



Paludiculture-Newsletter

With this newsletter the Greifswald Mire Centre (GMC) aims to keep a growing community informed on peatlands and paludiculture. You will find news from research, practice, politics, as well as announcements of conferences and other events and recommended publications. Sign up per e-mail to communication@greifswaldmoor.de for upcoming issues!

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1. General information and news on peatlands and paludiculture

1.1. A paludiculture programme will be launched in Finland

Almost one third of Finland's land areas are mires. Most of our country's mires are located in northern parts such as Ostrobothnia, Lapland and Kainuu. Over time, about one million hectares of land have been drained for cultivation. While some of these peatlands have become mineral-rich by long farming practices, new peatlands are also being drained for agricultural use at around 2000 hectares per year, and the share of peatlands from total acreage has increased since the 1990s, although the total cultivation area has remained stable. The drainage of new peatlands is therefore the main reason why agricultural emissions have not been reduced in the 2000s.

At present, only about 10% of Finland's total cultivated area are cultivated peatlands, but they produce about 50% of the greenhouse gas emissions of agriculture, taking into account also the emissions reported in the land use and land use change sector (LULUCF). Finland has in total about 2.3 million hectares of agricultural land. Instead of intensive food or feed production, some cultivated peatlands are in extensive use, such as fallow land, for example due to poor productivity, acidity, wetness or carrying capacity problems. However, low cultivation intensity does not remedy the cultivation problems of the soil, and finally the farmer makes only minor farming efforts in order to get agricultural supports per hectare. In practice, such fields produce emissions rather than commodities. The thicker the peat layer, the longer the source.

In particular, such low-yielding, thick layered peat soils in extensive use would be more useful to either be rewetted, restored or under paludiculture in order to meet the emission targets. According to the recent studies, such plots can be found in Finland about 23,000 ha, which is about 1% of the total cultivated area. According to calculations, by rewetting, restoring or transferring these fields to paludiculture, Finland could reduce about 10% of the emissions of croplands in the LULUCF sector.

As peatlands are a potential target of reducing emissions from the agriculture and LULUCF sectors, the new Finnish government, which was elected in the beginning of the year, has included starting a paludiculture programme in Finland in its recent government programme.

Read more: <https://valtioneuvosto.fi/en/rinne/government-programme/agriculture>

Projects around paludiculture in Finland:

SOMPA <https://www.luke.fi/sompa/en/>

CANEMURE <https://www.luke.fi/en/projects/canemure/>

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1.2. Fact paper on Germany's climate programme 2030

The document "Key points for the climate protection programme 2030" published by the German Federal Government on 20.09.2019 names sector-specific measures. For the agriculture and forestry sector, concrete implementation steps are missing under "Protection of peat soils / Reduction of peat use in growing media (36)". The [GMC fact paper "Peat soil protection as a nature-based solution in the climate protection programme 2030 - rapid cessation of peatland drainage necessary for effective climate protection"](#) compiles the initial situation, potentials and concrete proposals on four pages.

1.3. #Moormussnass at Fridays4Future



1 Demonstrating knee-deep in water because #peatlandsmatter! (Photo: Th. Beil)

The peatland scientists and climate activists of the Greifswald Mire Centre joined the worldwide Fridays4Future Climate Strike at 20th September – in the town’s fishermen’s fountain. With this action they rose attention to the fact, that the rewetting of mires and their sustainable utilisation is one of the five most effective measures to reduce Germany’s CO₂-emissions in short term.



2 GMC-staff and partner in action during climate action week #Allforclimate (Photos: GMC)

1.4. High demand on paludiculture expertise - Excursions with international delegations

During the last two months several delegations from all over the world travelled the north of Germany to be informed about paludiculture projects by the Greifswald Mire Centre. The INTERREG North West Europe project [Carbon Connects](#) visited Greifswald Mire Centre 27th / 28th of June with about 25 people (see separate report under 3.5).

About 30 agricultural and environmental attachés from 14 countries from Japan to Paraguay, together with Dr. Till Backhaus, Minister of Agriculture and Environment in Mecklenburg-Vorpommern, visited the GMC on 29th August. A great opportunity to show what Mecklenburg-Vorpommern and Greifswald peatland science have to offer: During a guided tour to the [Karrendorfer Wiesen](#), a successfully revitalised coastal flood mire owned by the Succow Foundation, the attachés could see and understand the significance of wet peatlands for biodiversity, climate protection and regional development "on the ground". At the research plots of the [WETSCAPES project](#), part of the MV Excellence Initiative, and the [mesocosm facility of the University of Greifswald](#), GMC representatives showed the current research.



3 Environmental attachés and minister Till Backhaus (M-V) at a guided tour at the new mesocosm facility (Photo: St. Busse)

An [Ukrainian delegation](#) researched possible requirements for a sustainable, climate-friendly use of recently drained, state-owned peatlands that are planned to be privatized. The GMC-scientists explained possibilities for paludiculture in a seminar and showed the harvest of cattail in Kamp and of wet meadow biomass in Neukalen as well as the "paludi biomass heating plant" in Malchin. In mid-September, a Vietnamese delegation and a representative from the University of California, Davis, visited these sites and travelled to Western Pomerania as part of the [Plant3 and the Bonamoor](#) project. A delegation of Finnish peatland scientists and students also made a stop at the paludiculture sites in the northeast after visiting the Sphagnum farming site in the peatland Hankhauser Moor near Oldenburg (Lower Saxony). Finland now plans to research and implement paludiculture more intensively (see article 1.1.).

Also, Elisabeth Aßmann, chairwoman of the Agricultural Committee of Mecklenburg-Vorpommern, had gained an impression of successfully combined peatland, climate and coastal protection, including innovative value creation, on the Karrendorfer Wiesen. Here it became clear that peatland

protection and paludiculture must be part of a sustainable agriculture in Mecklenburg-Vorpommern. Obstacles were also addressed: Rewetting is progressing too slowly in the federal state of Mecklenburg-Vorpommern. Planning and approvals take a long time.

2. A paludiculture project presented: „Paludi-PRIMA - Putting Paludiculture into Practice: Integration - Management - Cultivation"

2.1. Project start and milestone



4 Aerial photo of installing the PRIMA pilot site (Photo: lensescape.org)

The Paludi-PRIMA project started in May 2019 to test and investigate the cultivation of cattail and reed over three years (see [Paludiculture Newsletter I / 2019](#)). The establishment of the practical cultivation area (~10 ha) in September 2019 is a milestone for the implementation of paludiculture. In addition to valuable experience in planning and approval processes, area preparation and planting, the project area is now available for further trials and investigations as well as a demonstration area for interested visitors.

2.2 Practical cultivation and field trial

The paludiculture area was previously grassland, grazed by a herd of suckler cows and used for winter fodder production. The pilot site is rented from the local farmer for the duration of the project. In 2018, a hydrological feasibility study was carried out on the existing fen soil with a peat layer of about 4-5 meters. Based on this further planning for necessary construction work and the initiation of an approval procedure in accordance with the water law could follow. A further permit was required to comply with the nature conservation law. In addition, species of birds breeding on the site were evaluated, a preliminary audit in accordance with the Habitats Directive of the

European Union was carried out, an intervention-compensation balance was drafted and an exception from regulations on landscape conservation areas was obtained.

A commercial nursery, specialised in wetland plants, produced cattail seedlings and delivered them in mid-September.

Since the test area was planned as an stand-alone solution, it had to be ensured that the surrounding drained grassland remained dry despite this rewetted section. This required the backfilling of an embankment and the construction of an external ditch surrounding the area and, if necessary, collecting seepage water. Two additional ditches were constructed within the area to improve the flow of water during irrigation. Two outlets were also used to control the water level. This should be kept stable during the spring and summer months by pumping water.

After completion of the construction work, seedlings of *Typha angustifolia* and *Typha latifolia* were planted in two densities (2 x 0.5m and 2 x 1m) on 8.5 ha in September 2019. 22 million litres of water from the adjoining Teterower Peene river were then fed into the area. We currently aim to reach an optimal water level with little inundation as possible and simultaneously highest moisture retention for the complete area with 50,000 young plants in total. Now, we hope that the plants will get through winter, sprout vigorously in spring and then grow well despite this rather late planting time. In addition, 1000 genetically identical reed (*Phragmite australis*) seedlings were planted in small areas of the pilot site. They are cloned from a regional reed stock, which is harvested for thatching. The seedlings were produced by meristematic propagation by the Julius Kühn Institute. This way, genetic differences can be ruled out in field trials. This clone and four others of regional origin will also be subject to a mesocosm experiment considering a nutrient and a water level gradient.

2.3. Excursion destination and information exchange

Already during the planting groups of visitors looked at the cultivation pilot site. First came a Finnish delegation (see 1.4). On the same day participants of the MoKli field day came by (see 3.1). In October a delegation from the Baltic States (DESIRE project) and the KTBL executive committee (Kuratorium für Technik und Bauwesen in der Landwirtschaft e.V. – Advisory board for Technology and Construction in Agriculture) visited the pilot site.



5 Paludi-PRIMA-staff distributing typha seedlings (Photo: lensescape.org)

Paludi-PRIMA-staff themselves also went abroad to visit similar projects in the Netherlands in Ankeveen (1 ha) and Marickeland (6 ha) and exchange experiences on land preparation, planting/seeding, irrigation, population establishment and risk factors in the establishment of paludicultures.

2.4. Next steps

Within the Paludi-PRIMA project the cultivation near Neukalen is assigned to work package 3. Work package 6 comprises the economic evaluation of paludiculture methods. It gathers all costs of setting up practical cultivation (planning, approval, plant cultivation, construction costs, ...) and compares them with those of other pilot areas. During the mechanical planting data on working time and machine time were recorded. These are now analysed to obtain economic data on establishing large-scale cultivation sites for typha. Further work packages in the Paludi-PRIMA project are:

Workpackage 1: Project Coordination, Knowledge Transfer, Transferability

Workpackage 2: Genotyping of Reed

Workpackage 3: Cultivation and Harvest

Workpackage 4: Management

Workpackage 5: Biomass Quality

More information: www.moorwissen.de/prima

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6 Paludi-PRIMA pilot site during rewetting (Photo: lensescape.org)

3. News from other paludiculture projects

This section compiles news from current projects and initiatives on paludiculture from various regions and countries.

3.1. MoKli field day

More than 50 participants followed an invitation of the project [Moor und Klimaschutz \(MoKli, Peatland and climate protection\)](#) to visit the heating plant Malchin, which is combusting biomass from wet fens, and nearby harvesting sites. The farmers and participants from administration, NGOs or associations came from various German peatland rich regions such as Diepholz lowland (Diepholzer Moorniederung), county Osterholz in Lower Saxony, from the region Dithmarschen in Schleswig-Holstein and the federal state Brandenburg. The field day demonstrated how sustainable energy might be generated in Mecklenburg-Vorpommern with double benefit for the climate. Ludwig Bork, owner of enterprise Agrotherm GmbH operating the heating plant, explained how hay won in land care on rewetted areas is used for providing regional heating and simultaneously replacing fossil energy resources. A small selection of products from paludiculture was presented to make clear that there is huge potential also in using this biomass e.g. for building materials or packaging.



7 Visitors at the heating plant Malchin (Photo: A. Haberl)



8 Taking a look at a soil core of peatlands near Malchin (Photo: A. Haberl)

3.2. Peatland conservation: Solutions on 84 pages

The Greifswald Mire Centre successfully completed the [MoorDialog](#) project funded by the German government's National Climate Initiative from 2016-2019. Many important stakeholders of peatland and climate protection were reached and involved by events and publications within the project – thus building a #peatlandsmatter network in Germany. Another result of MoorDialog is its report [Klimaschutz auf Moorböden - Lösungsansätze und Best-practice-Beispiele](#) ("Climate protection on peat soils – solutions and Best-practice-examples", German only) which includes paludiculture. It recommends a possible transformation path for peatlands in Germany, as it would be necessary to achieve carbon neutrality by 2050. Now it is necessary to further develop this transformation path in dialogue and to bring the solutions more rapidly into society, politics, the economy and on the ground itself. It is published within the Proceedings of the Greifswald Mire Centre.

3.3. CANAPE - Creating a New Approach to Peatland Ecosystems Project



9 Visitors in the Broads National Park (Photo: Broads Authority)

The CANAPE partnership was recently reminded that we need to talk about our Love for Nature, rather than our fears of Extinction. Therefore, this update is purely about the positives happening in the CANAPE partnership in which 14 organisations work on restoring fens and bogs across five countries around the North Sea. The CANAPE project is co-funded by the European Regional Development Fund through the INTERREG North Sea Region Programme.

Capturing a soil core – changing perception through paleoecology

The fens of the Broads National Park in the UK attract visitors for their varied wildlife and ecology. However, what is under the surface, and the 39 million tonnes of CO₂ stored there is often less appreciated by visitors. So what better way to get the public to understand the importance of these wetlands than by showing them what is 1m, 2m, or even 5m below their feet?

This summer, the Broads Authority gave the public the chance to see what they are standing on using peat cores taken from the How Hill National Nature Reserve, extracting the layers of peat and clay from under their feet. This allowed them to clearly see the difference between the fen peat at the top, the estuarine clay from the Middle Ages, when the sea reached 20 miles further up the estuary than it does today and the brushwood peat, formed beneath forests that coincided with the Roman occupation. Over a mere 4 days over 400 people had the chance to hold prehistoric trees in their hands, giving them a clear understanding of how the fen had been sequestering carbon for the last 2 thousand years.

A blitz of bio discovery - In Denmark, a slightly different approach has been taken under the aegis of the project. A 'bioblitz' event was held, giving the local population the chance to head out into the Store Vildmose bog and learn about the wildlife to be found in the area, documenting finds from beetles to eagles and everything in between. 220 students ventured out into the bog, documenting over 800 species in 24 hours. This underpins the development of a bottom up strategy in the area, where the local people are leading the development of an alternative vision for peatland-based agriculture.

Talking to farmers about the future in Mittleres Wietingsmoor - In Germany in Lower-Saxony, work is continuing on a trial sphagnum farming site, offering a positive vision of future farming for farmers whose peat soils are close to degrading to nothing. Sitting on the edge of a larger area of land consolidation and rewetting for conservation in Landkries Diepholz, the Barver Moor Sphagnum site is being used to start conversations with local landowners, presenting them with a vision of the future. The designs for the site have now been completed, and work to build 2ha of sphagnum growing space will begin in the spring.

Read more: <https://northsearegion.eu/canape/>

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3.4. WETSCAPES Conference

Peatlands must be wet - immediately. A quick stop to peatland drainage is necessary to achieve global climate protection goals. This is a summary of the results of the international conference held 10.-13.09.2019 at the University of Rostock. 160 scientists from 20 countries discussed the results of their research in drained, rewetted and near-natural peatlands at the WETSCAPES conference. Representatives from various disciplines talked about plant growth, greenhouse gas emissions, nutrient losses and microbial processes in the soil. Most of these scientists deal with individual phenomena, and together they were able to establish clear relationships and connections between the results. This is particularly important for rewetted peatlands, as these systems represent completely novel ecosystems. The four-year joint research project WETSCAPES (derived from "wet" and "landscapes") is funded by the Excellence Research Programme of the State of Mecklenburg-Vorpommern with 5 million euros at the Universities of Greifswald, Partner in the Greifswald Moor Centrum, and Rostock. Here the [abstract volume of the conference](#).



10 WETSCAPES conference at the lecture hall of Rostock University (Photo: F. Tannerberger)

3.5. Carbon Connects partners meeting 2019



2 Visting typha fields near Kamp (Photo: J. Geurts)

The project [Carbon Connects](#) aims to reduce 50% of the high carbon footprint of peatlands soils in Northwest Europe from 2018-2021 by promoting alternative practices of wet agriculture and introducing new bio-based business models developed for sustainable land management practices. The business models enable the capturing of carbon in sustainable bio-based products which are marketed to different sectors such as construction, food and energy. This year's Carbon Connects partner meeting took place in Mecklenburg-Vorpommern, to see some successful examples of paludiculture in this area. Read here a short report:

The group consisted of 22 people from 7 countries and 15 different organizations. The meeting and excursions were very well organized by Aldert van Weeren together with representatives of Greifswald University.

On the first evening we visited a site in Kamp where cattail has been harvested successfully for the last three years. We discussed the different harvesting techniques, which depend on the time of the year (summer or winter) and the final use of the harvested biomass (e.g. building material or bioenergy). A nearby farmer was visited to have a look at two harvesting machines: a Seiga machine with balloontyres and a newer machine with caterpillar technic. This farmer especially harvests reed for thatching. We also had a look at the house in Kamp that Aldert is renovating with cattail insulation material.

Thursday morning we had a fruitful meeting in the building of the Harbour Club in Kamp, with working sessions on the pilot design and implementation in the different countries, and the

connection of business models to each pilot site. In the afternoon we visited coastal reed fields near Ueckermünde that are harvested in winter when the wind is off-land. After that, organic farmer Phillipp von Schöning showed us his cattle on high water level grasslands. Later in the afternoon we visited the floodplains of Lake Neukalen, where biomass is harvested for the energy plant of Ludwig Bork in Malchin. We discovered the advantage of harvesting in a wetland: yields are still high in years with droughts. Lastly, we visited the energy plant in Malchin, where bales with wetland biomass are shredded and burned to heat an entire village.

The working sessions on Friday morning were dealing with the monitoring of the CO₂ emission reduction in the pilot sites with the GEST+ approach and the introduction of the Advisory Board and Online Communication Platform of CConnects that offers an opportunity for collaboration between different projects that focus on carbon reduction, low-carbon business modelling and the implementation of both on pilot sites (incl. LIFE Peat Restore, CANAPE and Care-Peat).



3 Visiting the mesocosm facility of the REPEAT-project in the Greifswald Arboretum (Photo: J. Geurts)

Some people were able to visit Greifswald University in the afternoon, where Jürgen Kreyling showed us an interesting experiment of the REPEAT project with different wetland plant species on peat soil. Kerstin Haldan and Nora Köhn showed their experiments with reed and cattail exposed to different water levels and nutrient concentrations. Finally, prof. Hans Joosten showed us the beautiful Karrendorfer Wiesen, owned by the Succow Foundation, where the sea has retained free flow over the coastal inundation peatlands and water buffaloes were grazing.

The CConnects partner meeting was very inspiring for all participants and the gathered

knowledge and experience will be used in all the CConnects pilots in NW Europe. Clear is that more peatlands must be wet and that a lot of opportunities exist for business models in wet peatland areas.

More Information: www.nweurope.eu/cconnects

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3.6. Paludiculture studies for the Baltic States

During late summer stakeholders met in Estonia, Latvia and Lithuania to discuss the feasibility of paludiculture in the Baltic States. These workshops were organised by partners within the project 'Paludiculture in the Baltics', funded by the European Climate Initiative (EUKI). For each state a feasibility study and land classification for paludiculture was discussed. Representatives from agricultural and environmental ministries, other authorities, stakeholder associations (farmers, foresters) and the civil society acknowledged the relevance of adapted peatland management for the protection of organic soil carbon and mitigation of GHG emissions. They also discussed the agricultural policy framework for paludiculture and opportunities to overcome current regulatory obstacles by reforming EU's Common Agricultural Policy (CAP). Despite the lack of ready-made

business schemes and marketing options for paludiculture products participants were eager to push paludiculture further. And enjoyed tasting a typha snack and other gourmet paludiculture products...

4. Events on peatlands and paludiculture

12./13.11.2019	2nd DLR Symposium "New perspectives of earth observation" Cologne, Space Administration (DLR)
19.11.2019	Meeting of advisory committee „Paludikultur-Kompetenzstelle Niedersachsen“ Wagenfeld
21.11.2019	DGMT Conference Moor-Sanierung in Deutschland (Peatland restoration in Germany) in Kooperation with IVG Oldenburg (in German)
05.12.2019	World Soil Day, seminar Soils, Land Use and Climate Change University of Uppsala; the seminar can be followed on videolinks

5. Literature

Dietrich, O., Fahle, M., Kaiser, T., Steidl, J. (2019): Eine Lysimeter-Studie zu Auswirkungen unterschiedlicher Grundwasser-Steuerregime auf den Bodenwasserhaushalt eines grundwassernahen Standorts (A lysimeter study on the impacts of different groundwater control regimes on the soil water balance of a shallow water table site). *Hydrologie und Wasserbewirtschaftung* 63: 1, 6-18.

Geurts, J.J.M., van Duinen, G.A., van Belle, J., Wichmann, S., Wichtmann, W. & C. Fritz (in press): Recognize the high potential of paludiculture on rewetted peat soils to mitigate climate change. *Landbauforschung - Journal of Sustainable and Organic Agricultural Systems*, issue 1

Kandel, T. P., Karki, S., Elsgaard, L., Lærke, L. E. (2019): Fertilizer-induced fluxes dominate annual N₂O emissions from a nitrogen-rich temperate fen rewetted for paludiculture. *Nutrient Cycling in Agroecosystems*. DOI: [10.1007/s10705-019-10012-5](https://doi.org/10.1007/s10705-019-10012-5)

Nichols, J. E., Peteet, D.M. (2019): Rapid expansion of northern peatlands and doubled estimate of carbon storage. *Nature Geoscience* volume 12: 917–921
<https://www.nature.com/articles/s41561-019-0454-z>

Smolders, A., van de Riet, B., van Diggelen, J., van Dijk, G., Geurts, J. & L. Lamers (2019): The future of our peat meadow landscape. About rewetting, ‘optoppen’ (‘layering up’) and peat moss cultivation (Sphagnum farming). *Landschap* 36 (3): 133 – 141

Swindles, G. T., Morris, P. J. et al. (2019): Widespread drying of European peatlands in recent centuries. *Nature Geoscience* volume 12: 922–92.
<https://www.nature.com/articles/s41561-019-0462-z?fbclid=IwAR0y5LDHsIIzOXORTC-MNZ10vDtXiDfWvDqEQPlsIsawSazYQJ15qxmjQKc>

Vroom, R., Fuju, X., Geurtsa, J., Chojnowska, A., Smolders, A., Lamers, L., Fritz, C. (2019): *Typha latifolia* paludiculture effectively improves water quality and reduces greenhouse gas emissions in rewetted peatlands. *Ecological Engineering* 124: 88–98.
<https://www.sciencedirect.com/journal/ecological-engineering/vol/124/suppl/C>

Volume 25 Special Volume: Renewable Resources from Wet and Rewetted Peatlands (2019)

(<http://mires-and-peat.net/pages/volumes.php>)

Guest editors J. Couwenberg and W. Wichtmann A collection of articles based on selected presentations from the Second International Paludiculture Conference (RRR2017) held in September 2017 at the University of Greifswald, Germany.

- [Mixed farming systems on peatlands in Jambi and Central Kalimantan provinces, Indonesia: should they be described as paludiculture?](#) by Tata, H.L. Published online: 01.07.2019

RSPO Peatland BMP manual Volume 2 was just published. <https://we.tl/t-hsPY4gRj3Z>

It dedicates one chapter to paludiculture (pp 109 – 116)

Further new publications on peatlands and mires, restoration and rewetting of peatlands as well as nature conservation can be found in the IMCG bulletins, which are regularly published on the IMCG homepage.

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