



GREIFSWAL
MIRE
CENTRE



Interreg
Baltic Sea Region



EUROPEAN UNION
EUROPEAN
REGIONAL
DEVELOPMENT
FUND



WITH FINANCIAL
SUPPORT OF THE
RUSSIAN
FEDERATION



PALUDI
CULTURE
DESIRE

Implementing paludiculture How we can avoid land-use conflicts

*Wendelin Wichtmann**



* based on:

Christian Schröder 2017: Strategy for Paludiculture in Mecklenburg-Vorpommern

Tanneberger, F., Schröder, C., Hohlbein, M., Lenschow, U., Permien, T., Wichtmann, S. & Wichtmann, W. (2020): Climate Change Mitigation through Land Use on Rewetted Peatlands – Cross-Sectoral Spatial Planning for Paludiculture in Northeast Germany.

Wetlands 40, 2309–2320 (2020). <https://doi.org/10.1007/s13157-020-01310-8>

Great, now we have a solution to manage our protected sites!

Oh no, don't use our last unspoilt areas!

No chance to earn money with this!

Who should pay for it?

We do not have problems!

What should I do with my land?

That's no agriculture!

No matter what, but make it wet!

Mhh, maybe not so wet, 10 cm below surface would be nice!

?

Strategy for Paludiculture in Mecklenburg-Vorpommern



GREIFSWALD
MIRE
CENTRE

Publisher:

Ministry for Agriculture and Environment Mecklenburg-Vorpommern

Editors:

Christian Schröder, Monika Hohlbein, Sabine Wichmann & Dr. Franziska Tanneberger (DUENE e.V., Partner im Greifswald Moor Centrum), Dr. Uwe Lenschow (LUNG M-V), Dr. Karsten Pellnitz & Dr. Thorsten Permien (LM M-V)

Working group: (04.07.2016 + 16.12.2016)

Ralf Benecke (Bauernverband M-V), Arne Bilau (BUND M-V), Katja Brendemühl (LM Abt. 2), Dr. Matthias Dietze (LFA M-V), Angelika Fuß (LUNG), Dr. Hubert Heilmann (LFA M-V), Christian Hildebrandt (UNB V-G), Angelika Groth (LM Abt. 4), Frank Idler (LUNG), Dr. Hans-Eberhard Kape (LMS), Heike Kasten (LM Abt. 4), Hauke Kroll (Landgesellschaft), Peter Krüger (EM Abt. 3), Dr. Peter Röhe (LM Abt. 2), Frank Tessendorf (StALU Vorpommern), Dr. Wendelin Wichtmann (Universität Greifswald), Matthias Wolters (StALU Vorpommern), Prof. Dr. Nicole Wrage-Mönnig (Universität Rostock)

Strategy for Paludiculture in Mecklenburg-Vorpommern



GREIFSWALD
MIRE
CENTRE

Goal:

Summarising all current research results on paludiculture with special regard of the specifics of Mecklenburg-Vorpommern

The Strategy aims to create the basis for as many implementation projects as possible on a voluntary basis

Paludiculture strategy MV

Implementation of paludiculture on agriculturally used peatland in Mecklenburg-Vorpommern



GREIFSWALD
MIRE
CENTRE

1. Initial situation

- 1.1 Programs and Positions of the State of MV
- 1.2 Peatlands in Mecklenburg-Vorpommern
- 1.3 Previous support instruments for peatland protection in MV

2. Peat consumption reduction & peat conserving utilization opt.

- 2.1 Definition of good agricultural practice in peatland use
 - 2.2 Reed mowing as conventional peat-conserving use of peatlands
- 2.4 Management measures for the establishment and management of paludicultures

3. General conditions

- 3.1 Agricultural policy framework
- 3.2 Legal framework
- 3.3 Financing/support options for the introduction of paludiculture

4. Potentials

- 4.1 Criteria
- 4.2 Area potentials - backdrops for the implementation of paludicult
- 4.3 Implementation of paludiculture

5. Goals and need for action

6. References



Definition: Paludiculture



GREIFSWALD
MIRE
CENTRE

Definition (sensu lato): *Paludiculture is the **productive** use of **wet peatlands**.*

- productive → Harvesting and Utilisation of plant material
- wet → long term sustainable (preservation of peat)

Definition (sensu stricto): *Paludiculture is the **agricultural or forestry production** of **rewetted organic soils** which **preserves the peat body**.*

- agricultural or forestry production → production of plant or animal products
- rewetted → exclusion of undrained, peat forming mires
- Preservation of the peat body → highlight the main goal of paludiculture
- organic soil → inclusion of former peatlands

worldwide

Germany

Ecosystem services that go beyond the preservation of the peat body and productive use are not necessarily linked to the concept of "Paludiculture"!



Definition: Peat preserving conditions

Peat preserving land use (=Paludiculture): The groundwater level is year round near the surface, in summer maximum 20 cm below surface.

→ Currently very few sites in Mecklenburg Western Pomerania ~ 500 ha
(not accepted as agricultural use)

Land use where peat degradation is reduced (=no paludiculture): If the required water level for peat preservation is not possible, but the water level is as high as possible, in summer: 20 to 40 cm below surface.

→ Less than 1.500 ha in Mecklenburg Western Pomerania



Definition: Paludiculture plants

Perennial plants that grow under **permanent wet** conditions and supply **usable aboveground biomass**.

Perennial → no regular preparation of soil needed

Aboveground biomass → exclusion of belowground plant parts



peat preservation



Common Reed



Sundew



Rice



Water Chestnut

Paludicultures for Mecklenburg-Vorpommern

Wet
meadows

Water
buffaloes

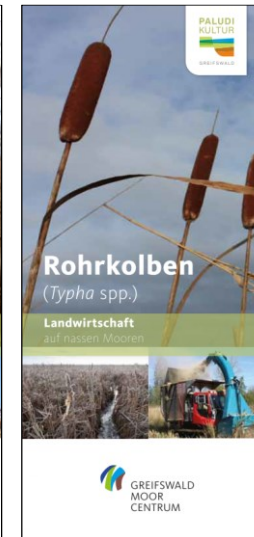
Reed
canary grass

Black alder

Common
reed

Cattail

Peat
mosses



Flyers with basic information how to establish, manage and use.

Paludiculture – Where to implement?



GREIFSWALD
MIRE
CENTRE

→ *What are the requirements of the cultures?*

Important factors and measures for establishment and management

- Field size
- Site preparation (tillage, leveling, infrastructure)
- New establishment (sowing, planting, "succession")
- Water management (passive, active, flooding? summer / winter)
- Nutrient requirement (low, moderate, high)
- Harvest (summer, autumn, winter)

→ *What kind of restrictions have to be considered on site?*

Premise:

Paludiculture has to respect the existing legal framework (e.g. protection of grassland, protected areas)!

Paludiculture – Where to implement



GREIFSWALD
MIRE
CENTRE

Wet pastures – grazing
Wet meadows - biomass



wet-grassland-paludiculture

→ Maybe shift of the composition of plant community after rewetting

Black Alder
Reed
Reed Canary Gras / other grasses
Cattail
Peatmoos
Sundew



cropping-paludiculture

→ Existing vegetation will be replaced!

→ Cropping-paludicultures are only possible where the existing vegetation is not protected!!!



Categories for paludiculture

1st Class: no restriction, all kinds of paludiculture possible

2nd Class: restrictions have to be considered and may limit the establishment of cropping-paludiculture (e.g. Bird Directive area (SPA), development zone of protected areas like Biosphere reserves and National Parks)

3rd Class: grassland is protected and has to be preserved, only a transfer to wet meadows is possible, no cropping-paludiculture (e.g. flora fauna habitat types, nature reserves)

4th Class: no paludicultures are possible (e.g. core zone of protected areas)

Permanent grassland (143,998 ha)

Cropland (20,531 ha)

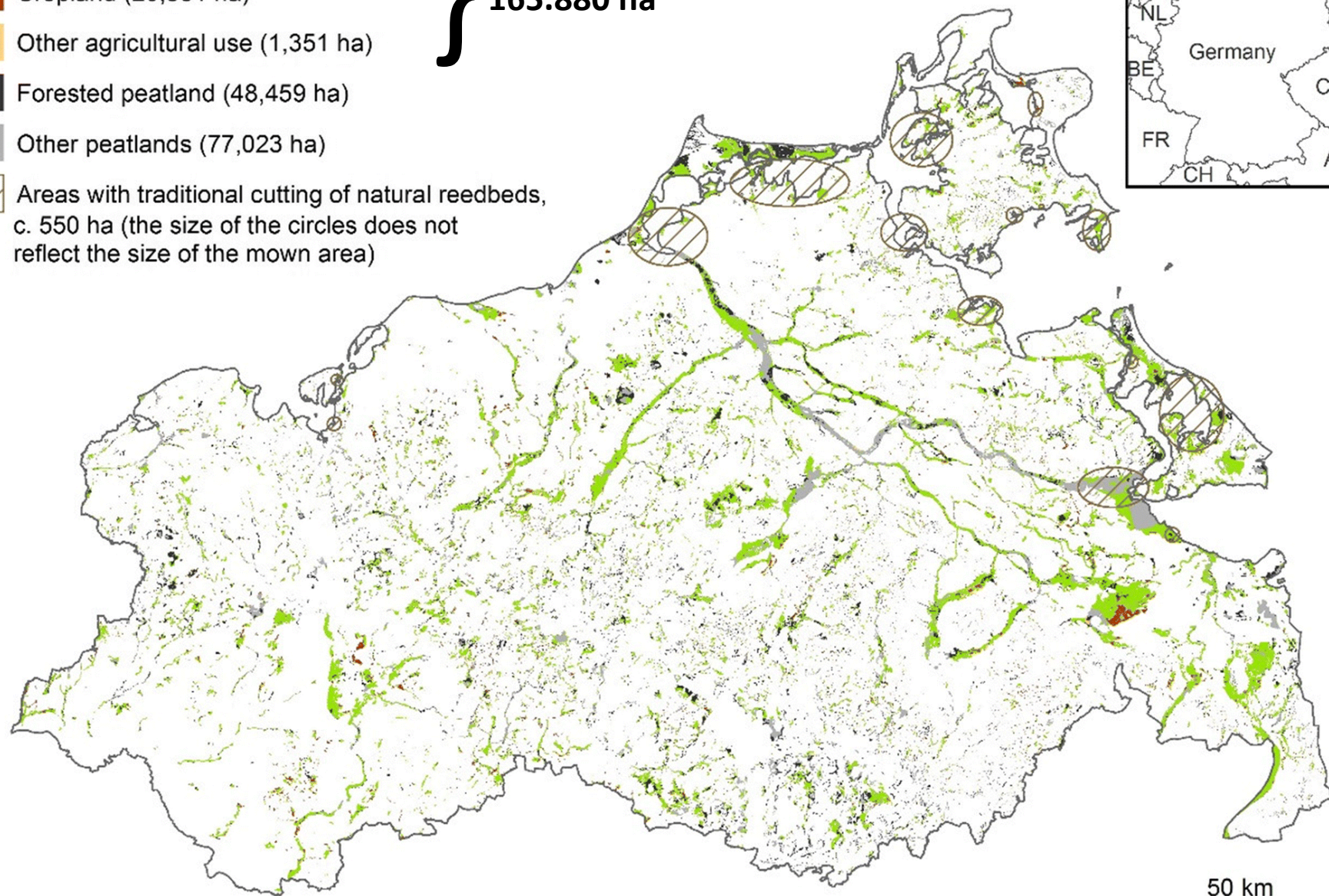
Other agricultural use (1,351 ha)

Forested peatland (48,459 ha)

Other peatlands (77,023 ha)






Areas with traditional cutting of natural reedbeds,
c. 550 ha (the size of the circles does not
reflect the size of the mown area)

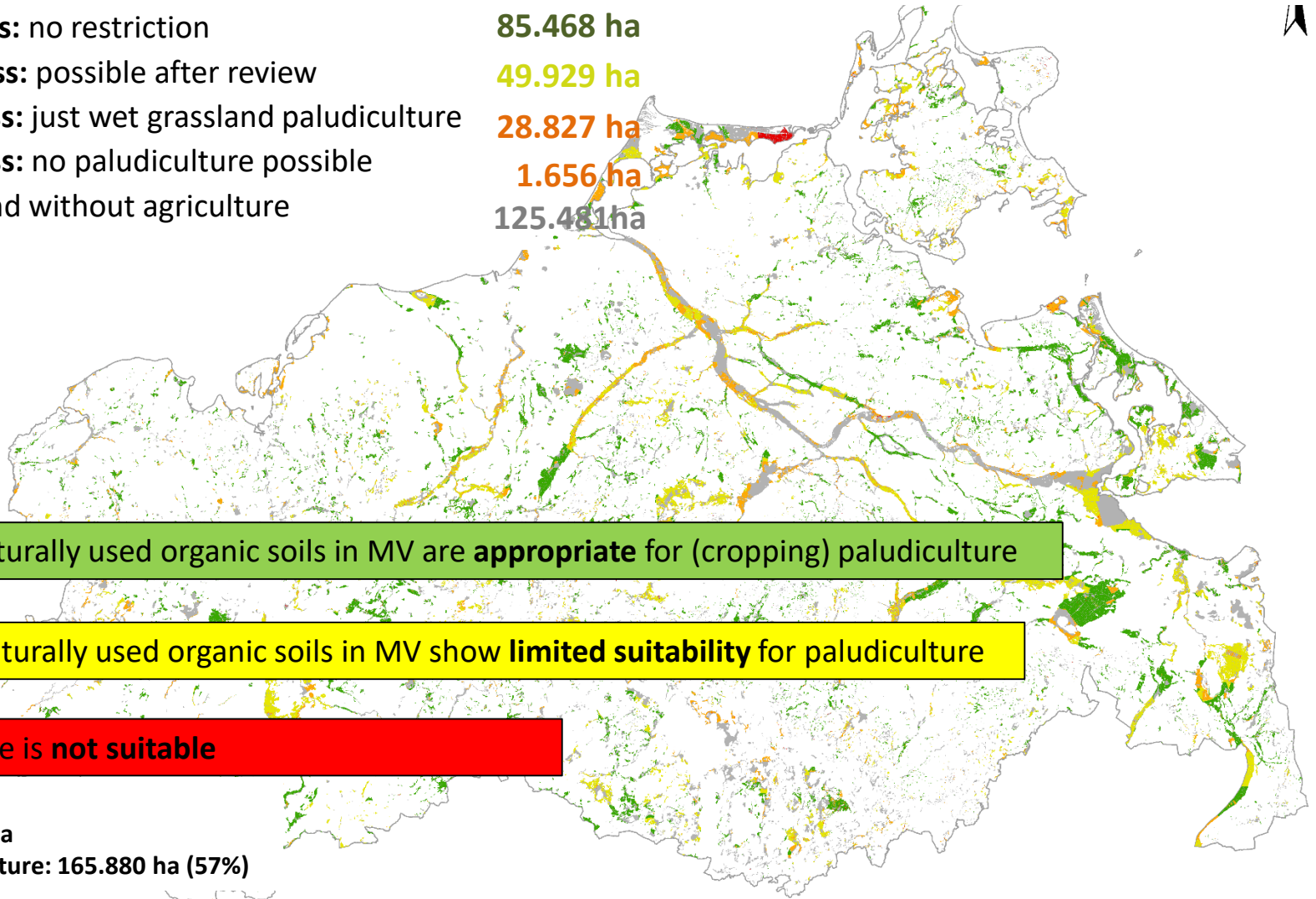
165.880 ha



50 km

Categories for paludiculture on agricultural used peatlands

| | | |
|--|---|------------|
|  | 1 st Class: no restriction | 85.468 ha |
|  | 2 nd Class: possible after review | 49.929 ha |
|  | 3 rd Class: just wet grassland paludiculture | 28.827 ha |
|  | 4 th Class: no paludiculture possible | 1.656 ha |
|  | peatland without agriculture | 125.481 ha |



>50% of agriculturally used organic soils in MV are **appropriate** for (cropping) paludiculture

47,5% of agriculturally used organic soils in MV show **limited suitability** for paludiculture

1% paludiculture is **not suitable**

peatland area:
Total: 291.361 ha
Used for agriculture: 165.880 ha (57%)

Source:
Landwirtschaftliches Feldblockkataster - Feldblöcke (2015), 1:10.000, MLUV.
Küstenüberflutungsmoore (Stand: 10/2016) 1:10.000, LUNG M-V.
Konzeptbodenkarte – Moorbodenformengesellschaften (Stand: 15.5.2014) 1:25.000, LUNG M-V.

Categories for paludiculture on agricultural used peatlands MV



GREIFSWALD
MIRE
CENTRE

| Class 1 | | Class 2 | | Class 3 | | Ineligible | | |
|---|---------------|---|---------------|--|---------------|---|------------|--------------|
| <i>Any paludiculture possible</i> | ha | <i>Permanent grassland paludiculture or cropping paludiculture possible (with administrative check)</i> | ha | <i>Only permanent grassland paludiculture possible (with administrative check)</i> | ha | | ha | |
| | Sum | 85,468 | Sum | 49,929 | Sum | 28,827 | Sum | 1,656 |
| Areas without restrictions | 16,619 | Biosphere reserves (transition zones) | 2,031 | Biosphere reserves (buffer zones) | 1,431 | Biosphere reserves (core areas) | 10 | |
| Areas eligible to EAFRD funding: low intensity grassland (funding period 2014–2020) | 68,849 | Special Protection Areas (SPA): | 42,596 | National parks (buffer and transition zones) | 2,646 | National park (core areas) | 753 | |
| | | Natura 2000 habitat types (Habitats Directive Annex I; provisional map) | 12,753 | Legally protected wetland biotopes | 10,674 | Legally protected dryland and woodland biotopes | 896 | |
| | | Areas owned by nature conservation organisations | 1,268 | Nature conservation areas | 9,732 | | | |
| | | | | Areas eligible for EAFRD funding: 'valuable grassland habitats' (funding period 2014–2020) | 6,302 | | | |
| | | | | Natural monuments | 357 | | | |
| | | | | Protected landscape elements | 124 | | | |
| | | | | Areas with priority plant species (flora protection concept) | 8,939 | | | |
| | | | | Expert landscape plan, class 'wet biotopes' | 7,813 | | | |
| | | | | Natura 2000 habitat types (Habitats Directive Annex I)* | 2,093 | | | |
| | | | | Areas with Habitats Directive Annex II habitats | 6,666 | | | |

Assessment of the potential of different paludiculture types on rewetted agricultural land MV



GREIFSWALD
MIRE
CENTRE

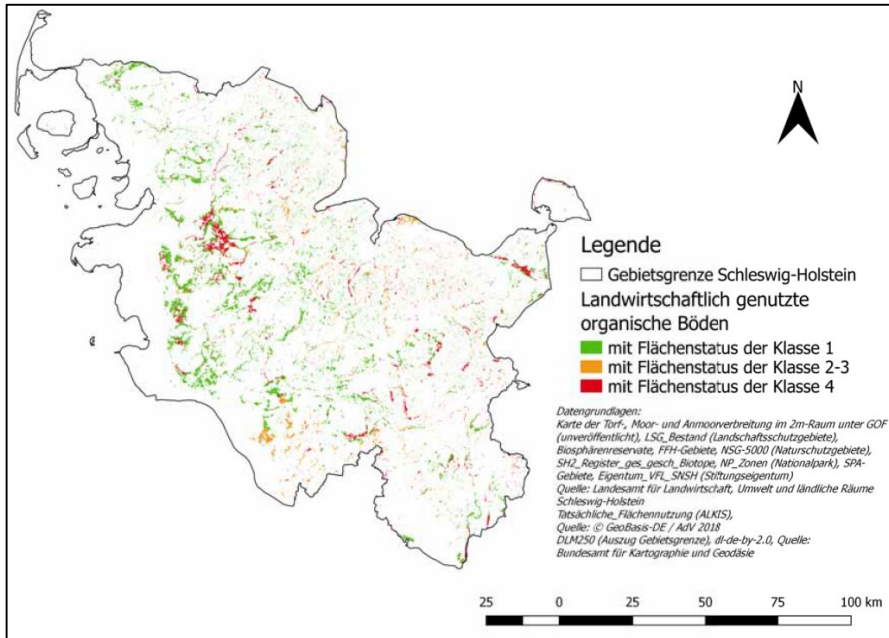
| | | Wet pasture | Wet meadow | Black Alder | Reed | Reed Canary Grass and other grasses | Cat-tail | Peat-moss | Sun-dew |
|-------------------------------------|---|-----------------------------------|------------|------------------------|------|-------------------------------------|----------|-----------|---------|
| | | Permanent grassland paludiculture | | Cropping paludiculture | | | | | |
| State of development | Implementation possible, ready for practical use | x | x | x | (x) | | | (x) | |
| | Recognized as agricultural crop | x | x | | | x | | x | x |
| | Demonstration site needed to show that ready for practical use | | | x | x | x | x | x | x |
| | Experimental site needed for further research in MV | | | | x | x | x | | |
| Sites | Suitable sites existing in MV | x | x | x | x | x | x | (x) | (x) |
| Profitability | Economically promising, as tested and/or demand/market existing | x | x | x | x | | x | | |
| | Economic potential, revenues expected from material/medicinal use | | | x | x | | x | x | x |
| Nature conservation | Favouring biodiversity (habitat value) | x | x | x | x | ? | x | x | x |
| | Landscape maintenance, protection of open/cultural landscapes | x | x | (x) | (x) | x | (x) | x | |
| Climate protection | Carbon store (peat preservation) | x | x | x | x | ? | x | x | x |
| | Carbon store and sink (peat preservation and formation) | (x) | x | x | x | | ? | (x) | x |
| Obstacles | Not unequivocally recognized as agricultural crop | (x) | (x) | x | x | | x | x | x |
| | Difference to legal biotope protection ambiguous | | | | x | x | x | x | x |
| Impairment of objects of protection | Soil | – | – | – | – | – | – | – | – |
| | Water | – | – | – | – | – | – | – | – |
| | Existing vegetation | – | – | (x) | (x) | (x) | (x) | (x) | (x) |

Excursus to other federal states



GREIFSWALD
MIRE
CENTRE

Schleswig-Holstein

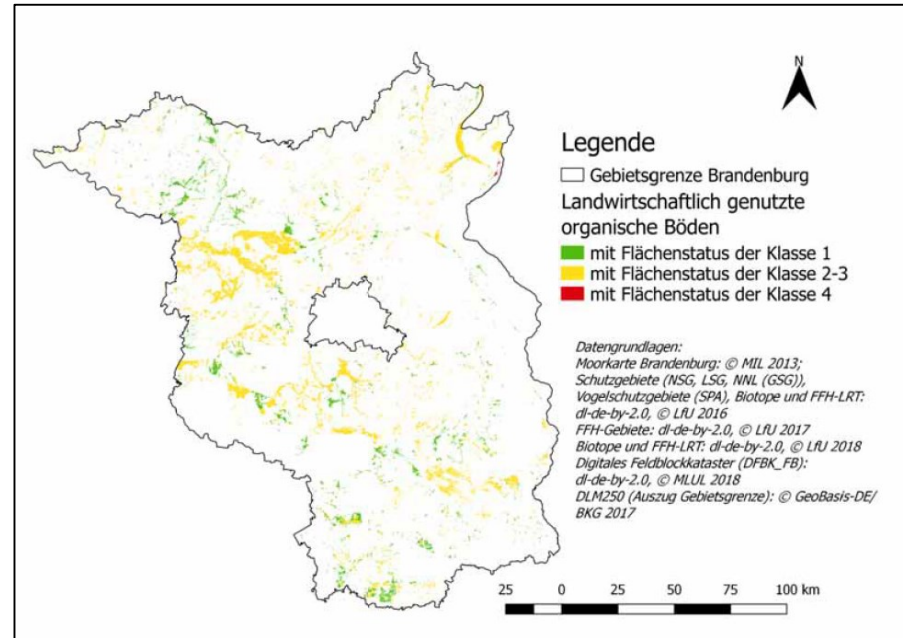


68%

12%

20%

Brandenburg



28%

>71%

0,2%

Närmann et al.
2020

Aim of this classification



GREIFSWALD
MIRE
CENTRE

Guide for spatial planning

- Classification of sites is not binding, deviations are possible!
- Estimation of the planning effort and the need for approval.
- Shows possible alternatives for farmers and consultants.
- Make clear where nature conservation interests are of priority!
- Help us in finding representative demonstration sites.
- Basis for future grant decisions (agri-environmental schemes).
- Estimate the mitigation potentials of paludiculture.

Conclusions



GREIFSWALD
MIRE
CENTRE

- Paludiculture discussed with stakeholders
- Joint information base created
- Concept of paludiculture was sharpened and focused towards a practice
- Sceneries for implementation of paludiculture formulated
- Continuation of the dialogue planned
 - Facilitate paludiculture
 - Demonstrate paludiculture

A wide-angle photograph of a large field of green plants, likely a wetland or marsh, with rows of plants in water. In the background, there is a farm building with solar panels on the roof, a silo, and trees under a blue sky with light clouds. A white banner with green text is overlaid on the middle of the image.

Make clear what and where?

Chapter 4: Scenarios for annual emission reductions by rewetting and conversion to paludiculture for peatlands in paludiculture eligibility classes 1–3



GREIFSWALD
MIRE
CENTRE

| Scenario | Area [ha] | Emission factor [t CO ₂ eq ha ⁻¹ a ⁻¹] | Emission [t CO ₂ eq a ⁻¹] | Emission reduction [t CO ₂ eq a ⁻¹] |
|--|-----------|--|---|---|
| <i>Rewetting drained cropland</i> | | | | 535,859 |
| Reference: drained, cropland | 20,531 | 32.8 | 673,417 | |
| Rewetting and cropping paludiculture | 20,531 | 6.7 | 137,558 | |
| <i>Rewetting drained grassland (class 3 only)</i> | | | | 507,356 |
| Reference: drained, grassland | 28,827 | 25.5 | 735,089 | |
| Rewetting and permanent grassland paludiculture | 28,827 | 7.9 | 227,733 | |
| <i>Rewetting drained crop/grassland - classes 1/2/3</i> | | | | 3,064,856 |
| Reference: drained cropland | 20,531 | 32.8 | 673,417 | |
| Reference: drained grassland | 143,693 | 25.5 | 3,664,172 | |
| Rewetting and cropping paludiculture | 20,531 | 6.7 | 137,558 | |
| Rewetting and permanent grassland paludiculture | 143,693 | 7.9 | 1,135,175 | |

Chapter 5 Recommendations



GREIFSWALD
MIRE
CENTRE

1. convening a paludiculture working group (including the development of a climate protection area premium to reward climate protection performance)
2. Implementation of demonstration projects and research sites
3. Support for the implementation of practical utilization processes:
 - a) thermal utilization
 - b) Cultivation of black Alder
4. Promoting the use of biomasses in areas that have already been rewetted.

Chapter 5: Recommendations



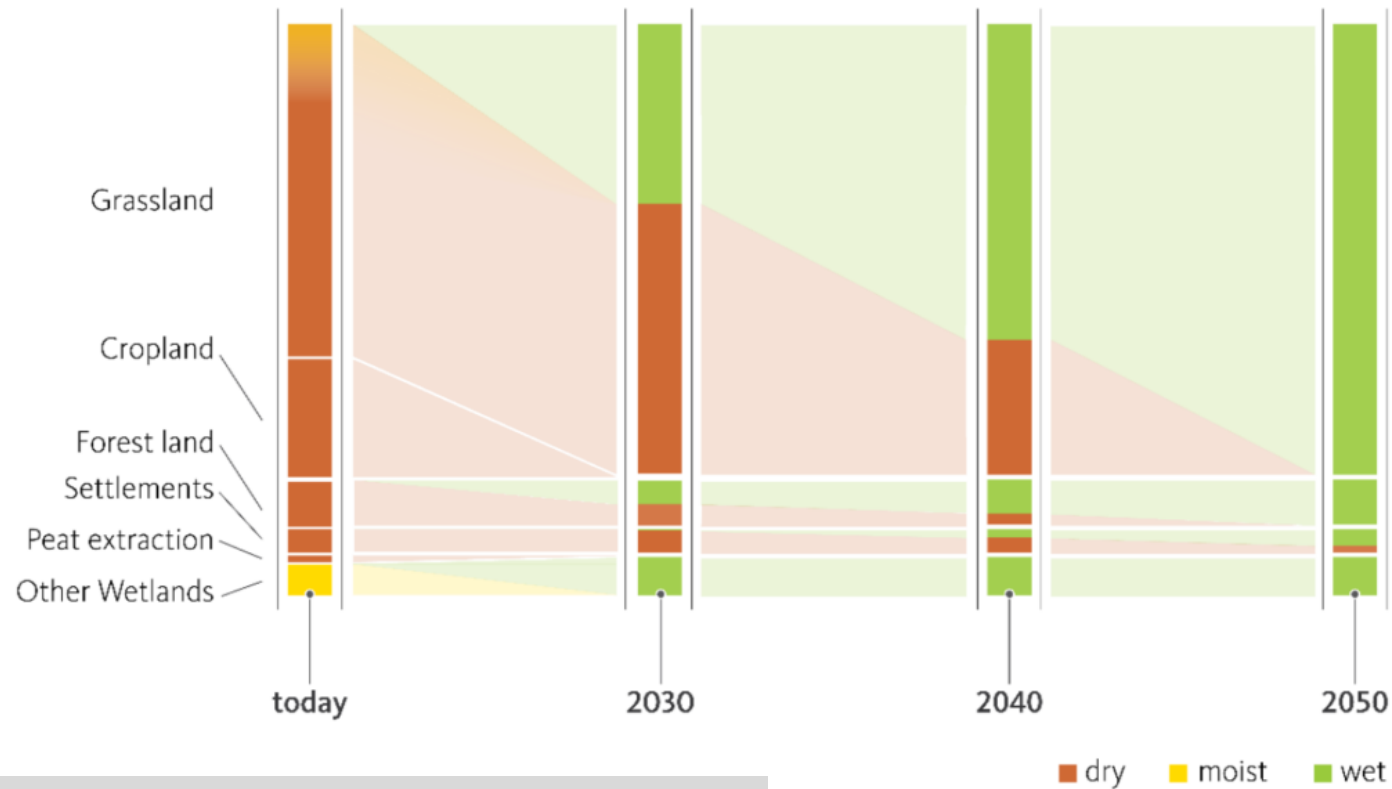
GREIFSWALD
MIRE
CENTRE

6. Strengthening university education
7. Consideration of climate protection potentials in the land use sector
8. Create financial incentives for paludiculture through the development of carbon credits (MoorFutures 3.0)
9. Revision of the reed mowing guidelines
10. Updating of data on peatland distribution
11. Establishment of a climate protection department
12. Strengthening the acceptance of paludiculture through better presentation of climate protection potentials in the field of peatland use

Transformation pathway for peatland use until 2050



GREIFSWALD
MIRE
CENTRE



→ approach to operationalizing the politically agreed targets

→ Peatlands considered alone

→ Target: max. reduction of existing GHG source; potential as sink minimal.



DESIRE



**GREIFSWALD
MIRE
CENTRE**



**Succow
Stiftung**

DESIRE WP 2.3 DIALOGUE OF MULTIDISCIPLINARY WORKING GROUP ON PALUDICULTURE IMPLEMENTATION

Leader –PP 2: Succow Foundation, Greifswald, Germany

DESIRE-Strategy for paludiculture in the Neman basin



GREIFSWALD
MIRE
CENTRE

Strategy

- Formulation of criteria on necessity of measures, temporal availability of peatland sites, status of sites and other site specific conditions
- identification of priority paludiculture areas for rewetting and paludiculture
refer to inventory and maps produced in the Inventory of peatlands in the Neman basin

Timeplan

- currently under development, needs support by PPs
- continue until EoP (December 2021)
- finalize with a brochure

Target group(s) and use of the main output



GREIFSWALD
MIRE
CENTRE

Target groups

- National and regional authorities:
 - policy development, involvement into strategic spatial planning aimed at reduced nutrients runoff, ownership
- Farmers:
 - designation of priority areas for planning of paludiculture, identify new business perspectives via providing ecosystem services (nutrient retention, GHG reduction) and harvesting of biomass.
- Nature conservation authorities and NGOs:
 - avoid conflicts of land use, make clear where (in which peatlands sites) nutrients retention is a priority, where nature protection goals have to be considered or are more important - as a basis for grant decisions (agri-environmental schemes).

Brochure on strategy for paludiculture for the Neman catchment area



GREIFSWALD
MIRE
CENTRE

Contents:

- Introduction, Situation of peatlands in the catchment area, aim of the brochure, target group
- Possibilities to develop degraded peatlands for different ecosystem services
 - natural succession / paludiculture (definition,)
- Necessary measures to be taken to implement paludiculture
- Sites for paludiculture in the catchment
 - General criteria for site selection - Criteria for bogs and fens/transgression mires
 - temporal availability of peatland sites
 - status of sites and other site specific conditions
- priority of a paludiculture areas for rewetting and paludiculture
- Assessment of ecosystem services by peatland restoration and implementation of paludiculture
 - Reduction potential for nutrient emissions
 - Reduced losses from mineralization, purification potential for waters from catchment ???
 - Reduction potential of GHG emissions
- recommendations for peatland restoration and implementation of paludiculture

DESIRE-Strategy for paludiculture in the Neman basin



GREIFSWALD
MIRE
CENTRE

The strategy will

- create the basis for implementation of paludiculture projects in the whole catchment of the Neman river.
- will discuss and therefore help to avoid land use conflicts like contrary interests of users, nature conservation and overarching objectives like nutrient retention.
- will describe peatland management schemes (different options for paludiculture), measures to be realised towards change to paludiculture, framework conditions for wet peatland utilisation for optimised nutrient retention and potential for implementation.
- guide identification of priority areas for upscaling of rewetting and paludiculture in the catchment and avoid conflicts.
- shed light on open questions and conflicts for which the working group and further post-project discussion can find solutions.
- raise awareness and ownership of working group members and institutions for the progress of the proposed project but also for the implementation of paludiculture per se.

It is an important element for potential future larger scale expansion of the proposed measures in priority areas and for the sustainability of project results after closing of project.