approach, and it expressly includes wetlands in its scope. Yet, when it comes to detailed implementation, the directive targets different wet habitats as if they were separate segments (or water cycles): groundwaters, rivers, lakes, ponds, and also wetlands. The differentiation leads to different governance cycles, including with respect to the measuring of results against the WFD's objectives. This ignores the inter-dependence of water bodies and segments and may undermine effective implementation of the directive in the long run.

Peatlands management and restoration need to be considered as an effective instrument within RBMPs to reach the goal of a good ecological status of open water bodies. Water bodies have to be treated jointly with their accompanying mires and peatlands in spatial planning. This tool is still largely neglected by water managers as water engineering and construction follows old paradigms in lower administration levels. Water management is carried out locally, rarely on higher levels which set policies and legislation. Local water management authorities which are in charge for implementation on the ground largely do not harbour the capacity to see the negative impact of peatland degradation for whole river basins. Therefore, the directive lacks a robust implementation and does not provide adequate peatland protection assessments, restoration targets, and overall strategies.

Seen in the context other policy fields, the WFD proves elusive both when it comes to the potential for synergies as well as regulatory conflicts. A case in point is the relationship between the WFD and the CAP. Water sources heavily impact what kind of and how soils are used by farmers, and vice versa agriculture has a substantial impact on water resources (including in terms of wetland drainage and pollution) (BATEMAN et al. 2006). CAP-subsidised drainage-based agriculture is largely responsible for nutrient-rich water inflow into river basin and their negative ecological state (TIEMEYER et al. 2007) and therefore strongly counteracts the targets of WDF. This notwithstanding, the WFD is absent from the list of compulsory standards for application under the cross-compliance mechanism (see chapter 5.3), and the WFD does not reflect, let alone regulate, the Union's agricultural sector.

A separate area of conflict lies in the relationship between WFD and Natura 2000, in cases when the WFD requires or aims at restoration works (to achieve a more native state of a river, for instance), while this would mean the deterioration of a genuine (if not 'native') habitat (VISCHER-LEOPOLD et al. 2015). Peatland restoration in many Member States is so far mainly focused on nature conservation objectives and misses out benefits for WDF and climate change and vice versa.

Advanced institutional interplay oriented at the need for cross-sectoral governance is in high demand, but only partially implemented. In 2000, the European Commission together with the Member States formulated a common implementation strategy (CIS), which pointed the way (EUROPEAN COMMISSION 2000).

### **River Basin Management Plans in Poland**

*Legal basis:*

Water Law Act (2001)<sup>50</sup>

*Key requirements:*

- River basin management plans (RBMP) must be drawn up for river basins or parts of river basins in Poland.
- RBMPs are issued for the period of 6 years at a time.

*Practice:*

The territory of Poland comprises the following river basins:

- a) major basins: basin of Vistula (around 59% of the country's area) and basin of Oder (around 38% of the country's area),
- b) basins of river: Ucker, Dniestr, Danube, Jarft, Swieza, Pregolya, Elba, Nemunas.

Each of above mentioned basins is the subject of a separate RBMP.

The first set of RBMPs has been issued in 2011. Currently, all RBMPs are subject to a review. According to the schedule, new versions of RBMPs (2016-2021) were to be adopted by the Polish Government up to June 2016, which has not happened yet.<sup>51</sup>

RBMPs provide a number of regional programs for small water retention.<sup>52</sup> One of the purposes of these programs is to increase the level of water on the degraded peatlands and peat soils.

RBMPs also provide measures dedicated to protect aquatic habitats (among them peatlands but also swamps and marshes). However, the main aim of these measures is the protection of birds and plants' habitats.

Furthermore, RBMPs identify groundwater-dependent terrestrial ecosystems which shall be the subject to special monitoring (the number of monitoring points has been increased) and include inter alia marshes and peatlands.

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<sup>50</sup> Ustawa z dnia 18 lipca 2001 r. Prawo wodne (in Polish) <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20011151229>

<sup>51</sup> [http://ec.europa.eu/environment/water/participation/map\\_mc/countries/poland\\_en.htm](http://ec.europa.eu/environment/water/participation/map_mc/countries/poland_en.htm)

<sup>52</sup> For example, provided in RBMP for basin of Vistula Regional program for small retention in Małopolska Region provides for construction of 64 small retention objects.

### *Impacts:*

RBMPs do not provide specific measures dedicated solely to peatlands and peat soils. Peatlands are protected only in the context of the wider initiatives, chosen to maintain and restore waters and water dependent ecosystems. The outcomes of these initiatives (also with reference to peatlands) have not been identified and described so far.

### *Gaps:*

A major gap is a lack of coordination between individual initiatives implemented under separate RBMPs instead of a more cross-border-oriented implementation including entire catchments. This prevents synergy effects in the water dependent areas and ignores the fact that water bodies form a connected and often interdependent system.

Furthermore, the various initiatives as well as the competences of different administrative bodies tend to intersect and overlap, making the coordination and supervision of actions taken difficult. In many cases, they are also realized with delays or not completed in time<sup>53</sup>.

In addition, the protection of peatlands could be further strengthened through measures dedicated directly to these sites.

## **River Basin Management Plans in Estonia**

### *Legal basis:*

Water Act of 1994, amended 2004 in accordance with the WFD

### *Key requirements:*

- River basin management plans (RBMPs) must be drawn up for river basins or parts of river basins in Estonia.
- RBMPs had to be updated by 22<sup>nd</sup> December 2015 and will be updated every 6 years thereafter.

### *Practice:*

The first RBMPs were drawn up by the competent Ministry of Environment for the period of 2009 to 2015. The second set was adopted in January 2016 and will be in force until 2021. There are three River Basin Districts in Estonia: East-Estonia watershed, West-Estonia watershed and Koiva watershed (transboundary).

The first set of RBMPs did mention the large amount of peatlands and wet areas in Estonia, but did not treat them as water bodies; this was a task designed for the next set of RBMPs. The RBMPs adopted in early 2016 also state the need to treat wetlands as either separate water bodies or parts of water bodies and “establish clearer links between the wetlands and rules governing status of surface water bodies”.<sup>54</sup> However, there are no measures planned under the RBMPs that would directly benefit the status of the wetlands.

### *Impacts:*

Impact of RBMPs to the protection of wetlands and peat soils is almost non-existent, as no specific measures have so far been planned under this measure.

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<sup>53</sup> E.g. see the report of Supreme Audit Office on the preparation and implementation of river basin management plans, 2015 <https://www.nik.gov.pl/plik/id,9426,vp,11661.pdf>

<sup>54</sup> [http://www.envir.ee/sites/default/files/ida-eesti\\_veisikonna\\_veemajanduskava.pdf](http://www.envir.ee/sites/default/files/ida-eesti_veisikonna_veemajanduskava.pdf), p 40, 44

### *Gaps:*

Besides the above mentioned problems in Poland that apply to Estonia as well, the main gap is a lack of clear legal obligations as regards wetlands (neither the WFD nor transposing Water Act set environmental objectives for wetlands). Although the European Commission has provided guidance on how to integrate wetlands management in the RBMPs and programme of measures (EUROPEAN COMMISSION 2000), this has for the moment being, been largely ignored.

### *Prospects:*

Any improvement of national-level policies is not expected before 2021, when the next RBMPs are to be drafted.

Water policy is central to peatland conservation and restoration, and healthy peatlands secure clean water supply and serve as ecological stabilisers of ecosystems at large as well as effective flood prevention tools. Yet, the EU legislative framework – the Water Framework Directive, in particular – and Estonia's implemented legislation – mainly the Water Act of 1994, amended in 2010 – contain few 'hard' provisions that would address peatland-specific needs and objectives.

The knowledge levels about mires and peatlands for water managers needs to be improved beyond existing guidelines and stricter legislation to follow these guidelines on all levels is needed. MS have to fulfil this task as it touches the national implementation of WFD with EU support. Beside local implementation also the larger-scale cross-border catchment based implementation based on exchange between MS need to be improved. WFD could be more widely used as justification for peatland rewetting. Funding through ERDF, EAFRD could set incentives for peatland restoration as a measure in River Basin Management Plans.

According to the Directive, Member States must adopt River Basin Management Plans (RBMPs) to define concrete measures and objectives within a certain timeframe. Estonia has adopted three RBMPs, one for the East-Estonian watershed, one for the West-Estonian watershed and one for the (transboundary) Koiva watershed. In all these plans (the latest update was approved in January 2016<sup>55</sup>), peatlands are recognized as important components of the freshwater system, but they are not treated as water bodies in their own right (key objectives and benchmarks are linked to these), and no concrete measures have been designed.

## **5.5 EU Flood Directive**

After major damaging floods in Europe between 1998 and 2009 with catastrophic ones along the Danube and Elbe rivers in particular and according need for action, the European Commission reacted with a special Flood Directive issued in 2007.<sup>56</sup>

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<sup>55</sup> <http://www.envir.ee/et/eesmargid-tegevused/vesi/veemajanduskavad/veemajanduskavad-2015-2021>

<sup>56</sup> Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks, official Journal of the European Union 288, p. 27-34.

The directive has the purpose of establishing a framework for the assessment and management of flood risks while aiming at the reduction of flood consequences for human health, the environment, cultural heritage and economic activity (Art. 1). It applies to all kinds of floods (river, lakes, flash floods, coastal floods, storm surges and tsunamis) on all of the EU territory. It demands Member States to undertake a preliminary flood risk assessment (Art. 11) which was done in all countries by 2011, develop flood hazard maps and flood risk maps in areas with risk of flood damage (Art. 6, accomplished by 2013) and set up according Flood Risk Management Plans until 2015 (Art. 7) which has been done by almost all Member States.

Also the Directive sets the goal for a more coordinated action at the EU level as many river basins in Europe are split between Member States and thus require cross-border cooperation, responsibility and, as the directive puts it, solidarity (Preamble, No. 7). The Flood Directive entails maps of river basin districts including borders of river basins, sub basins and coastal areas, a description of floods that occurred in the past and an assessment of the likelihood of future floods based on available information.

The directive includes direct reference to the WFD at several points (Preamble; Art. 4; Art. 9). It states that Member States may appoint competent authorities for the directive's implementation different from those dealing with the WFD and asks Member States to coordinate the directives' application with the one of the WFD (Art. 9) as well as focus on the improvement of efficiency, information exchange, synergies and benefits regarding the objectives of WFD and Flood Directive.

#### *Overall assessment*

Peatland and wetlands are not particularly addressed. This points to a missed opportunity, as peatlands are natural buffers against floods and deserve full attention. It also demonstrates a risk, as wetlands and peatlands are potentially affected by the Flood Directive through measures taken in order to reduce the likelihood of floods and their impact in specific locations such as restoring flood plains and wetlands. It would seem important to impose an obligation on flood governance authorities to measure, anticipate, and mitigate the impact on peat- and wetlands from their actions in general.

### **5.6 EU Climate Policy and Land Use**

The EU with several peatland-rich country is the second biggest emitter of GHG from peatlands worldwide, only surpassed by Indonesia, and largest emitter of all Annex 1 Parties to the Kyoto protocol. Total GHG emissions sum up to approximately 270 Mt CO<sub>2</sub>e (Figure 4).



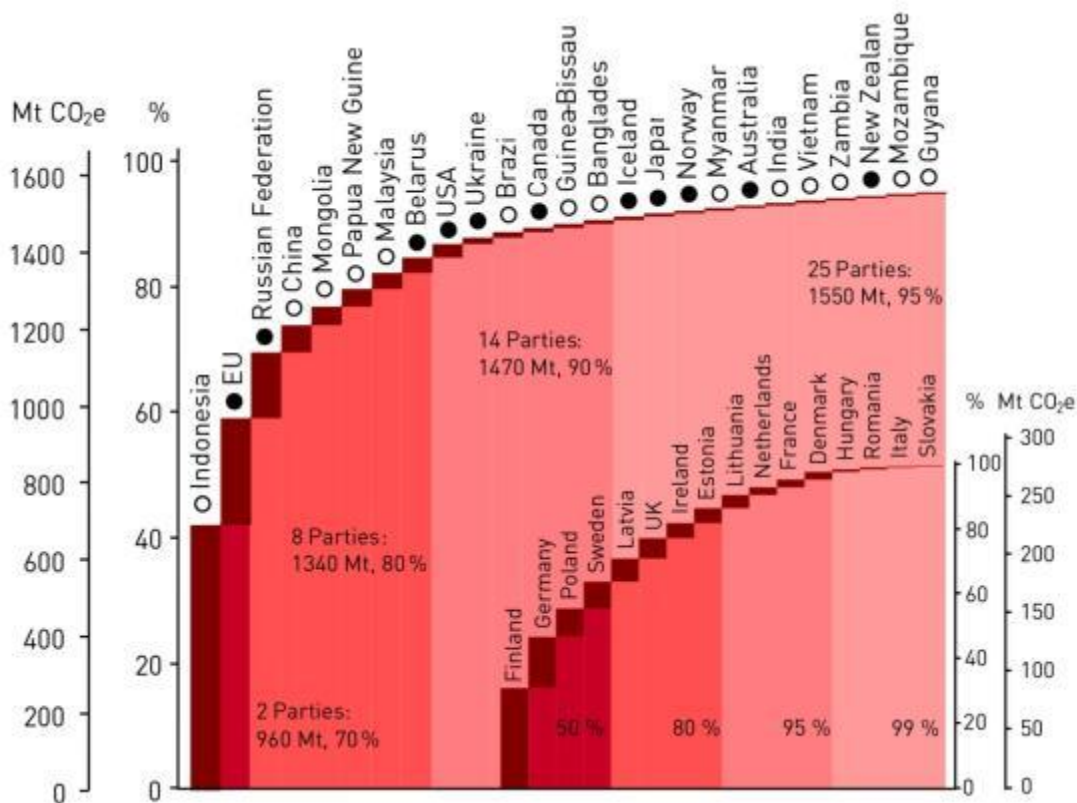


Figure 4: Key countries with emissions from drained organic soils. The graph shows the amount of GHG emissions in a cumulative way in Mt CO<sub>2</sub>e per year and as percentage of the total global emissions from degrading peatlands. Emissions are shown for the 25 Parties to the UNFCCC responsible for 95% of the emissions in descending order. White dots denote non-Annex 1 Parties, black dots Annex 1 Parties. Red shades indicate where the 70, 80, 90 and 95 percent marks are crossed. The inset depicts the relative contributions of the 16 EU countries that are together responsible for 99% of EU and 17% of global emissions from organic soils (WETLANDS INTERNATIONAL 2015).

As a recent study show, Poland ranks at 3<sup>rd</sup> position of largest emitter from peatlands in the EU with 23.8 Mt CO<sub>2</sub>e emissions per year, calculated with emission factors of IPCC 2014 and complete inventory of peatland areas (cf. JOOSTEN et al. 2017). It is topped only by Finland and Germany. Worldwide it ranks at 10<sup>th</sup> position. The finding is in stark contrast to peatland-related emissions figures as represented in Poland's National Inventory Submission to the UNFCCC 2014 (NIS POLAND 2014). Emissions from drained organic soils in forest lands, croplands and grasslands (incl. shallow drained grasslands), in the submission, are set at only 2.74 Mt CO<sub>2</sub> per year, a divergence from the recent scientific assessment with the factor 10. The Polish example is not unique. Accounting for peatland emissions is mostly not complete and unreliable across Member States; areas of organic soils and peatlands are underestimated and outdated emission factors are used (BARTHELMES et al. 2015).

Estonia ranks with 7.7 Mt CO<sub>2</sub> annual (BARTHELMES et al. 2015) at number 8 of GHG emitting countries from peatlands in the EU (18<sup>th</sup> worldwide (JOOSTEN 2009)) which is remarkable despite of the small country size. The carbon footprint from peat, as provided by Estonian government in its annual reports (NIS 2014), looks minimal (ten times less) in comparison to

this new calculation of peatland emissions which BARTHELMES et al. published 2015 for the Nordic Baltic Wetland Initiative under the Ramsar convention (NorBalWet). They found that the emissions from peatlands compares to almost half of Estonia's non-land use related emissions. The long-lasting lack of action may owe to the fact that most peat-related emissions, in particular those from agricultural soils, are not traced under the reporting rules of the Kyoto Protocol. It is prognosticated, that this is about to change once the new EU rules on GHG monitoring rules for land use, land-use change and forestry (Decision No 529/2013/EU) are fully implemented. The rules include mandatory accounting for emissions from cropland management and grassland management as of 2021 which will include most of the organic soils drained for agriculture.

### **Box 3: Peatland and Climate Change**

Peatland distribution on the earth has varied according to climate changes in the past as climate is the most important determinant of distribution and character of peatlands. Even though natural peatlands were resilient to past climate changes by adaption, future climate change might, by its rate and magnitude, have a huge negative impact on them. Already, melting of permafrost peatland and changing vegetation in temperate peatland areas as well as the desertification of steppe peatlands can be witnessed. At the same time, human activities such as drainage, overgrazing and vegetation clearance negatively impacted peatlands and made them more vulnerable to climate change (TANNEBERGER & WICHTMANN 2011).

While being essentially influenced by climate change themselves, peatlands also affect climate through a series of feedback effects including the sequestration of carbon, the emission of methane gas and the alteration of microclimate. They affect the balance of three main GHG: Carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). Peatlands are one of the most important terrestrial carbon stores. Peatlands cover only 3 percent of the world's land area but contain 30 percent of its soil carbon (550 Gt C) (PARISH et al. 2008). Permanent water saturation in natural state hinders decomposition of organic matter and accumulation of peat starts. Only 15 percent of the world's peatlands have been drained and used for agriculture, livestock and forestry, including bioenergy plantations (JOOSTEN 2009). These drained peatlands, which make up 0.3% of the world's land cover, emit almost 6 percent of global CO<sub>2</sub> emissions (JOOSTEN 2009). If organic soils are drained, carbon is released from the soil (FLESSA et al. 2012). By raising the water tables of drained peatlands, GHG emissions can be mitigated; the carbon conserved in the peat and storage function re-activated in the long term.

**Box 3 contd.**

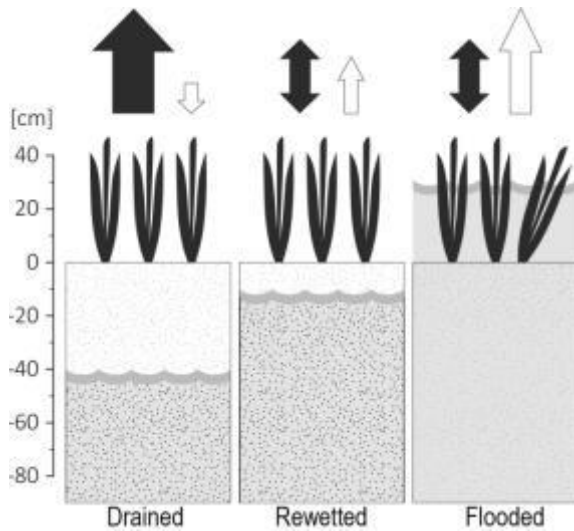


Figure 5: Gas exchange in peatlands. Schematic diagram of CO<sub>2</sub> (black arrows) and methane CH<sub>4</sub> (white arrows) in relation to water level. (JURASINSKI et al. 2016).

Reduction potential is highest when deeply drained sites are rewetted to a mean annual water table close to natural conditions (around 10 cm below the surface) without flooding to avoid methane emissions. In the mid- and long-term peatlands restored back to a carbon neutral or even slight sequestration status.

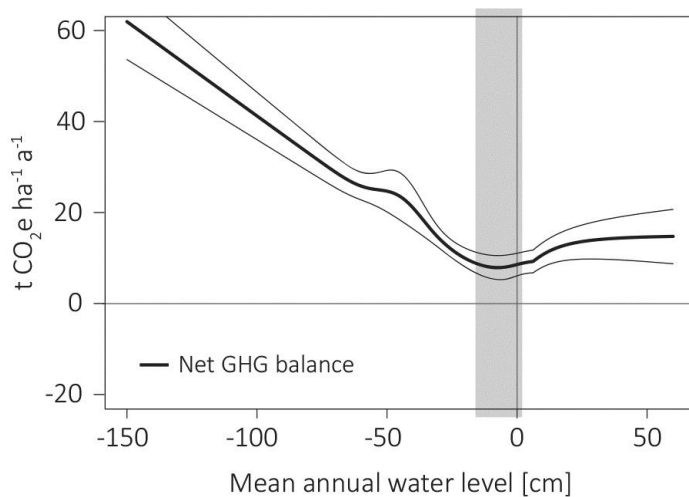


Figure 6: GHG emissions and net GHG balance of peatlands in relation to mean annual water level. The hairline graphs illustrate the 95% confidence intervals. (JURASINSKI et al. 2016).

## EU Climate Action

When the EU adopted its first economy-wide climate mitigation target of 8% below 1990 emissions in the context of the ratification of the Kyoto Protocol – the European Community signed the Kyoto Protocol in 1998 and ratified it in 2002 –<sup>57</sup> the land-use sector, generally referred as LULUCF (“land use, land-use change and forestry”), fell largely outside the scope of GHG emissions accounting and thus also the recognition of peatlands. This was not least a consequence of the accounting decisions made at the level of the Kyoto Protocol. Different from the GHG reporting obligations under the United Nations Framework Convention on Climate Change (UNFCCC), which aim at the total of human-induced emissions, including all LULUCF emissions, the Kyoto rules follow a selective approach to the scope of human-induced GHG emissions and removals deemed *accountable*. For LULUCF-based emissions, only a specific set of sub-sectors fell within the scope.

Net emissions and GHG removal (absorption) changes due to *afforestation, reforestation and deforestation* (altogether “ARD”), in every commitment period, were to be accounted for (Article 3.3 Kyoto Protocol), but not the absolute emissions or removals accounting to these activities. For other activities than ARD (Article 3.4 Kyoto Protocol), it was for Parties to the Kyoto Protocol to choose from the list that the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (“CMP”) would issue. For the first Kyoto Protocol commitment period, covering the years from 2008 to 2012, this list included the activities forest management, cropland management, grazing land management and revegetation.<sup>18</sup> EU Member States (including Poland, but not Estonia) made use of the option to account for forest management.<sup>58</sup> Only three Member States, Denmark, Portugal and Romania, made use of additional accounting activities, namely cropland management and grazing land management (Denmark and Portugal) and revegetation (Romania).<sup>59</sup>

When it came to implementation of the Kyoto reduction goals, the EU decided to exclude LULUCF in its entirety from the domestic climate change instruments and targets. The flagship climate policy instrument, the EU Emissions Trading Scheme (EU ETS), adopted in 2003 and modified in 2008 in the context of the 2020 Climate and Energy Package, covers only industrial installations and aviation.<sup>60</sup> The Effort Sharing framework – based on the EU

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<sup>57</sup> Council Decision 2002/358/EC of 25 April 2002 concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfilment of commitments thereunder.

<sup>58</sup> European Commission, Progress towards achieving the Kyoto and EU 2020 objectives, October 2014, [http://ec.europa.eu/clima/policies/strategies/progress/docs/kyoto\\_progress\\_2014\\_en.pdf](http://ec.europa.eu/clima/policies/strategies/progress/docs/kyoto_progress_2014_en.pdf).

<sup>59</sup> Ibid.

<sup>60</sup> Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, Official Journal L 275/32 of 25 October 2003, most recently amended by Regulation (EU) No 421/2014, accessible at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02003L0087-20140430&from=EN>.

Effort Sharing Decision (ESD) –<sup>61</sup> was meant as an umbrella to cover all GHG emissions not covered by the EU ETS, including notably agriculture (see box 4). Yet, it too, left LULUCF outside its scope. The reasons were of technical and economic, but also of legal and political nature (v. UNGER et al. 2012). Area-based emissions and removals are harder to monitor and calculate than installation-based ones.<sup>62</sup> Sequestration gains also risk to be reversible (e.g. when a planted forest burns down or is logged), and in its preparatory works, the European Commission concluded that this reversal or “permanence” risk would apply to all LULUCF-based emission and removal sources – the matter is contentious – and thus would disqualify the sector from meeting absolute emission reduction targets. (v. UNGER et al. 2016). From a technical point, the LULUCF sector is playing with different “currencies” of emission fluxes as net-net accounting taking the base year 1990 as a reference is used for the accounting of all Article 3.4 activities (cropland management, grazing land management, revegetation, and wetland drainage and rewetting) but for forest related activities (Article 3.3) a gross-net accounting is used which only measures the emissions and removals within the commitment period. For countries which had a carbon sink in forests in 1990, which is true for most EU Member States, the gross-net approach increases the accounted carbon removal from forest considerably (LIU et al. 2011). For the activity “forest management” under Article 3.4. in the second Kyoto Protocol commitment period a reference level accounting approach was introduced. A forest management reference level (FMRL) needs to be set against which emissions and removals during the commitment period are compared. The FMRL is derived for most countries from forward looking scenarios. From an economic perspective, the European Commission noted the risk of market-flooding (with cheap LULUCF-emissions credits).<sup>63</sup> At the legal level, the Commission pointed to questions concerning the solidity of carbon units, and liabilities from reversals.<sup>64</sup> In wider discussions among scholars, interest groups and civil society, the technical and legal discussions have often been conflated with political and even philosophical questions. “Putting a price on the natural environment” has sometimes been described as unethical (CANEY & HEPBURN 2011), and there is a wide understanding that the special role of the agricultural sector for food security requires particular protection against regulatory over-reach. CAP principles (good agricultural practice, cross-compliance, greening) and payments take little attention to GHG emissions from land use practices on organic soils and peatlands, e.g. high emission drainage-based agriculture is highly subsidised, climate-smart rewetting / paludiculture loose CAP payments (WICHTMANN et al. 2016). The European Council, as recently as in 2014, stated that the

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<sup>61</sup> Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020, Official Journal L 140/136 of 5 June 2009, accessible at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009D0406&from=EN>.

<sup>62</sup> Commission Staff Working Document, Impact Assessment EU ETS (2008), COM(2008) 16 final, pp. 56 et seq.

<sup>63</sup> Ibidem.

<sup>64</sup> Ibidem.

“multiple objectives of the agriculture and land use sector, with their lower mitigation potential, should be acknowledged, as well as the need to ensure coherence between the EU’s food security and climate change objectives”<sup>65</sup>.

#### **Box 4: Agriculture and LULUCF**

The ESD covers GHG emissions from agriculture (or the categorisation within the ESD see VAN DOORN et al. 2012). Following the classification used under the Kyoto Protocol, however, agricultural emissions exclude soil-based emissions and are virtually limited enteric fermentation by ruminants, soil N<sub>2</sub>O emissions from mineral fertilizers and manure, from manure management, and fuel combustion in agricultural transport and production.

LULUCF-related emissions, by contrast, fall outside the scope of the ESD. LULUCF covers GHG emissions into, and removal of GHG from, the atmosphere resulting from soils, trees, plants, biomass and timber. This means in principle all human activities that take place on agricultural land, forested land, wetland and peat land and which result directly in emissions or removals of greenhouse gases: draining of peat land, felling of forest or ploughing up grassland generates emissions; rewetting of organic soils, afforestation, conversion of arable land into grassland can result in protection of carbon stocks or even carbon sequestration.

However, the importance of the LULUCF sector for reaching the global warming goal of “well below 2°C on pre-industrial averages” (Article 2.1 Paris Agreement) today is undisputed. At the global level, a framework for reducing emission from deforestation and forest degradation (“REDD+”) has been established<sup>66</sup> and concepts to combat climate change through sustainable agricultural practices are emerging.<sup>67</sup> Peatland-related emissions have been specifically recognized, when the CMP, at the negotiation at Durban, South African in 2011, added wetland drainage and rewetting (“WDR”) as a new activity to the list of voluntary accounting activities under Article 3.4 Kyoto Protocol.<sup>68</sup> Subsequently, updated accounting guidelines for wetland related emission have been issued (IPCC 2014).

<sup>65</sup> European Council of 23 and 24 October 2014: Conclusions on 2030 Climate and Energy Policy Framework, SN 79/14, accessible at [http://www.consilium.europa.eu/uedocs/cms\\_data/docs/pressdata/en/ec/145356.pdf](http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145356.pdf).

<sup>66</sup> The decisions No 9 – 15 of the Conference of the Parties adopted at the 19<sup>th</sup> session (COP 19 in Warsaw) together represent the Warsaw Framework for REDD+, accessible at [http://unfccc.int/land\\_use\\_and\\_climate\\_change/redd/items/8180.php](http://unfccc.int/land_use_and_climate_change/redd/items/8180.php). See also Article 5 of the Paris Agreement, Decision 1/COP.21, accessible at [http://unfccc.int/paris\\_agreement/items/9485.php](http://unfccc.int/paris_agreement/items/9485.php).

<sup>67</sup> The Paris Agreement recognizes safeguarding “food security” as a “fundamental priority” (Preamble), while referencing, in Article 5, the Convention, which aims at the promotion of sustainable management of all sinks and reservoirs including “terrestrial ecosystems” (Article 1.4 (d) Convention). A body under the Convention, SBSTA, is working on certain issues concerning agriculture, and smart agriculture is, for many REDD+ intervention, a central element.

<sup>68</sup> Decision 2/CMP.7: “Wetland drainage and rewetting’ is a system of practices for draining and rewetting on land with organic soil that covers a minimum area of 1 ha. The activity applies to all lands that have been drained since 1990 and to all lands that have been rewetted since 1990 and that are not accounted for under any other activity [ARD, forest management, cropland management, grazing

The EU responded to the growing sensibility for LULUCF-based emissions, in general, and the Durban CMP decision, in particular, by adopting, in 2013, a decision on LULUCF accounting rules<sup>69</sup>, which requires Member States to account emissions from ADR and forest management from 2013 (Articles 3, 6), and for cropland management and grassland management from 2021 (Articles 3, 8). Wetland drainage and rewetting is treated as an optional activity. It is noted in this context, however, that most peatland related emissions are, or will be, covered by the new accounting rules in the first place (as part of forest, cropland or grassland related emissions). In the recitals of the decision (No 3), the legislator mentions that the decision is “a first step... to contribute to policy development towards the inclusion of the LULUCF sector in the Union’s emissions reduction commitment”.

Since then, developments have accelerated. The European Council, in the context of the above-quoted statement, called for an ‘optimisation’ of the “[agriculture and land-use] sector’s contribution to GHG mitigation and sequestration, including through afforestation”, as well as an integration into the bloc’s 2030 GHG mitigation framework.<sup>70</sup> When the EU made its 2015 submission to the UNFCCC concerning the intended nationally determined contribution,<sup>71</sup> it committed to a “100%” coverage of emissions (though it noted that a “policy on how to include [LULUCF] into the 2030 GHG mitigation framework” would be established “as soon as technical conditions allow and in any case before 2020”).<sup>72</sup>

In July 2016, the European Commission presented its proposal on binding GHG emission reductions for Member States (2021-2030) and how to integrate the land use sector into the 2030 Climate and Energy Framework.<sup>73</sup> Together with the 2015 proposal for the revision of the EU ETS, these measures, once adopted, will be the milestone instruments under the Union’s 2030 Climate and Energy Framework to implement the Paris Agreement.

The proposal on binding GHG emissions expands the Effort Sharing framework (ESD) into the period 2021 to 2030. As before, each Member State receives an emission reduction target compared to the 2005 emissions. They range from -40% (Luxembourg) to 0% (Bulgaria); Poland’s target is -7% and Estonia’s is -13%. LULUCF emissions remain outside the scope of the ESD; however, Member States are granted a limited contingency of LULUCF “quantities” that may be credited against their compliance needs (Article 7). Such

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land management or revegetation], where drainage is the direct human-induced lowering of the soil water table and rewetting is the direct human-induced partial or total reversal of drainage...”

<sup>69</sup> Decision No 529/2013/EU of the European Parliament and of the Council of 21 May 2013 on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities, Official Journal L 165/80 of 18 June 2013.

<sup>70</sup> Ibidem (footnote 65).

<sup>71</sup> <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Latvia/1/LV-03-06-EU%20INDC.pdf>.

<sup>72</sup> Ibidem.

<sup>73</sup> The proposals can be accessed at [http://ec.europa.eu/clima/news/articles/news\\_2016072001\\_en.htm](http://ec.europa.eu/clima/news/articles/news_2016072001_en.htm).

quantities require over-compliance of the Member State's obligation under the LULUCF instrument.

Under the proposal for the LULUCF instrument, Member States will be bound by the “no-debit rule”, i.e. in each Member State emissions – from afforested land (includes reforestation activities), deforested land, managed cropland, managed grassland, and managed forest land – must not be greater than removals over each of the two periods (Period 1: 2021-2025; Period 2: 2026-2030) (Article 4). Wetlands that do not fall under one or more of the categories listed (almost all peatland related emissions in the EU will) may be selected by a Member State as an optional category.

Where a Member State risks non-compliance, the regulation's flexibility instruments can help:

- Member States may use units from the Effort Sharing framework to reach the no-debit-rule (Article 11.1);
- Member States may trade surplus quantities among each other (Article 11.2);
- Member States may bank its surplus quantity from Period 1 into Period 2.

Alternatively, a Member State can use certain amounts of its LULUCF quantity – in sum they must not exceed the pre-defined total country cap – to meet its annual effort sharing compliance targets (Article 7 Regulation on binding emission reduction targets). The quotas are low, but not negligible. Altogether – for all Member States over the entire trading period – the LULUCF offset amount is 280 million tonnes of emission. For comparison, total GHG emissions of EU countries (excluding LULUCF) in 2013 stood at roughly 4.4 billion tonnes; in average, the LULUCF flexibility will represent around 1% of total EU ESD emissions (2005 level) per year.<sup>74</sup> For countries with high shares of agricultural emissions, the LULUCF flexibility is considerably larger than 1%. Ireland will be able to offset 5,6% of its 2005 emissions with LULUCF ‘credits’; Lithuania 5.0%; Estonia 1.7% and Poland 1.2%.<sup>75</sup>

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<sup>74</sup> European Commission, Impact Assessment accompanying the ESR proposal, accessible at [http://ec.europa.eu/clima/news/docs/20160720\\_\\_impact\\_assessment\\_1\\_en.pdf](http://ec.europa.eu/clima/news/docs/20160720__impact_assessment_1_en.pdf).

<sup>75</sup> Ibidem.



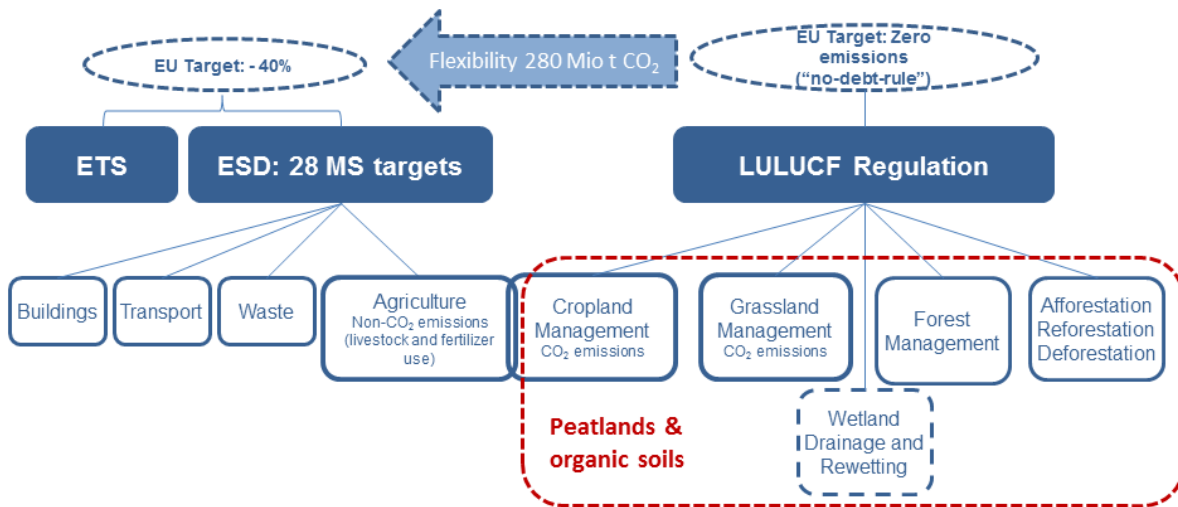


Figure 7: Accounting of emissions from land use and forestry in the proposed 2030 EU Climate & Energy Framework.

#### Overall assessment

Given that the EU LULUCF sector as a whole is likely to remain a massive sink – though improved accounting for soil-related emissions, in particular from peatlands, will substantially lower the total net amount set at around 300 Mt CO<sub>2</sub>e annually –<sup>76</sup> compliance with the LULUCF instrument should not present a major difficulty for Member States. Indeed, as forest sink activities in peat-rich countries will exceed peatland and other soil-related emissions, and in the absence of an actual mitigation target – the no-debt-rule secures zero additional emissions only – there will be little, if any, incentive for reducing peatland-related emissions coming from EU climate policy. This seems a missed opportunity. Peatlands restoration is considered a “low hanging fruit” to reduce GHG emissions as it shows cost-efficiency at least in the medium and long run (RÖDER & OSTERBURG 2012). An EU-wide peatland-based carbon standard and mechanism – which comprehensively tracks rewetting and conservation interventions and calculates GHG fluxes – would help raising funding, expertise and promote action to tackle peatland conservation and restoration throughout Member States. The question whether to allow offsetting of industrial and other emissions through such a mechanism is a contentious one and may require further assessment (v. UNGER et al. 2016). In the meantime, however, a peat project mechanism could be funded through dedicated public sources as well as through voluntary schemes.

Member States are free to pioneer into project-based approaches, and some do, including in the context of emissions trading. Germany<sup>77</sup> and the UK<sup>78</sup> each are piloting schemes under which peatlands are voluntarily rewetted, the emission reduction result is measured and

<sup>76</sup> European Environment Agency, Trends and projections in Europe 2014, accessible at <http://www.actu-environnement.com/media/pdf/news-23105-etude-eea-europe-climat-energie.pdf>.

<sup>77</sup> S. the MoorFutures scheme, documentation available at <http://www.moorfutures.de>.

<sup>78</sup> S. the Peatland Carbon Code, documentation accessible at <http://www.iucn-uk-peatlandprogramme.org/peatland-code>.

certified and offset credits – for use on voluntary carbon markets – are generated. The German scheme – *MoorFutures* – is embedded in a public-private partnership, in which the regional governments assume certain guarantees. The scheme is fairly simple to replicate, and cross-border cooperation may happen in the future. Other than creating mitigation demand, EU climate policy could long have provided a platform for such cooperation. In the absence of it, Member States must cooperate on their own. Most Member States have yet to establish a wetland-based climate mitigation policy in the first place. Poland, for instance, looks at the sector from the perspective of adaptation alone (see box).

### **Soil- and wetland-based climate policy in Poland**

#### *Legal basis:*

- Polish National Strategy for Adaptation to Climate Change (NAS 2020)<sup>79</sup>
- Energy Safety and Environment. 2020 outlook<sup>80</sup>.

#### *Supported activities:*

In the context of biodiversity protection against climate-induced changes, the National Strategy for Adaptation to Climate Change makes cursory reference to the need for soil retention, especially in forests and grassland (Priority Action No 1.4.6) and refers in this respect to the document Energy Safety and Environment: 2020 Outlook.

The latter focuses mainly on flood prevention concerns and ways to ensure adequate water supplies in times of droughts. While there is one target explicitly devoted to the protection of biodiversity (Aim 1.3), it focuses mainly on forests and pays no attention to water-dependent habitats.

#### *Impacts:*

The aforementioned policy aims related to soil retention are prepared and developed at local and/or regional level;<sup>81</sup> therefore the coordination and synergy between separate actions taken is uncertain. At national level and amongst the central authorities the awareness of the gravity of state of water-dependent habitats and their significance for the biodiversity is apparently inadequate.

#### *Gaps/ shortcomings:*

Not enough attention is given to the water-dependent environments requiring protection or restoration. While the strategic documents tend to identify the negative impacts on the peatlands<sup>82</sup>, they do not provide for accurate answer to that challenge. They lack concrete plans of actions as well as identification of sources of financing.

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<sup>79</sup> Strategiczny plan adaptacji dla sektorów i obszarów wrażliwych na zmiany klimatu do roku 2020, October 2013 (in English) [https://klimada.mos.gov.pl/wp-content/uploads/2014/12/ENG\\_SPA2020\\_final.pdf](https://klimada.mos.gov.pl/wp-content/uploads/2014/12/ENG_SPA2020_final.pdf)

<sup>80</sup> Strategia Bezpieczeństwo energetyczne i Środowisko. Perspektywa do 2020, April 2014 (in Polish) [http://www.kigeit.org.pl/FTP/PRCIP/Literatura/008\\_3\\_Strategia\\_Bezpieczenstwo\\_Energetyczne\\_i\\_Srodowisko\\_2020.pdf](http://www.kigeit.org.pl/FTP/PRCIP/Literatura/008_3_Strategia_Bezpieczenstwo_Energetyczne_i_Srodowisko_2020.pdf)

<sup>81</sup> See e.g. [http://www.malaretencja.pl/o\\_projekcie](http://www.malaretencja.pl/o_projekcie)

<sup>82</sup> See the introductory chapter of Energy Safety and Environment. 2020 outlook (p. 15) stating that almost 100% of peatlands in Poland is dehydrated, 80% is significantly degraded by this factor and only as little as 15% remain on good condition.

### *Prospects:*

The Ministry for the Environment is aware that among the sites most endangered by the climate changes in Poland are habitat of freshwater flowing or standing, bogs swamps and spring areas, inland swamp forest habitats<sup>83</sup>. However, it does not provide for a coherent action aimed at the protection of these habitats. It seems that no conclusions were drawn therefore the plan of concrete aims to be achieved in this respect is lacking.

As, judging from the LULUCF Proposal, the use of EU climate mechanisms does not seem likely in the near future, Member States can and should make better use of EU funding vehicles, including the Cohesion Fund, the European Regional Development Fund (ERDF), and European Agricultural Fund for Rural Development (EAFRD) (see above chapter 6). At the level of reporting and accounting, Member States have to make use of consistent, comparable calculations for GHG emissions from peatlands using the 2013 IPCC Wetland supplement, preferably with Tier-2 approaches. Technical support for MS, if needed, needs to be initiated by research programme schemes (Horizon 2020, JRC) to develop and use Tier 2 and Tier 3 approaches for emissions and for reliable and comprehensive inventories of peatlands for science-based decisions and development of strategies for more effective peatland conservation and management across the EU.

At the strategic level, Member States are increasingly responsive to peatland-related emissions, and efforts are made to focus on peatlands when it comes to defining actions on the pathway to 2050. Estonia recently issued its Draft Framework Climate Strategy – expected to be adopted by the Estonian Parliament by the end of 2016 to reduce emissions by at least 80% till 2050 in Estonia<sup>84</sup> stressing the need to combat climate change through an effective peatland protection policy. While the draft remains vague on explicit targets, the strategy would be based on the 2013 study on possibilities of turning Estonia into a low-carbon economy<sup>85</sup>. The low CO<sub>2</sub> scenario proposed in the study requires phasing out of drainage of agriculturally used peat soils and turning them in natural grasslands. The impact assessment of the draft strategy assumes to achieve this aim by 2040. For now, ambitious aims for permanent rewetting of agriculturally used sites with the highest reduction potential and adapted utilisation with reeds or peat mosses (paludiculture) are missing so far. The Framework Strategy is expected to be adopted by the Estonian Parliament by the end of 2016.

## **5.7 EU Renewable Energy Policy**

Sometimes, particularly in rural areas, peat is still used as an alternative to firewood for cooking and heating. In a number of Member States (including Estonia), however, peat remains a considerable fuel source for electricity-generation and heat generation and serves

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<sup>83</sup> <http://klimada.mos.gov.pl/en/?p=165>

<sup>84</sup> <http://www.envir.ee/et/eesmargid-tegevused/kliima/kliimapoliitika-pohialused-aastani-2050-0>

<sup>85</sup> [http://www.envir.ee/sites/default/files/madala\\_sysinikuga\\_majandus\\_2050\\_loppraport\\_0.pdf](http://www.envir.ee/sites/default/files/madala_sysinikuga_majandus_2050_loppraport_0.pdf)

directly as a source of heat for industrial as well as residential purposes. The total production area for fuel peat in the EU amounts to 1750 km<sup>2</sup> (0.34% of the total peat area).<sup>86</sup>

Peat is the least carbon efficient fuel source, if compared to oil, natural gas or coal; its combustion can emit over 90% of total CO<sub>2</sub> emissions of the full peat energy chain (MURPHY et al. 2015). Yet, the categorization of peat in the context of energy has been a subject of controversy. Several peat-burning countries maintain that peat is a “biomass fuel” or a “slowly renewable fuel”, to be placed in a unique spot between biofuels and fossil fuels (CRILL et al. 2000).

The Intergovernmental Panel on Climate Change (IPCC), however, disagrees. It considered peat as a “solid fossil” in 1996 (IPCC 1996). The 2006 IPCC Guidelines on energy (IPCC 2006) state that “[although] peat is not strictly speaking a fossil fuel, its GHG emission characteristics have been shown in life cycle studies to be comparable to that of fossil fuels...”<sup>87</sup>

The EU, consistent with this approach, excludes peat from the scope of renewable energy sourcing. Peat does not meet the definition of biomass as set by the Renewable Energy Directive (RED).<sup>88</sup> The directive also attempts to avoid the use of peatlands for the production of biofuels. It states that biofuels and bioliquids in order to be eligible as renewable source “shall not be made from raw material obtained from land with high carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status” such as “wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year” (Art. 17, Paragraph 4(a)) or from “land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil” (Art. 17, Paragraph 5). The directive defines an energy saving threshold for solid and liquid biofuels of at least 35% (Article 17 (2)).

#### *Overall assessment*

The impact of Article 17 RED on the EU biofuel practice has been found overall positive (European Commission 2015c). However, in the assessment performed as part of the regulatory fitness programme (REFIT), the European Commission noted (European Commission 2015d) that the directive did not comprehensively address indirect consequences of increased biofuel and biomass demand (pressure on agricultural land as a whole). In 2012, the EU dedicated 3 percent of its total cropland to the production of

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<sup>86</sup> [http://www.worldenergy.org/wp-content/uploads/2013/09/WER\\_2013\\_6\\_Peat.pdf](http://www.worldenergy.org/wp-content/uploads/2013/09/WER_2013_6_Peat.pdf)

<sup>87</sup> <http://www.ipcc-nggip.iges.or.jp/faq/faq.html>.

<sup>88</sup> Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, Official Journal L 140/16 of 6 June 2009. Cf. Article 2 (e): “Biomass’ means the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste...”

feedstock for biofuels consumed in the EU (European Commission 2015c). The EU biofuel policies have increased the pressure on agricultural organic soils with negative impacts on peatland GHG emissions. The expansion of biomass production on drained peatlands (mainly maize and rapeseed) results in higher rather than lower GHG emissions compared to fossil fuels, due to both direct and indirect impacts (Wetlands International 2013). Even if it is guaranteed that no biofuel feedstock is sourced from peatlands, the non-fuel agricultural demand will still need to be satisfied – either through intensification of current production or by bringing non-agricultural land into production elsewhere. These indirect land-use changes (ILUC) may, then, affect peat soils.

To counter these effects, renewable energy regulations and the sustainability criteria for biofuels should include prevention of additional land-based emissions especially for biomass grown on organic soils as priority objective (including ILUC impacts). Biomass grown on peatlands for renewable energy has to be prohibited immediately and all subsidies from CAP or renewable energy schemes (like from the German Renewable Energy Act (EEG 2014)) need to be cut.

On the other hand, there are no or very limited economic support for energy fuels from paludiculture at stage which could be alternative biofuels from rewetted peatlands (WICHTMANN et al. 2016). Incentives and preferential benefits for biomass grown on rewetted peatlands (paludiculture) need to be created. These could also incentivise the use of cut-over peatlands in for paludiculture. The framework conditions for the production and for application of renewables (incl. real biofuels) from paludiculture to replace fossil resources for construction materials and fuels.

Furthermore, it is noted that sustainability criteria for biomass production were missing from the directive entirely.<sup>89</sup> Biomass harvested from drained peatlands, in other words, may still count towards the EU's renewable energy targets, no matter the carbon footprint. Given the size of the biomass-to-energy industry – wood and wood waste accounted for 5.5% of the total energy consumed within the EU-28 in 2013 –<sup>90</sup> (EUROPEAN COMMISSION 2015) the impact on peat areas may be considerable both within the EU as well as in those countries that import wood and wood products to the EU (US, Canada, followed in size by Russia, Belarus, Ukraine). In Poland and Estonia, wood was the source for more than three quarters of renewable energy consumed.<sup>91</sup>

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<sup>89</sup> Concerning the use of biomass, only non-binding recommendations, issued by the Commission, exist, cf. <https://ec.europa.eu/energy/en/topics/renewable-energy/biomass>.

<sup>90</sup> Eurostat, Forestry statistics in detail (August 2015), accessible at [http://ec.europa.eu/eurostat/statistics-explained/index.php/Forestry\\_statistics\\_in\\_detail](http://ec.europa.eu/eurostat/statistics-explained/index.php/Forestry_statistics_in_detail).

<sup>91</sup> Ibid.

In 2015, the Renewable Energy Directive (RED) was revised to mitigate the risks from indirect land use changes in the context of solid and liquid biofuel production.<sup>92</sup> Biomass sourcing, however, remains unrestricted.

New legislation proposed by the European Commission in July 2016 (see next chapter) will, for the first time, provide an accounting framework for biomass. This will apply to domestically grown and cut biomass only (as it will be counted towards the land-use sector), however, and it will have no direct impact on biomass sourcing under RED.

Finally, it should be noted in this context that peat fuels are considered as regional / local biofuels in some Member States (e.g. Finland), and correspondingly national subsidies can be made available. It is recommended to make it a joint effort for the EU to phase out peat-from-energy use across the Union. As much of the energy policy remains in the hands of Member States, these have to take the lead in their national strategies. Phasing out peat-from-energy will ultimately be a small, but relevant step on the pathway of the EU's nationally determined contribution (NDC) under the Paris Agreement and its long-term goal to reduce emissions by 80-95% in 2050.

## **Poland National Renewable Energy Action Plan**

*Legal basis:*

EU Renewable Energy Directive<sup>93</sup>

*Key requirements:*

- EU directive obliges Poland to draw up national renewable energy action plans (NREAP) that provide measures to reach the renewable energy targets set in the Directive (15% of energy consumption by 2020 in case of Poland with 11,45% achieved in 2015 with most of it coming from wind energy sources. The other significant sources of renewable energy include biomass, hydropower and biogas.
- Such plan was established in 2010.<sup>94</sup>
- The main measure to promote renewable energy is the support for producers of energy from renewable sources, derogation from certain taxes, as well as the promotion of biofuels.

*Impacts:*

- The impact of this document is doubtful as the national policy in this respect is streamlined through legislation. Currently, the Act on Renewable Energy Sources is strongly debated in the Parliament with an unpredictable outcome.
- Neither peatlands nor the fuels/biomass derived from them are mentioned in the document.

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<sup>92</sup> Directive (EU) 2015/1513 of the European Parliament and of the Council of 9 September 2015 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources, Official Journal L 239/1 of 15 September 2015.

<sup>93</sup> Directive 2009/28/EC on the promotion of the use of energy from renewable sources, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN>

<sup>94</sup> NREAP for Poland available here <http://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans> (in English).

### *Gaps/ shortcomings:*

Theoretically, peat can be considered as a biomass for the purpose of energy production; however, due to the limited peat resources in Poland, it is not used in that manner in practice. Nevertheless, peat can be used as a fuel for residential heating occasionally. According to the 2015 Statistic Yearbook, in 2014 peat and wood jointly provided 198,671 Tera joules (Tj) of energy.<sup>95</sup>

### *Prospects:*

The relatively new Act on Renewable Energy Sources dated 20 February 2015 is currently under revision in the Parliament in the respect of the support mechanism for the generation of renewable energy.

## **Renewable Energy Action Plan Estonia**

### *Legal basis:*

- EU Renewable Energy Directive<sup>96</sup>
- Electricity Market Act<sup>97</sup>

### *Key requirements:*

- EU directive obliges Estonia to draw up national renewable energy action plans (NREAP) that provide measures to reach the renewable energy targets set in the Directive (25% of energy consumption by 2020 in case of Estonia). As the main measure reported, feed-in tariffs are provided to electricity producers such as:
- Electricity generation in facilities with the power of less than 100 MW that use renewable sources (including biomass, whereas only liquid biofuels must comply with the sustainability criteria to be eligible for support, peat excluded);
- Electricity generation in the form of “efficient cogeneration” if peat is used as a fuel.<sup>98</sup>

### *Impacts:*

- Feed-in tariffs have successfully increased the share of renewable energy and electricity generated in the form of efficient cogeneration.
- Estonia has become a European frontrunner on renewable energy generation. The country is likely to meet the EU target of providing 20% of its final energy use from renewable sources (Directive 2009/28/EC).
- The high renewable quota is mostly due to subsidised increase of biomass production, mainly wood chips (DARNY 2012).
- The direct use of energy peat for combustion is not subsidised, except if it is burned in “efficient cogeneration” heat and power plants. For that reason, the combustion of peat as fuel dropped from 350,000 t in 2010 to only 130,000 t in 2015 (STATISTIKAAMET 2016). The law does, in any case, not exclude indirect peat-use, i.e. biomass produced on (drained) peatlands is an accepted renewable energy source which could result in much higher net-emissions from soil loss than burning of fossil fuels. Renewable energy generation has, thus, increased the pressure on land-use for forestry, including on peatlands.

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<sup>95</sup> Environment 2015, Central Statistical Office, Warsaw 2015, p. 220, [stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/ochrona-srodowiska-2015,1,16.html](http://stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/ochrona-srodowiska-2015,1,16.html)

<sup>96</sup> Directive 2009/28/EC on the promotion of the use of energy from renewable sources

<sup>97</sup> <https://www.riigiteataja.ee/en/eli/503072015001/consolide>, in English, dynamic link

<sup>98</sup> <https://www.riigiteataja.ee/en/eli/ee/503072015001/consolide/current> (in English, dynamic link), § 59(1)

- EU law not only fails to impose restrictions for biomass use from drained organic soils under the Renewable Energy Directive nor provides for mechanisms that would enable to have even an overview of the share of such biomass (e.g. certification of biomass). Estonia also relies on one of Europe's most destructive forms of energy production: oil shale. Mining and use of the rock in the north-eastern part of the country not only put a risk on pristine forests and mires but also causes huge GHG emissions on its own.

*Gaps/ shortcomings:*

- The current system has two main shortcomings:
  - a) as regards biomass, no attention is paid to the properties, including the soil type, of area the biomass originates from e.g. wood from wet forest on peat soils;
  - b) peat extraction is directly supported by the public finances in cases where the peat is later used in efficient heat and power co-generation plants.
- This means that additional pressures to peatlands are to an extent created by the subsidies.

*Prospects*

The renewable subsidies were to be changed in order to comply with new State Aid Guidelines from the European Commission. These changes however have been delayed and their nature is still under consideration.

### **5.8 Peat in Horticulture**

Another large consumer of peat is the horticultural and agricultural industry, where peat is used as a growing medium, soil improver, cowshed/stable litter and compost ingredient, especially based on the internationally growing demand for vegetables, fruits and flowers. With natural soil being insufficient for the growing of high-quality plants on a high production level, cultivation is supported by special growing media – peat has emerged as the foremost constituent of such substrates. EU law does not include specific provisions for peat extraction, commercial or private use. Several big producers and distributors apply the voluntary standard European Eco-label, Responsible Produced Peat (RPP).

*Overall assessment*

In 2005, the total amount of peat used in the EU summed up to 67.982 Mio m<sup>3</sup> (ALTMANN 2008).



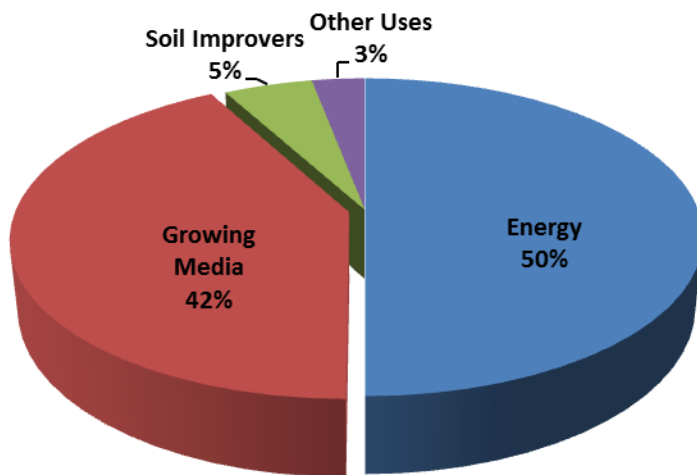


Figure 8: Peat usage in the EU based on data obtained from main producer and consumer countries in 2005 (based on ALTMANN 2008).

Half of the excavated peat is used for combustion, 42% for growing media (Figure 8). 77% of all substrate production in the EU is made from peat (SCHMILEWSKI 2008) of which approximately 57% is white peat, 43% black peat (SCHMILEWSKI pers. comm. 2016). While there are reasons to have professional horticulture transitionally continue to use peat in its production (replacement products that do not fluctuate in content and do not have major environmental draw-backs on their own are not yet always marketable), hobby horticulture can easily do without peat; yet, the switch to alternative material is lagging behind. The GHG emissions from peat extraction and use should be comprehensively addressed part in clear climate targets. Serious strategies for alternative growing media constituents have to be developed to replace peat in EU's hobby gardening market immediately and to phase out peat utilisation in professional horticulture in medium-terms and fund research on alternatives. The EU should consider adding a regulatory layer to the voluntary RPP standard. A regulatory phase-out along similar provisions laid out in the Eco-Design Directive may be suitable. Definitely, more research on alternatives is needed, so that peat might get replaced in 20-30 years. In UK the voluntary phase out strategy till 2030 announced by the government Department for Environment, Food and Rural Affairs (DEFRA) in 2010<sup>99</sup>, does not fulfil its ambitious targets so far<sup>100</sup>. A good example for cooperation between substrate and horticultural cooperates, researchers, politics, and civil society organisations to find solutions to gradually reduce utilization of peat in gardening is the Peat Replacement Forum (*Torfersatzforum*) established by the state government of Lower-Saxony (Ministry of Agriculture)<sup>101</sup>.

<sup>99</sup> <https://www.gov.uk/government/news/government-calls-for-peat-to-be-phased-out>

<sup>100</sup> <http://www.stockbridgeonline.co.uk/wp-content/uploads/downloads/2011/10/Jack-Rieleys-Presentation.pdf>

<sup>101</sup>

[http://www.ml.niedersachsen.de/themen/landwirtschaft/ue\\_nachwachsende\\_rohstoffe/torfersatzforum-132426.html](http://www.ml.niedersachsen.de/themen/landwirtschaft/ue_nachwachsende_rohstoffe/torfersatzforum-132426.html)

## **6 Specific Incentive Schemes**

From its budget (see box 5), EU law provides for a number of non-compulsory mechanisms designed to enhance peat- and wetland protection as a whole.

### **6.1 Rural Development Funding**

The EU's rural development policy, in its current form introduced as part of the reform "Agenda 2000", aims at helping the rural areas of the EU to meet economic, social and environmental challenges. As the "second pillar" of the Common Agricultural Policy (CAP), it complements the so called "first pillar" of direct payments to farmers. It is funded by the European Agricultural Fund for Rural Development (EAFRD). Under the EAFRD, Member States are required to base their rural development programmes on at least four out of six common EU priorities, including "restoring, preserving and improving ecosystems related to agriculture and forestry" and "promoting resource efficiency and supporting the shift towards a low-carbon and climate resilient economy in the agricultural, food and forestry sectors".

The EU's rural development policy rests on the approach that it is up to the Member States to define their rural development programmes (RDPs) and that the central (EU) level formulates areas, broad targets and options only, while providing funding for Member States to hand out under the so called agri-environment schemes (AES).<sup>102</sup> Payments are granted to farmers who (voluntarily) subscribe to environmental commitment that go beyond legal obligations proper.

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<sup>102</sup> The legal basis for the concept of AES payments is Council Regulation (EC) No. 1698/2005 (Art. 39)

### **Box 5: Multiannual Financial Framework 2014-2020**

The multiannual financial framework (MFF) lays down the maximum annual amounts ('ceilings') the EU may spend in different political fields ('headings') over a time span of at least 5 years. The current MFF covers a period of seven years from 2014 to 2020.

For those six years, the MFF sets a maximum amount of 960 billion € for commitment appropriations and 908 billion € for payment appropriations. The MFF 2014-2020 is divided into six categories of expense corresponding to the different areas of EU activities, including "Sustainable Growth: Natural Resources" which concentrates the funding for the common agricultural policy, common fisheries policy, rural development and environmental measures. For this heading, the annual budget for 2016 reserves almost 56 billion €<sup>1</sup> up from 55 billion € in 2014.

These payments flow into several funds: The European Agricultural Guarantee Fund (EAGF) that covers direct payments to farmers as well as market related expenditures and with 43 billion € received the biggest share in 2014, the European Agricultural Fund for Rural Development (EAFRD)<sup>1</sup> (see chapter 6.1) that received some 20% of the funds in 2014 (11 billion €), the Environment and Climate Action ("LIFE", see chapter 6.3) which received around 0,5% of the payments (264 million € in 2014)<sup>1</sup> and the Maritime and Fisheries Fund (MFF) with 90 Mio €.

Besides the above mentioned, other funds such as the European Regional Development Fund (ERDF, see chapter 6.2), the European Social Fund (ESF), the Cohesion Fund (see chapter 6.2) and the Framework Programme for Research and Innovation (Horizon 2020) might serve as co-funding opportunities for environmental measurements.

Out of the above mentioned, EAFRD and LIFE are of particular relevance for peatland conservation and restoration across Europe. Under the EAFRD, Member States are required to base their rural development programmes on at least four out of six common EU priorities, including "restoring, preserving and improving ecosystems related to agriculture and forestry" and "promoting resource efficiency and supporting the shift towards a low-carbon and climate resilient economy in the agricultural, food and forestry sectors" (EAFRD)

The LIFE programme for the years 2014-2020 has an allocated budget of about 3.5 billion €. The programme aims at contributing to sustainable development and to the achievement of the European climate and environmental objectives (see chapter 6.3).

In contrast to the cross-compliance mechanism, which in essence is a penalty, the EU's AES represent an independent subsidy of size. For its sheer size, AES matters. EU expenditure

on agri-environment measures amounted to approximately 20 billion € for 2007-2013 which was about 22% of the total expenditure for rural development.<sup>103</sup>

The European Commission spent 3.23 billion € on AES in 2012; in comparison, the funds for managing Natura 2000 sites that year was not even 40 Mio € (BATARY et al. 2015). The current funding cycle covers the years 2014-2020.

### *Overall assessment*

The impact of agri-environmental schemes on agricultural behaviour is high, and so are the opportunities to increase peatland sustainability across the EU. It is for Member States, however, to choose funding priorities; and grassland protection on peat soils may not always be highest on the list. The funds available are also not always sufficient to stimulate behaviour.

While Member States may well resist any attempts at the central EU level to break the number of AES choices down and select a mandatory set of measures for implementation, mainstreaming sustainable peatland management better into the AES – but also at the level of cohesion policy – seems both suitable in the light of the EU target to spend 20% of the bloc's budget on climate change related action<sup>104</sup> as well as technically and politically feasible. Special schemes have been developed for peatland (biodiversity) management (see Poland, in particular); however, more refined incentive schemes are needed to allow for the raising of water levels and enhanced focus on climate change related aspects (FRELH-LARSEN et al. 2014). Extensification on organic soils is seen as the second-best option because emission reductions are much lower than of complete and permanent rewetting. Many Member States also allow funding to go into refurbishing drainage systems (“amelioration systems”) which continues peatland degradation.

In a temporal dimension, funding priorities change considerably in consecutive funding periods which hinders farmers to take part in the measures. Long-term guarantees should be given in EU policies to encourage farmers to join programmes; drastic changes from one programming period to another need to be avoided.

Mainstreaming would lead to a more comprehensive and logical support framework. Peatland-friendly policies should apply across EAFRD funding options. Funding for implementation / maintenance of drainage systems in organic soils should not be permitted at all or, at least, should require substantial compensation action for peatland restoration. A system that pays both to stabilise wet environments and to drain them makes hardly sense (whether at the economic or at the environmental level). Also, While Member States accepted to use between 12% and 25% of ERDF funding to boost the low-carbon economy, it seems little known that peatland protection and restoration are effective low-carbon tools, which would meet the threshold funding criteria.

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<sup>103</sup> [http://ec.europa.eu/agriculture/envir/measures/index\\_en.htm](http://ec.europa.eu/agriculture/envir/measures/index_en.htm)

<sup>104</sup> [http://ec.europa.eu/clima/policies/budget/index\\_en.htm](http://ec.europa.eu/clima/policies/budget/index_en.htm).

The mainstreaming exercise could also inspire regulators to extend project funding cycles (within a funding period or even beyond), where peatland conservation or restoration is involved, as longevity of the intervention yields the highest biodiversity and climate change benefits. Financial compensation from 2<sup>nd</sup> pillar should be granted for supposed loss in value of land by rewetting, e.g. by remunerating provision of ecosystem services depending on national priorities (carbon storage, nutrients, water retention/ space for flooding in river catchments etc.).

A generic concern of practitioners is that the bureaucratic needs for AES support applications are high (GRODZIŃSKA-JURCZAK et al. 2012). At the EU level, but more importantly at the Member State level, the process could be made more slender (including through the use of one-stop-shop procedures), and local and regional governments could step in to help farmers (in particular small-scale farmers) to put forward AES-compatible applications. Simplification can include increased involvement of farmers' associations or cooperatives of small-scale farmers to steer the application and verification process which also ensures success of the rewetting or extensification measures (FRELH-LARSEN et al. 2014). Agricultural extension services for small scale farmers (e.g. "Paludikulturberatung Mecklenburg-Vorpommern") could be a suitable tool to raise awareness and build capacity among farmers. The implementation of AES in MS and other funding measures could be effectively supported by European agencies, research institutes or independent advisory services.

### **EAFRD (2<sup>nd</sup> Pillar of CAP) Support Schemes in Poland**

*Legal basis:*

Rural Development Programme 2014-2020<sup>105</sup>

*Supported activities:*

- The main goal of Rural Development Programme 2014-2020 is the improvement of competitiveness of Polish agriculture, sustainable management of natural resources, climate-oriented measures and sustainable territorial development of rural areas.
- It was established in order to implement EU priorities with regard to rural areas, as provided for by Article 5 of the Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD):
  - a) Facilitation of the transfer of knowledge and innovations in agriculture, forestry and rural areas,
  - b) Improvement in the competitiveness of various types of agricultural businesses and increase in the economic viability of agricultural holdings,
  - c) Improvement in the organisation of the food chain and promotion of risk management in agriculture,
  - d) Restoration, protection and strengthening of ecosystems dependant on agriculture and forestry,

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<sup>105</sup> <http://www.minrol.gov.pl/Wsparcie-rolnictwa/Program-Rozwoju-Obszarow-Wiejskich-2014-2020> (in Polish)

- e) Support for effective resource management and for the shift to low-emission, climate-change-proof economy in the agricultural, food-production and forestry sectors,
- f) Promotion for social inclusion, poverty reduction and promotion of economic development in rural areas.
- RDF 2014 – 2020 provides for 15 actions, one of them dedicated to agro-environmental interventions. The latter includes also efforts to protect restore water-dependent habitats covered by Natura 2000 network, including peatlands, through re-watering and restoration of such sites, removal of trees and bushes from non-forest land and mowing of cane.
- The total budget allocated for the implementation of the Rural Development Programme for the years 2014-2020 is approximately EUR 13.6 billion (including EUR 8.7 billion coming from EU funds complemented by EUR 4.9 billion of Polish budgetary means)<sup>106</sup>

*Impacts:*

- The trend of abandonment of fen grasslands (see chapter land use change) due to the changes in the agricultural markets and decline of traditional extensive farming as well as the collapse of state-owned farms led to negative effects on habitats for flora and fauna. With the help of AES payments management of abandoned area continued or resume for species and habitat conservation with help of AES.
- Although climate change objectives e.g. by reducing loss of organic carbon from soils are mentioned prominently in the Rural development programme 2014-2020 the AES measures have limited influence of GHG emissions from peat soils as they are not incentivising raising of water levels on peatland sites.
- Most of the AES used for management of peatland sites in the study area are not subdivided under the package 1 “Sustainable farming” or package 2 “Soil and water protection” but under package 4 “Valuable habitats and endangered species of birds in Natura 2000 areas”.
- Nevertheless, the rules for this package include several aspects beneficial for the peat soil as well. The creation of new, expansion and recovery of existing drainage systems is prohibited. Many of the targeted bird species are connected to peatlands or wet meadows like common snipe (*Gallinago gallinago*), redshank (*Tringa tetanus*), lapwing (*Vanellus vanellus*), aquatic warbler (*Acrocephalus paludicola*), and Eurasian curlew (*Numenius arquata*).
- Additional, the requirement to receive the AES is to protect valuable peatland habitats in Natura 2000 areas, ie. Molinia meadows, semi-natural wet meadows, semi-natural hay meadows and bogs. The payment is quite attractive for farmers with up to 1300 zł / ha (300 € /ha).
- Package 5 “Valuable habitats outside Natura 2000 sites” has similar requirements as package 4 in regard to adapted grassland management, minimized drainage impact and habitat protection. Therefore it can also benefit management of peatland sites outside Natura 2000 network in Poland.
- Annex 7 to Rural Development Programme 2014-2020 provides for set of rules concerning the farming on habitats protected mainly under Natura 2000, including peatlands. It includes a brief description of good farming practice which may be a good reference for farmers cultivating lands not covered by the support from RDP.
- Note that the rules do not foresee support for the construction and repair works on drainage systems on these areas.

<sup>106</sup> <http://www.arimr.gov.pl/o-arimr/information-about-the-agency/forms-of-aid-managed-by-arma/rural-development-programme-for-2014-2020-poland.html>

### *Gaps/ shortcomings*

- Especially interviewed farmers complained that application and paperwork for AES in Poland are very bureaucratic so that only larger farmers can take the effort to apply for them.
- Furthermore they and undergo drastic changes from one programming period to another which makes it difficult for farmers to adapt their long term land use and resource planning in their operating procedures to these schemes. This is mainly due to interpretation of EU regulations in Poland and their national implementation.
- Another hurdle for farmers to take part in the measures is that there is practical no beneficial market for the biomass from these schemes at the moment and most of it is just dumped close to the sites. Markets for biomass used as fuels from peatlands – neither drained nor produced under wet conditions- is underdeveloped in Poland right now, but could become more relevant in the future with the adoption of the Renewable Energy Act.
- While there are support sources and several requirements (e.g. the frequency of mowing, removal of biomass, removal of bushes and trees, prohibition of extraction of peat etc.) relating to the farming on lands where peatlands occur, they focus on areas that are already protected especially under Natura 2000 scheme and significantly less attention is paid to water-dependent sites that fall outside these protection regimes.

### *Prospects:*

EAFRD support schemes are not expected to be significantly reviewed before the next financing period, i.e. after 2020.

## **EAFRD (2<sup>nd</sup> Pillar of CAP) Support Schemes in Estonia**

### *Legal basis:*

- Regulation No 40 of the Minister of Rural Affairs of 22 April 2015 on regional support scheme for soil protection<sup>107</sup>
- Regulation No 76 of the Minister of Rural Affairs of 29 July 2015 on support scheme for agricultural and forestry infrastructure investments<sup>108</sup>
- Regulation No 63 of the Minister of Rural Affairs of 3 June 2015 on renewal of state-managed jointly used drainage water recipients<sup>109</sup>

### *Supported activities:*

- AES-based funding is available to support “the maintenance of semi-natural habitats”; the measure does not target peat areas exclusively, but funding has been provided for 8502 ha of land whose soil type is peaty (98% of semi-natural habitats are located in Natura 2000 areas and cannot be used as arable land).
- Another AES-based funding measure, of more recent origin, concerns the management of peat soils with peat depth of min. 1 m as permanent grassland for duration of at least five years (Regulation No 40 of the Minister of Rural Affairs of 22 April 2015 on regional support scheme for soil protection). Funding does not require the raising of water levels. Despite this, according to government officials, participation by farmers has thus far been minimal.

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<sup>107</sup> <https://www.riigiteataja.ee/akt/124042015009> (in Estonian)

<sup>108</sup> <https://www.riigiteataja.ee/akt/130102015002?leiaKehtiv> (in Estonian, dynamic link)

<sup>109</sup> <https://www.riigiteataja.ee/akt/105062015019> (in Estonian)

- Additional subsidy payment of € 50/ha a year to farmers for managing parcels where peat soils make up at least 90% as either grasslands or grow fruit trees and bushes on such land<sup>110</sup> with the precondition of the farmers' corresponding application under the environmentally friendly management support scheme,<sup>111</sup> e.g. use of diverse crops, taking soil samples etc.<sup>112</sup>
- As a limitation, the support scheme is not applied on “environmentally sensitive” grasslands i.e. grasslands situated in Natura 2000 areas with 100% peat soil.<sup>113</sup> The scheme is also exclusive – no other EAFRD (CAP 2<sup>nd</sup> pillar) support scheme may be applied for regarding these parcels (with the exception of support for growing local crops).
- Construction, reconstruction or refurbishment of drainage works, e.g. drainage network ditches. The investment scheme is not applicable to certain areas, including areas where the peaty soils with the thickness of more than 1 m makes up more than 30% of the area of drainage network.
- Renewal of state-managed jointly used drainage water recipients, i.e. natural or artificial water bodies into which drainage water from more than one plot of land is led to (no special conditions as regards soils affected). There are 775 recipients with a total length of about 5500 km.<sup>114</sup>

#### *Impacts:*

Impacts of different support schemes are mixed. Whereas the soil protection support scheme may provide some incentives for the protection of grasslands on parcels with high content of peat soil, support schemes for construction and repair works on drainage works may also actively contribute to increasing emissions from peat soils.

#### *Gaps/ shortcomings:*

- Limited impact given the relatively low subsidy amounts and the prohibition to seek complementary subsidies;
- Arbitrarily high threshold of 90% peat content, which leaves soils below the threshold without the funding source;
- Supporting the refurbishment of drainage systems (on the basis of Regulations 76 and 63) undermines the goal to reduce the pressure from wetland drainage. (Estonia has adopted some restrictions – funding is not available for areas where peat soils of more than 1m thickness make up more than 30% of the area of the drainage network – but outside these limits, funding for enhanced drainage also of peatlands is eligible)
- Additional, the renewal of state-managed, jointly used drainage water recipients which collect water from various smaller drainage networks is supported by EAFRD funds regardless of soil properties (Regulation No 63 of the Minister of Rural Affairs of 3<sup>rd</sup> June 2015 on renewal of state-managed jointly used drainage water recipients). The length of the system measures up to 5437.9 km in total and in the period 2014-20 4.9 million € are available for the measures.

<sup>110</sup> Regulation No 40, § 5 (1) and (2)

<sup>111</sup> <https://www.riigiteataja.ee/akt/129102015017?leiaKehtiv> (in Estonian, dynamic link)

<sup>112</sup> <https://www.riigiteataja.ee/akt/124042015009> (in Estonian), § 4

<sup>113</sup> Regulation No 40, § 5 (4)

<sup>114</sup> <http://www.pma.agri.ee/index.php?id=104&sub=355&sub2=441>



*Prospects:*

EAFRD support schemes are not expected to be significantly reviewed before the next financing period, i.e. after 2020.

## 6.2 Structural Funds: EU Cohesion Policy

Outside the CAP – itself attributed with allocating a total of 115 billion € to support climate action through improved land management and targeted investments<sup>115</sup> –and other specific funding,<sup>116</sup> the EU Structural Funds are of particular importance for environment-focused investments in rural areas. The **European Regional Development Fund (ERDF)** aims at strengthening the economic and social cohesion in the EU by correcting regional imbalances and diminishing gaps between the levels of development. Even though not being a thematic priority of the ERDF, the environment is mentioned as an area of funding in several of the covered categories.<sup>117</sup> Furthermore, between 12% (less developed regions) and 20% (more developed regions) of ERDF funding must be channelled towards low-carbon economy projects. (EUROPEAN COMMISSION 2014b)

The **Cohesion Fund**, part of the wider EU Cohesion Policy, aims at Member States with a Gross National Income (GNI) per inhabitant of less than 90% of the EU's average in order to reduce economic and social disparities and promote sustainable development. Through the Common Provision Regulation, it is now subject to the same rules of programming, management and monitoring as the ERDF and ESF.

Under the EU Cohesion Policy framework, Poland will receive around 78 billion € between 2014 and 2020. The Cohesion Fund budget proper for Poland will provide some 23 billion € (out of a fund budget total of 63.4 billion €)<sup>118</sup>; it mainly covers trans-European transport networks and the environment. Within the latter category, it also supports projects related to energy and transport if they benefit the environment.

Estonia financed a total of 96 water management projects in the funding period 2007-2013.<sup>119</sup> For peatland-related funding, see the boxes. The country will receive some 3.6

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<sup>115</sup> European Commission, Accelerating Europe's transition to a low-carbon economy, Communication accompanying measures under the Energy Union Framework Strategy, COM(2016) 500 final of 20 July 2016, accessible at <https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-500-EN-F1-1.PDF>.

<sup>116</sup> See, for instance, the recently created European Fund for Strategic Investments (EFSI), which aims at mobilizing 315 billion EUR by mid-2018. The fund has several funding windows, among them 'environment and resource management', cf. European Commission, The Investment Plan for Europe. State of Play (2016), accessible at [http://ec.europa.eu/priorities/sites/beta-political/files/investment\\_plan\\_booklet\\_en.pdf](http://ec.europa.eu/priorities/sites/beta-political/files/investment_plan_booklet_en.pdf).

<sup>117</sup> Such as in Art. 3, 4 and 6 of the Regulation (EC) No 1080/2006 of the European Parliament and of the Council of July 2005

<sup>118</sup> [http://ec.europa.eu/regional\\_policy/en/information/publications/factsheets/2014/cohesion-policy-and-poland](http://ec.europa.eu/regional_policy/en/information/publications/factsheets/2014/cohesion-policy-and-poland).

<sup>119</sup> [http://ec.europa.eu/regional\\_policy/sources/information/cohesion-policy-achievement-and-future-investment/factsheet/estonia\\_en.pdf](http://ec.europa.eu/regional_policy/sources/information/cohesion-policy-achievement-and-future-investment/factsheet/estonia_en.pdf).

billion € under the Cohesion Policy umbrella (2014-2020), of which around 1 billion € will be channelled through the Cohesion Fund.<sup>120.</sup>

So far, Poland has used cohesion policy funding mostly in the areas of urban and overland transport, research and development, digital environment, and waste water treatment.<sup>121</sup>

## **Cohesion Policy in Poland**

### *Legal basis:*

Act on the Principles of Development Policy<sup>122</sup>; Act on the Principles of implementation of the cohesion policy programmes, financed under the 2014-2020 financial perspective (July 2014)<sup>123</sup>

### *Supported activities:*

The structural assistance programs for the years 2014 – 2020 do not provide special measures dedicated to peatland protection but foresee programs supporting small-scale water retention

Contrary, plans to renew of drainage system in Krowie Bagno and other parts of Polesie Lubelski have been prepared by the regional drainage authority for EU funding (ERDF). The plans are not yet approved by voivodship government. It is rather unlikely that they will pass the review from regional agency for environment and conservation (RDOS). So far there was no direct funding for drainage infrastructure from EU funds.

### *Impacts:*

The Operational Programme “Infrastructure and Environment for 2014 – 2020” provides for continuation of financial aid for transregional programs supporting small-scale water retention. Such programs could also serve the purpose of protecting peatlands.

During the previous fiscal outlook 2007 – 2013, a number of programmes dedicated to the protection of peatlands have been established in the context of Structural Funds, especially the Infrastructure and Environment Operational Programme, for example the national alkaline peatlands protection program (“Protection program: alkaline peatlands (7230) and related endangered species and related regional programs, concluded in 2012) , as well as a number of local measures related to water.

The program covers the entire country with the financial means allocated through 16 Regional Operational Programmes. The summary over the programme has not been prepared however the environmental NGO “Klub Przyrodników”, the major stakeholder

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<sup>120</sup> ebd

<sup>121</sup> [http://ec.europa.eu/regional\\_policy/sources/information/cohesion-policy-achievement-and-future-investment/factsheet/poland\\_en.pdf](http://ec.europa.eu/regional_policy/sources/information/cohesion-policy-achievement-and-future-investment/factsheet/poland_en.pdf).

<sup>122</sup> Ustawa z dnia 6 grudnia 2006 r. o zasadach prowadzenia polityki rozwoju (in Polish) <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20062271658>

<sup>123</sup> Journal of Law of the Republic of Poland, item 1146

involved in the implementation of this program, provides the most complex relevant information on its webpage.

*Gaps/ shortcomings:*

Not enough attention is given to the water-dependent environments requiring protection or restoration. This might be surprising in the light of the findings of the Strategic Impact Assessment of the Operational Programme “Infrastructure and Environment for 2014 – 2020”, stating that the protection of peatlands is an imminent aim of this programme.

*Prospects:*

Currently the information on concrete measures and programs that could serve this purpose is not available.

## **Cohesion Policy in Estonia**

*Legal basis:*

2014-2020 Structural Assistance Act<sup>124</sup> and Regulations issued according to the implementation plan of the Cohesion Fund

*Supported activities:*

- Restoration of drained, depleted and abandoned peat areas (measure 7.2.3 in the implementation plan).
- Restoration of protected habitats, including wetlands (measure 8.1.1.).
- Major bog restoration efforts took place in Estonia financed by ERDF and CF money (since 2009, total completed area 2,122 ha, 1,064,468 €; Ongoing projects 2 124 ha, estimated cost 1,169,685 €), mainly state land (RMK) in protected areas, smooth and well established process chain.
- In an ambitious attempt to fulfil the EU biodiversity strategy’s target to restore 15% of degraded ecosystems till 2020 (EU Commission 2011, EU biodiversity strategy 2020) the Estonian Nature conservation development plan states that 10,000 ha of peatlands should be restored in protected areas until that year. In addition, 1,000 ha of cut-over peatlands outside of protected areas should be rehabilitated or restored (MoE Estonia, 2012).
- To reach this goal an action plan for protected mires (MoE Estonia, 2016) was approved in 2016 to foster conservation and restoration of biodiversity and ecosystem services of mire habitats in protected areas and set priorities for actions. It contains a list of sites prioritised for restoration and gives objectives, timetables and budget needs. At the moment 3,038 ha are in planning stage. The policy and funding of EU via Structural Funds (ERDF, CF) since 2010 for restoration became available with EU membership. In the funding period 2014-2020 the Cohesion Fund offers 54,000,000 € for nature conservation and biodiversity actions, including 26,700,000 € for habitats restoration, but not only of mires.

*Impacts:*

- Restoration of 1300 ha of peat areas expected.
- 5441 ha of habitats planned to be restored, the proportion of peat areas unknown.

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<sup>124</sup> <https://www.riigiteataja.ee/en/eli/531102014003/consolide>, in English, dynamic link

#### *Gaps/ shortcomings:*

- Measures are well focused, but limited in their scope (only a fraction of the drained areas would be restored, as a total area of areas in need of restoration is more than 100 000 ha). Fens and heavily degraded areas are underrepresented in the restoration efforts as agricultural areas with private ownership are nearly not touched. As these are the peat soils with highest GHG emissions and reduction potential climate mitigation effects of restoration can be stated as so far low (ILOMETS, SALM, pers. comm. 02/2016).
- There are also inherent conflicts for management and restoration in the EU regulations as e.g. most of the bog woodlands priority habitat under the habitat directive (91D0\*) are originally raised bog habitats (7110\*) with changed water regime. This concerns at least 150,000 ha in Estonia and difficult case-by-case decisions have to be taken by conservation entities.

#### *Prospects:*

Currently the exact conditions for the first measure (restoration of peat areas) are not yet published. The first call for proposals on restoration of protected habitats ended on 29<sup>th</sup> February 2016.

#### *Overall assessment*

Generous funding sources under the cohesion policies are available, but little goes into peatland related measures. This is, first and foremost, due to the fact that governments need to choose between different policy goals, and often environmental and climate change matters come second or third only on country priority lists.

Beyond that, however, a number of changes at the regulatory level and concerning implementation could help increase funding for peatland conservation and restoration measures. To date, many countries do not consider peatland related measures to be fundable under the cohesion policy at all. Yet, the Estonian example shows that peatland restoration measures are certainly eligible for funding. The example should be spread and other countries should take advantage, too.

Knowledge exchange is also important, when it comes to planning and implementation. Compartmentalized, small-scale ownership structure of peatland sites and lack of funding to buy land and implement measures hinders ecosystem restoration and rewetting as well. Member States can help structure the cohesion policy accordingly, and at the EU level, specific attention to the issue should be raised.

As a rule, drainage systems should not be eligible for EU funding, as it flatly undermines the purpose of sustainable interventions.

### **6.3 LIFE**

LIFE (L'Instrument Financier pour l'Environment) is an EU funding instrument for the environment and climate action, which has been started in 1992 and is managed by the European Commission. Its main objective is to contribute to the implementation and

development of legislation in the corresponding fields by co-financing projects with added value. Until 2013, four phases of the programme have been completed and another work programme has been adopted for 2014-2017. From 1992 to 2013, LIFE has co-financed some 3954 projects across the EU with a contribution of approximately 3.1 billion €. The total budget for the multiannual work programme for 2014-2017 covers 1.1 billion € under the sub-programme for environment and 0.36 billion € under the sub-programme for Climate Action.

The 2014-2017 programme gives explicit priority to projects that “contribute to the achievement of the WFD” and “allow the achievement of WFD objectives” as well as projects “restoring river, lake, estuary and coastal morphology and/or recreating associated habitats including flood- and marsh-plants, to allow the achievement of WFD and FD objectives.”

*LIFE funded projects with impact on peatland in Poland:*

Several LIFE projects with connection to peatland habitat types or flagship species like Aquatic Warbler (*Acrocephalus paludicola*) or European pond turtle (*Emys orbicularis*) have been conducted or are running (for a complete overview see Table 2). These projects target on the conservation as well as restoration and management for biodiversity of fens and bogs. They are very important for awareness raising, public participation and education, too. Some exemplary projects are described below:

LIFE programme on the conservation of Baltic raised bogs in Pomerania, Poland:

The first LIFE Nature programme in Poland had a duration from 2003 to 2007 and included several habitat restoration activities such as blocking 724 points of drainage systems, the construction of 4 km of ditches and the cutting of trees in 13 bogs sites on an area of approx. 720 ha. Water level conditions were improved in 17 project sites and management plans for Baltic raised bogs areas established. By the end of the project, 22 of the 23 project sites were on the Polish Natura 2000 network site list, 15 of them as a result of the project. The budget was 0.98 million € with an EU-contribution of 0.68 million €.

LIFE programme on the conservation of alkaline fens in southern Poland:

A programme aiming at maintaining and improving the conservation status of peatland habitats with a total budget of 1.03 million € of which 0.55 million € are contributed by the EU. It covers 25 Natura 2000 sites and the expected results as mentioned in the programme’s outline include the removal of trees and shrubs on area of approx. 51 ha, the mowing of 152 ha of mires and their restoration for extensive use as well as the purchase of around 3 ha of most valuable alkaline fens plots and the creation of management plans for the creation and expansion of nature reserves.

LIFE programme on the conservation and restoration of alkaline fens in the young-glacial landscape of northern Poland:

A programme running from 2012-2018 with a budget of 1.8 million € of which 0.9 million € are contributed by the EU. The expected outcome of this programme includes the

maintenance and restoration of the “favourable” conservation status of the 35 most valuable areas of alkaline fens in northern Poland as well as the construction of 165 small water gates and the removal of trees and shrubs from an area of 213 ha of fens as well as the mowing of 352 ha of peatlands. This programme does not cover Natura 2000 sites.

LIFE Janowskie Forest:

The main objective of this programme is to provide comprehensive protection for the most valuable peat bog patches in a range of habitat types in the Natura 2000 sites in Lasy Janowskie and Uroczyska Lasów Janowskich in eastern Poland. The programme started in 2015 and runs until 2019 with a budget of 0.97 million € of which 0.48 million € are EU-contribution. The expected results include the improvement of the conservation status of peatland habitats on 94 ha, the outflow of water from peat bogs and the stop of peat decay on an area of about 150 ha. Also, the protection of wetland and the restoration of water reservoirs to maintain habitats for species associated with aquatic ecosystems are covered.

Table 2: Overview of LIFE projects conducted in Poland related to peatlands.

LIFE Project Title	Project Number	Mire type	Habitat	Beneficiary	Years
Life - Lasy Janowskie PL - In harmony with nature- Life + for Janowskie Forest	LIFE13 NAT/PL/000032	Bogs/woodland	7110 7140 7150 9170 91D0 91P0	SME Small and medium sized enterprise	2015-2019
Renaturyzacja II_LIFE_PL - Restoration of hydrological system in the Middle Basin of the Biebrza Valley. Phase II	LIFE13 NAT/PL/000050	Fens/ bog woodland	7140 7230 91D0 3150	Park-Reserve authority	2014-2018
AlkFens_S_PLife - Conservation of alkaline fens (7230) in southern Poland / Ochrona torfowisk alkalicznych (7230) południowej Polski	LIFE13 NAT/PL/000024	Fens	7230	NGO-Foundation	2014-2018
LIFE Pieniny PL - Nature mosaics - protection of species and	LIFE12 NAT/PL/000034	Fens	6510 6520 7230 9130	Park-Reserve authority	2013-2018

LIFE Project Title	Project Number	Mire type	Habitat	Beneficiary	Years
habitats in Natura 2000 site "Pieniny"			9150 6210		
AlkFens_PL - Conservation and restoration of alkaline fens (code 7230) in the young-glacial landscape of northern Poland	LIFE11 NAT/PL/000423	Fens	7230	NGO- Foundation	2012- 2018
Górna Biebrza - Preservation of wetland habitats in the upper Biebrza Valley	LIFE11 NAT/PL/000422	Fens/bog woodland	7140 7230 91D0 6410	Park-Reserve authority	2012- 2017
Polskie Ostoje Ptaków - Protection of water and marsh birds in five national parks-reconstructing habitats and curbing the influence of invasive species	LIFE09 NAT/PL/000263	Bogs		Research institution	2011- 2014
ActiveKPN - Protection of natural resources of Kampinos Forest – Natura 2000 Site, through the renaturalisation of bought-up land.	LIFE10 NAT/PL/000655	Bogs/ woodland	6510 7110 7140 9170 91D0 91E0 91I0 6410 91T0 6120	Park-Reserve authority	2011- 2015
Biomass use for Aquatic Warbler – Facilitating Aquatic Warbler ( <i>Acrocephalus paludicola</i> ) habitat management	LIFE09 NAT/PL/000260	Fens	6410 6510 7210 7230	NGO- Foundation	2010- 2015

LIFE Project Title	Project Number	Mire type	Habitat	Beneficiary	Years
through sustainable systems of biomass use					
Renaturyzacja - Restoration of hydrological system in the Middle basin of Biebrza Valley Phase I.	LIFE09 NAT/PL/000258	Fens/bog woodland	6510 7230 91D0 6410 3150 6120	Park-Reserve authority	2010-2016
Wetlands Butterflies – Conservation and upgrading of habitats for rare butterflies of wet, semi-natural meadows	LIFE06 NAT/PL/000100	Bog woodland/fens/mires	6510 7140 7230 91D0 6120	NGO-Foundation	2006-2010
NELEAP - Protection of Emys orbicularis and amphibians in the north European lowlands	LIFE05 NAT/LT/000094	Fens/mires	6270 6430 6450 7140 7150 7210 7230 91E0 3150 3160 3260	NGO-Foundation	2005-2009
Aquatic Warbler project - Conserving <i>Acrocephalus paludicola</i> in Poland and Germany	LIFE05 NAT/PL/000101	Bogs/fens	6410 7140 7210 7230 1330 3140	NGO-Foundation	2005-2011



LIFE funded projects with impact on peatland in Estonia:

Several LIFE projects in connection to peatland habitats have been conducted or are running (for a complete overview see Table 3). These projects have less impact for restoration, but are very important for awareness raising, public participation and education. Some examples are listed below:

LIFE Mires Estonia:

With the objective of securing the favourable conservation status of wetlands with a special focus on mires and habitats protected by the Habitats Directive (see chapter 5.1), this project started 2015 and has a duration until 2020 with a budget of 2.8 million € of which 2.1 million € are contributed by the EU. It covers 7 Natura 2000 sites and the expected results include the improvement of conditions of active raised bog habitats, bog woodland, swamp woods and western taiga as well as the development of methodologies to reduce potential negative impacts on certain species due to restoration activities.

LIFE Springday:

Restoration and management of the Häädemeeste wetland complex Estonia:

A programme that started 2001 with a total budget of 675,286 € aiming at the conservation of coastal meadows and species in the Estonian Häädemeeste wetland complex as well as stopping their degradation and neutralizing negative effects of drainage on Tolkuse bog. At the projects end in 2005, among other goals reached, a total of more than 1500 ha of Tolkuse bog area was restored through the blocking of key ditches and 600 ha of Boreal coastal meadow habitat restored.

Table 3: Overview of LIFE projects conducted in Estonia related to peatlands.

Life Project Title	Project Number	Mire type	Habitat	Beneficiary	Years
LIFE Mires Estonia – Conservation and Restoration of Mire Habitats	LIFE 14 NAT/EE/000126	Bogs, fens, mires	7110, 7140, 7230, 91D0	NGO-Foundation	2015-2020
LIFE Springday – Conservation and restoration of petrifying spring habitats (code *7220) in Estonia	LIFE12 NAT/EE/000860	Fens	7220	NGO-Foundation	2013-2018
KpoNatura – Management of Natura 2000 habitats of the Kopu Peninsula	LIFE04 NAT/EE/000073	Bogs/fens	7160, 7210, 7230, 91D0	Park-Reserve authority	2004- 2007
EE Priority Forests – Protection of priority forest	LIFE02 NAT/EE/008555	Bogs/mires	7110, 7140, 91D0	NGO-Foundation	2001-2005

Life Project Title	Project Number	Mire type	Habitat	Beneficiary	Years
habitat types in Estonia					
KARULA – Conservation of Natura 2000 biotopes in Karula National Park	LIFE02 NAT/EE/008559	Bog woodland	91D0	Park-Reserve authority	2001-2004
Häädemeeste – Restoration and Management of the Häädemeeste wetland complex	LIFE00 NAT/EE/007082	Bogs/mires	7110, 7120, 7140, 91D0	NGO- Foundation	2000- 2005

*Overall assessment*

LIFE Nature projects have limited impact for on-the-ground restoration as the scheme has not sufficient funds for large-scale implementation and innovative approaches are needed, but it serves a very important role for awareness raising, public participation and education on peatland issues.

The LIFE Climate is so far not used for ecosystem-based mitigation and adaptation in which peatlands can play an important role (DOSWALD & OSTI 2011). To strengthen this instrument and make more LIFE Climate money available also for restoration within and outside Natura 2000 would be helpful to raise water levels in sensitive areas. So far, the co-funding requirements for LIFE Climate peatland projects are too high to be covered by some Member States or local initiatives. For LIFE Climate lower co-funding thresholds for particularly valuable interventions could be considered including emission hotspot peatland projects.

As national state expertise (and in some cases EIA) for implementation of rewetting measures takes longer time than project period allows, short project duration might be an hurdle as no large-scale measures for rewetting can be realised in a 3-4 years project. Longer-term perspectives for more effective and comprehensive protection and restoration of grasslands and peatlands have to be developed which already PE'ER (2014) argued.

## 7 Case Studies

In the following last chapter we will present the specific results of the case studies in Poland and Estonia and chosen regions in the two countries retracing the positive and negative impacts of EU law and policy on the management of specific peatland areas. In both countries, (semi-)natural peatland areas are well protected under national law and/or the Habitats Directive, but also not protected peatlands used for agriculture or forestry are included in the analysis. Based on a detailed analysis of the situation on site, GIS data and the involvement of all relevant stakeholders, the concrete effects of EU legal system, funding mechanisms, and their regional design on peatlands are presented. It has to be noted that most of the findings from the case study countries and regions and information gained within workshops and meeting have been used for the analysis of the general EU regulatory framework of this study.

### 7.1 Case study 1: Eastern Poland, Lublin region

The Lublin region owns its share of the larger Polesie region (called Polesie Lubelski) which is a historical transboundary region between Poland, and Non-EU Member States Belarus and Ukraine, rich in peatlands and other wetland ecosystems. In the Polish part, the most precious peatland areas (fens and transitional mires) are protected by the Polesie National Park (Poleski Park Narodowy), established in 1990 (CHMIELEWSKI et al. 1990) of which largest areas are designated as Natura 2000 sites as well (Figure 9). The park is habitat for peatland plant and animal species of national and international importance like marsh angelica (*Angelica palustris*), common butterwort (*Pinguicula vulgaris*), Aquatic warbler (*Acrocephalus paludicola*), or European pond turtle (*Emys orbicularis*) (CHMIELEWSKI et al. 1990).

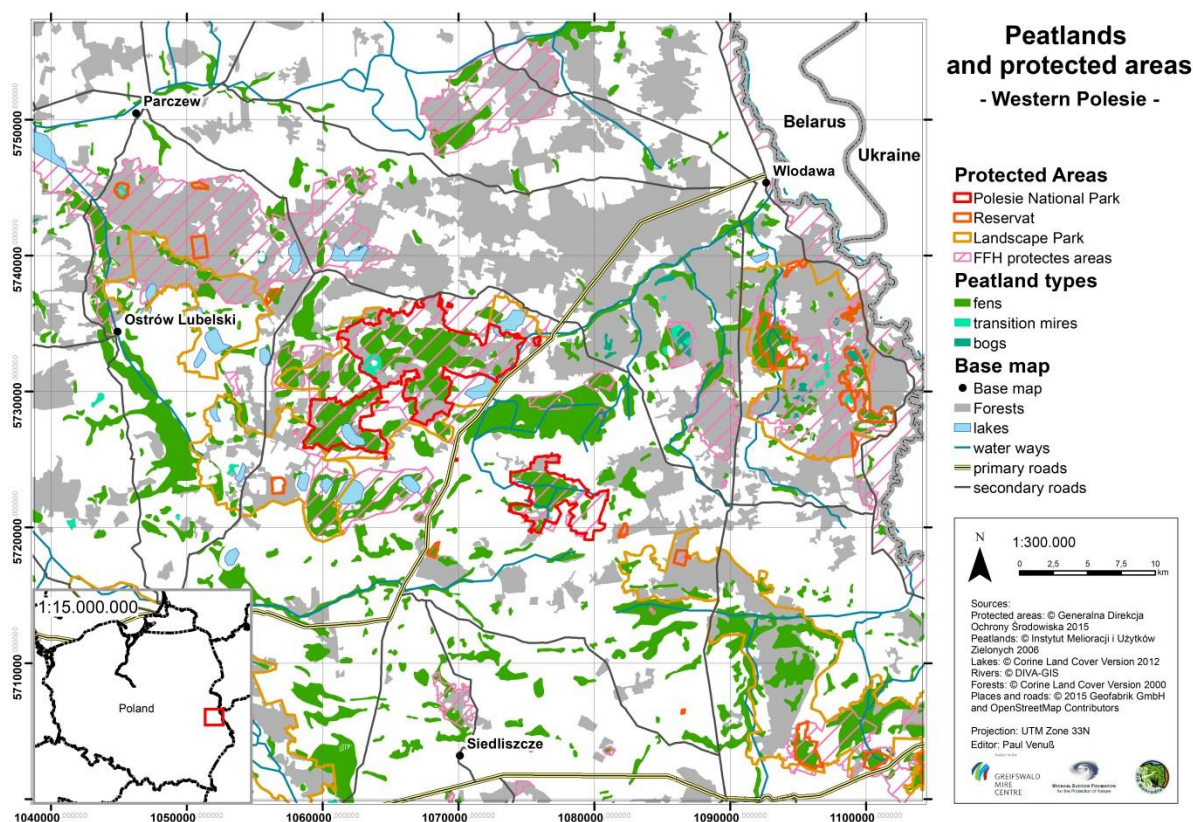


Figure 9: Peatlands distribution, national and Natura 2000 protected areas in the Western Polesie case study region.

The national park is one of the core zones of the transboundary UNESCO Biosphere Reserve ‘West Polesie’ (Figure 10). It was created in 2012 with a total area of 263,016 ha. It forms an umbrella over three national Biosphere Reserves: the West Polesie (139,917 ha) in Poland, established in 2002; the Pribuzskoe Polesie (48,024 ha) in Brest district, Belarus, established in 2004; and the Shatsk Biosphere Reserve (75,075 ha) in Volhynia district, Ukraine, established in 2002 (CHMIELEWSKI et al. 2015).

At the moment, the Biosphere Reserve has no strong activities and influence due to different political situations in the three countries and lack of resources for reinforced cooperation (CHMIELEWSKI pers comm. 2015). Nevertheless, it could be a good basis for conservation and sustainable utilisation of peatlands of the whole region in the future to counteract negative impacts like bigger infrastructure projects, wind farms, mining activities or housing and tourism development in sensitive areas (CHMIELEWSKI pers. comm. 2015).

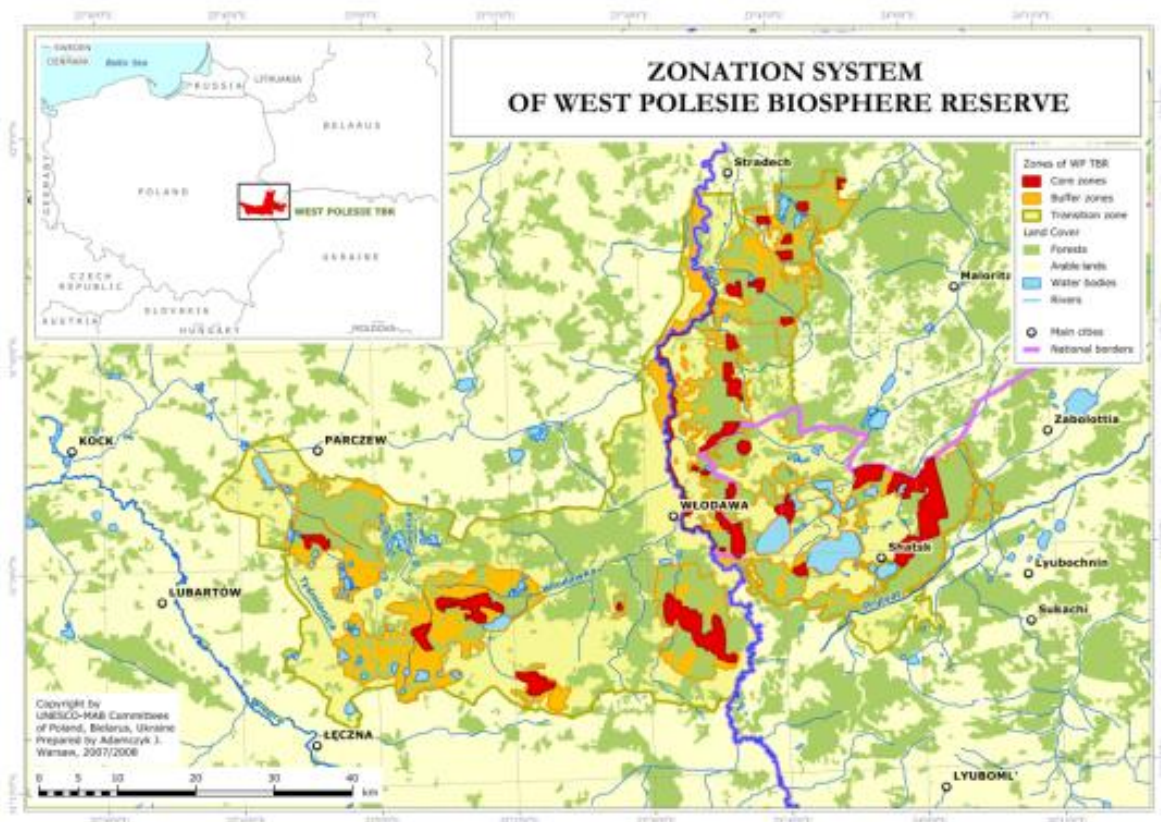


Figure 10: Zonation of the trans-boundary UNESCO West Polesie Biosphere Reserve.

In Poland the core and buffer zones are surrounded by landscape parks, partly designated as Natura 2000 sites. Beside semi-natural or extensively used fens like Bagno Bugnow (Figure 11) with high conservation value there are also large grassland areas deeply drained and intensively used for fodder production for dairy farms like Krowie Bagno which is the largest meliorated fen complex in Lublin part of Polesie with about 3500 ha (Figure 12).





Figure 11: Bagno Bugnow, semi-natural fens in Polesie National Park. (Photo: Jan Peters)



Figure 12: Krowie Bagno, deeply drained, intensively used fen, partly Natura 2000 site. (Photo: Jan Peters)

Drainage started in the early 19th century (LORENS & SUGIER 2004) and intensified during the 1940s when prisoners of the Krychów forced labour camp had to work in digging ditches during period of Nazi-German occupation in the frame of the General Plan East (Figure 13).

Complex melioration with large scale drainage systems and pumping stations was carried out in the 1970s and 80s and natural fen vegetation was converted into high intensive hay meadows. In some parts, high value *Molinia* meadows on calcareous, peaty soils (Natura 2000 habitat type 6410) developed. In the 1990s with the collapse of state-owned farms, largest parts of the area fell abandoned, nowadays mainly *Molinia* meadows are managed by agri-environmental schemes, mainly to improve habitat for bird species like corncrake (*Crex crex*).



Figure 13: Drainage works in Krowie Bagno by prisoners of the German-Nazi forced labour camp in Krychów.

Regarding land use change in Poland, we could see a clear trend of abandonment of peatland areas. Overall 3.75% of potentially agricultural peatlands fell abandoned, only 0.35% have been recultivated. The process was most pronounced on fens (38,752 ha abandoned, 3,397 ha recultivated) which represent the majority of peatlands in Poland. If we look on the regional distribution of land use changes, we see that strongest abandonment happened in north-eastern Poland (Podlaskie region) but also in central (Lodz) and south-western parts (Lower Silesian). Recultivation took part in western parts of the country (West Pomerania, Lubusz), but much less pronounced (Figure 14).

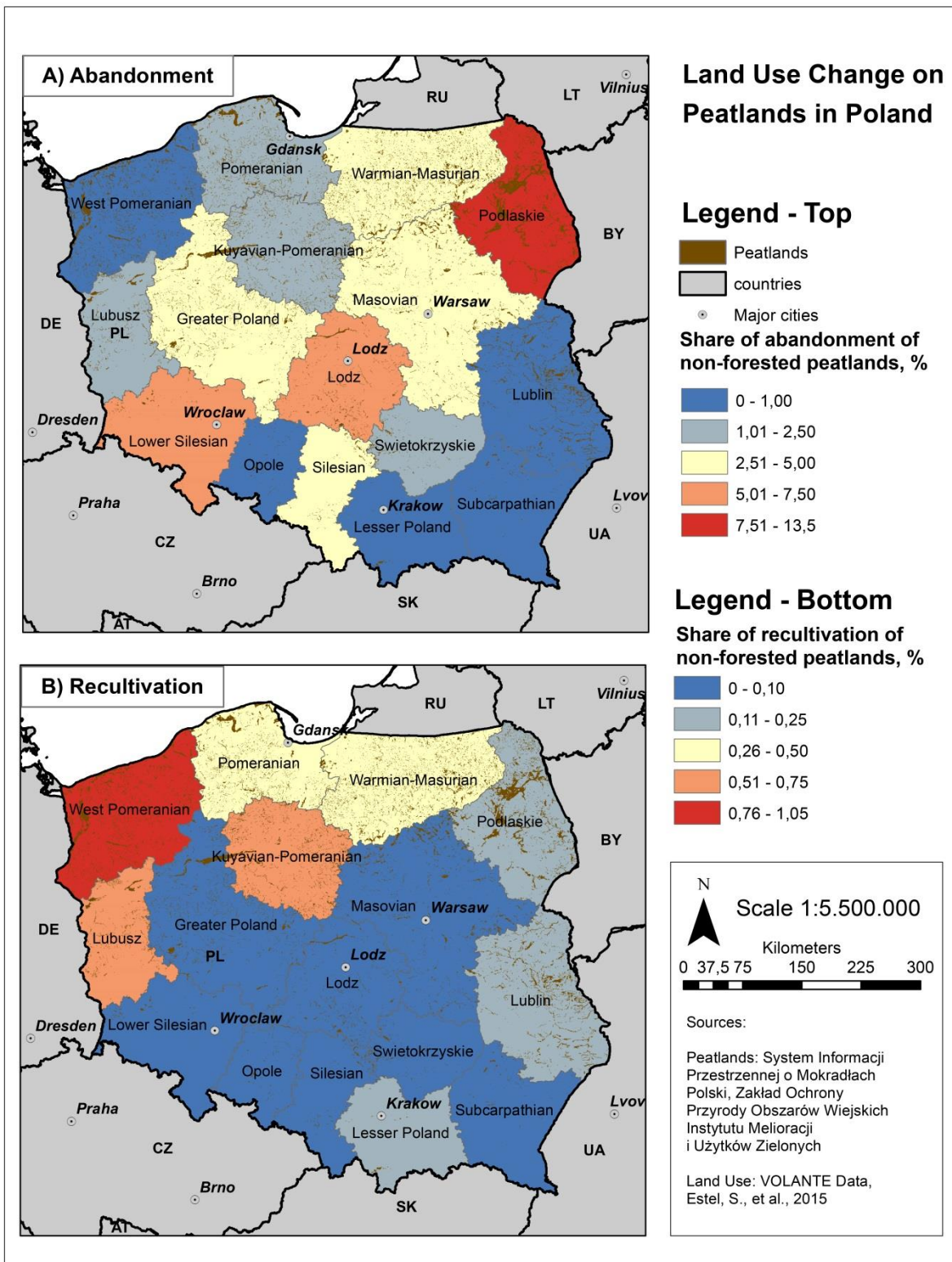


Figure 14: Land Use Change on Peatlands in Poland using VOLANTE data (ESTEL et al. 2015).

North-eastern Poland is a general hotspot for abandonment in the EU, not only on organic soils (ESTEL et al. 2015). Changes in the agricultural structure and decline of markets for



products at the European periphery are reasons for trend as well as unfavourable changes in the national and/or EU policies (RENWICK et al. 2013). Peatland areas with less drainage impact and difficult access are marginal revenue sites for agriculture or even Less Favoured Areas according to Council Regulation (EC) 1257/99, and therefore specially prone to abandonment. The EU common agricultural policy and the current economic conditions lead to the abandonment of large grassland areas on peatland especially in north-eastern Poland (Biebrza valley) (PIÓRKOWSKI & RYCHARSKI 1999), in Poznań region (ILNICKI et al. 2004), and in other parts of the country (ILNICKI 2002). The major hotspot of abandonment found in north-eastern Poland (Wschodni and Centralny regions) corresponds to a strong decrease in goat and sheep populations as well as to a decrease in the cropland extent and total farmland area (EUROSTAT 2015). This abandonment results in the overgrowing of wet grasslands highly valuable for biodiversity especially for birds like Aquatic Warbler (LITTLEWOOD et al. 2010). To slow down this process, approx. 10,000 ha are managed under agri-environmental schemes, also in Polesie region. Slight trend of recultivation of fens in western Poland (West Pomerania, Lubusz) could be explained by market response for agricultural products and investment into farm structures due to EU CAP subsidies but also open borders to Western Europe and free market access from membership to the EU.

The findings of the land use change analysis might be blurred in areas of high land fragmentation due to small holdings which is observed in south-eastern Poland (HARTVIGSEN 2014) and on extensively used peatland meadows. This results in mixed pixels as land-use patterns are highly heterogeneous (i.e., fields are smaller than the MODIS pixel size of ~5.4 ha) (ESTEL et al. 2015). Additionally, results can be vague for semi-natural areas managed at low intensity such as meadows with very low mowing or stocking rate which is typical for fens in eastern Poland. The predominant vegetation can look like on fallow lands and not managed as the NDVI methodology based on spectral contrast between vegetation classes (ESTEL et al. 2015).

## **7.2 Case study 2: Estonia, Pärnu region**

The Pärnu region (Pärnumaa) is situated in south-western part of Estonia, on the coast of Gulf of Riga. In the south it is bordering to Latvia. It is Estonia's largest county with 4,807 km<sup>2</sup>. The proportion of peatlands is higher in Pärnu lowland (32%) than in other regions (ORRU 2010) characterized by large bog complexes which are surrounded by transitional mire types. Larger parts of these areas are strictly protected by national and EU law. Parts of the famous mire national park Soomaa are situated within the region (Figure 15). On the other hand, the region is a hotspot for peat extraction mainly for horticultural use. 33% of peat is mined in Pärnu county, followed by Tartu (17%), Ida-Viru County (15%) and Harju County (8%) (Ministry of the Environment<sup>125</sup>). In the county, 5,300 ha of active peat extraction sites can be found. The harbour in Pärnu facilitates the fast and easy export of

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<sup>125</sup> <http://www.envir.ee/en/mineral-resources>

high quality horticultural peat to Western Europe e.g. Netherlands and Germany. Beside the bog areas also large fen mires can be found in lower parts of the county which are partly used for agriculture and forestry.

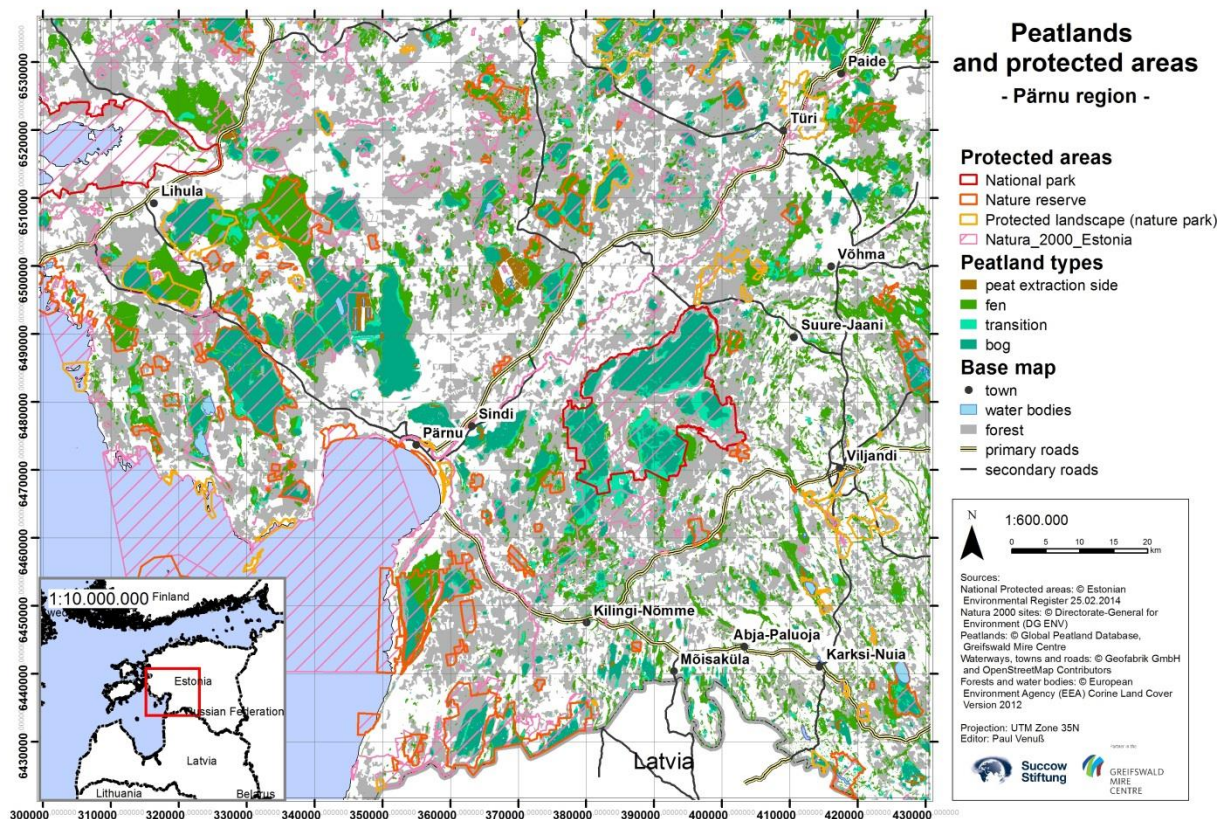


Figure 15: Peatlands distribution, national and Natura 2000 protected areas in the Pärnu county case study region.

Since the beginning of the 20<sup>th</sup> century and during Soviet times peat extraction grew constantly until independence on the 1990s (ILOMETS et al. 1995). It is still an important economic activity. Approximately 30,000 ha of mires have been destroyed directly by peat extraction, whereas another 30,000 ha have been affected indirectly by drainage (Figure 16).

In 2015, active mining licences were issued for peat extraction on 21,000 ha of bogs (ESTONIAN LAND BOARD 2015). Between 600,000 and 1,000,000 t of peat have been excavated yearly in the period 2006-2015, mainly peat for horticultural substrate production exported from Estonia (STATISTICS ESTONIA 2016). 5000 ha of valuable mires have furthermore been destroyed and 1500 ha indirectly affected by open-cast oil shale mining in north-eastern Estonia. The latter process still continues on a small scale (ILOMETS 2017).



Figure 16: Large-scale peat extraction for horticultural use in Pärnu region, Estonia (Photo: Mati Kose)

Major peatland areas (145,000 ha of different mire habitats) were protected in national protected areas (national parks, nature reserves, nature parks) already before 2004. After joining the EU Estonia designated not only new national protected areas but also Natura 2000 sites on approximately 35,000 ha of peatlands. Management plans for the sites have been elaborated with support from the funds of ERDF and adopted. Also the development of species action plans and compensation for land owners within Natura 2000 is paid by ERDF. They build the basis for restoration works in the protected areas and no further environmental impact assessment (EIA) is needed for planned restoration measures.

Beside this, more information about habitats and species, more effective nature protection and a common ground for cooperation with other organisations in EU, exchange of knowledge (e.g. Natura 2000 Biogeographical region programme) have created by EU policies.





Figure 17: Bog restoration implemented in Soomaa National Park, Pärnu region, funded from Cohesion Fund monies. (Photo: Jan Peters)

In Estonia, we observed little land use changes on peatlands in form of abandonment or recultivation with a slight trend to recultivation. Only 1% of all potentially cultivated peatlands experienced changes. Most pronounced was the recultivation of 2755 ha fens and 1780 ha bogs which is still less than 1% of the area of these peatland types potentially used in agriculture.

The slight trend of recultivation in Estonia could be explained by the fact that fallow farmland was widespread in Eastern Europe after the collapse of Soviet Union (especially in Russia and the Baltic states) (ESTEL et al. 2015). EU CAP payments probably incentivised the recultivation of productive farmland which also affected peatland areas which became unused in the 1990s but deliver good potential yields. Similar developments have been observed in other unfavourable mountainous sites in the new EU Member States (GRIFFITHS et al. 2013).

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## 9 Bibliography

- ALTMANN, M. (2008): Socio-economic impact of the peat and growing media industry on horticulture in the EU. Epagma. Brussel.
- BARTHELMES, A., COUWENBERG, J., RISAGER, M., TEGETMEYER, C. & JOOSTEN, H. (2015): Peatlands and Climate in a Ramsar context: A Nordic-Baltic Perspective (Vol. 2015:544). Nordic Council of Ministers. Copenhagen.
- BATEMAN, I.J., COLE, M.A., GEORGIU, S. & HADLEY, S.D. (2006): Comparing contingent valuation and contingent ranking: A case study considering the benefits of urban river water quality improvements, *Journal of Environmental Management* 79 (2006) 221–231.
- BIGNAL, E., JONES, G. & MCCRACKEN, D. (2001): Comment: future directions in agriculture policy and nature conservation. *British Wildlife*, 13(1), 16-20.
- BUNDESMINISTERIUM FÜR ERNÄHRUNG UND LANDWIRTSCHAFT (BMEL) (2015): Umsetzung der EU-Agrarreform in Deutschland. Berlin. accessible at [http://www.bmel.de/SharedDocs/Downloads/Broschueren/UmsetzungGAPinD.pdf?\\_\\_blob=publicationFile#page=42](http://www.bmel.de/SharedDocs/Downloads/Broschueren/UmsetzungGAPinD.pdf?__blob=publicationFile#page=42).
- CANEY, S. & HEPBURN, C. (2011): Carbon trading: unethical, unjust and ineffective? Centre for Climate Change Economics and Policy. Leeds.
- CHMIELEWSKI, T. J., FIJAŁKOWSKI, D., RADWAN, S. & WILGAT, T. (1990): Nature values of the Polesie National Park and problems of their conservation; (in Polish: Walory przyrodnicze Poleskiego Parku Narodowego i problemy ich ochrony). *Chrońmy Przyrodę Ojczyzną*, PAN Kraków; 47, 4: 17 – 31.
- CHMIELEWSKI, T. J., CHMIELEWSKI, S., KUŁAK, A., MICHALIK-ŚNIEŃSEK, M. & MAŚLANKO, W. (2015): Landscapes of the west Polesie – regional identity and its transformation over last half century. Lublin / Urszulin.
- CRILL, P., HARGREAVES, K. & KORHOLA, A. (2000): The role of peat in Finnish greenhouse gas balances (No. KTM-RAP--10/2000). Ministry of Trade and Industry. Helsinki.
- DEMBEK, W., PIÓRKOWSKI, H. & RYCHARSKI, M. (2000): Mokradła na tle regionalizacji fizycznogeograficznej Polski. [Wetlands against the physical and geographical regionalization of Poland]. *Wiadomości IMUZ* 97: 1-135 (in Polish).

- DOSWALD, N., & OSTI, M. (2011): Ecosystem-based approaches to adaptation and mitigation: good practice examples and lessons learned in Europe. Federal Agency for Nature Conservation (BfN). Bonn.
- DRÖSLER, M., AUGUSTIN, J., BERGMANN, L., FÖRSTER, C., FUCHS, D., HERMANN, J. M., KANTELHARDT, J., KAPFER, A., KRÜGER, G., SCHALLER, L. & SOMMER, M. (2012): Beitrag ausgewählter Schutzgebiete zum Klimaschutz und dessen monetäre Bewertung. BfN-Skripten Bd, 328, 15. Bonn.
- ESTEL, S., KUEMMERLE, T., ALCÁNTARA, C., LEVERS, C., PRISHCHEPOV, A., & HOSTERT, P. (2015): Mapping farmland abandonment and recultivation across Europe using MODIS NDVI time series. *Remote Sensing of Environment*, 163, 312-325.
- EUROPEAN COMMISSION (2000): Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Brussels.
- EUROPEAN COMMISSION (2008): Package of Implementation measures for the EU's objectives on climate change and renewable energy for 2020. SEC(2008) 85/3. COM(2008) 16 ,COM(2008) 17,COM(2008) 19. Brussels.
- EUROPEAN COMMISSION (2009): On the application and effectiveness of the Directive on Strategic Environmental Assessment (Directive 2001/42/EU), COM(2009) 469, final. Brussels.
- EUROPEAN COMMISSION (2009): On the application and effectiveness of the EIA Directive, (Directive 85/337/EEC, as amended by Directives 97/11/EC and 2003/35/EC). COM(2009) 378 final. Brussels.
- EUROPEAN COMMISSION (2011): Our life insurance, our natural capital: an EU biodiversity strategy to 2020. COM(2011) 244 final. Brussels.
- EUROPEAN COMMISSION (2012): Executive summary of the impact. SWD(2012) 354 final. Brussels.
- EUROPEAN COMMISSION (2014a): Factsheet Cohesion Policy and Estonia. Brussels.
- EUROPEAN COMMISSION (2014b): Factsheet Cohesion Policy and Poland. Brussels.
- EUROPEAN COMMISSION (2014c): Progress towards achieving the Kyoto and EU 2020 objectives. COM(2014) 689 final. SWD(2014) 336 final. Brussels.
- EUROPEAN COMMISSION (2015a): Report from the Commission to the European parliament and the Council. The Mid-Term review of the EU biodiversity strategy to 2020. COM(2015) 478 final. Brussels.

- EUROPEAN COMMISSION (2015b): Report on the status of and trends for habitat types and species covered by the Birds and Habitats Directives for the 2007-2012 period as required under Article 17 of the Habitats Directive and Article 12 of the Birds Directive. COM(2015) 219 final. Brussels.
- EUROPEAN COMMISSION (2015c): Renewable energy progress report SWD(2015) 117 final.COM(2015) 293 final. Brussels. accessible at <https://ec.europa.eu/transparency/regdoc/rep/1/2015/EN/1-2015-293-EN-F1-1.pdf>.
- EUROPEAN COMMISSION (2015d): Renewable Energy Package: new Renewable Energy Directive and bioenergy sustainability policy for 2030. ENER – C.1 – AP 2016/ENER/025. Brussels. accessible at [http://ec.europa.eu/smart-regulation/roadmaps/docs/2016\\_ener\\_025\\_cwp\\_renewable\\_energy\\_package\\_en.pdf](http://ec.europa.eu/smart-regulation/roadmaps/docs/2016_ener_025_cwp_renewable_energy_package_en.pdf).
- EUROPEAN COMMISSION (2015e): The State of Nature in the EU. COM(2015) 219 final. Brussels.
- EUROPEAN ENVIRONMENT AGENCY (2014): Trends and projections in Europe 2014. Copenhagen.
- EUROSTAT (2015): Regional agriculture statistics. accessible at <http://ec.europa.eu/eurostat/data/database> (assessed 24.03.2015). Brussels.
- FAO (2014): FAOSTAT, Methods & standards. Rome. accessible at <http://faostat3.fao.org/mes/glossary/E> (accessed 24.03.15).
- FLESSA, H., MÜLLER, D., PLASSMANN, K., OSTERBURG, B., TECHEN, A.K., NITSCH, H, NIEBERG, H, SANDERS, J, MEYER, Z.U. HARTLAGE, O., BECKMANN, E. & ANSPACH, V. (2012): Studie zur Vorbereitung einer effizienten und gut abgestimmten Klimaschutzpolitik für den Agrarsektor. Landbauforschung – vTI Agriculture and Forestry Research. Sonderheft 361. 437 S. Braunschweig.
- FRELIH-LARSEN, A., MACLEOD, M., OSTERBURG, B., EORY, A. V., DOOLEY, E., KÄTSCH, S., NAUMANN, S., REES, B., TARSITANO, D., TOPP, K., WOLFF, A, METAYER, N., MOLNAR, A., POVELLATO, A., BOCHU, J.L., LASORELLA, M.V. & LONGHITANO, D. (2014): Mainstreaming climate change into rural development policy post 2013. Final report. Ecologic Institute. Berlin.
- GRIFFITHS, P., MÜLLER, D., KUEMMERLE, T. & HOSTERT, P. (2013): Agricultural land change in the Carpathian ecoregion after the breakdown of socialism and expansion of the European Union. Environmental Research Letters, 8.



- GRODZIŃSKA-JURCZAK, M., STRZELECKA, M., KAMAL, S. & GUTOWSKA, J. (2012): Effectiveness of Nature Conservation—a case of Natura 2000 sites in Poland. *Protected area management*, 183-202.
- HART, K., BUCKWELL, A., BALDOCK, D. (2016). Learning the lessons of the Greening of the CAP, Institute for European Environmental Policy, London. Accessible under: [http://www.ieep.eu/assets/2028/Learning\\_the\\_lessons\\_from\\_CAP\\_greening\\_-\\_April\\_2016\\_-\\_final.pdf](http://www.ieep.eu/assets/2028/Learning_the_lessons_from_CAP_greening_-_April_2016_-_final.pdf).
- HARTVIGSEN, M. (2014): Land reform and land fragmentation in Central and Eastern Europe. *Land Use Policy*, 36, 330-341.
- ILNICKI, P. (2002): Restoration of carbon sequestering capacity and biodiversity in abandoned grassland on peatland in Poland. 170 p. Akademia Rolnicza. Poznań.
- ILNICKI, P., DARDAS, J., SIKORA, K., TADROWSKA, A., TRZASKOWSKA, L. & WOŹNIAK A. (2004): Zmiany sposobu użytkowania torfowisk Wielkopolski. [Changes of land use on peatlands in the Poznań region] *Woda-Środowisko-Obszary Wiejskie* 4(1): 357-371 (in Polish).
- ILOMETS M. (2017): Estonia. In: Joosten H., Tanneberger F. & Moen A. (eds.), *Mires and peatlands of Europe: Status, distribution, and nature conservation*. Schweizerbart Science Publishers. Stuttgart.
- ILOMETS, M., ANIMÄGI, J. & KALLAS, R. (1995): Estonian Peatlands. A brief review of their development, state, conservation, peat resources and management. 48 p. AS Printall. Tallinn.
- ILOMETS, M., TRUUS, L., SEPP, K. & PAJULA, R. (2010): Soometsade inventuur - Soometsad väljaspool kaitsealaid. [Inventory of mire forests – mire forests outside protected areas] 59 p. Manuscript. (in Estonian) Ministry of Environment. Tallinn.
- INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE IPCC (EGGLESTON H.S., BUENDIA L., MIWA K., NGARA T. & TANABE K. (eds.)) (2006): IPCC Guidelines for National Greenhouse Gas Inventories, Prepared by the National Greenhouse Gas Inventories Programme. Published: IGES, Japan.
- INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE IPCC (HIRAISHI, T., KRUG, T., TANABE, K., SRIVASTAVA, N., BAASANSUREN, J., FUKUDA, M. & TROXLER, T.G. (eds.)) (2014): 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands. Published: IPCC, Switzerland. accessible at <http://www.ipcc-nggip.iges.or.jp/home/wetlands.html>

- JOOSTEN, H. (2009): The Global Peatland CO<sub>2</sub> Picture: peatland status and drainage related emissions in all countries of the world. Wetlands International. Ede.
- JOOSTEN, H., & CLARKE, D. (2002): Wise use of peatlands. International Mire Conservation Group & International Peat Society. Jyväskylä.
- JOOSTEN, H., TANNEBERGER, F. & MOEN, A. (eds.) (2017): Mires and peatlands of Europe: Status, distribution, and nature conservation. Schweizerbart Science Publishers. Stuttgart.
- JURASINSKI, G., GÜNTHER, A., HUTH, V., COUWENBERG, J. & GLATZEL, S. (2016): Greenhouse gas emissions. In: Wichtmann, W., Schröder, C. & Joosten, H. (eds.) (2016). Paludiculture – productive use of wet peatlands. Schweizerbart Science Publishers. Stuttgart.
- KETTUNEN, M., TORKLER, P. & RAYMENT, M. (2014): Financing Natura 2000 in 2014-2020: Guidance Handbook, a publication commissioned by the European Commission DG Environment. Brussels. accessible at <http://ec.europa.eu/environment/nature/natura2000/financing/docs/handbook.pdf>.
- KOTOWSKI, W. & PIÓRKOWSKI, H. (2003): 4.6. Poland. In: Strategy and Action Plan for Mire and Peatland Conservation in Central Europe (ed. by O. Bragg & R. Lindsay), pp. 49-53. Wageningen: Wetlands International, Publication 18. London.
- LAPPALAINEN, E. (1996): General review on world peatland and peat resources. Global peat resources, 53-56. Springer. Netherlands.
- LINDSAY, R. & IMMIRZI, P. (1996): An inventory of lowland raised bogs in Great Britain. Technical Report. Scottish Natural Heritage. Perth.
- LITTLEWOOD, N., ANDERSON, P., ARTZ, R., BRAGG, O., LUNT, P. & MARRS, R. (2010): Peatland biodiversity. IUCN UK Peatland Programme. Edinburgh.
- LIU, S., LI, Y. E., GAO, Q., WAN, Y., MA, X. & QIN, X. (2011): Analysis of LULUCF Accounting Rules after 2012. Advances in Climate Change Research, 2(4), 178-186.
- LORENS, B. & SUGIER, P. (2004): The monitoring of vegetation and habitats of water-peatland ecosystems of Krowie Bagno (Leczna-Włodawa Lakeland). Teka Komisji Ochrony i Kształtowania Środowiska Przyrodniczego, 1.
- MILIEU LTD, INSTITUTE FOR EUROPEAN ENVIRONMENTAL POLICY (IEEP), ICF INTERNATIONAL AND ECOSYSTEMS LTD (2015): Evaluation Study to support the Fitness Check of the Birds and Habitats Directives. Brussels.

- MURPHY, F., DEVLIN, G., & MCDONNELL, K. (2015): Benchmarking Environmental Impacts of Peat Use for Electricity Generation in Ireland—A Life Cycle Assessment. *Sustainability*, 7(6), 6376-6393.
- NIS ESTONIA (2014): National Inventory Submission of Estonia. GHG Emissions in Estonia 1990–2012, Submission to the UNFCCC secretariat. 443 p. + Annexes. Tallinn.
- OKRUSZKO, H. (ED.) (1996): Characterization and valuation of wetlands and grasslands in Poland in the aspect of natural environment protection. *IMUZ, Materiały seminaryjne* 35: 1-139.
- ORRU, M. (2010): Dependence of Estonian Peat Deposit Properties of Landscape Types and Feeding Conditions. TUT Press. Tallinn.
- PAAL, J. & LEIBAK, E. (2011): Estonian mires: Inventory of habitats. 174 p. Eestimaa Looduse Fond. Tartu.
- PAAVILAINEN, E. & PÄIVÄNEN, J. (1995): Peatland forestry: ecology and principles (Vol. 111). Springer Science & Business Media.
- PARISH, F., SIRIN, A., CHARMAN, D., JOOSTEN, H., MINAYEVA, T., SILVIUS, M. & STRINGER, L. (2008): Assessment on peatlands, biodiversity and climate change: main report. Global Environment Centre, Kuala Lumpur and Wetlands International, Wageningen.
- PATTERSON, G. & ANDERSON, R. (2000): Forests and Peatland Habitats. Forestry Commission of the United Kingdom. Edinburgh.
- PE'ER, G., DICKS, L. V., VISCONTI, P., ARLETTAZ, R., BÁLDI, A., BENTON, T. G. & HENLE, K. (2014): EU agricultural reform fails on biodiversity. *Science*, 344(6188), 1090-1092.
- PIÓRKOWSKI, H. & RYCHARSKI, M. (1999): Zróźnicowanie przestrzenne i dynamika sukcesji zbiorowisk leśnych i zaroślowych w dolinie Biebrzy na podstawie analizy zdjęć lotniczych. [Areal differentiation and succession of forest and shrub communities in the Biebrza River valley on the basis of aerial photographs] In: Aktualna problematyka ochrony mokradeł. Materiały seminaryjne 43, pp. 89-95. Wydawnictwo IMUZ (in Polish). Falenty.
- PIÓRKOWSKI, H., OŚWIECIMSKA-PIASKO, Z., DEMBEK, W. & OSTROWSKI, J. (2007): System informacji przestrzennej o mokradłach w Polsce i możliwości jego wykorzystania. *Roczniki Geomatyki-Annals of Geomatics*, 5(7), 69-79.
- POINTEREAU, P., COULON, F., GIRARD, P., LAMBOTTE, M., STUCZYNSKI, T., SANCHEZ ORTEGA, V. & DEL RIO, A. (2008): Analysis of farmland abandonment and the extent and

location of agricultural areas that are actually abandoned or are in risk to be abandoned. In E. Anguiano, C. Bamps, & J. -M. Terres (Eds.), JRC Scientific and Technical Reports (EUR 23411 EN).

RAUSCHMAYER, F., BERGHÖFER, A., OMANN, I. & ZIKOS, D. (2009): Examining processes or/and outcomes? Evaluation concepts in European governance of natural resources. *Environmental Policy and Governance*, 19(3), 159-173.

RENWICK, A., JANSSON, T., VERBURG, P. H., REVOREDO-GIHA, C., BRITZ, W., GOCHT, A. & MCCRACKEN, D. (2013): Policy reform and agricultural land abandonment in the EU. *Land Use Policy*, 30(1), 446-457.

RÖDER, N. & OSTERBURG, B. (2012): The impact of map and data resolution on the determination of the agricultural utilisation of organic soils in Germany. *Environmental management*, 49(6), 1150-1162.

SCHMILEWSKI, G. (2008): Peat covers 77 percent of the growing media production in the EU. *Peatlands International*, 1, 39-43.

SILVA, J., PHILLIPS, L., JONES, W., ELDRIDGE, J & O'HARA, E. (2007): LIFE and Europe's wetlands - restoring a vital ecosystem, European Commission, Environment Directorate-General. Luxembourg.

STATISTIKAAMET (2016): Eesti statistika aastaraamat (Statistical Yearbook of Estonia). Tallinn.

SUCCOW, M. & JOOSTEN, H. (2002): *Landschaftsökologische Moorkunde*. 2. Auflage, Schweizerbart'sche Vertragsbuchhandlung. Stuttgart.

SSYMANK, A., ULLRICH, K., VISCHER-LEOPOLD, M., BELTING, S., BERNOTAT, D., BRETSCHNEIDER, A., RÜCKRIEM, C. & SCHIEFELBEIN, U. (2015): Handlungsleitfaden „Moorschutz und Natura 2000“ für die Durchführung von Moorrevitalisierungsprojekten. In: VISCHER –LEOPOLD, M., ELLWANGER, G., SSYMANK, A., ULLRICH, K. & PAULSCH, C. (2015). *Natura 2000 und Management in Mooregebieten, Naturschutz und Biologische Vielfalt* Bd. 140. Landwirtschaftsverlag. Münster.

TANNEBERGER, F. & WICHTMANN, W. (2011): *Carbon credits from peatland rewetting - Climate-biodiversity-land use*. Schweizerbart. Stuttgart.

TETZLAFF, B., HOLSTEN, B. & TREPPEL, M. (2015): Bedeutung der Moore für den Gewässerschutz. *Telma Beiheft* 5: 113 – 132.

TIEMEYER, B., FRINGS, J., KAHLE, P., KÖHNE, S. & LENNARTZ, B. (2007): A comprehensive study of nutrient losses, soil properties and groundwater concentrations in a

degraded peatland used as an intensive meadow—implications for re-wetting. *Journal of Hydrology*, 345(1), 80-101.

TREPEL, M. (2010): Assessing the cost-effectiveness of the water purification function of wetlands for environmental planning. *Ecological Complexity*, 7(3), 320-326. Flintbek.

VALK, U. (1988): Utilization of peatlands in Estonia: a historical review. *Proceedings of the 8<sup>th</sup> International Peat Congress 1*: 78-82.

VAN DOORN, A., LESSCHEN, J.P. & KUIKMAN, P. (2012): Analysis of Member States actions to implement the Effort Sharing Decision and options for further communitywide measures. Brussels. accessible at [http://ec.europa.eu/clima/policies/effort/docs/esd\\_case\\_studies\\_agriculture\\_en.pdf](http://ec.europa.eu/clima/policies/effort/docs/esd_case_studies_agriculture_en.pdf)

VASANDER, H., TUUTTILA, E. S., LODE, E., LUNDIN, L., ILOMETS, M., SALLANTAU, T. & LAINE, J. (2003): Status and restoration of peatlands in northern Europe. *Wetlands Ecology and Management*, 11(1-2), 51-63.

VON UNGER, M., STRECK, C. & LEE, D. (2012): Options for Financing REDD+ in the Context of EU Climate Policy Status and Opportunities. The Nature Conservancy Climate Change Program. Arlington.

VON UNGER, M., EMMER, I., COUWENBERG, J. & JOOSTEN, H. (2016): Peatlands, Forests and the Climate Architecture, Setting Incentives through Markets and Enhanced Accounting, Climate Change 14/2016, Umweltbundesamt. Dessau. accessible at <http://www.umweltbundesamt.de/publikationen/peatlands-forests-the-climate-architecture-setting>

WETLANDS INTERNATIONAL (2013): Policy Brief on Indirect Land Use Change and Peatlands. Ede. accessible at: <https://www.wetlands.org/publications/policy-brief-on-indirect-land-use-change-and-peatlands/>

WETLANDS INTERNATIONAL (2015): Briefing paper: accelerating action to Save Peat for Less Heat!. Ede. accessible at: <https://www.wetlands.org/publications/briefing-paper-accelerating-action-to-save-peat-for-less-heat/>

WICHTMANN, W., SCHRÖDER, C. & JOOSTEN, H. (2016): Paludiculture – Cultivation of wet Peatlands. Climate Protection, Biodiversity, Regional Economic Benefits. Schweizerbart. Stuttgart.

WOŁĘJKO, L., HERBICHOWA, M. & POTOCKA, J. (2005): Typological differentiation and status of Natura 2000 mire habitats in Poland. *Moore von Sibirien bis Feuerland (Mires from Siberia to Tierra del Fuego)*. *Stapfia*, 85, 175-219.



## 10 Annex

### Questionnaire EU Peatland Policy, Case Study Lublin region

General information:

1. Name
2. Institution / Business
3. Position
4. Contact

Site specific information:

5. Peatlands and organic soils play an important role in the Lublin region esp. Western Polesie. How is your work related to organic soil / peatland areas? How large is the area of peatland you work on?
6. What are your main utilization and management objectives and activities? What is specific for peatland sites (practices, techniques, timing...)? Which advantages and obstacles exist?
7. Have you utilized the areas already before 2004 (before Poland joined EU)?
8. If yes, what has changed in your management of peatlands / organic soils since 2004 till today? What role would you give to implementation of EU schemes? Do you have any maps or data you can share with us for the project (cultivated crops, vegetation cover, water level measurements, soil properties)?
9. Do you think the situation has improved or worsened since 2014? For your benefits, the management and utilization, and for conservation of organic soils?
10. In which way EU regularities directly affect your work on these sites? Which are positive (incentives), which are negative (restriction) for your business / activities?
11. Which EU funding schemes are you using for your activities on the sites (Common Agricultural Policy, AES, European Regional Development Fund (ERDF), European Agricultural Fund for Rural Development (EAFRD), others)? In which way they provide incentives for your activities?

12. If so, which specific AES are you using on your sites? Size of sites under AES? What are your experiences?
13. Are you using funds from Programu Rozwój Polski Wschodniej (Programme Development of Eastern Poland)? For what? What are your experiences?
14. Are there any conflicts between different EU regulations and schemes? How do they look alike?
15. Which improvements you see for EU regulations to better suit the requirements of cost-effective utilization, protection of soil and ecosystem services and conservation of organic soils / peatlands?
16. Are there any funding schemes for biomass used for energetic purposes like burning bales or pellets as renewable energy (co-firing in coal power plants, small heating devices)? Are you using these schemes? What are their benefits?
17. Do you have other institutions / individuals in mind which we should contact for interviews? Do you have suggestions for literature, data to consult?
18. Do you have any comment on our project? Final remarks?



## Questionnaire EU Peatland Policy, Case Study region Pärnu

### General information:

19. Name
20. Institution / Business
21. Position
22. Contact

### Site specific information:

23. Peatlands and organic soils play an important role in Estonia / Pärnu region. How is your work related to organic soil / peatland areas? How large is the area of peatland you work on?
24. What are your main utilization and management objectives and activities? What is specific for peatland sites (practices, techniques, timing...)? Which advantages and obstacles exist?
25. Have you utilized the areas already before 2004 (before Estonia joined EU)?
26. If yes, what has changed in your management of peatlands / organic soils since 2004 till today? What role would you give to implementation of EU schemes?
27. Do you have any maps or data you can share with us for the project (cultivated crops, vegetation cover, water level measurements, soil properties)?
28. Do you think the situation has improved or worsen since 2014? For your benefits, the management and utilization, and for conservation of organic soils?
29. In which way EU regularities directly affect your work on these sites?

30. Which are positive (incentives), which are negative (restriction) for your business / activities?
31. Which specific EU funding schemes are you using for your activities on the sites (Common Agricultural Policy, AES, European Regional Development Fund (ERDF), European Agricultural Fund for Rural Development (EAFRD), others)?
32. In which way they provide incentives for your activities?
33. Are there any funding schemes for peat or biomass grown on peatlands used for energetic purposes as renewable energy (small heating devices, (co-)firing in power plants,)? Are you using these schemes in Estonia? What are their benefits?
34. Are there any conflicts between different EU regulations and schemes? How do they look alike?
35. Which improvements you see for EU regulations to better suit the requirements of cost-effective utilization, protection of soil and ecosystem services and conservation of organic soils / peatlands?
36. Do you have other institutions / individuals in mind which we should contact for interviews? Do you have suggestions for literature, data to consult?
37. Do you have any comment on our project? Final remarks?