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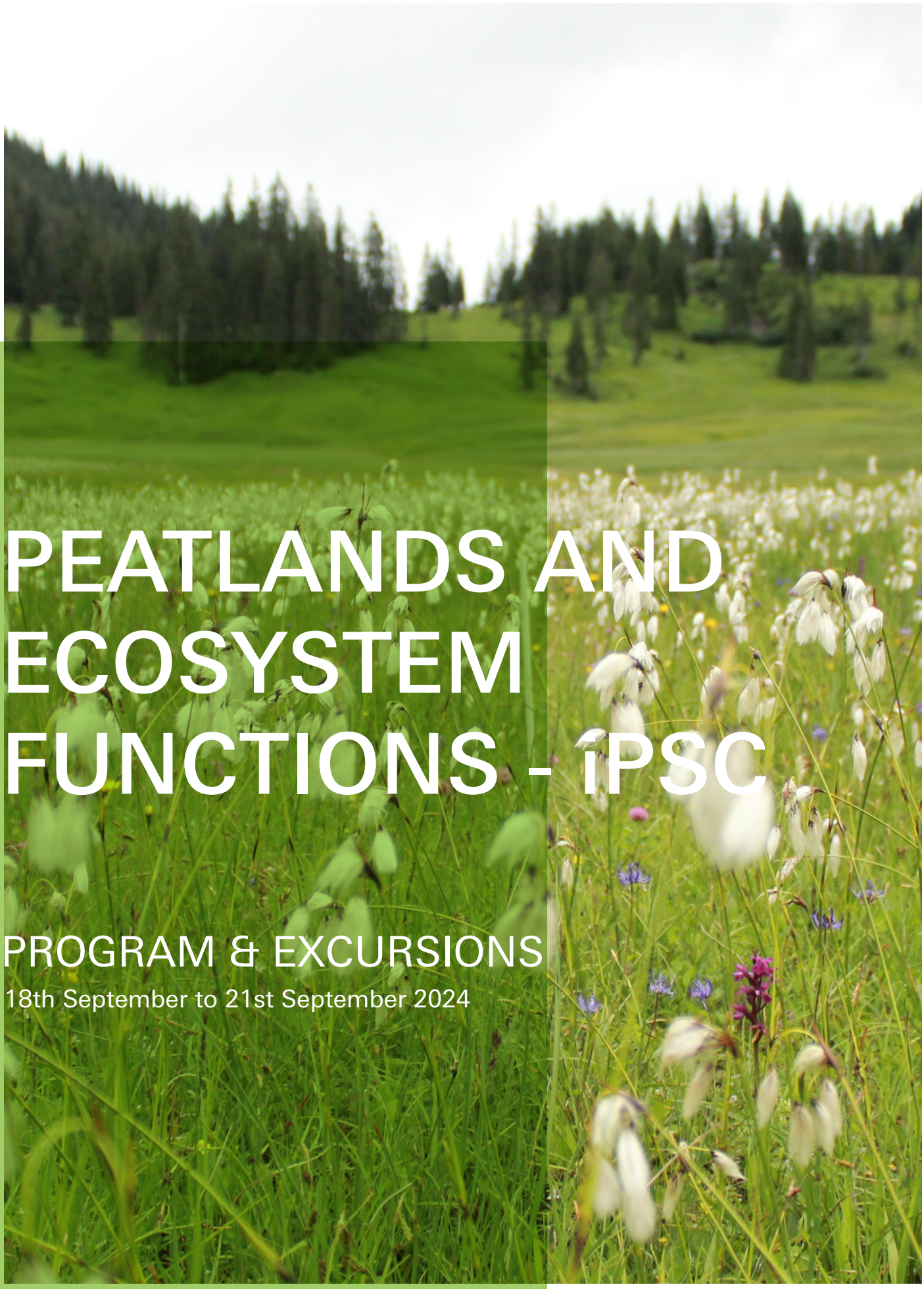

PEATLANDS AND ECOSYSTEM FUNCTIONS - iPSC

PROGRAM & EXCURSIONS

18th September to 21st September 2024

WEIHENSTEPHAN · TRIESDORF
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Arbeitsgemeinschaft Schwäbisches Donaumoos e.V.

Národní park · Chráněná krajinná oblast Šumava

DONAUMOOS-TEAM

NATIONALPARK
Bayerischer Wald

GREIFSWALD
MOOR
CENTRUM

LfL

Donaumoos
Zweckverband
Heimat verbindet.

BAYERISCHE
STAATSGÜTER
Landwirtschaft gestalten

THÜNEN

LIFE
FOR
MIRES

DFG Deutsche
Forschungsgemeinschaft

LWF Bayerische Landesanstalt
für Wald und Forstwirtschaft

Bayerisches Landesamt für
Umwelt


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The international Peatland Science Conference (iPSC) „Peatlands and Ecosytem Functions“ is held from 18th to 21st September 2024 at University of Applied Sciences Weihenstephan-Triesdorf (HSWT) in Freising, Germany. Host of the Conference is the Peatland Scinece Centre (PSC), part of the Institute for Ecology and Landscape at HSWT.

Local Organizing Committee
- Prof. Dr. Matthias Drösler (PSC, HSWT)
- Ella Papp (PSC, HSWT)
- Pia Röder (PSC, HSWT)
- Sarah Gutermuth (PSC, HSWT)
- Dr. Christina Hans (HSWT)
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- Dr. Annette Freibauer (Bavarian State Research Centre for Agriculture, Institute for Agroecology and Organic Farming)
- Dr. Stefan Müller-Kroehling (Bavarian State Institute for Forestry and Forest Economics, Department of Biodiversity, Nature Conservation, Hunting)
- Ines Langensiepen (Bavarian State Office for the Environment, Bavarian Species Conservation Centre)
- Prof. Dr. Christoph Moning (University of Applied Sciences Weihenstephan-Triesdorf)
- Dr. Franziska Tanneberger (Greifswald Mire Centre)
- Dr. Bärbel Tiemeyer (Thünen institute of climate-smart agriculture)

This booklet is also available for download as an electronic document on the conference website (https://www.hswt.de/newsroom/veranstaltungskalender/detail/peatlands-and-ecosystem-functions-ipsc)

Other conference booklets are the abstractbook and the exhibitor catalogue. Both are also available digitally on the conference website.

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18:30 -20:00	Early bird Registration		
19:00 -	Get together		

Thursday the 19th of September

07:30 -08:30 — Registration

08:30 -09:00 — Opening and welcome notes

09:00 -09:40 — Could improved water management optimize the greenhouse gas balance of peatlands?
Speaker: Bärbel Tiemeyer (Thünen-Institute)

Coffee - Break

10:00 -12:00

1.1 Soil Properties and Biogeochemical Processes in Peatlands
Chair: Haojie Liu (University of Rostock), Dominik Zak (Aarhus Univerity)

2 Renaturierungspraxis in verschiedenen Moortypen
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3 Peatlands under stress and their ecological resilience
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13:20 -14:00 — Habitat features and biodiversity of peat bogs in Belarus
Speaker: Gennadi Sushko (Vitebsk State University)

14:15 -16:00

1.2 Soil Properties and Biogeochemical Processes in Peatlands
Chair: Haojie Liu (University of Rostock), Dominik Zak (Aarhus Univerity)

4 Stoffliche und energetische Nutzung von Paludikultur-Biomasse
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5 Rewetted peatlands – Biodiversity hotspot or novel ecosystems
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17:00 -18:00 — Paludi - Fair

19:00 - — Conference dinner

*For more details please see page 18.

Friday the 20th of September

08:00 -08:30 — Registration

08:30 -09:10 — MONAS collective for environmental art with the 'Moorreaktor'

09:15 -10:15

- 6.1 Exchange of greenhouse gases from organic soils — *Chair: Tim Eickenscheidt (PSC-HSWT)*
- 7.1 Perspektiven für Wälder auf Moorböden — *Chair: Stefan Müller-Kroehling (Bayerische Landesanstalt für Wald und Forstwirtschaft)*
- 8 Social and economic challenges and impacts of peatland transformation — *Chair: Harald Grethe, (Agora Agrar & Humboldt University Berlin)*

Coffee - Break

10:45 -12:00

- 6.2 Exchange of greenhouse gases from organic soils — *Chair: Tim Eickenscheidt (PSC-HSWT)*
- 7.2 Perspektiven für Wälder auf Moorböden — *Chair: Stefan Müller-Kroehling (Bayerische Landesanstalt für Wald und Forstwirtschaft)*
- 9 Hydrological models for peatlands: processes, scales and applications — *Chair: Kristian Förster (HSWT)*
- 10.1 Wet management and strategies in agriculture — *Chair: Matthias Drösler (PSC-HSWT)*

Lunch

13:20 -14:00 — People make Peatlands – practical projects and political processes towards peatland rewetting — *Speaker: Gerald Jurasinski (GMC)*

14:00 -15:00 — Poster Session

Coffee - Break

15:30 -17:15

- 11 Classification and mapping of organic soils including remote sensing — *Chair: Ulli Dettmann (Thünen Institute of climate smart agriculture)*
- 12.1 Peatland conservation, restoration and management policies and programmes — *Chair: Matthew Warren (Food and Agriculture Organization of the United Nations)*
- 12.2 Rechtliche Herausforderungen und Anpassungsbedarf — *Chair: Jose Martinez (Georg-August University Göttingen) Anna Kiermeier (PFGC)*
- 10.2 Wet management and strategies in agriculture — *Chair: Matthias Drösler (PSC-HSWT)*

17:30 -18:00 — Closing Session

*For more details please see page 20.

Saturday the 21th of September					
08:00 -18:00	Field trips				
Excursion 1: Karolinenfeld experimental station (BaySG) and Koller- and Hochrunstfilze	Excursion 2: Schechenfilz and Benediktbeuern	Excursion 3: Swabian Donaumoos and Dattenhauser Ried	Excursion 4: Bavarian Donaumoos	Excursion 5: Bavarian Forest	Excursion 6: Freisinger Moos and Erdinger Moos

*Subject to alterations

CONFERENCE LOCATION DETAILS

PEATLAND SCIENCE CENTRE (PSC)

Peatland
Science
Centre

The Peatland Science Centre (PSC) traces its origins to research initiated 25 years ago by its director Prof. Dr. Matthias Drösler on the climate relevance of raised bogs on the edge of the Alps. The starting point was the Kyoto Climate Conference in 1997, where biological sinks were highly controversial as a measure for climate protection and were ultimately not approved. There was a lack of a solid knowledge base for assessing the climate protection potential of peatlands. This was, among other things, due to the fact that the measurement and modelling of climate-relevant trace gases in small-scale ecosystem types had not yet been methodically solved. The prerequisite for this was the development of a hood-based measurement method, which subsequently became the standard for recording the climate relevance of peatlands in the DACH countries (Germany, Austria, Switzerland).

To date, more than 40 research projects with an international, national, and regional focus have been carried out, making a significant contribution to establishing the state of knowledge on the climate relevance of peatlands.

The PSC was financially supported for the start-up phase in 2022 with state funding from the government factions of the Committee for Science and the Arts in the Bavarian State Parliament. It was further developed from the chair for vegetation ecology at the University of applied sciences Weihenstephan-Triesdorf (HSWT) and the research chair for climate change and peatland ecosystems.

The PSC will significantly improve the scientific basis for peatland development at national and international scale and offer regional solutions. Climate protection needs scientifically sound solutions for renaturation, water level elevation, and paludiculture (agricultural use of wet or rewetted peatland soils) as well as the transfer of knowledge into practical implementation.

The aims of the Peatland Science Centre

- Further research and answering of central questions around ecosystem functions, especially climate effectiveness, water balance, biodiversity of peatlands, their protection, and wet use strategies (focus on paludiculture).
- Supporting the process towards climate neutrality in Bavaria and internationally in synergy with other resources (biodiversity, water balance, and productivity)
- Continuation of the institution and safeguarding of the peatland research station in the Freisinger Moos and the ICOS measuring sites in Schechenfilz and Mooseurach, because peatland protection is a permanent task, both in science and in implementation practice.
- Expansion of knowledge transfer and university teaching in relation to the protection and wet use of peatlands

Tasks of the Peatland Science Centre

The basic concept of the PSC is based on the pillars of research & monitoring, teaching & training, policy advice & knowledge transfer. Project-based research in the field of climate relevance of peatlands will continue. The monitoring pillar enables the continued operation of the important long-term monitoring infrastructure of ICOS (Integrated Carbon Observation System) sites such as Schechenfilz or Mooseurach and the unique automatic measuring bonnet in the Freisinger Moos. The knowledge acquired from ongoing and past research projects is now to be increasingly incorporated into teaching and knowledge transfer within the framework of the PSC, thus accelerating and supporting the implementation of peatland conservation on a large scale.

The Peatland Science Centre (PSC) represents the current state of knowledge for climate protection through peatland conservation in synergy with other ecosystem functions mentioned above and is continuously developing it. Here, the standards for measurable, reportable, and verifiable (MRV) are set. Additionally, the PSC develops urgently needed, innovative, and practicable solutions for climate protection in peatlands, considering the specific starting point in Bavaria, southern Germany, and neighboring areas.

Find out more about PSC at www.hswt.de/psc

UNIVERSITY OF APPLIED SCIENCES WEIHENSTEPHAN–TRIESDORF (HSWT)

WEIHENSTEPHAN · TRIESDORF
University of Applied Sciences

The University of applied Sciences Weihenstephan-Triesdorf (HSWT) is a renowned university of applied sciences in Bavaria, specializing in the fields of environmental sciences, agricultural sciences, food technology, and landscape architecture. With campuses in Weihenstephan, Triesdorf, and Straubing, HSWT offers a unique blend of traditional knowledge and modern research.

The oldest part of the University of Applied Sciences Weihenstephan-Triesdorf, founded in 1971, is the Weihenstephaner Berg. More than 1,000 years ago, monks were already cultivating fruit and horticulture, agriculture, forestry and brewing here, always in harmony with nature. Following this tradition and committed to the principles of sustainability, the HSWT allows the interplay of man, technology and nature to take effect in its practice-oriented degree programmes, its applied research as well as in knowledge transfer and further education, following its motto "Applied Sciences for Life".

HSWT is one of the leading national and international universities of applied sciences and green engineering. Excellent teaching with a strong practical orientation and applied research form the core of our self-image. It stands for anchoring the principles of sustainability in society and the economy.

The Weihenstephan campus, located in Freising, is particularly known for its close ties to agricultural and environmental research. This campus offers degree programs in agricultural sciences, horticulture, food technology, and landscape architecture. It is well-equipped with modern laboratories, experimental farms, and an extensive library, providing students and researchers access to a wide range of resources. The Peatland Science Centre is also located on the Weihenstephan campus.

The Triesdorf campus is situated in rural Middle Franconia and is characterized by its practice-oriented approach. The focus here is on agricultural management, agriculture and green engineering sciences. The starting point for all degree programmes is the sustainable use and protection of natural resources. Triesdorf is renowned for its practical training opportunities, supported by extensive agricultural experimental facilities and modern laboratories. Students have the chance to apply theoretical knowledge directly in practice, preparing them optimally for their future careers.

Research and knowledge transfer are playing an increasingly important role for universities of applied sciences. The HSWT has already been achieving considerable success in this area for several years. Research and knowledge transfer are of central importance for HSWT's reputation as a science location. No other University of Applied Sciences in Germany has a comparable range of subjects as consistently focused on green engineering. In the seven departments at the two campuses, HSWT covers ecological, technical and economic topics in 19 Bachelor's and 13 Master's degree programmes. In the winter semester 2023/24, around 6000 students were educated at the HSWT.

CONFERENCE VENUES

Here you see the Weihenstephan campus and the surrounding area. The most important conference venues are marked in blue. Below you will find two enlarged sections of the map.

Overview of the campus area

Map of departure point (Freising) exkursions - needed for saturday

TOURISTIC INFORMATION

Here you find a list of tourist attractions in the immediate vicinity of Freising, but also throughout Bavaria:

- 1300 Years of Freising Celebration: In 2024 Freising, one of Bavaria's oldest towns, celebrates its 1300-year anniversary with a series of special events and festivities. The celebration included historical reenactments, concerts, exhibitions, and guided tours, highlighting the town's rich cultural heritage and historical significance. Visitors experience Freising's vibrant history, from its origins as a bishopric to its modern-day charm.

- Oktoberfest in Munich: The world's largest beer festival, held annually in Munich, attracts millions of visitors from around the globe. It features traditional Bavarian music, food, and, of course, a wide variety of local beers served in massive tents

- Neuschwanstein Castle: The famous fairytale castle in the Alps, built by King Ludwig II, is a must-see for every visitor. Its picturesque setting and romantic architecture make it one of the most popular tourist destinations in Germany.

- Marienplatz in Munich: The heart of the Bavarian capital features the impressive New Town Hall and the famous Glockenspiel. It is a bustling square with shops, restaurants, and historic buildings.

- English Garden in Munich: One of the largest urban parks in the world, perfect for walks, picnics, and even surfing on the Eisbach river. The park also hosts the iconic Chinese Tower beer garden.

- Zugspitze: Germany's highest mountain offers breathtaking views and a variety of winter sports activities. You can reach the summit by cable car or cogwheel train.

- Old Town of Nuremberg: The historic old town is home to the Kaiserburg Castle, Albrecht Dürer’s House, and the famous Christmas Market. It is a city rich in medieval architecture and history.

- Chiemsee: Bavaria's largest lake features the impressive Herrenchiemsee Palace, modeled after Versailles. You can take a boat tour to explore the beautiful islands.

- Berchtesgadener Land and Königssee: A region with picturesque landscapes, deep blue lakes, and the historic Eagle's Nest (Kehlsteinhaus). The Königssee is known for its crystal-clear water and surrounding mountains.

- Regensburg: One of the oldest cities in Germany with a well-preserved medieval old town that is a UNESCO World Heritage Site. The city is famous for its stone bridge and impressive cathedral.

SCOPE AND INTRODUCTION OF THE KEYNOTE SPEAKERS

SCOPE OF THE CONFERENCE

Peatlands are unique ecosystems, due to their water saturation in natural conditions creating specific habitat functions for specialized species and offering regulation functions for carbon storage and the landscape water balance. Rising knowledge leads to better understanding of processes and functions, of importance and threads, of conservation needs and wet management options.

Europe bears a significant responsibility for peatland management, as it is the second in emissions from drained peatlands globally, following Southeast Asia. Within the European Union (EU), Germany is the largest total emitter despite having only the sixth largest peatland area. The EU adopted the climate neutrality goal untill 2050 and likewise Germany untill 2045. But without strengthening the role of biological sinks, it would be quite impossible to achieve these goals.

In addition, the EU published the nature restoration law (NRL) recently, with focus on peatland management, among other fields of action. Germany has launched a funding program (“ANK”) for naturebased climate action, including biological carbon sinks.

Globally a constantly rising number of research- and management-projects addresses peatlands in their complexity from a wide range of approaches.

Therefore, the Conference on "Peatlands and Ecosystem Functions" offers a platform for

- four stimulative keynotes by acclaimed experts covering main themes of peatland research
- exchange of latest scientific findings linked to ecosystem functions organized in a broad spectrum of sessions
- insight into alternative and innovative products from paludiculture-grown biomass (Paludi-Fair)
- three pre-conference workshops on (1) communication, (2) water management and (3) the legal framework for adaptive management
- six different one-day excursions to selected peatland areas in Bavaria

In order to bridge between the requirements of an international scientific exchange and regional needs, the conference will be principally held in English, but offers some sessions and workshops for practicioners in German.

Key questions which set the frame of the conference are:

- **What is the state of the art of peatland research?**
- **Where are knowledge gaps to address in the future (regions, themes)?**
- **What are the key challenges for a transition to restoration and wet management?**
- **How to enhance the synergies between scientific information, political programs and transformation?**
- **And overall: How can the concept of "ecosystem functions" help in assessing the status of peatlands and in measuring, reporting and verifying the benefits of restoration and wet management?**

We will address these questions throughout the course of the sessions and plan to summarize them at the end of the conference.
This approach aims to engage practicioners, decision-makers, and scientists, stimulating their support for the future of peatlands.

Thank you for being a part of the international Peatland Science Conference – we are excited to having you join us!

The organizing Committee

KEYNOTE SPEAKERS

Dr. Bärbel Tiemeyer

Thünen-Institute of climate-smart agriculture, Germany

Keynote: Could improved water management optimize the greenhouse gas balance of peatlands?

Dr. Bärbel Tiemeyer studied Land Management and Environmental Protection at Rostock University and Sustainable Management of the Water Environment at the University of Newcastle upon Tyne. After returning to Rostock for her PhD, she has been working at the Thünen-Institute since 2010. The Institute of Climate-Smart Agriculture is responsible for the sectors agriculture and LULUCF of the German GHG inventory. She heads this institute's Peatland Group.
Besides conducting research projects on GHG fluxes, hydrology and water quality, the group is responsible for deriving emission factors and regionalisation methods for organic soils in the greenhouse gas inventory as well as etablishing the German Peatland Monitoring Programme (Open Land).

Prof. Dr. Gennadi Sushko

Vitebsk State University named after P.M. Masherov, Belarus

Keynote: Habitat features and biodiversity of peat bogs in Belarus

Gennadi G. Sushko, is a distinguished Professor and Doctor in Ecology and Entomology. He currently serves as the Head of the Department of Ecology and Geography at Vitebsk State University named after P.M. Masherov in Vitebsk, Belarus. Born on August 2, 1970, Professor Sushko has dedicated over 20 years to studying peat bog ecology and the species diversity of peat bog insects. He is the author of three monographs and more than fifty articles in this field of research.

His home country Belarus is one of the few European countries that have preserved its rich peat heritage. The vast Belarusian peatlands, spanning thousands of hectares, are distinguished by their unique biodiversity. Since the last glaciation, these peatlands have been home to populations of subarctic and boreal species, making them a significant ecological treasure.

KEYNOTE SPEAKERS

Prof. Dr. Gerald Jurasinski

University of Greifswald, Institute of Botany and Landscape Ecology, Germany

Keynote: People make Peatlands – practical projects and political processes towards peatland rewetting


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Gerald Jurasinski is Professor of Peatland Science at the University of Greifswald. He studied Landscape Management and Environmental Protection at the University of Rostock where he earned his Dipl.-Ing. in 2000 with a work on nature conservation management plans for dry grassland ecosystems. In 2007 he got his Doctorate in Biogeography from the University of Bayreuth with a work on Spatio-Temporal Patterns in Vegetation driven by disturbance through human land use. During his work on the dissertation he started to use resurveys as a method to investigate mid- to long-term changes in vegetation.

He kept working on this topic after starting his PostDoc at the Landscape Ecology group at the University of Rostock but now shifting to peatland ecosystems. In Rostock GJ developed a broad research interest in lowland and coastal peatlands including greenhouse gas exchange and carbon turnover in differently managed peatlands, long-term vegetation development, options for sustainable use of peatlands, and development of best practices for rewetting and restoration. The Peatland Science group in Greifswald also synthesises available data on the role of peatlands in the Earth's climate system and conducts paleo-ecological research because we can learn for the future by understanding the past.

FURTHER INFORMATION FOR PARTICIPANTS – DETAILLED PROGRAM

INFORMATION FOR PARTICIPANTS OF THE CONFERENCE

Instructions for session chairs

Please arrive at the conference rooms at least 15 minutes before the session starts and make contact with your speakers. In every room there will be assistants to help with technical questions. With so many speakers and other sessions running concurrently we need to adhere strictly to the time schedule and we rely very much on you as chairperson. Please notify the speakers that they have 12 minutes speaking time and 3 minutes for discussion.

Instructions for oral presentations

The timing of your presentation is of utmost importance. With so many speakers and another sessions running concurrently, we need to adhere strictly to the time schedule. Please, practice your talk and make sure that it will not overrun your time slot. The length of your talk is limited to 15 minutes with an 3 minutes reserved for discussion, which is considered as important as your presentation. All speakers are requested to be in the room of their session at least 15 minutes before the session starts, to bring your presentation to the technical staff and to contact the session's chairperson. Please note that it will not be possible to connect your own laptop to the projector. We want your presentation in a memory stick readable by a Windows PC (pdf, ppt or pptx). Please be responsive to the indications on the timing near the end of your talk. The session organiser will also pay attention to the duration of your presentation.

Instructions for poster presentations

Posters can be mounted on boards in the 1st and/or 2nd floor of the conference building. Poster slots will be labelled with your name and title of your poster.
Drawing pins and adhesive tape will be provided. Please mount your poster as soon as possible after your registration at the desk. There will be a poster session on Friday 20 September from 14:00 to 15:00. The posters will be accessible throughout the whole conference. During the poster session please stand next to your poster to answer questions.

Instructions for exhibitors at the Paludi fair

Each exhibitor will be provided with a table and a partition wall in the conference building, a power connection is available. The Paludi fair will take place on Thursday 19 September from 16:30 to 18:00. At the beginning, all exhibitors will have the opportunity to present their products or your idea in a 2-minute pitch. Afterwards there will be time for free networking at the stands.

Program Thursday, 19th Sept.

Thursday, 19.09.2024

07:30-08:30	Registration with coffee/tea			Foyer – ground floor
08:30-09:00	Opening and Welcome notes			D1.401 & D1.402
09:00-09:40	**Keynote: Could improved water management optimize the greenhouse gas balance of peatland? - Bärbel Tiemeyer**			D1.401 & D1.402
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10:00	Shrinkage Behavior of Peat and Other Organic Soils - Ronny Seidel et al.	Einleitung Renatuierungstechniken - Conny Siuda	Reaction and resilience of Austrian mires to 35-40 years of environmental stress: A comprehensive resampling study in 200 mires - Michael Steiner et al.	
10:15	Peat Type and Climate Zone Control the Hydraulic Functions of Peat along a Bulk Density Gradient - Ji Qi et al.	Herausforderungen bei der Umsetzung von Wiedervernässungsmaßnahmen im Wald - Anna Kühnel et al.	How resilient is the Puergschachen bog as a GHG sink over 7.5 years? - Pamela A. Baur et al.	
10:30	Soil Hydro-Physical Properties and Spatial Characteristics of Northern German Peatlands: Insights for Peatland Restoration Management - Miaorun Wang et al.	Moorrenaturierung in Niedersachsen: Too big to Fail - Martha Graf	Climate and Water Stress Symptoms in S Bavarian Mires (Das „Schlenken- und Spirkensterben" in südbayerischen Hoch- und Zwischenmooren) - Alfred Ringler	
10:45	River connection determines soil development and physicochemical properties in hardwood floodplain forests of the lower middle Elbe - Lizeth K. Vásconez et al.	Naturschutz und Denkmalpflege Hand in Hand: Renaturierungspraxis am Federsee - Judith Engelke, Katrin Fritzsch	Response of vegetation on the water level drop-down gradient on a calcareous fen (nw estonia) - Mati Ilomets et al.	
11:00	Mineral nitrogen dynamics of peatland under paludiculture following organic fertilizer amendments in contrasting hydrological regimes - Wallace Ongara et al.	Wählen Sie eine Stahlspundwand - Elisabeth Pleyl	The N-factor at different layers in peatland areas of Northeastern Mongolia - Nandintsetseg Nyam-Osor et al.	
11:15	Soil structure of peat and its role in ecosystem functioning – Haojie Lui et al.	So viel Wissen, so viele Daten- Konzeptionelle Umsetzung eines Moordaten- und Dokumentenmanagementsystems für die Erzgebirgsregion - Romy Wöllner	Restoration and conservation of peatlands in areas of interest for Quito's water supply - Raúl Galeas	
11:30	Physical parameters of peat and other organic soils can be derived from properties described in the field - Ulli Dettmann et al.	Klima- & Umweltschutz durch Hochmoorsanierung in der praktischen Umsetzung unter Beteiligung verschiedener Akteure - Frank Woesthoff et al	Mountain Peatlands: Natural Laboratories for Understanding Climate Change Effects on Carbon Fluxes – Maria E. Sanchez, Cherie J. Westbrook	
11:45	Establishment of a German peatland monitoring programme for climate protection - Open land (MoMoK) – Bärbel Tiemayer		Observing ENSO-induced Climate Variability and Seasonality of Tropical Peatlands in the Eastern Colombian Lowlands with Remote Sensing - Antje Uhde et al.	
12:00-13:20	Lunch			Canteen
13:20-14:00	**Keynote: Habitat features and biodiversity of peat bogs in Belarus - Gennadi Sushko**			D1.401 & D1.402
14:00-14:15	Break			Foyer – ground floor
14:15-16:00	Parallelsessions 2			
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14:15	Magnitude of percolation in peat profiles controls organic matter transformation in different mire types - Stephan Glatzel et al.	Ökonomische Effizienz der Paludikulturen: Eine wirtschaftliche Analyse des Anbaus von Typha und Phragmites – Wenke Rannow et al.	Identifying risk factors for the rare, endangered fen orchid Liparis loeselii in NE Germany - Kai Horbitz, Johannes Metz	
14:30	Sorption of Pharmaceutically Active Substances in Peat Soils – Eric Mirenga, Sören Thiele-Bruhn	Das Potential der Mischung aus Kartoffelpülpe und Paludikultur-Biomasse als Biogassubstrat - Christina Hartung, Hauke Heuwinkel	Project „Insekten beleben Moore" – Promoting insect diversity on rewetted cut-over peatland - Amanda Grobe et al.	
14:45	Microbial community development during and after rewetting a coastal peatland - Sara E. Anthony et al.	Mehr als ein Papiertiger: Paludikultur-Pilotprojekte in der Papierherstellung und im Bausektor - Clemens Kleinspehn et al.	Of thick shelled river mussels, weatherfishes and co. - protected species in the secondary habitat peatland - Sebastian Rudischer	
15:00	Discovering the composition of SOM from drained and rewetted peatlands: insights from molecular and biogeochemical parameters - Sonja Paul et al.	Produkte aus Moorfasern (ProMoFa) - neues Potenzial für Moore und eine Chance für das Bayerische Donaumoos – Stefanie Lang	Paludiculture can support biodiversity conservation in rewetted fen peatlands - Hanna. R. Martens et al.	
15:15	Comparative analysis of metal and nutrient uptake in different Sphagnum species: Do we have a champion for water purification? – Gabrielle R. Quadra et al.	Paludikultur Biomasse: Eine nachhaltige Ressource für Naturfaserverbundwerkstoffe im Spritzguss und 3D-Druck? – Jonas-Rumi Baumann	Does Sphagnum farming create habitat for bog species? - Lotta Zoch, Amanda Grobe	
15:30	Understanding Human Impacts on Peatland Degradation and Restoration: A Field Experiment Approach - D. Tolunay et al.	Biomasse aus der Niedermoor Paludikultur als Torfersatz im Gartenbau - Herausforderungen und Lösungen – Michael Muser	Sphagnum paludiculture sites as surrogate habitats for bog species of many species groups – results of long-term investigations in NW Germany - Greta Gaudig et al.	
15:45	The Dynamics Between Groundwater Tables and CO2 Emissions at Åstrup Fen, Denmark: primary results from a study utilizing IoT Networks, Artificial Intelligence, and Aquatic Vegetation investigation - Fenjuan Hu		Environmental and social safeguards in conflictive context : from environmental conflict to effective local participation in tropical areas - Pablo Ramos Baron	
16:00-16:30	Break with coffee			Foyer – ground floor
16:30-17:00	Quick Talk - exhibitor			D1.401 & D1.402
17:00-18:00	Paludi-Fair			Foyer + D1.310
19:00	Conference dinner			Bräustübl

WEIHENSTEPHAN · TRIESDORF University of Applied Sciences

Program Friday, 20th Sept.

Peatland Science Centre

Friday, 20.09.2024 – morning

08:00-08:30	Registration			Foyer – ground floor
08:30-09:10	**MONAS collective for environment art with the "MoorReaktor"**			D1.302
09:10-09:15	Break			Foyer – ground floor
09:15-10:15	Parallelsessions 3			
	6.1 Exchange of greenhouse gases – Tim Eickenscheidt D1.201	7.1 Perspektiven für Wälder auf Moorböden – Stefan Müller-Kroehling D1.202	8 Social and economic challenges and impacts of peatland transformation - Harald Grethe D1.301	
09:15	Influence of water management on ghg-balances along a land use intensity gradient in fen peatlands - Daniel Lenz et al.	Moore und Wald, Moorwald, Waldmoore - das Moor vor lauter Bäumen (nicht) sehen - eine Standortbestimmung zum Thema (Einführungsvortrag) Stefan Müller-Kroehling	What is considered to be meaningful in the communication on peatland rewetting, and how has this changed over time? Findings from a discourse analysis of German newspaper articles since 1975 – Jens Jetzkowitz, Charlotte Schroeder	
09:30	Don't blame the birches – impact of birch encroachment as a consequence of insufficient rewetting on carbon balances and evapotranspiration in a rewetted bog - Carla Welpelo et al.	Entwicklung der Moorwälder in Süddeutschland zwischen 1996 und 2015 - Giselher Kaule	An analysis of land use on peatlands and their economic implications - Johannes Wegmann	
09:45	Paludiculture as a nature-based solution for organic soils - Results of GHG mitigation potentials in fen peatlands - Matthias Drösler et al.	WaMoBiKi - Bewaldete Moorgebiete: Beitrag zum Schutz der biologischen Vielfalt und des Klimas und nachhaltige Nutzung zu deren Erhaltung - Dorit Protze & Corinna Schulz et al.	Socio-economic impact of peatland rewetting on farm structures in Bavaria: An analysis in the context of climate protection - Korbinian Hadersbeck et al.	
10:00	Adaptation of fen peatlands to climate change: rewetting and management shift can reduce greenhouse gas emissions and offset climate warming effects - Carla Bockermann et al.	Ein Toolkit für die Feldidentifizierung und ökohydrologische Interpretation von Moorvorkommen in Deutschland - Corinna Schulz et al.	Sustainable Management of Peatland Ecosystem in Malaysia: Enhancing Governance and Strengthening Institutional Capacity – Noradli Mohd Adli Parsada, A. Ainuddin Nuruddin	
10:15-10:45	Break with coffee			Foyer – ground floor
10:45-12:00	Parallelsessions 4			
	6.2 Exchange of greenhouse gases – Tim Eickenscheidt D1.201	7.2 Perspektiven für Wälder auf Moorböden - Stefan Müller-Kroehling D1.202	9 Hydrological models for peatlands: processes, scales and applications - Kristian Förster D1.301	10.1 Wet management and strategies in agriculture – Matthias Drösler D1.302
10:45	The relationship between vegetation type and greenhouse gas budget of moist and wet German peatlands - Lukas Guth et al.	Einige moorgenetische, hydrologische, hydroklimatische, hydromorphologische und pyrologische Aspekte einer Moor-Wald-Interaktion in (vorwiegend) sauren nährstoffarmen Mooren - Frank Edom	Using process-based modelling on parcel level to calculate nation-wide rewetting effects on peatland hydrology - Simon Jansen et al.	The Netherlands Research Programme on Greenhouse gas dynamics in Peatlands and organic soils (NOBV) - Gilles Erkens et al.
11:00	Valuation of Peatland Ecosystem Services – VALPEATS – Daniel Pönisch et al.	Biomasse und Struktur von Moor Wäldern - Jonas Sitte	Mapping Bavarian Peatlands: High-Resolution Water Level Insights Using AI - Sebastian Friedrich	Paludiculture – future wetland generation from degraded peatlands - Christian Fritz et al.
11:15	Greenhouse gas emissions and mitigation potential of Bavarian peatlands - Janina Klatt et al.	Baumarteneignung auf organischen Böden - Ergebnisse aus dem Projekt MoorWald - Steffi Dunger et al.	Modelling ditch blocking impact on field peat water level for emission reporting using MODFLOW – assessing effects of model structure and parameterization - Muhammad M. Ar Rahiem et al.	The relevance of drainage ditches as breeding habitat for mosquitoes (Diptera: Culicidae) in Northern Germany - Felix Sauer et al.
11:30	Reporting updated CO2 emission values for Dutch organic soils using a process-based model framework - Gilles Erkens et al.	Für und Wider von Baumentnahmen im Rahmen von Moorrenaturierungen am Beispiel des Ochenfilzes, Landkreis Landsberg/Lech - Cornelia Siuda		Rewetting of grassland on bog peatlands in Lower Saxony – Heinrich Höper
11:45		Was bedeuten primäre und sekundäre Moorwälder für die Zukunft unserer Moore? - Alfred Ringler		Grassland management on rewetted fens: results of field experiments in Bavaria - Annette Freibauer et al.
12:00-13:20	Lunch			Canteen

Program Friday, 20th Sept.

Friday, 20.09.2024 - afternoon

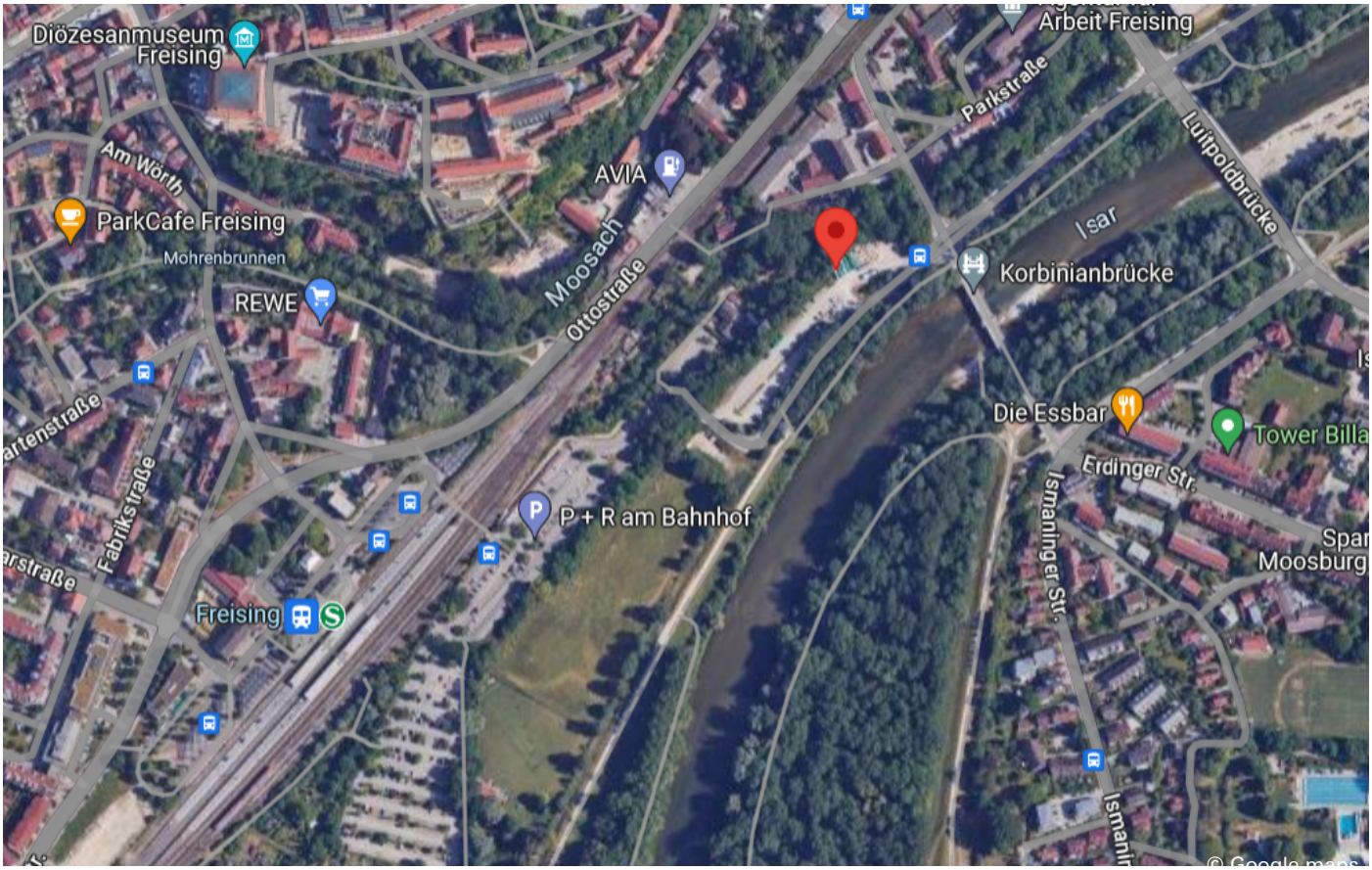
13:20-14:00	**Keynote: People make Peatlands - practical projects and political process towards peatland rewetting - Gerald Jurasinski**		D1.401 & D1.402
14:00-15:00	Postersession		Foyer – upstairs
15:00-15:30	Break with coffee		Foyer – ground floor
15:30-17:15	Parallelsession 5		
	11 Classification and mapping of organic soils including remote sensing - Ulli Dettmann D1.201	12.1 Peatland conservation, restoration and management policies and programmes – Matthew Warren D1.202	10.2 Wet management and strategies in agriculture – Matthias Drösler D1.302
15:30	Cross-scaling exploration of peatland areas - from satellite to microscope - Stephan Costabel et al.	Restoration of peatlands in Ukrainian Polissya within the framework of the project "Promoting sustainable livestock management and ecosystem conservation in Northern Ukraine" - Vasyl Fesyuk et al.	Water Management for Sphagnum and Typha paludiculture – Matthias Krebs et al.
15:45	Mapping and characterising peatland using ground-penetrating radar (GPR) and nuclear magnetic resonance (NMR) - Jan Igel et al.	The Leyte Sab-a Peatland Forest Restoration Initiative Project (2018-2021) - Matutes Heremerose et al.	The establishment phase of paludiculture with sedges – planting a sea of grass - Frank Pannemann et al.
16:00	Potential of radar remote sensing for monitoring the status of peatlands - Katrin Krzepek	Bright spots in peatland conservation and restoration – Renske Vroom et al.	Putting Paludiculture into Practice – Six Years of large-scale - Typha cultivation in North East Germany - Josephine Neubert et al.
16:15	Indication of water level by vegetation structure types, peat investigation in combination with gauges - Cornelia Siuda	Paludiculture Innovation Project – A case study from the UK – Ana I.M. Natálio et al.	Peat formation potential of Typha spp. on a paludiculture pilot site - Meline Brendel et al.
		12.2 Rechtliche Herausforderungen und Anpassungsbedarf – Jose Martines, Anna Kiermeier	
16:30	PEATMAP: A prototype model for the study of peatland and swob distribution, ecology and carbon dynamics in the Iberian Peninsula landscape mosaic) - Miguel Geraldes et al.	Skizzierung von rechtlichen Lösungsansätzen zur Flächensicherung für die Wiedervernässung von Moorböden – Thorsten Uhl, Bernhard Osterburg	Productivity and biomass quality of cattail (Typha spp.) on a 10 ha paludiculture pilot site in northeast Germany - Nora Köhn et al.
16:45	The Global Peatlands Assessment: The State of the World's Peatlands - Patrick Scheel	Noch Moor oder schon Bruchwald? – Herausforderungen Moorschutzmaßnahmen aufgrund des gesetzlichen Biotopschutzes - Thilo Tesing	Economic Prospects of Photovoltaic Systems on Rewetted Peatlands - Florian Heinrich et al.
17:00		MoorLandwirtschaft für Klimaschutz Allgäu (MoLaKlim) - Andreas Stauss	Photovoltaics and rewetted peatlands- legal framework and foundation systems - Enna M. Wetjen et al.
17:15-17:30	Break		Foyer – ground floor
17:30-18:00	Closing Session, Ausblick		D1.401 & D1.402

EXCURSIONS

DEPARTURE

Departure time: 8:00 a.m.

Departure point: 48°23'52.0"N 11°44'59.6"E



DAY EXCURSION TO THE PEATLANDS

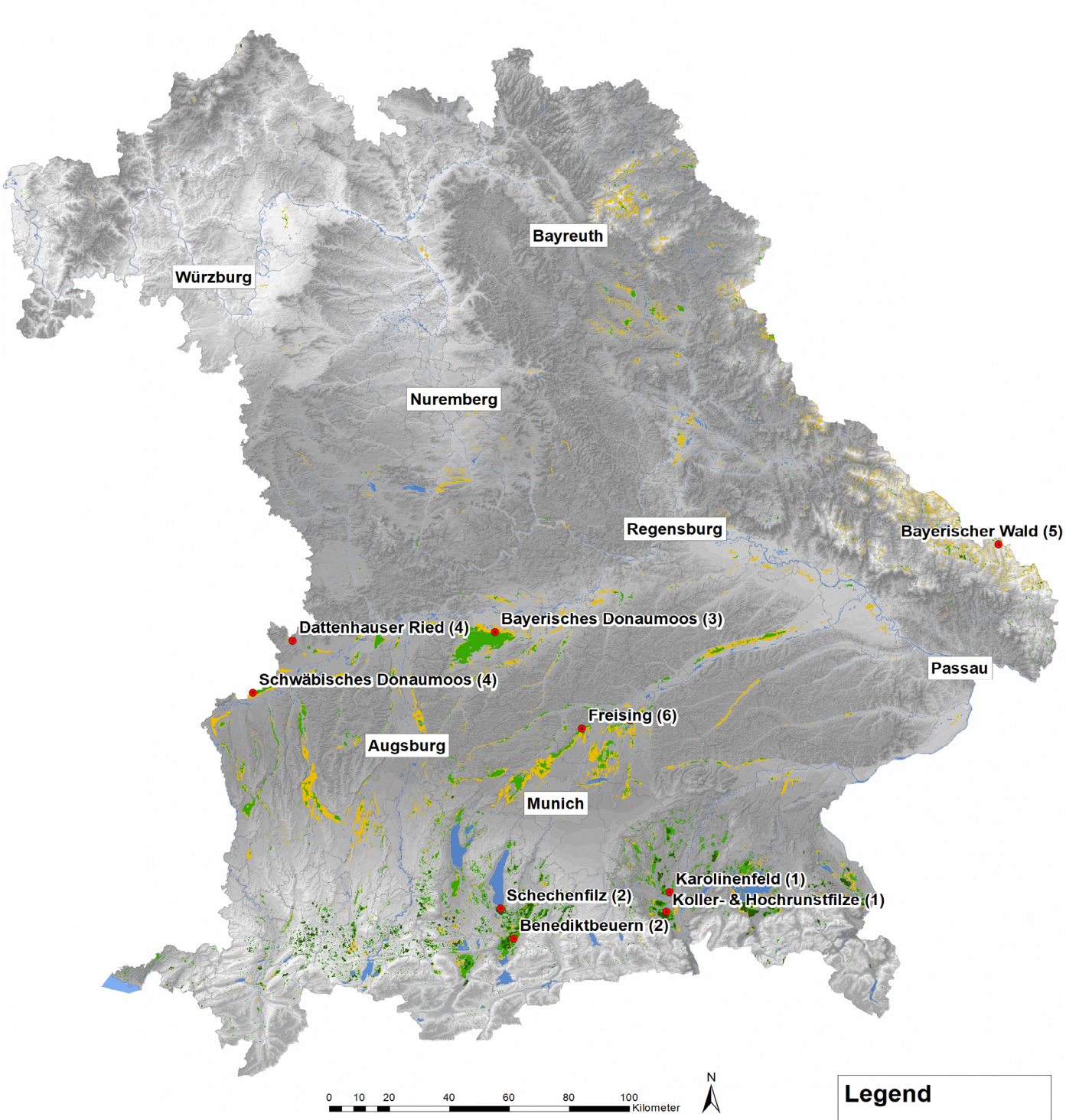
From near-natural over restored to sustainably used

Persons involved:

Matthias Drösler, Frank Pannemann, Tim Eickenscheidt, Carla Bockermann, Ella Papp, Pia Röder, Heta Meyer, Janina Klatt, Daniel Lenz, Cornelia Siuda, Luise Dexl, Sarah Gutermuth, Jörg Eberl, Florian Braumann, Moritz Demmer, Michael Kraut, Simone Mann

Annette Freibauer, Bastian Zwack, Michael Diepolder, Lennart Gosch, Johann Pflügler, Ewald Sticksel, Andreas Walz, Stefan Janda, Sebastian Knietig, Leoni Henle, Korinna Kappler, Viktoria Lindner, Maximilian Trautner, Anja Schumann, Alois Kapfer, Susanne Kling, Andreas Drexler

Excursion destinations



Sources:

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Verwaltungsgrenzen & Reliefkarte: Bayerisches Landesamt für Digitalisierung, Breitband und Vermessung

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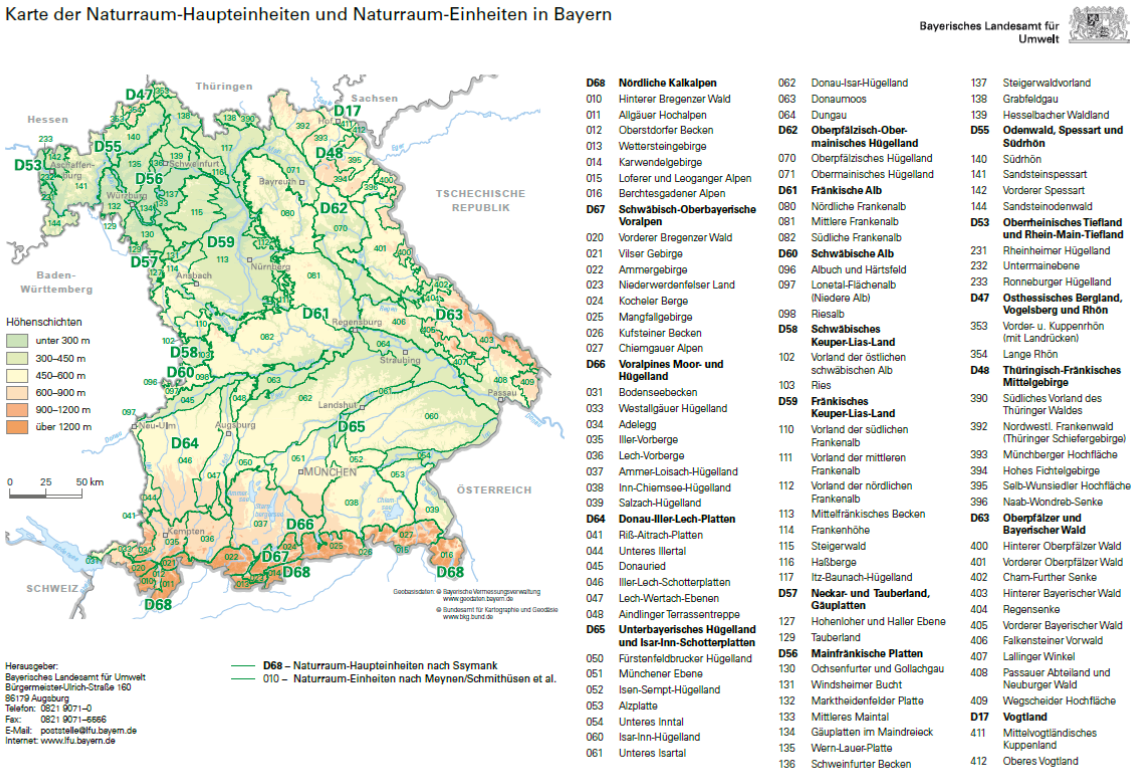
GENERAL INTRODUCTION

Natural region and their location



D68 Nördliche Kalkalpen
010 Hinterer Bregenzer Wald
011 Allgäuer Hochalpen
012 Oberstdorfer Becken
013 Wettersteingebirge
014 Karwendelgebirge
015 Loferer und Leoganger Alpen
016 Berchtesgadener Alpen
D67 Schwäbisch-Oberbayerische Voralpen
020 Vorderer Bregenzer Wald
021 Vilser Gebirge
022 Ammergebirge
023 Niederwerdenfelser Land
024 Kocheler Berge
025 Mangfallgebirge
026 Kufsteiner Becken
027 Chiemgauer Alpen
D66 Voralpines Moor- und Hügelland
031 Bodenseebecken
033 Westallgäuer Hügelland
034 Adelegg
035 Iller-Vorberge
036 Lech-Vorberge
037 Ammer-Loisach-Hügelland
038 Inn-Chiemsee-Hügelland
039 Salzach-Hügelland
D64 Donau-Iller-Lech-Platten
041 Riß-Aitrach-Platten
044 Unteres Illertal
045 Donauried
046 Iller-Lech-Schotterplatten
047 Lech-Wertach-Ebenen
048 Aindlinger Terrassentreppe
D65 Unterbayerisches Hügelland und Isar-Inn-Schotterplatten
050 Fürstenfeldbrucker Hügelland
051 Münchener Ebene
052 Isen-Sempt-Hügelland
053 Alzplatte
054 Unteres Inntal
060 Isar-Inn-Hügelland
061 Unteres Isartal
062 Donau-Isar-Hügelland
063 Donaumoos
064 Dungau
D62 Oberpfälzisch-Obermainisches Hügelland
070 Oberpfälzisches Hügelland
071 Obermainisches Hügelland
D61 Fränkische Alb
080 Nördliche Frankenalb
081 Mittlere Frankenalb
082 Südliche Frankenalb
D60 Schwäbische Alb
096 Albuch und Härtsfeld
097 Lonetal-Flächenalb (Niedere Alb)
098 Riesalb
D58 Schwäbisches Keuper-Lias-Land
102 Vorland der östlichen schwäbischen Alb
103 Ries
D59 Fränkisches Keuper-Lias-Land
110 Vorland der südlichen Frankenalb
111 Vorland der mittleren Frankenalb
112 Vorland der nördlichen Frankenalb
113 Mittelfränkisches Becken
114 Frankenhöhe
115 Steigerwald
116 Haßberge
117 Itz-Baunach-Hügelland
D57 Neckar- und Tauberland, Gäuplatten
127 Hohenloher und Haller Ebene
129 Tauberland
D56 Mainfränkische Platten
130 Ochsenfurter und Gollachgau
131 Windsheimer Bucht
132 Marktheidenfelder Platte
133 Mittleres Maintal
134 Gäuplatten im Maindreieck
135 Wern-Lauer-Platte
136 Schweinfurter Becken
137 Steigerwaldvorland
138 Grabfeldgau
139 Hesselbacher Waldland
D55 Odenwald, Spessart und Südrhön
140 Südrhön
141 Sandsteinspessart
142 Vorderer Spessart
144 Sandsteinodenwald
D53 Oberrheinisches Tiefland und Rhein-Main-Tiefland
231 Rheinheimer Hügelland
232 Untermainebene
233 Ronneburger Hügelland
D47 Osthessisches Bergland, Vogelsberg und Rhön
353 Vorder- u. Kuppenrhön (mit Landrücken)
354 Lange Rhön
D48 Thüringisch-Fränkisches Mittelgebirge
390 Südliches Vorland des Thüringer Waldes
392 Nordwestl. Frankenwald (Thüringer Schiefergebirge)
393 Münchberger Hochfläche
394 Hohes Fichtelgebirge
395 Selb-Wunsiedler Hochfläche
396 Naab-Wondreb-Senke
D63 Oberpfälzer und Bayerischer Wald
400 Hinterer Oberpfälzer Wald
401 Vorderer Oberpfälzer Wald
402 Cham-Further Senke
403 Hinterer Bayerischer Wald
404 Regensenke
405 Vorderer Bayerischer Wald
406 Falkensteiner Vorwald
407 Lallinger Winkel
408 Passauer Abteiland und Neuburger Wald
409 Wegscheider Hochfläche
D17 Vogtland
411 Mittelvogtländisches Kuppenland
412 Oberes Vogtland

Natural spatial structure of Bavaria (Source: LfU)

Inn-Chiemsee-Hügelland (038)

Landscape characteristics

This area is bordered to the west by the Mangfall, and to the east lies the Chiemsee, the largest Bavarian lake. It is a hilly terrain and terminal moraine landscape that has been shaped by meltwater valleys. In the Southern Prealps, the silting up of the Rosenheimer See, which was formed after the Würm Glaciation, allowed mighty peatlands to grow. In the north of the area, the post-glacial glacier disintegration created lakes and ponds as well as numerous deadice basins in so-called dead-ice fields. The landscape is characterized by a large number of peatlands and a mosaic of forest areas and open grasslands. Due to the large amounts of sediment and suspended matter that are transported by the Tiroler Ache into Lake Chiemsee, an estuary delta that is unique in Germany and even Central Europe can be preserved at its mouth. A band of densely populated and industrially used areas stretches along the Inn and Mangfall rivers.

Landuse and vegetation

The utilisation as forest and grassland in the Inn-Chiemsee hills is only possible through systematic drainage of the moors and wetlands, with grassland being the dominant agricultural utilisation. The areas are mostly intensively managed as meadows or hay pastures. In some cases, grassland areas are also converted into fields, primarily to grow silage maize. This intensive use is only possible through the above-mentioned land improvement measures in the fens and bogs. Systematic drainage, peat extraction and afforestation of the dried-out peat bodies led to the loss of many species typical of the habitat. In addition, the nutrient input from intensively used landscape areas is a problem for both the peatlands and Lake Chiemsee.

In the dead-ice basins of the dead-ice fields, which are mostly water-retaining, valuable biotope complexes with various silting levels have been able to form. Valuable biotopes are also the Abgebrannte Filze, Koller Filze and Hochrunstfilze, the largest contiguous raised bog area in Southern Germany. Despite large-scale peat extraction, near-natural remnants still exist here. Since December 1, 2020, the Rosenheim Stammbeckenmoore have also been designated as a Ramsar site.

Ammer-Loisach-Hügelland (037)

Landscape characteristics

The young moraine landscape shows the typical landforms of a landscape shaped by the glacial tongues of the last ice age. Characteristic features include the diverse, highly varied relief and the abundance of water bodies and peatlands (see also natural area 038 Inn-Chiemsee-Hügelland). The two large lakes, Ammersee and Starnberger See, whose basins were also formed during the Ice Age, are particularly characteristic of the area. The natural conditions result in a high degree of site diversity. In combination with the characteristic relief, this has resulted in an extremely varied and diverse pre-alpine landscape. This is particularly true of the so-called „five-lakes-land", as the area between Lake Ammersee and Lake Starnberg is known.

Landuse and vegetation

Forests and grassland make up a relatively large proportion of the Ammer-Loisach-Hügelland. In addition, the natural area has the highest proportion of zones of high and very high nature conservation importance in the region. These include several large complexes of peatland, but also a large number of smaller fen and spring areas. However, intensification of utilisation on the one hand and abandonment on the other are increasingly leading to the impairment of these near-natural areas. Only very small areas of the so-called „Hardtlandschaft", a formerly extensive park-like mixture of grassland and sparse pasture woodland, can be found today. The scenic beauty of the natural surroundings, especially Lake Starnberg and its environs, led wealthy Munich residents to build numerous castles, villas and country estates here from the 19th century onwards. The Bavarian royal family also planned and built on Lake Starnberg. As a result, the area was discovered and appropriated by an elite social class as a recreational area at an early stage. With the rapid growth of Munich, the „five-lakes-land" became one of the most frequented recreational areas around Munich and is now subject to high recreational pressure.

Münchener Ebene (051)

Landscape characteristics

The Munich Plain, which slopes slightly to the north, owes its formation to the glacial and post-glacial meltwater streams, which have built up this large plain with their gravel masses in the run-up to the glaciers. In this gravel body, a deep-lying groundwater flow moves northwards above a water-accumulating flint layer. As a result of the gradient, the distance to the groundwater table decreases towards the north. In the northern peripheral areas, the emerging groundwater has led to large marginal bogs. In the south, the Hachinger Bach, the Würm and above all the Isar have created deep valleys. The Würm and Isar in particular form important dividing structures in their further course through the plain. Apart from the few main rivers that cross the plain, the natural area is extremely poor in natural bodies of water. The younger gravel terraces in the northern part of the natural area are characterised by extremely shallow, permeable soils, which naturally provide very dry and poor site conditions.

Landuse and vegetation

The state capital of Munich is located in this natural area. The entire area is subject to enormous development dynamics and at the same time has to fulfil important recreational functions for the metropolis. Arable farming predominates in the agriculturally utilised areas. South of Munich, the area is characterised by extensive forests. The shallow soils to the north of the city are the main area of heathland in the Munich region. The typical calcareous grasslands have declined considerably compared to their former distribution area. However, in conjunction with the hardwood and coppice forests in the north of Munich, they still represent one of the most important nutrient-poor grassland habitats in Central Europe. The formerly extensive areas of fenland on the northern edge of the natural area have been drained, in some cases massively, and are largely subject to intensive agricultural use. The „Franz-Josef-Strauß" airport is also located in the fen zone. Despite the far-reaching changes, the fen areas are still characterised by a high number of highly endangered or endangered species. The Isar runs through the plain from south-west to north-east and forms an area of high biotope quality along long stretches.

Donau-Iller-Lech-Platten (045)

Landscape characteristics

The Danube-Iller-Lech plateau comprises the part of the Alpine foothills that was not glaciated during the last glacial period (Würm Ice Age). The landscape is characterized by the predominantly flat hills of the old moraines and the glacial gravel deposits as well as the gravel plains in the Würm glacial meltwater channels along the rivers Danube, Ablach, Riß and Iller. Landscape features include the large peaty former lake basins of the Federseeried and the Wurzacher Ried as well as the Bussen, which towers over its surroundings by more than 100 m and consists of Miocene freshwater limestones . The Donauried [045] is peaty over a large area. However, as a result of various hydraulic engineering measures, sites remote from groundwater prevail today. The average annual temperature is 8.0°C, the annual precipitation is between 630 and 700 mm. The soils are mainly used for arable farming or as intensive grassland.

Landuse and vegetation

The Swabian Danube Valley is largely an open valley plain that is heavily characterised by arable farming. The proportion of woodland is low and is mainly limited to alluvial forests along the Danube. Settlement in the area is concentrated on the edges of the valley. The valley floor has remained a sparsely populated area to this day as a result of the former risk of flooding and the originally wet site conditions. The consequences of the regulation of the Danube, drinking water extraction, gravel mining and extensive drainage measures have permanently changed the water balance and the character of the Swabian Danube Valley. Nevertheless, the Danube Valley is still of outstanding importance today as an important European migration axis of outstanding importance for the conservation of biodiversity. In the Swabian Danube Valley, the still existing and in the central areas still largely intact fen areas and the partly extensive and in some places still periodically flooded alluvial forests form important habitat complexes. Their core areas are protected as FFH and/or SPA sites.

As the Danube floodplain offers good potential for restoring large contiguous floodplain habitats and allowing natural processes to take place over a large area, despite its major hydraulic engineering changes, development in this direction should be pursued.

Donaumoos (063)

Landscape characteristics

The Old Bavarian Donaumoos is an extended, almost completely flat lowland fen in the immediate area of influence of the river Danube. It is separated from the river course by an approximately five-kilometre-wide low terrace. The Donaumoos basin was formed mainly during the Pleistocene when numerous streams flowed through the landscape from south to north. Over time, these waters repeatedly shifted their courses. In this way, the water carved out a basin from the soft rock layers. At the end of the Pleistocene, low-terrace gravels deposited by the Danube impeded the flow of the Donaumoos streams to the north, facilitating the formation of peat. In terms of its formation, the Donaumoos can be categorised as a percolation fen. In the south-west of the Donaumoos, peat thicknesses with a maximum of seven metres can be found. This is the transition area from the tertiary hills with mineral soils to the lowland fen. Towards the northern fringe of the Donaumoos, the thickness of the peat body is steadily decreasing. Drainage and agricultural cultivation have created sections of the peatland with varying ground water levels. The drained peat body is not only characterised by poor thermal conductivity, the basin of the Donaumoos additionally acts as a collection area of cold air from the surrounding hills. Therefore, the number of days with temperatures below 0°C is relatively high.

Landuse and vegetation

Until it's cultivation, starting in the late 1700s, the Donaumoos was the largest connected fen in Bavaria, covering around 17,000 hectares. The flat, naturally sparsely wooded area is now used intensively for agriculture following repeated drainage measures. Large areas of grassland can only be found on the fringes of the Donaumoos. The straight drainage ditches that run through the entire area are characteristic and were created from 1790 onwards. The ditches are often lined with birch trees, which at that time were planted for fortification and today structure the Donaumoos plain as long, straight birch avenues. Since draining the fen, its agricultural utilisation did not develop as hoped: fertility of the drained, dark peat soils had been overestimated. As a result, the organic soils lacked important phosphoric acids and potassium salts for plant growth, which could only be compensated for by mineral fertilisation. In the second half of the 20th century, with increasing mechanisation in agriculture, the Donaumoos became the largest continuous area for potato-growing in Bavaria. Today, potato cultivation is in decline, while corn is taking up ever larger areas. Around two thirds of the agricultural land in the Donaumoos is used for growing potatoes, corn and cereals. The remaining farmland is grassland.

Lonetal-Flächenalb (Niedere Alb) (097)

Landscape characteristics

The Lonetal-Flächenalb slopes from west to east from 640 metres to 510 metres above sea level. It is a mostly open, undulating plateau with soft shapes. The plateau is essentially divided by the valleys of the Lone and Brenz rivers, some of which are deeply incised. The plateau is mainly formed by mass limestones. These are replaced in parts by impermeable limestone layers or are covered by tertiary and, in the southern part, quaternary deposits. The deep weathered clays are improved by loess drifts. The watercourses mostly have their source in spring pools. Contiguous forests are particularly present in the area of the Lone Valley, otherwise scattered forest remnants can be found, especially on the tops of the mass limestones. The open land forms more or less continuous bands that are interrupted by deeply incised valleys.

Landuse and vegetation

The Riesalb cultural landscape unit forms a relatively undissected area with a high proportion of forest in large areas. These include large contiguous areas of deciduous forest. The alternation of open land and forest in combination with structurally rich forest edges and fringes make these areas, which are largely protected as SPA areas, one of the most important areas in Bavaria for the red kite and other birds of prey. At the same time, they provide valuable habitats for various woodpecker species. In particular, the large, closed, calcareous beech forests north of Höchstädt, which are also registered as an FFH area, are an important breeding habitat and hunting ground for bats such as the Bechstein's bat and the greater mouse-eared bat. There are also significant populations of the yellow-bellied toad and the great crested newt in these forests. The Dattenhauser Ried is one of the few Jura peatlands and is therefore an important link in the system of wetlands in the Alb. Species-rich moor-grass meadows, large sedge reeds and forage meadows as well as pastures cultivated with varying degrees of intensity alternate with fallow and scrubland areas. The area is an important breeding, feeding, resting and wintering habitat for wading birds.

Hinterer Bayerischer Wald (403)

Landscape characteristics

The inner Bavarian Forest is a low mountain range landscape characterised by extensive forests. It lies on a broad upland zone whose highest peaks are the Arber (1456 metres above sea level) and Rachel (1453 metres above sea level). The north-western part is divided into three Hercynian-striking ridges. Gabbro amphibolite, mica schist, gneiss and granite intrusions are found in the subsoil. There are cirque lakes at 900 to 1100 metres above sea level; moraine remnants reach down to 800 metres above sea level. Except for a few grassland areas, the forested area is dominated by spruce forests, with only low-growing birch, pine and juniper near Zwiesel and Kaitersberg. At higher altitudes, windthrow damage can often be seen in the spruce forests.

Landuse and vegetation

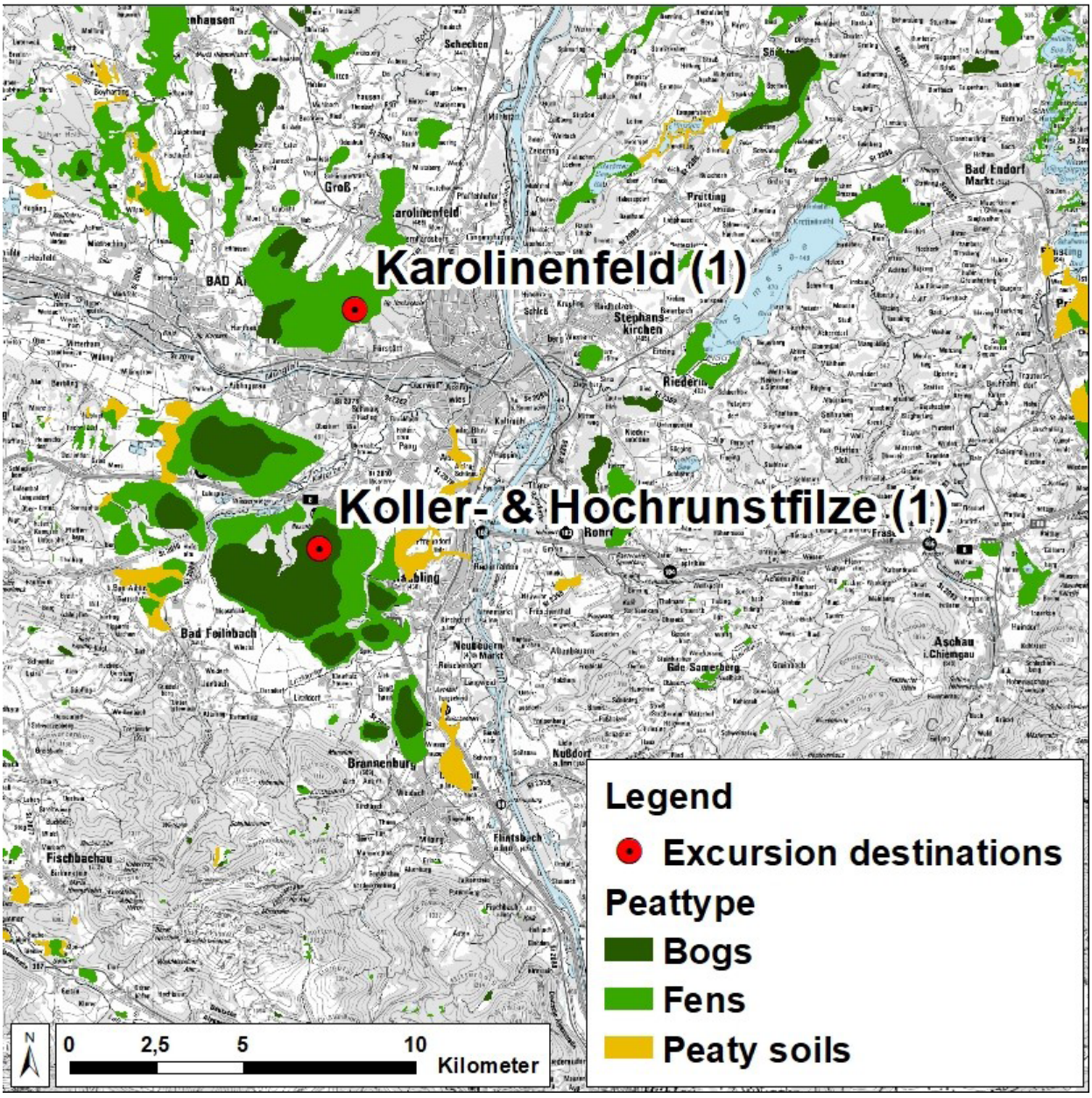
In addition to forestry utilisation, tourism is of great importance and natural forests, springs, streams, raised bogs and fens as well as dry sites are the relevant habitats of the landscape. The Arber massif, which is characterised by mountain pine forests and subalpine vegetation in the summit area, and the Falkenstein massif are very valuable areas, as they represent balancing areas in the otherwise agriculturally used region due to the large proportion of near-natural forests. The hardly developed border ridge forests are suitable retreats for capercaillie and lynx, and the area of the Regen is otter territory. However, the primeval forests have shrunk to small remnants, for example in the Höllenbachspreng, Mittelsteighütte and Arberseewand forest conservation areas. In addition to water acidification, the increasing development of the forests, damage to the forests due to air pollution and unguided recreational use, e.g. on the Arber, are problematic. Large areas in the centre of the landscape are occupied by the Bavarian Forest National Park.

FIELD TRIPS

Karolinenfeld and Koller- and Hochrunstfilze

Timetable

08:00 Departure in Freising
09:30 Arrival at Karolinenfeld – start of program
10:00 Northern grassland study site
10:30 Southern grassland study site & paludiculture
12:15 Vehicle hall
12:45 Lunch break
13:30 Continue to Hochrunstfilze
14:00 Arrival Hochrunstfilze
14:25 Presentation at the green classroom
16:20 Return to Freising
18:00 Arrival in Freising



Karolinenfeld


© Birgit Gleixner

At the agricultural research station Karolinenfeld of the Bavarian State Estates (BaySG), advanced experiments are conducted within the project "Development of peat conserving management measures for agricultural peatland and climate protection" (MoorBewi) aiming at developing sustainable concepts to cultivate wet peatland sites.

The research station spans 166 hectares, is situated at 468 meters above sea level, and receives an average of 1,200 mm of annual rainfall with an average temperature of 8.6°C. Until 2019, intensive arable farming was practiced, after which the area was converted to grassland. The station also manages 10 hectares of short-rotation plantations and 20 hectares of natural forest. Now, Karolinenfeld is fully dedicated to developing future-oriented peatland management methods.

Since 2013, the HSWT has been conducting greenhouse gas measurements, and since 2019, the Bavarian State Institute for Agriculture (LfL) has been conducting experiments on wet grassland use under the Moor-KULAP project. These efforts continue under the "MoorBewi" project, which also addresses topics such as water management and pluvicultures.


© Pia Röder

Impoundment of drainage systems

The existing drainage systems (primarily pipe drains) are controlled using regulatory structures (e.g., shaft systems). This measure aims to raise the groundwater level and thereby slows down peat decomposition. The regulatory structures allow for flexible adjustment of the water level according to weather conditions and agricultural needs.

Establishment of moisture-tolerant grassland

Special grassland stands with moisture-adapted forage grasses are established. Management is carried out as moderately intensive mowed grassland with 3-4 cuts per year. The growth can be used as a structural supplement in dairy cow feeding or for feeding dry cows and young cattle.

Establishment of paludicultures

The targeted cultivation of large sedges (Carex acutiformis) as paludiculture is being investigated in field experiments. The focus is on sowing time, companion plants, and particularly weed suppression during the establishment phase (1st and 2nd year).

Greenhouse gas emissions at peatland-compatible management

In the testing of peatland-compatible management (wet grassland and sedges as cultivated paludiculture), greenhouse gas monitoring is conducted to assess and optimize the effects of the measures on the climate balance. The focus is on the establishment phase, which involves raising the water level.

Wetness-adapted agricultural technology

For the management of re-wetted areas, peatland-conserving agricultural machinery is used. This includes adapted standard equipment that is lighter and equipped with special tires and mowers to reduce soil pressure. Additionally, specialized equipment (including machinery from mountain agriculture) such as mowers and single-axle machines with double-blade mowers is employed.

Koller- und Hochrunstfilze

The prealpine region is characterized by many wetlands, originally grounded by glacier activites after the latest ice age. In the region of the outlet of the Inn-glacier out of the Alps a large wetland (about 900 hectares), the so-called “Rosenheimer Stammbeckenmoore” emerged. This mire is built up by several peat bogs, only divided by brooks as linear flood lines.

Our visit goes to Raubling to the middle part of these peat bogs, the Hochrunst-Kollerfilze (about 500 hectares), where central parts have been used for peat mining since the middle of the 19th century. It started with manual peat digging for breweries. Since 1920 industrial peat mining with dredgers came up to gain heating material, after 1960 parts of these mining fields – 200 hectares – were used for harvesting peat for gardening. This ended in 2003. In autumn 2012 the restoration of 300 hectares started (100 hectares of former fields used with dredgers, 200 hectares of milled peat extraction); it was finished only few months later in February 2013.

- Restoration of fields exploited with dredgers was realized by peat dams, secured with inlaying logs. Locally available peat was used (still up to 3-4 meters of Sphagnum-Eriophorum-peat), the logs were brought from outside the bog by dumpers (Fig. 1, 2).
- Restoration of milled peat fields started with levelling and closing all trenches within the fields; outside peat walls were erected to hold rainwater within the sites (Fig. 3, 4).
- Central trenches were secured by 5 technical constructed mineral dams with fixed embankment in the middle of the dam. Planning and survey while realization was in hand of consulting engineers. The construction of these dams was very challenging (Fig. 5-8):
    - heavy material - only for one - the biggest dam 650 m^3 of mineral material - had to be brought in the middle of the bog (proved mixture of gravel, sand and cohesive components). Transportation on special routes (plastic mats and gravel roads on fleece material as mobile building roads)
    - the working sites had to be kept dry by permanent use of pumps
    - pouring of the material intermittent with compaction

After completion we got not only excellent dams for rewetting but also an effective flood protection (Dec. 2012 and Juli 2013 with 100-year floods) for the settlement nearby.

Construction with tansverse and vertical logs before coverage with peat and vegetation sods

Levelling milled peat fields by a snow ("peat") groomer

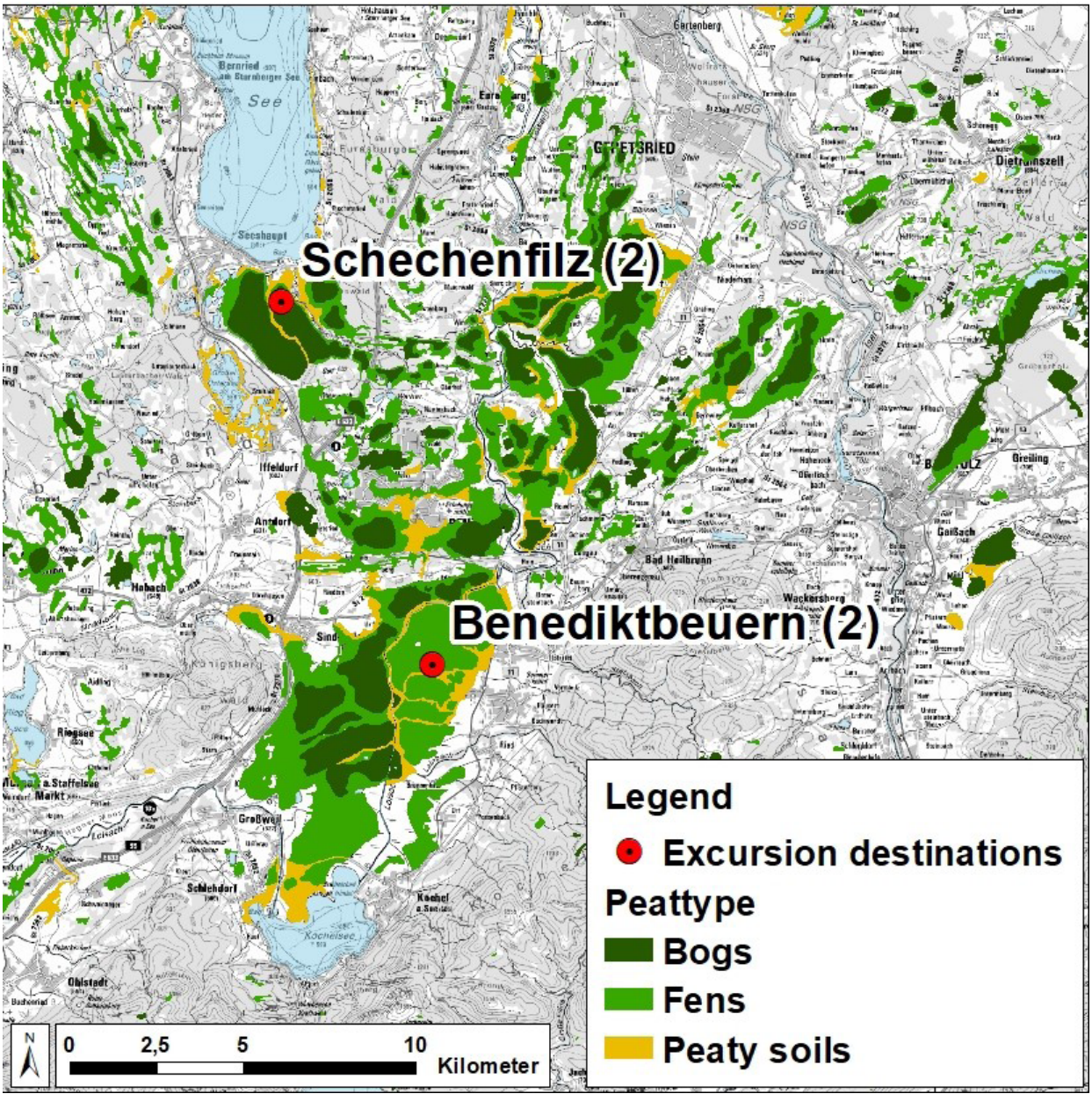
Compression of mineral material; right: Hose for water management

Mineral dam after completion

Schechenfilz and Benediktbeuern

Timetable

08:00 Depature in Freising
09:30 Schechenfilz program (Cornelia Siuda, Janina Klatt)
12:30 Drive to Benediktbeuern
13:00 Lunchbreak at Kloster Benediktbeuern (Option to use a restroom)
13:30 Benediktbeuern program
16:30 Return journey
18:00 Arrival in Freising



Schechenfilz

The Schechenfilz is a raised bog covering an area of around 111 hectares, located approximately 3 km southeast of Seeshaupt, south of Lake Starnberg. Together with the Weidfilz, which borders directly to the west, it forms part of a lake and peatland landscape created by the Isar piedmont glacier. The Schechenfilz and Weidfilz together constitute the northern part of the "Osterseen" nature reserve, which has existed since 1981 and is also designated as an FFH area. The spatial proximity to Lake Starnberg creates a lake breeze system: during the day, wind mainly blows from the lake, and thus from northern directions, while southern directions prevail at night.

The wind always blows from the relatively cooler surface area. Peat was mined in the Schechenfilz until the 1950s. Besides the actual mining areas, other parts of the peatland were prepared for mining by creating slit trenches. Only the central part of the bog remains mostly in its natural state. Since 2001, measures such as filling the slit trenches for renaturation have been implemented in the Schechenfilz (SIUDA 2001). In 2015, the slit trenches in the central area of the Schechenfilz were closed. Nowadays, the Schechenfilz is a robust sink for carbon.

The soil in the Schechenfilz is a raised bog without rooting. This means that during the development of the bog, peat sedentation was initially influenced by groundwater or stagnant water, resulting in the formation of radicell peats (mainly various Carex species, as well as reeds, birch, and pine). This was followed by the development of raised bogs fed by rainwater, with the sedentation of Sphagnum (mainly Sphagnum magellanicum) and Eriophorum peats. With a pH value of barely 4, the peat is quite acidic. While the upper 12 cm are only temporarily water-saturated, the underlying layer is continuously saturated with water and can reach a thickness of 5 m (Hommeltenberg, 2014).

The vegetation in large parts of the Schechenfilz is characterized by colorful peat moss lawns and bulge-slope complexes. In the peripheral areas, moist peat moss heath is primarily found.

The center of the raised bog is partially forested by a dense bog-pine forest (Pinus mugo rotundata). This bog-pine is endemic to central Europe and prefers nutrient-poor, acidic, and waterlogged peat soils as its habitat. Since Pinus mugo spp. rotundata is light-demanding and slow-growing, it can withstand competitive pressure under such conditions (Schmid et al., 1995).

Benediktbeuern

The Loisach-Kochelsee peatland complex, which includes the Benediktbeuern monastery land, extends south of Munich on the edge of the Alps. The complex has an area of 3,600 hectares and is designated as a FFH area and bird sanctuary. This peatland landscape was created more than 15,000 years ago during the Würm Glaciation. Initially, a vast fen complex was created through swamping, which over time developed into raised bogs. In the eastern and north-eastern areas, the Loisach-Kochelsee marshes are visibly characterised by stream alluvial deposits, which flow in from side streams from the Loisach or the Kochel mountains. For this reason, the eastern edges are characterised by pronounced alluvial fans that slope downwards towards the Loisach (QUINGER, 2009).

The close proximity to the Alps influences the climate: the location near the Alps leads to frequent orographic rainfall events, which decrease the further you move away from the mountains. At the same time, temperatures are influenced by Alpine föhn winds.

The monestary land itself is 200 ha in size and is in addition to peatlands and litter meadows mainly characterized by grassland and only small areas of woodland. The few forests were rewetted about 20 years ago and function as birch-succession forests since then. The monastery areas contain mainly fen peat, although there are also isolated areas of transition bog.

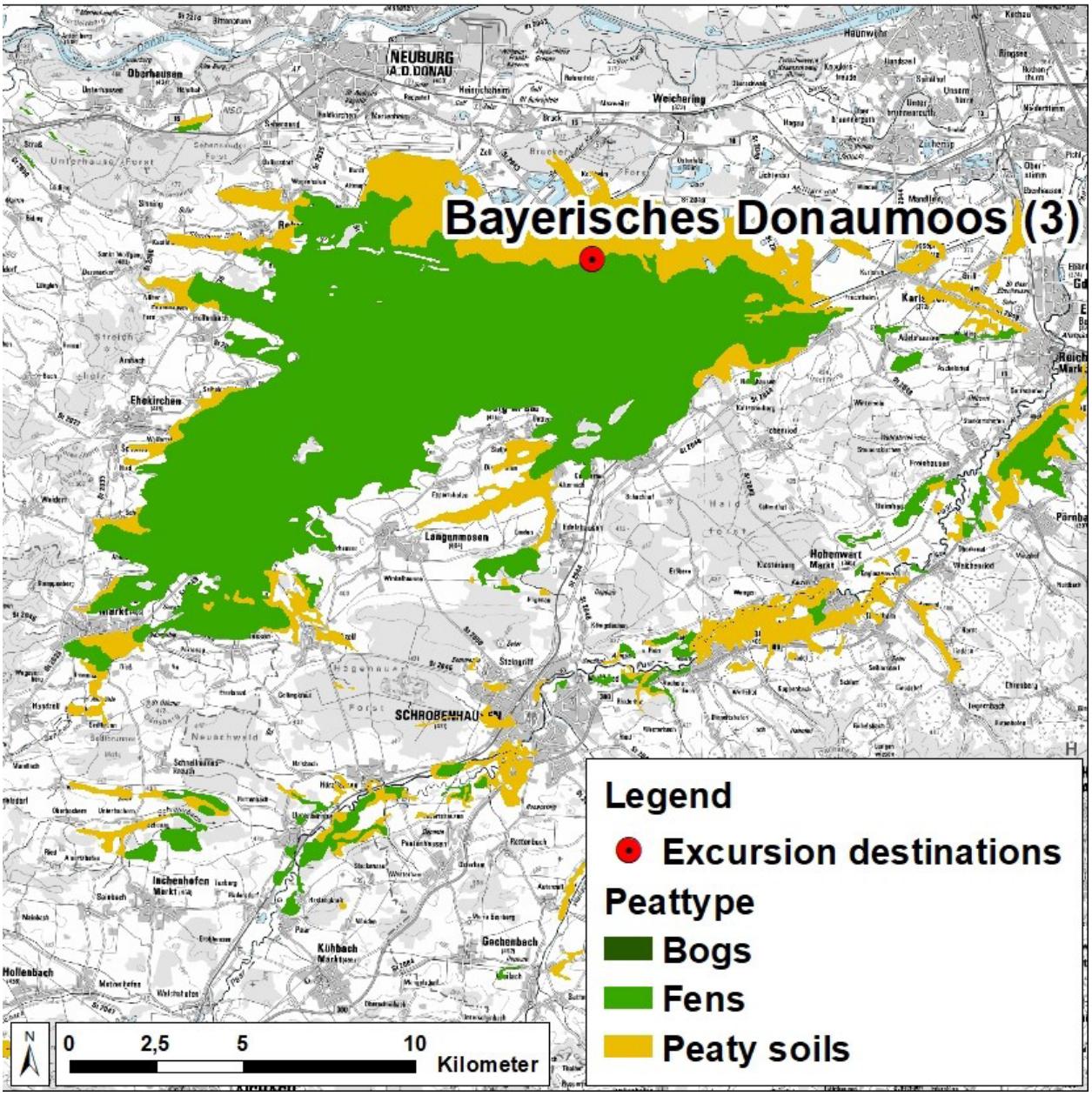
The monks living in the monastery dug drainage ditches in the area for decades in order to make the moor areas usable as pastures or meadows to obtain green fodder or bedding for stables. Since 1992, the rewetting of the moor areas and the extensification of the monastery land have been promoted by local farmers and the nature conservation office of the Center for Environment and Culture (ZUK).

As a result of this conversion, numerous rare animal and plant species live on the monastery land. The complex of naturally preserved raised bog, extensively used litter meadows and pastures provides a breeding backdrop for some meadow breeders, e.g. Whinchats and Meadow Pipits. In total, over 200 species of birds rest and breed in this area. The monastery land also provides a habitat for many species of reptiles, amphibians and insects that are highly endangered in Bavaria. Another change in land use is the grazing of the rewetted peatland areas. In a model project, grazing by Murnau-Werdenfelser cattle, Scottish Highland cattle and water buffalo was successfully established.

Bavarian Donaumoos – from the past into the future

Timetable

08:00 Departure in Freising
09:00 Arrival at Haus im Moos – start of program
11:00 Donaumoos level
12:30 Lunch break in the parish hall in Langenmosen
13:30 Experimental area near Lampertshofen (by foot)
15:00 Peatland protection site near Obermaxfeld (from bus)
15:15 Peatland protection site Baierner Flecken (by foot)
17:00 Conclusion at Haus im Moos with a flying visit to the largest herd of European bison in Southern Germany
18:00 Arrival in Freising



Haus im Moos & Donaumoos level

The Scheidegraben in the Schorner Röste - a typical drainage ditch in the Donaumoos.

The Donaumoos is a landscape with a very diverse settlement as well as cultural history. Furthermore, it is a landscape in which many different interests collide. Its impressive development over the past 250 years is demonstrated by the Haus im Moos with an open-air museum. At the same time, the facility serves as an important venue for the Donaumoos dialogue - including events for the general public, trade fairs and specialist conferences.

The history of settlement, reclamation and drainage in the Donaumoos must always be viewed in the context of the processes occurring in the soil, above all the massive loss of peat. Due to human intervention, most of the Donaumoos is no longer an intact fen.

The Donaumoos level shows soil loss.

The Donaumoos level is a particularly impressive visualisation of the change in the landscape. The oak pole in the central Donaumoos indicates the loss of soil since 1836. In concrete terms, one to two centimetres of organic soil are lost each year.

In total, this amounts to around one million cubic metres of soil loss per year for the entire area. As the largest fen in Southern Germany, the soil loss with the resulting emissions is also a climate factor.

The lowland fen emits around 600,000 tons of greenhouse gases every year. The municipal Donaumoos association (Donaumoos-Zweckverband) and the governmental Donaumoos-Team are facing this responsibility together with their partners.

Peatland protection and projects to create added value in the Donaumoos

As a long-standing player in the Donaumoos region, the Donaumoos-Zweckverband has already established itself with many implemented projects in the areas of peatland protection, flood control, agriculture and conservation of nature. In close cooperation with the Peatland Science Centre and the Bavarian State Research Center for Agriculture (LfL), the development of new value chains is also included. In several research and development projects, the association is working with its partners to establish new products, e.g. for the paper and cardboard industry. Raw materials for these experiments primarily are fibres from paludicultures. In connection with the management of rewetted areas, in a way that protects the peat, this creates the ideal combination of economy and ecology. The paludiculture test area near Lampertshofen shows how this can work.

Paludiculture has been growing on the trial area near Lampertshofen for many years.

Paludi fibres from the Donaumoos can be processed into paper, among other things. Research is ongoing.

The peatland protection projects implemented by the Donaumoos-Zweckverband are in cooperation with the Donaumoos-Team. Examples are a project site near Obermaxfeld and the Baierner Flecken. The latter actually serves as a retention area for flood control. In order to enhance biodiversity and for maintenance purposes, Murnauer-Werdenfelser, an endangered cattle breed suited for wet grounds, are grazing the site. In 2023, the peatland protection area Baierner Flecken was expanded by around 40 hectares and 18 controllable weirs were installed. A long-planned project for groundwater management near the Neuburg district of Obermaxfeld was realised in spring 2024. Through the damming of a ditch, another 40 hectares were rewetted. Here, as well as in numerous other areas in the Donaumoos, the protection of endangered meadow breeding bird species plays an additional major role. Fens are one of the most important habitats in Bavaria for these birds, some of which are threatened by extinction.

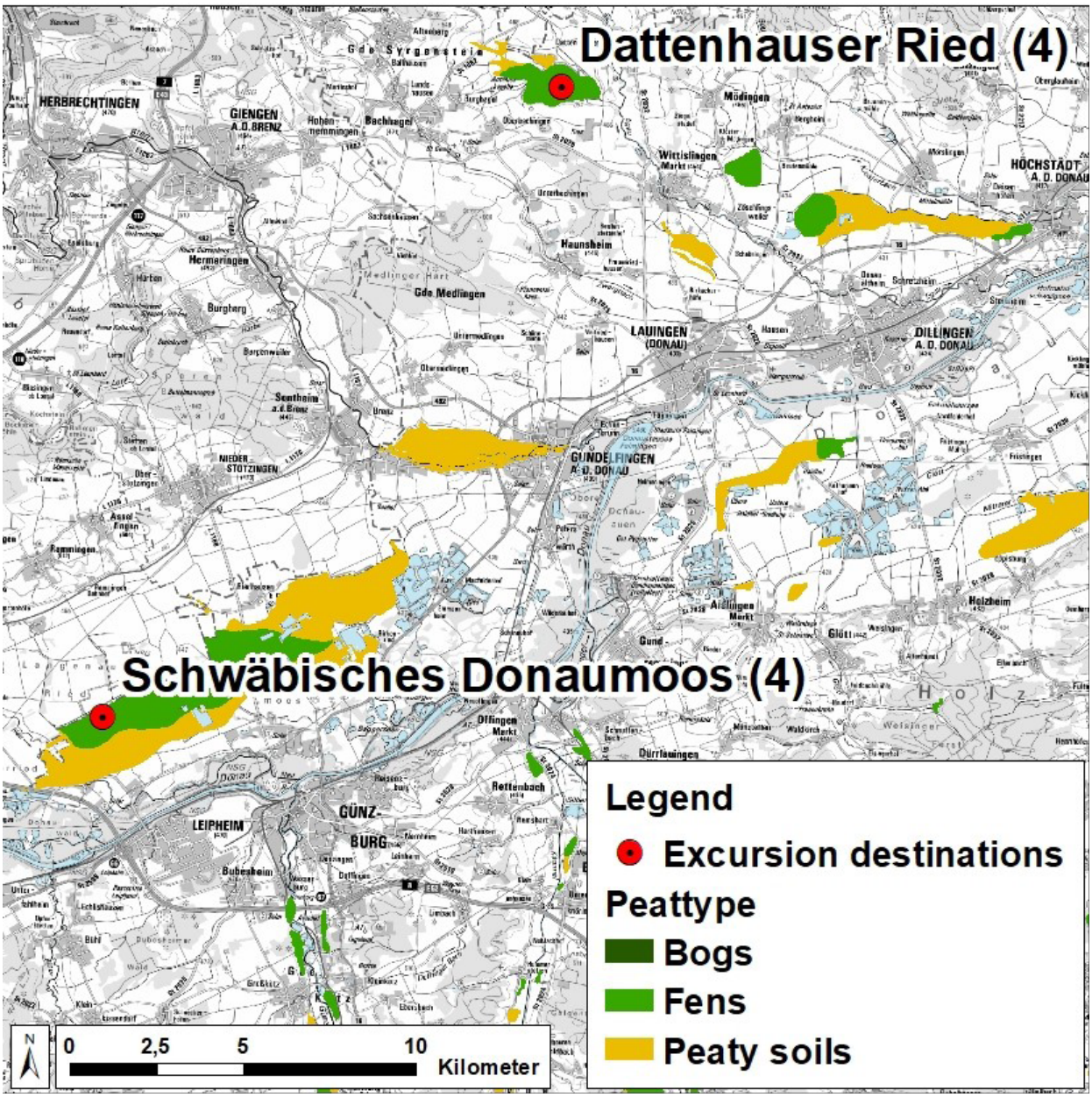
In the so-called Baierner Flecken water retention, grazing, peatland protection and nature conservation complement each other perfectly.

The starting signal for the peatland conservation area near Obermaxfeld in spring 2024

Dattenhauser Ried and Swabian Donaumoos

Timetable

08:00 Depature in Freising
10:00 Dattenhauser Ried program (Dr. Alois Kapfer)
12:00 Drive to Swabian Donaumoos
12:30 Swabian Donaumoos Stop1
13:30 Lunchbreak at Alpaka farm (Option to use a restroom)
14:15 Swabian Donaumoos Stop 2 (Anja Schumann (ARGE), Luise Dexl (PSC))
16:30 Return journey
17:30 Exit Stop in Augsburg
18:30 Arrival in Freising



Dattenhauser Ried

The Dattenhauser Ried is the largest peat and wetland area in the Bavarian part of the Swabian Alb. The fen developed around 4,000-6,000 years ago in a natural depression, fed by precipitation and groundwater. It is located about 10 km northwest of Dillingen at the Danube, on the border between Bavaria and Baden-Württemberg. The peatland, including its peripheral areas, covers 297 hectares and is situated in a depression surrounded by intensively farmed hilly land. In the Middle Ages, the depression was artificially dammed for fish farming, but it was later systematically drained and used in various ways. To this day, there are still hay meadows, species-rich fodder meadows, and remnants of peat cuttings. Gentians and orchids bloom in its species-rich meadows. The tree-free and open areas are important refuges for migratory birds and meadow breeders such as lapwings, snipes, whinchats, and curlews in the region.

Due to its great importance for strictly protected animal and plant species as well as rare habitat types, the Dattenhauser Ried is protected nationally as a nature reserve and internationally as an FFH area (Fauna-Flora-Habitat area). Special attention should also be given to the presence of the great crested newt (Triturus cristatus) and the yellow-bellied toad (Bombina variegata). The hydrological restoration of the Dattenhauser Ried aims to permanently secure the fen, make a significant contribution to climate protection by reducing emissions as much as possible, and preserve and develop the site-specific biodiversity. Overall, the water balance will be influenced over an area of about 220 hectares. According to cautious estimates, this could save 100,000 tons of CO_2 equivalents over a period of 50 years.

Swabian Donaumoos / Schwäbisches Donaumoos

The Swabian Donaumoos, covering approximately 4,000 hectares, is located in southern Germany, east of Ulm, in the states of Bavaria and Baden-Württemberg. This region is hydrogeologically unique due to the massive influx of karst water from the Swabian Alb, which creates a large groundwater reservoir that sustains the fen. Although it was once Bavaria's second-largest fen with peat layers up to 3 meters thick, only a small portion remains undeveloped today. This remnant is now internationally protected and recognized as a significant habitat, with around 550 hectares designated as nature reserves on both the Bavarian and Baden-Württemberg sides.

Until the 19th century, the wetlands were used for extensive agriculture. The straightening of the Danube and the construction of drainage ditches enabled agriculture but lowered the groundwater level. This led to droughts in dry years and floods in wet years. A comprehensive renovation of the drainage system in the 1960s further lowered the groundwater level. The expansion of the state border ditch between Bavaria and Baden-Württemberg also had an „extremely negative" impact on the fen. However, the extension of the protected area in 1981 gradually stabilized the water balance. Nature conservation organizations, such as the Swabian Danube River Wetland Association (ARGE Donaumoos), have been very active in the area, achieving significant progress over the past decades.

Water buffalos with GPS tracker in the fen pasture during rain

The EU bird protection area „Swabian Donaumoos" covers approximately 2,600 hectares. It includes high-quality habitats such as the core fen areas Leipheimer and Gundelfinger Moos with peat cuttings, hay meadows, shrub/swamp forest areas, and extensively used wet meadows, as well as intensively farmed grassland and arable land. The gravel pit lakes created by gravel extraction around the core fen areas also fall within this protected area. The Leipheimer and Gundelfinger Moos are designated as both nature reserves and FFH (Fauna-Flora-Habitat) areas. These areas host characteristic bird species, including meadow breeders like lapwings, curlews, whinchats, and meadow pipits, as well as typical fen birds such as snipes and corncrakes.

Water Buffalo Pasture

The ARGE Donaumoos manages over 140 hectares of extensive pastures in the Leipheimer Moos with Scottish Highland and Dexter cattle, Exmoor ponies, and water buffalo. Since 2023, the PSC has been measuring greenhouse gas emissions on the water buffalo pasture using an eddy covariance tower, and since 2024, with manual chambers.

Harvest of the paludi area with Phalaris arundinacea

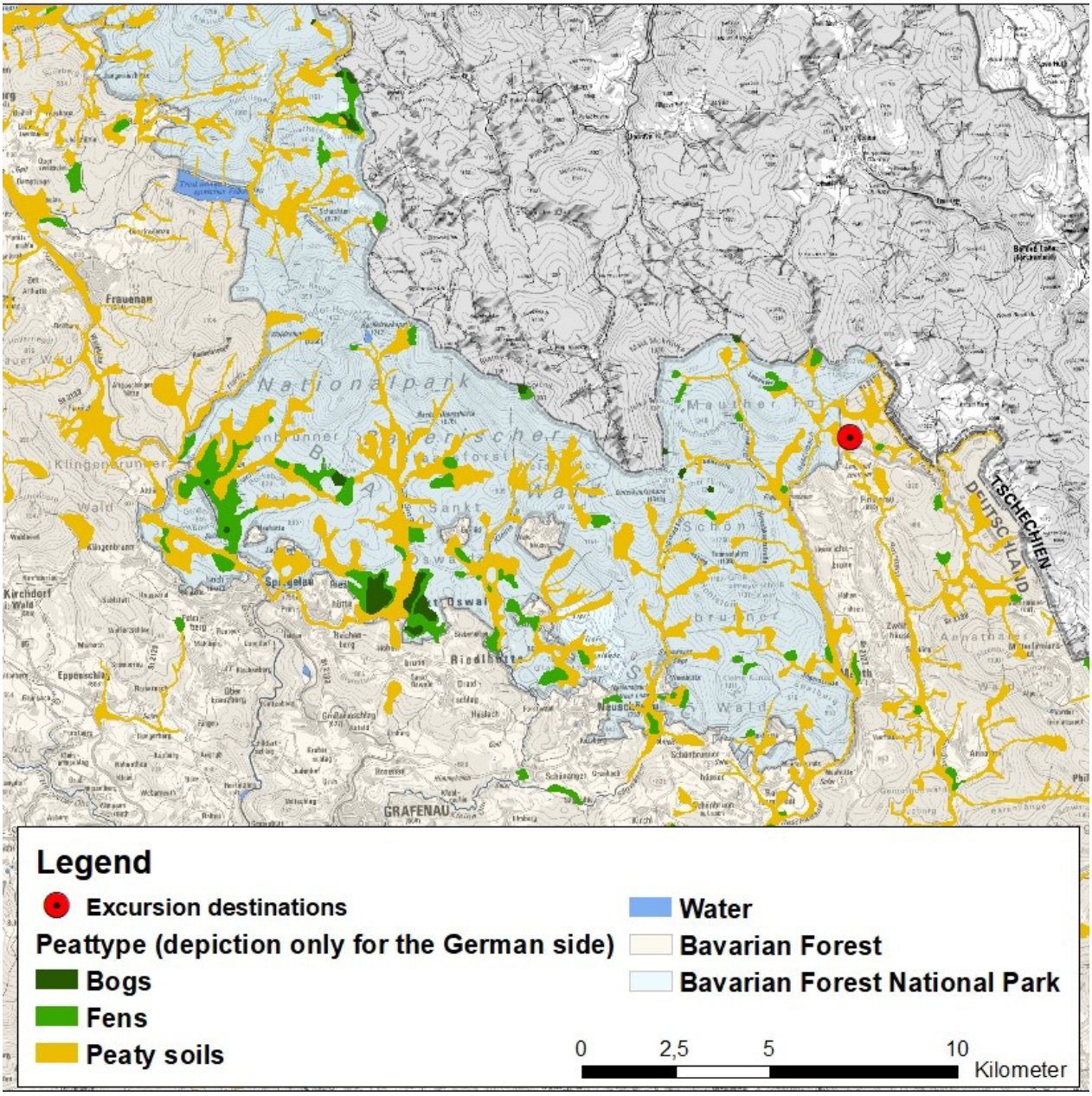
Paludi Area Riedhausen

Near Riedhausen, the area was a research site for the MOORuse collaborative project (involving ARGE and PSC, among others, 2016-2022). Before the project, the area was used half as arable land and half as grassland, drained by ditches. During the project, the area was rewetted, and from 2019, paludiculture crops *Carex acutiformis* and *Phalaris arundinacea* were established. Greenhouse gas measurements demonstrated the enormous climate protection potential of rewetting organic soils and subsequently using them for paludiculture. With a current emission factor of –13.0 ± 13.9 t CO_2-eq. ha–1 yr–1, a reduction potential of up to 53.4 t CO_2-eq. ha–1 yr–1 is achievable by converting drained arable land into fen paludiculture. Thus, fen paludiculture currently exhibits the highest empirically proven climate protection performance among land use measures to reduce GHG emissions, making it one of the most efficient and cost-effective natural climate protection solutions.

Bavarian Forest / Bohemian Forest

Timetable

08:00 Departure in Freising
10:30 Excursion Finsterauer Filz, Bavarian Forest Nationalpark
12:15 Lunch break in Finsterau
12:45 Departure to Šumava Nationalpark (CZ)
13:15 Excursion "Life for mires" (CZ)
15:00 Departure back to Freising
18:00 Arrival in Freising



Bavarian-/ and Bohemian Forest

The Bavarian Forest is part of the larger Bohemian Forest, a mountain range which stretches across Germany, Austria, and the Czech Republic. It's highest peaks are „Großer Arber" (1456m a.s.l.) and „Großer Rachel" (1453m a.s.l).

This region is characterized by its harsh climate, dense forests, rolling hills, and numerous peatlands. The climate is characterized by moderately warm summers and cold winters. The Bohemian Forest is situated in the transitional zone between the Atlantic and continental climates. The continental influence brings icy cold weather in winter with severe sub-zero temperatures (down to -30°C), which can be intensified by strong east winds. The continental-influenced summer weather is also dry but comparatively warm for a low mountain range. Thunderstorms frequently develop over the mountain ridges. During transitional seasons, Atlantic weather predominates, whereas low-pressure systems dominate in winter, potentially leading to significant snowfall. In summer, these systems bring only moderate warmth and persistent rainfall. In the areas of 800 – 1,000 m above sea level, the annual average temperature is low, between only 5 and 6°C. The even higher areas show an even colder annual mean temperature below 4.5°C. The typical orographic precipitation and increased thunderstorm activity in the summer months lead to high annual precipitation totals of 1100 to 1300 mm. Data from Finsterau indicates an average annual temperature of 5.1°C and an average annual precipitation of 1100 to 1200 mm. The precipitation maximum occurs in July, with another smaller peak in December-January. The period with continuous snow cover averages 150 days per year (REIF et al. 1989).

First evidence of settlement can be found during the Iron Age, when the region was inhabited by Celtic tribes. The Romans later expanded along the Danube river, although the dense forests of the Bavarian Forest remained largely impenetrable and served as a natural boundary.
During the Middle Ages, the Bavarian dukes extended their influence into the forest. Settlers cleared parts of the forest for agriculture, and small villages began to form. By granting rights of use and tax relief, the dukes enabled the settlers to colonize the Bavarian Forest bit by bit and make it arable.

During the early modern era the Bavarian Forest became known for its glassmaking industry. The abundance of raw materials like wood and quartz sand made it an ideal location for glass production. This industry flourished and became a significant part of the region's economy. As the population grew, so did deforestation. The wood was used for building, fuel, and especially for the glassmaking industry. This period also saw the establishment of more permanent settlements and towns. In this time period settlers started draining peatlands for peat cutting and afforestation.

The 19th and 20th century brought industrialization, which further impacted the traditional ways of life in the Bavarian Forest. Improved transportation and the expansion of the railway network made the region more accessible and almost all ancient forests were cultivated. Also, most peatlands were drained for forestry use and peat cutting during this time.

A significant milestone in the history of the Bavarian Forest was the establishment of the Bavarian Forest National Park in 1970, Germany's first national park. This marked a shift towards conservation and sustainable tourism. Following the fall of the Iron Curtain and German reunification in 1990, the Bavarian Forest saw increased cooperation with neighbouring regions in the Czech Republic. This included the establishment of the Bavarian Forest and Šumava transboundary parks, promoting ecological preservation and cross-border tourism. Today, the Bavarian Forest is known for its commitment to environmental conservation, its thriving tourism industry, and its rich cultural heritage. The area continues to balance the needs of conservation with those of local communities and visitors. An example of a transboundary project is „Life for mires", in which both national parks cooperate to rewet peatlands on both sides of the border.

Finsterauer Filz

After restoration, peat mosses regain their habitat in the Finsterauer Filz.

The Finsterauer Filz is a raised bog along a mountain saddle, which was drained for forestry use. As part of the expansion of the Bavarian Forest National Park, the Finsterauer Filz recently became part of the national park area. To accommodate for a soft tourism concept a board walk was built in parts of the bog to further encourage environmental education around peatlands. Extensive restoration measures have been implemented in the Finsterauer Filz to restore the natural water balance and regenerate the peatland ecosystem. Installation of dams reduce water runoff and promote natural rewetting of the bog. This prevents the peat body from drying out during the summer months and encourages the settlement of typical peatland species. Drainage ditches that were dug in the past to dry out the bog were permanently filled and blocked. This helps stabilizing the water level and restoring the natural hydrology.

Shrubs and young trees that invaded the bog due to drainage and nutrient input were removed to further help typical peatland vegetation to reestablish itself. This maintains the open peatland landscape and promotes the development of typical peatland species. The water balance, vegetation, and fauna are continuously monitored.

“Life for mires” in Šumava Nationalpark

Transboundary restoration of mires for biodiversity and landscape hydrology in Šumava and Bavarian Forest

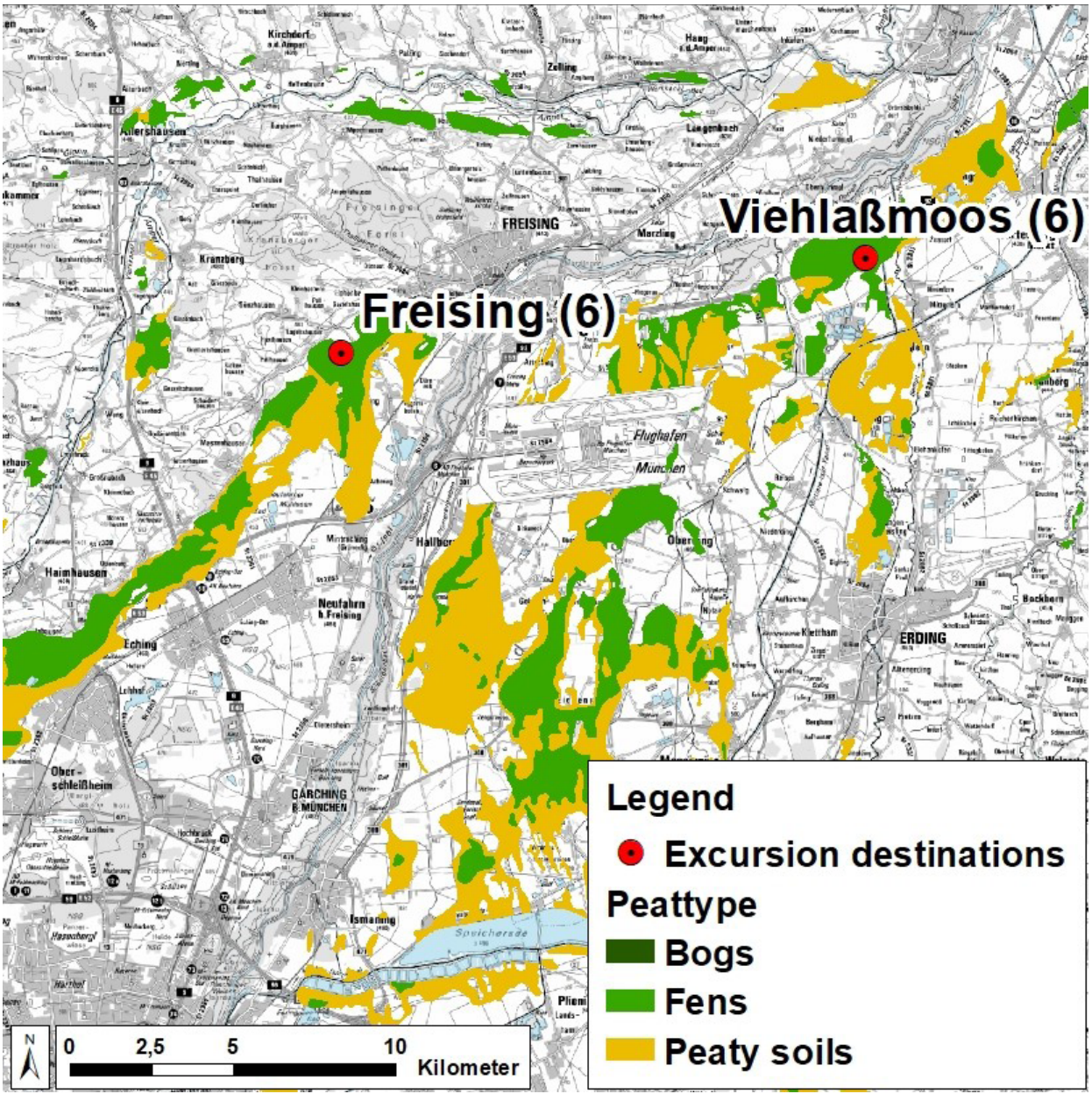
The goal of this project is to improve the natural condition of degrading peat bogs, other mires and wetlands as well as to renew the natural water regime over an area of 2,059 hectares. Field activities will be carried out on both sides of the state border and include, for instance, blocking and refilling of about 80 kilometres of drainage channels and the restoration of 13 kilometres of natural streams. The project also comprises a large number of activities for the general public, aimed at informing local inhabitants as well as tourists, and raising awareness about the importance of wetlands for the landscape and its inhabitants.

Restoration efforts and their impact on peatland regeneration in Šumava.

Freisinger-/ and Erdinger Moos

Timetable

08:00 Depature in Freising
09:00 Program Freising (Dr. Tim Eickenscheidt, Carla Bockermann)
10:30 Transit to Erding
11:30 Program Viehlaßmoos (Maximilian Trautner)
12:30 Return
13:00 Arrival in Freising



Freisinger Moos

The automatic measuring system in Freisinger Moos

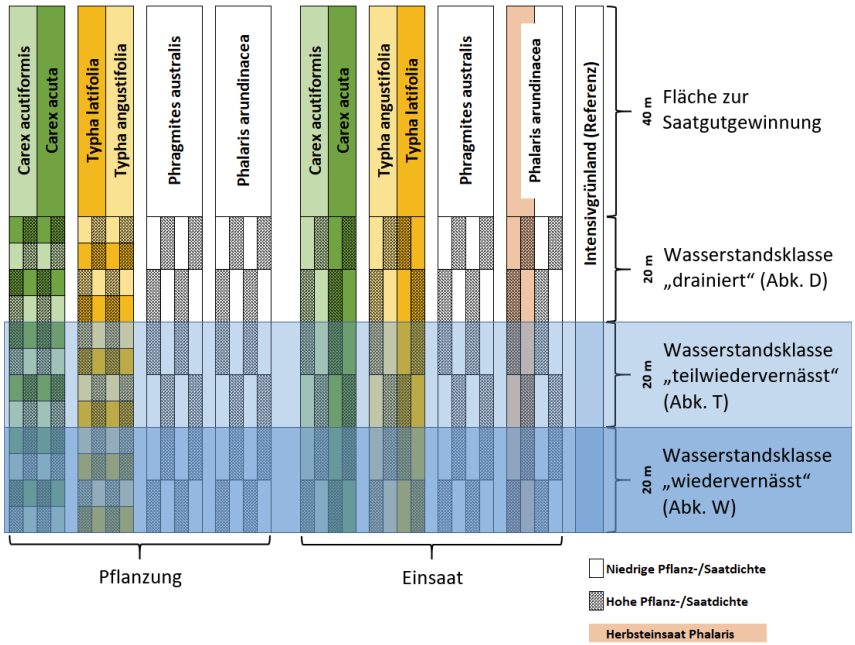
Experimental site FREISINGER MOOS (FSM):

The Freisinger Moos (FSM) is a flow-through fen located on the northern edge of the Munich gravel plain in the floodplain of the Isar. In the Quaternary period, fluviatile, late-glacial gravels and Würm glacial low-terrace gravels were deposited here (Schwaiger and Margraf, 2020). Below the peat layer, there is a fine sandy-marly flint layer that is difficult to permeate (Schwaiger and Margraf, 2020).

In the north-west, the Freisinger Moos borders directly on the Tertiary hill country, causing the groundwater flow to emerge over a large area. In this region, this occurs in bands along the entire Tertiary hill country, which has led to the formation of numerous successive mire complexes (Dachauer Moos, Freisinger Moos, Erdinger Moos, etc.). The Freisinger Moos covers an area of almost 3000 ha and has been systematically drained and intensively cultivated since 1914. Currently, approx. 24.1 % is used as arable land, 23.5 % as intensive grassland and 41.2 % as extensive grassland.

Aerial image of the study site in Freisinger Moos from 2018. The establishment tests from the MOORuse project are clearly visible, as is the system for automatically measuring GHG fluxes from the MOORuse project and continued in the NAPALU project in the left-hand area of the image.

The FSM is also characterised by different intensities of use of grassland ecosystems, scrubland and woodland. There are only a few areas of arable land in the marginal areas. Due to its intensive utilisation history and its proximity to the Weihenstephan-Triesdorf University of Applied Sciences (5 km southwest of Freising), the former flow-through fen is ideally suited as a test site.Figure 1 shows the study area of 1.2 ha, which was created in 2015 for experiments on paludiculture establishment and biomass production (Fig. 2), and for greenhouse gas balancing (Fig. 3) in the MOORuse project (48°22‘43.6 „N 11°41‘01.6“). Tested paludiculture plant species are *Carex acuta*, *Carex acutiformis*, *Phalaris arundinacea*, *Phragmites australis*, *Typha angustifolia* and *Typha latifolia*. The study area is a peat bog with a peat thickness of between 255 - 290 cm and borders on the Bründelgraben, which is the main drainage from the sub-area of the bog body and ensured a year-round water supply to the test areas.



Schematic illustration of the partially randomized block experiment for conducting the establishment experiment at the FSM test site from the MOORuse project.

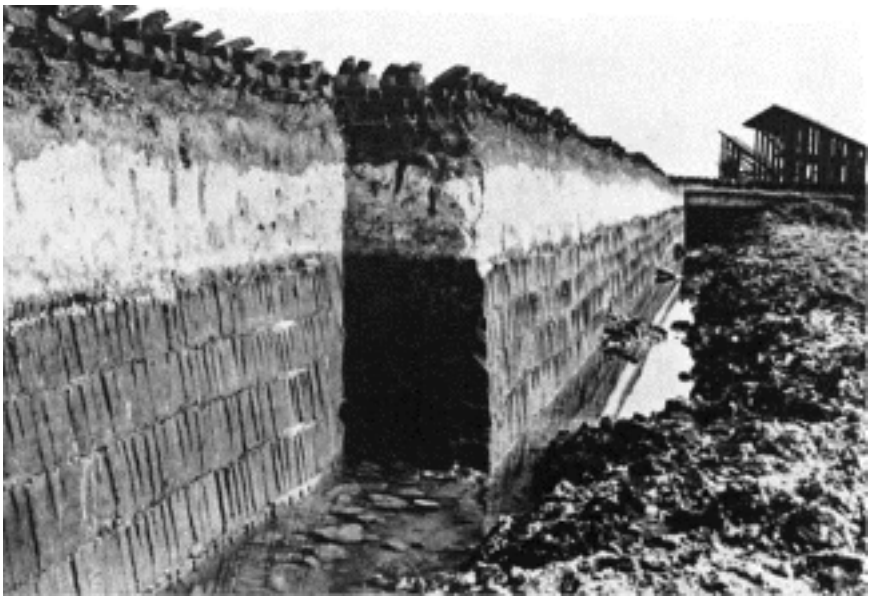
The greenhouse gas measurements in the Freisinger Moos were carried out using the automatic bonnet measuring system developed in the MOORuse project (Fig. 8). The newly developed system records the trace gas fluxes of CO_2, CH_4 and N_2O based on periodic measurement campaigns in three consecutive sheet pile basins (each 16 x 10 metres, 2.5 metres deep, open at the bottom). In the MOORuse project, the water level classes „partially rewetted“, „rewetted“ and „dammed“ were set in the paludicultures *Carex acutiformis*, *Phalaris arundinacea*, *Phragmites australis* and *Typha latifolia*. In total, the automatic canopy measurement system made it possible to carry out around 140,000 individual CO_2 measurements (Reco and NEE) in 2020 and 2021 using closed dynamic canopy measurement.

Annual greenhouse gas balances are modelled using the determined model parameters for Reco and GPP and the continuously recorded main explanatory variables (air temperature, soil temperatures, radiation). The exchange of CH_4 and N_2O is recorded in the automatic canopy measurement system using closed static canopy measurement and quantified in the field using a portable cavity ring down spectroscopy analyser (gas analyser type PICARRO G2308).

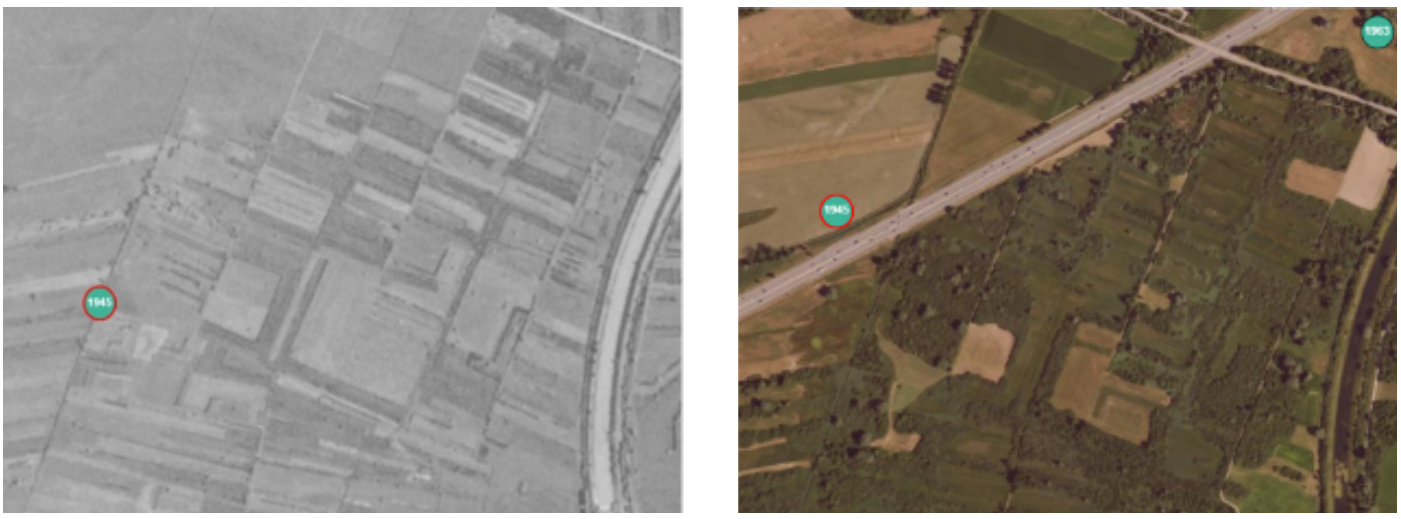
A total of approx. 25,000 CH_4 and approx. 25,000 N_2O measurements were carried out with the automatic GHG measurement system in the FSM in the 2020 and 2021 measurement period. Annual greenhouse gas balances of CH_4 and N_2O are linearly interpolated based on the flow rates. The trace gases CO_2, CH_4 and N_2O were recorded methodically in accordance with the GHG survey for generating the national greenhouse gas inventory for German climate reporting and fulfils the measure specification of the standardised method of the federal-state target agreement on climate protection through peatland protection (BMU, 2021).

Erdinger Moos – Nature Reserve Viehlaßmoos

The Erdinger Moos was created by the large protruding quantities of groundwater from the water saturated gravel body of the Munich gravel plain. Until 150 years ago, the Erdinger Moos was still largely in a near-natural state; in the following period it was largely cultivated and thus made accessible to more intensive agricultural use. In recent decades it has been increasingly used as an industrial area and residential area wit big traffic infrastructure projects as the Flughafen Munich. The federal motorway A92 cuts through the Viehlaßmoos. Especially large Projects made soil exchange of the peat Body aswell as the lowering of the Groundwatertable necessary.



Soil profile from the middle Erdinger Moos. Above the peat lies a layer of about 50 cm thick meadow chalk (Karl Helmut)



Nature reserve Viehlaßmoos 1944 (left) and 2024 (right)

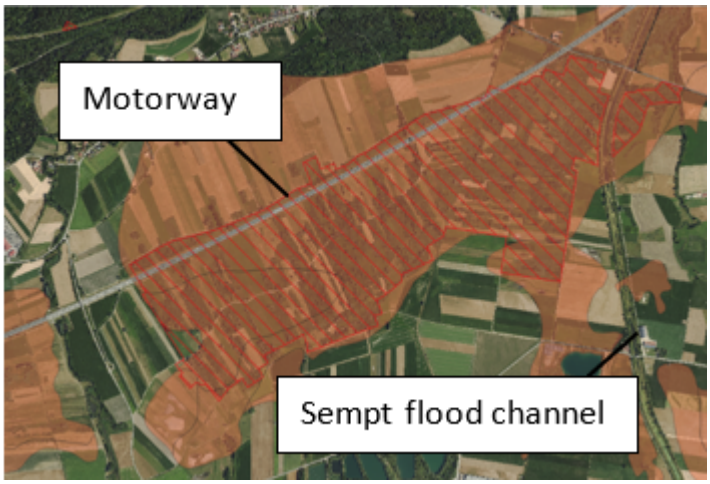
Erdinger Moos is a significant peatland located in the northern part of Erding County, Bavaria, covering an area of 242 hectares. It is recognized as the largest coherent fen in relatively natural conditions and traditional usage within the Erdinger Moos region.

Designated as a nature reserve since 1982, the area is ecologically important. The peat layer can reach thicknesses of up to 2 meters, with interspersed layers of meadow chalk, indicating a complex geological structure.

This region supports a variety of typical fen species and plays a crucial role in conservation efforts, maintaining its significance as a habitat for numerous plant and animal species despite human activities and agricultural use.

The nature reserve Viehlaßmoos is characterized by historical litter meadow use and small-scale peat cutting.

The loss of traditional agricultural practices is leading to the encroachment of woody plants, altering the natural landscape structure. This issue is further exacerbated by agricultural intensification. Another significant deficit is the fragmentation of habitats due to infrastructural developments, such as the construction of a federal motorway and the Sempt flood channel. Additionally, disturbances to natural groundwater conditions caused by human activities further disrupt the ecological balance.



Aerial view showing the motorway and Sempt flood channel, which cut through and impact the agricultural land.

To address conservation challenges, several key measures have been implemented. These include the removal of shrubs and trees to prevent woody plant encroachment and the resumption of mowing to restore the biodiversity of litter meadows. Contractual agreements with farmers under the Conservation Program (VNP) support sustainable practices, while the acceptance of beaver activities, despite potential drainage issues, aids in creating valuable wetland habitats.

Before and after removal of shrubs – recovery of litter meadows and reestablishment of traditional mowing

Additionally, the purchase of land by the public sector or conservation associations helps protect critical areas, and collaboration with project developers ensures the establishment of compensation areas that focus on preserving typical fen species.
One of the main challenges is raising the water table in dry areas, which is essential for restoring and maintaining healthy ecosystems. Additionally, there is the complex task of balancing the conservation of rare litter meadows, which thrive in drier conditions, with the goals of peatland conservation, which requires wetter environments.

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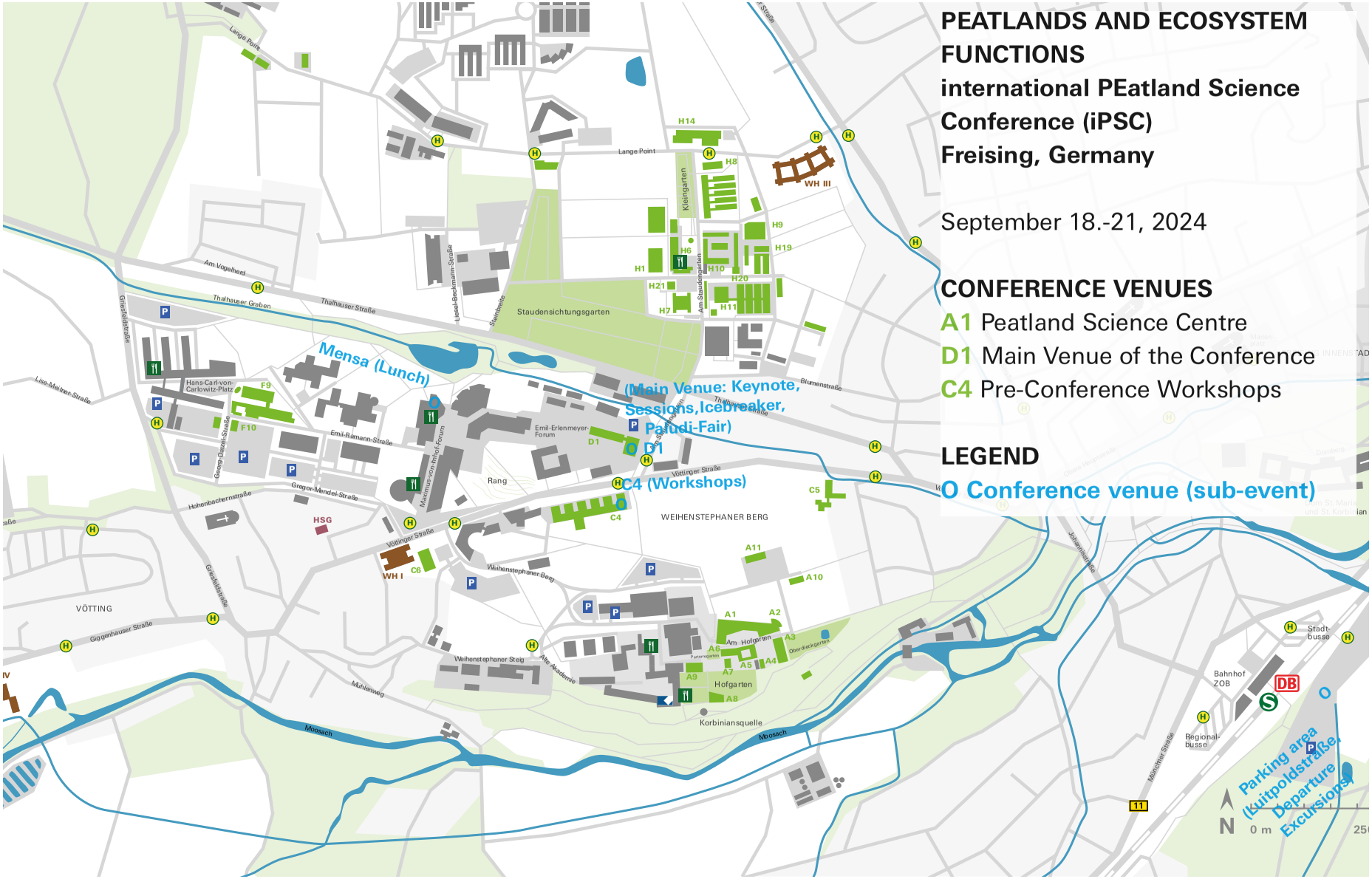

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