

Peatlands

International

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Sign up for the IPS Convention in Aberdeen!
Responsible Management of Peatlands - Symposium and Workshops
Sphagnum Farming - Peat mosses as bog builder and growing media constituent
The AUGER Project - PeAtland properties influencing greenhouse Gas Emissions and Removals
RRR2017 - Conference Week on "Renewable Resources from Wet and Rewetted Peatlands"
Changing demands in industry require new baling machine
Research in the Peruvian High Andean Wetlands (Bofedales)
New tool evaluates peatland sensitivity to climate change

International Peatland Society Annual Convention 2017

*“Responsible
Management
of Peatlands”*

*Aberdeen, UK
28 - 31 May 2017*

www.peatlands2017.net

Editorial

This year, Finland will turn 100. This is a very important and happy event for us in the north. But, did you also know that the International Peatland Society (IPS) will turn 50 next year? This is half the age of Finland, and of course another reason to celebrate. The IPS was founded in 1968 in Québec and has survived the wildness of 1960s, the Cold War, through the yuppified 1980s and the dawn of a new millennium in 2000. It has also seen 15 International Peat(land) Congresses, with the next one coming to Tallinn in 2020.

The topics have also changed, from basic peat research and production technology to matters related to biodiversity, restoration and global climate change. Some of you have been on board for almost as long as the society has existed, while others have only joined recently. However, the basic idea remains the same: to provide a forum to exchange information and opinions on all kinds of peat and peatland issues.

We will continue to travel along this road of diversity in one month's time in Aberdeen, Scotland, where the IPS will meet its members for the annual convention and symposium, which this year will be on "Responsible Management of Peatlands". Up to 200 guests are expected,



IPS 2nd Vice President Samu Valpola, President Gerald Schmilewski and Communications Manager Susann Warnecke during a briefing meeting at the IPS Secretariat in April 2017. Photo: Saila Aarnio, Diverstas Oy

and we hope you will be one of them. Professor Jack Riele and his colleagues have prepared an extraordinary programme (see the keynote speakers listed on page 7!).

We are very much looking forward to sharing environmental, economic and societal information on peat and peatlands, as well as show you the famous Scottish highland bogs. Visit the symposium website at www.peatlands2017.net and bring your family or colleagues with you. In Aberdeen, we will also reveal where our 50th anniversary symposium will be held.

In addition, this spring, the IPS has been busy staffing our new three Commissions, respectively on Peatlands and Environment, Peatlands

Peatlands International is the global magazine of the International Peatland Society (IPS). It provides the almost 1,500 individual and corporate members of the Society with up-to-date information on peat and peatland matters, reports and photos of conferences and workshops, background reports and publication reviews.

To serve all of our members, we provide always a good balance between economic, social and environmental points of view. To receive Peatlands International in your email every three months, visit www.peatlands.org/join-us and sign up as a member.

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www.peatlands.org/publications/peatlands-international

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and Economy, and Peatlands and Society. We have also deepened our cooperation with Ramsar, become a new partner in the Global Peatlands Initiative, and continued to work together with FAO and CIFOR on their latest peatland events. Make sure to get involved and offer your knowledge to these important discussions.

I hope you enjoy this issue of Peatlands International. We wish you a busy and happy spring, and hope to hear from you for the next magazine.

Susann Warnecke

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Sign up for the IPS Convention in Aberdeen!

**MUST-GO
EVENT!**

Responsible Management of Peatlands - Symposium and Workshops

This year the Convention, Symposium and Workshops of the International Peatland Society (IPS) will be held in Aberdeen, Scotland during **28 - 31 May**. The venue will be the Marriott Hotel, Dyce, which is near Aberdeen International Airport.

The Theme of the Convention is 'Responsible Management of Peatlands' the core of which will be a Symposium and Workshops on the importance and effects of different land uses on peatlands in boreal, temperate and tropical regions of the world.

The Convention offers an excellent opportunity for scientists, policy makers, regulators and industry managers to meet, share and discuss current and emerging knowledge and experiences on all aspects of peat and peatlands. The meeting will present the most recent scientific research, technical developments and practical activities related to agriculture and forestry on peatland, responsible peat production and peatland restoration.

Convention Organisers

The 2017 IPS Convention is being organised by the UK Peat Society (UK National Committee of the International Peatland Society) in association

with the Northern Peat and Moss Company. It is supported by the James Hutton Institute, Forest Research and the Universities of Dundee, Highlands and Islands, Leicester and Nottingham. Sponsoring companies are, so far, the Canadian Sphagnum Peat Moss Association, Forestry Commission Scotland, Griendtsveen, Klasmann-Deilmann, Vapo and VisitAberdeen.

Convention Format

The event will consist of a mixture of keynote presentations, workshops with oral and poster contributions on themes related to 'Responsible Management of Peatlands', brainstorming, interactive sessions involving the participants, a day of excursions to sites related to peatland management and other places of interest in Northeast Scotland and a Gala Dinner with traditional Scottish entertainment.

The Convention also provides the opportunity to spend some leisure time in a beautiful part of Scotland.

Language: The official language will be English. Translation facilities will not be provided.

Website: The latest Convention information can be found at **www.peatlands2017.net**.



Keynote Speakers

The following special guests have promised to provide keynote speeches for the symposium:

- **Professor Chris Evans of the UK Centre for Hydrology and Ecology.** Chris is an expert on GHG emissions from peatlands, a prominent peatland scientist with also a good knowledge of tropical peatland and their GHG emissions.
- **Professor Line Rochefort of Université Laval** in Quebec, Canada. Line is one of the foremost experts on peatland restoration, employing novel methods for the rehabilitation of cutover Sphagnum bogs.
- **Professor Carl Trettin works for the US Forest Service** as Team Leader at the Southern Research Station in South Carolina. He is also an Adjunct Professor in Soil Science at North Carolina State University. His current research focusses on the carbon cycle in wetlands.
- Since January 2015, **Mike Quinn has been**

Important Dates

30 April: Standard Registration Deadline

Early May: Third Circular with final Programme

19 May: Last date for registration

28 - 31 May: IPS Convention, Symposium and Workshops,

31 May - 3 June: Post-Convention excursion to the bogs of the Flow Country (maximum 15 persons with 5 reserves)

1 June: A day of golf on one of the many courses in Aberdeenshire.

CEO of Bord na Móna, the public-semi-state company formed in 1946 for the development of peatlands for the generation of electricity. Since then Bord na Móna has diversified its operations greatly and is meeting the challenges of modern society and its environmental issues. Mike has a degree in Physics and Electronics and a postgraduate qualification in Project Management; he has had a career in senior management positions in a range of companies.

- **Nazir Foead is head of the Indonesian Agency for Restoration of Tropical Peatland** that was established a year ago by the President of Indonesia to address the problem of massive CO₂ emissions from developed peatland and fire. Prior to this, Nazir was Coordinator for Climate and Land Use Alliance responsible for direct grants and support and the Conservation Director of WWF Indonesia, managing over 300 staff in 26 conservation sites.

Excursions

On Tuesday 30th May there will be a choice of four different Excursions to places of peat and peatland interest, scenic beauty and historic buildings in and around Aberdeenshire. These will provide an introduction to the varied scenery and land use of this beautiful and historic part of Scotland. It is a mixture of coast and sea, rich farmland, bog, moor and mountain.

Excursion 1: Peat extraction and whisky distillery

Excursion 2: Loch of Strathbeg and Fyvie Castle

Excursion 3: Red Moss of Netherley, hill peat farming, Dunnottar castle

Excursion 4: Peatland forestry and restoration plus whisky cask making at Speyside Cooperage

Post-conference trip 5: Flow Country

See the preliminary programme below and register now at www.peatlands2017.net!

Sessions and activities in Aberdeen

SUNDAY 28th MAY

- 09.00-12.30 IPS business meetings: Executive Board, Scientific Advisory Board
14.00-16.00 Brainstorming Sessions on Current and Emerging Peatland Priorities
16.30-19:00 Poster setting up and first session

PLUS joint and parallel sessions facilitated by the Chairs of the three new IPS Commissions on Environment, Economy and Society.

MONDAY 29th MAY

- 09.00 Opening of the Convention
09.45-12.30 Keynote Presentations
14.00-17.30 Workshops on Responsible Management of Peatlands (parallel sessions):

Theme A: Responsible Management of Peatlands under Agriculture and Non-Forestry Land Uses

Relevant land-uses: Agriculture on bog, fen, tropical peatland;

Other land uses: conservation, moorland management (for shooting); wind farms; energy crops; paludiculture, including Sphagnum farming; plantations of oil palm, pineapple etc.

Key topics:

- Impact of land uses on peatland carbon balance*
- Protecting peat carbon and reducing GHG emissions*
- Impact of land uses on ecosystem services*
- Codes of practice: effectiveness and opportunities*
- Historical information*
- Survey*



Theme B: Responsible Management of Peatlands under Forestry

Relevant land uses: Peatland forestry in the UK; peatland forestry in the rest of Europe; peatland forestry in North America; peatland forestry and plantations in the tropics

Key topics:

- a) Impact of forestry on peatland carbon balance*
- b) Protecting peat carbon and reducing GHG emissions*
- c) Impact of timber/pulpwood production on ecosystem services*
- d) Codes of practice: effectiveness and opportunities*

Theme C: Responsible Peat Production

Relevant areas: Responsible Peat Production Certification in the EU, Floriculture Peat Certification in Canada, UK Growing Media Association proposal, peat use in horticulture; energy use of peat

Key topics:

- a) Impact of peat production on peatland carbon balance*
- b) Protecting peat carbon and reducing GHG emissions – e.g. through end-use restoration*
- c) Balancing peat production and ecosystem services*
- d) Codes of practice: effectiveness and opportunities*
- C) Responsible Peat Production*

Theme D: Responsible Peatland Restoration

Relevant areas: Peatland restoration in the UK and Europe, peatland restoration in other countries, GHG mitigation

Key topics:

- a) Impact of restoration on peatland carbon balance*
- b) Protecting peat carbon and reducing GHG emissions*
- c) Impact of restoration on ecosystem services*
- d) Codes of practice: effectiveness and opportunities*
- e) Monitoring rewetting/restoring peatland*

TUESDAY 30 MAY

Excursions

WEDNESDAY 31ST MAY

08.30-10.00 Special Session on Restoration of Tropical Peatland

Contributions by members of the Indonesian Peatland Restoration Agency, and Global Peatland Initiative

10.00 Refreshment break and Posters

10.30-12.15 Plenary on future direction of responsible management of peatland

10.30-11.10 Summary presentations by the four Workshop facilitators (max 10 min each)

11.10-12.00 Participants discussion and conclusions

12.00-12.30 Closing of the Symposium and Workshops and information on the event to mark the 50th Anniversary of the IPS in 2018 and the IPS Annual Convention 2019.

12.30 Lunch

14.00-16.00 **Open Round Table and Annual Assembly of IPS National Committee Representatives**

14.00-16.00 Focus group planning sessions

Changes of the programme are possible, see www.peatlands2017.net for latest information and updates.

Peat mosses as bog builder and growing media constituent

Network for international cooperation

Introduction

In 2014, the International Peatland Society Executive Board launched a strategic assessment of its operations and structure in order to meet future challenges as international and national priorities for peatland and peat use change.

This is especially important in the horticulture sector and for prioritizing the after-use of cutover peatlands.

This IPS Strategic Plan 2016 - 2020 emphasizes a stronger project approach and sets priorities for an efficient sharing of information and knowledge. Working groups have identified the top two priorities for the near future: biodiversity and climate change.

Background

Peatlands are one of the most important carbon stocks. Drainage of peatland results in

greenhouse gas emissions. Therefore, all kinds of drainage-based peatland usage is continuously under pressure by NGOs and policy. The focus of discussion differs by region and addresses topics like:

- Responsible management of peatlands
- Developing after-use concepts for sustainable bog restoration and increase of biodiversity
- Climate change mitigation
- Peat substitution in horticultural growing media



Harvested peat mosses for inoculation.
Photo: Jan Köbbing / Klasmann-Deilmann

To address these topics, degraded peatlands should be restored and a new resource for growing media constituents found.

The cultivation of peat mosses (Sphagnum farming), a form of wet peatland use or so-called paludiculture (lat. *palus* = mire or morass), seems to be one of the most promising alternatives to obtaining a sustainable peat alternative and living bogs.



Peat extraction field after moss inoculation. Photo: Jan Köbbing / Klasmann-Deilmann

With the surface near water level leading to the stoppage of carbon emissions, this makes it potentially the only climate-friendly bog use known so far.

Accordingly, peat moss cultivation could not only become a sustainable after-use concept for extracted peatfields, but also for many peatlands currently used for agriculture, which are among the biggest greenhouse gas sources at present. Summarizing this type of paludiculture brings advantages, such as the:

- Production of a renewable, high-quality growing media constituent
- Sustainable and climate-smart after-use of peat extraction sites
- Protection of pristine mires
- Potential increase of biodiversity, in particular in Europe
- Maintenance of infrastructure and employment options in economically weak rural areas
- Mitigation or even sequestration of greenhouse gases

Cultivated Sphagnum can also serve as an inoculum to restore degraded peatlands.

Network for bog restoration and production of a sustainable growing media constituent

The IPS is currently developing an international network of people from science, business, policy and NGOs interested in Sphagnum cultivation for growing media production (CultiMoss), peat moss harvesting and processing, and peatland restoration.

The overall goal is to bundle existing knowledge on Sphagnum cultivation and use, and to develop a sustainable Sphagnum-based growing media constituent, with significant breakthroughs in suitable growing conditions, increased productivity, harvesting and processing. This will be achieved by organizing regular workshops, field seminars, training courses and short-scientific missions, also involving policy stakeholders.

The gained knowledge and information will be summarized in a manual on “Sphagnum Farming

Sphagnum palustre and *Drosera rotundifolia* at the Sphagnum-farming site after one year. Photo: Jan Köbbing / Klasmann-Deilmann



for Horticulture and Restoration”, helping practitioners and policy-makers.

Project results from all over the world are expected to prove the suitability of Sphagnum as a growing media constituent and show techniques for efficient seeding, irrigation, harvesting and processing peat mosses.

By the end of the year, the IPS will apply for funding to enhance and promote the research and implementation of Sphagnum farming and harvesting and, the application of Sphagnum-based products.

So far, more than 40 participants from universities, NGOs and the private sector from more than 10 European and three international countries have expressed their interest in participating in the project.

However, the network is still open to peat moss enthusiasts from all over the

world! A working group meeting will be held on the IPS Annual Convention, in Aberdeen, Scotland, UK during 28 - 31 May 2017.

Dr. Jan Felix Köbbing

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Drone picture of the Klasmann-Deilmann Sphagnum site with the new inoculated site in front and the one-year old side in the back. Photo: Henry Hurink / Klasmann-Deilmann



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RRR2017 - Conference Week on

“Renewable Resources from Wet and Rewetted Peatlands”

The Greifswald Mire Centre warmly invites you to join the paludiculture conference week entitled “Renewable Resources from Wet and Rewetted Peatlands 2017 (RRR2017)”.

From **25 - 30 September 2017**, this second international conference on the utilization of wetland plants comprises a national and an international part, a day of excursions and a Sphagnum farming workshop. With this conference, the dialogue and exchanges that took place at the first RRR conference, which was also held in Greifswald in 2013, will resume.

Scope of the conference

The use of wetland biomass has a long tradition in human history and has been revived due to global research activities on renewable resources.

This conference brings together various actors from research, governance and practice, who are dealing with the utilization of wetland plants. The focus is on paludiculture, i.e., agriculture and forestry on wet or rewetted peatlands. The main objectives of the conference are building and fostering networks, exchanging experience and information, and identifying research demands. Therefore, this conference is targeted at scientists, land owners, land users and environmentalists alike.

The production and utilization of wetland biomass offer manifold opportunities to address the increasing and diversifying demand for biomass, as well as reduce the level of competition between biofuel and food production. Wetland biomass can replace fossil resources as a raw material for manufacturing, industry and energy production, using both traditional and new processing lines and techniques.



Salt meadows near Greifswald. Photo: Michael Succow

The cultivation and exploitation of reed plants (such as common reed, sedge, reed canary grass and cattail), tree species (such as alder) or peat moss (Sphagnum farming) can lead to sustainable land use options for peatlands. The rewetting of degraded peatlands for paludiculture reduces greenhouse gas emissions and restores many other ecosystem services,

including nutrient removal, water retention and habitat provision.

Day trips

Six excursions with a variety of destinations and topics are offered. Participants should register if they wish to learn, for example, about a pioneering paludi-biomass heating plant in Malchin, mowing machinery and paludi-biomass use for building materials, or birds in the rewetted Lower Peene River Valley. The implementation of paludiculture on rewetted bogs (Sphagnum farming) can be observed on a trip to the Oldenburg area.

Keynotes & speakers

Ab Grootjans, an international expert in the ecohydrology of wetlands, who first worked as a professor at the University of Groningen and then Radboud University Nijmegen, has supported restoration activities in various parts of the world, including the former GDR, Slovakia, Latvia, Russia, Ireland, Tierra del Fuego, Japan, Australia and South Africa. His keynote will focus on “peatland restoration and paludiculture for clean and safe water”.

An Extraordinary Professor since 2008, **Hans Joosten** leads the Department of Peatland Studies and Palaeoecology of Greifswald University, Germany. He coined the term ‘paludiculture’ and co-edited the first textbook about the topic with Wendelin Wichtmann and Christian Schröder. In his keynote, Prof. Joosten will address “the contribution of paludiculture to climate change mitigation and adaptation”.

Faizal Parish is the Director of the Global Environment Centre, a Malaysian non-profit organization working throughout East and South East Asia on forest and peatland management,

Machinery for utilisation of wet peatlands.
Photo: Greifswald Mire Centre



biodiversity, water resources and climate change. He is a wetland ecologist with more than 30 years' experience in the assessment and management of peat swamp forests, mangroves and river systems in all ASEAN countries. Mr. Parish will speak on “climate-smart peatland use to improve livelihoods”.

Info & Registration

For more information and to register for the national and/or international conference, as well as the conference excursions, please email info@rrr2017.com or visit www.rrr2017.com. This will ensure you'll receive regular updates about RRR2017. Abstract submission for oral or poster presentations was open until 31 March. We provide the possibility to submit a late abstract for a poster presentation at our website. Exhibition space for contractors, manufacturers and any other stakeholders will also be provided in indoor and outdoor locations.

Susanne Abel

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The AUGER Project

Peatland properties influencing greenhouse Gas Emissions and Removals

The climate footprint of peatlands has been found to be strongly dependent on their management (Petrescu et al. 2015). Greenhouse (GHG) dynamics are significantly altered when peatland undergoes a change in land use, which usually involves drainage and leads to lowered water table levels that directly affect its ecohydrology.

Increased emissions of carbon dioxide (CO₂) and nitrous oxide (N₂O), together with a reduction in methane (CH₄) emissions, have been widely reported for drained grasslands on organic soils (Klemmedtsson et al. 2009, Renou-Wilson et al. 2014), for industrial peatlands (Wilson et al. 2007, Wilson et al. 2012, Wilson et al. 2015) and forested peat soils (Byrne and Farrell 2005, Minkinen et al. 2008).

Rewetted/restored peatlands have increasingly become the focus of GHG studies, which show that the effect of rewetting



Kilian Walz using the Russian auger at Croaghonagh Bog, Co. Donegal, November 2016. Photo: D. Wilson

on GHG dynamics in these new ecosystems can be somewhat unpredictable.

Furthermore, some studies have reported high CO₂ and CH₄ emissions post-rewetting (Wilson et al. 2007, Wilson et al. 2009, Vanselow-Algan et al. 2015), while others have shown that the CO₂ sink function can be re-established relatively quickly (Tuittila et al. 1999, Wilson et al. 2013). In addition, climate change may result in higher CO₂ and CH₄ losses from peatlands, thereby acting as positive feedbacks on climate change (Frolking et al. 2011).

Natural peatlands in Ireland currently comprise a small C sink (absorbing CO₂ while emitting CH₄), but represent less than 15% of the current national resource. Anthropogenic disturbances, mainly in the form of drainage (for agriculture and forestry) and peat extraction, result in increased CO₂ and N₂O emissions, as well as reduced CH₄ emissions.

There are two options for mitigating GHG emissions from peatlands: avoiding new or recurrent drainage and reducing emissions on the existing drained areas by rewetting/restoration. Climate policy instruments involving mitigation on peat soils are not being implemented in Ireland due to a lack of basic information on the peatland resource and, in particular, its properties. Peatland properties that can influence emissions and removals include water table position, vegetation composition and peat soil edaphic properties, such as peat type (pH), soil temperature, nutrient status, microbial composition.

A considerable amount of peat soil data (bulk density, carbon (C) content, peat depth, degree of decomposition (von Post), pH and vegetation composition data) has already been gathered by various organizations countrywide over the last few decades, while efforts to combine these are now critical in order to identify the gaps in the coverage of the various peatland land use categories (LUCs).

However, three major uncertainties exist: (1) the C density of peat soils remains largely unknown, as soil bulk density and C content have only been measured at a relatively small number of sites across the whole country; (2) regional peat volumes (and therefore the national peatland

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C stock) are highly uncertain, as peat depth and peatland basin morphology have not been assessed across all peatland types (very few studies consider the full profile or even sub-peat soils, which are estimated to contain between 4 and 28% of the total C stored in peatlands in the UK, for example (Fyfe et al. 2013)), and (3) the absence of accurate mapping of peatland land use change (to be addressed in a sister project funded by the Irish Environmental Protection Agency, EPA). These knowledge gaps should be addressed in order to fully quantify the role of



human activities on the climate footprint of Irish peatlands.

The AUGER project is funded by the Irish Environmental Protection Agency (2016-2019) with the aim of carrying out a nationwide survey to document the properties of various types of peatlands and peat soils, how they are affected by various management options, and how this influences the C and GHG dynamics of these systems, thereby quantifying the role of human activities on the climate footprint of Irish peatlands.

The key objectives of the project are as follows:

1. To review Ireland's need for C stock and GHG flux monitoring capacities on peatland sites; to identify priority site types; to assess potential candidate sites for such a network, including the collection of detailed information on current monitoring sites and a proposed programme of monitoring activities.
2. To review current models and tools used to assess peatland conditions and growth; to review the significance of peatland properties and management in modelling GHG emissions.
3. To characterize peatland LUCs and their associated edaphic and ecosystem properties: This will build on existing data to identify potential gaps to be filled and be further informed by a nationwide peatland survey of the physical, chemical and ecological parameters of peatlands and peat soils (and overall assessment condition). It is intended to compile a database regrouping all types of peatlands under existing land use (including 'natural' or 'near pristine') and management.
4. To support ongoing field observations and modelling of GHG emission/removals at two core peatland sites: Moyarwood Bog (Co. Galway) and Clara Bog (Co. Offaly).
5. To model anthropogenic impacts (in the form of land use impacts) on GHG emissions and removals: The development of the process-



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

based ECOSSE (Estimation of Carbon in Organic Soils – Sequestration and Emissions) model will allow Ireland to move to the Tier 3 level of NI-reporting.

The sustainable management of Ireland's peat soils is an environmental challenge, but represents a significant opportunity as these soils can be managed to their strengths, which in turn will benefit society at large. Are Irish peatlands a boon or a burden? Society can decide, but this will require full cognisance of the extent, location and condition of peat soils and peatlands, vegetation, land cover, land use, management and a range of environmental influences.

As part of the international drive to understand and quantify the GHG impacts of wetland management, Ireland needs to address the existing knowledge gaps by first establishing a robust and representative database of the characteristics of peatlands types and LUCs, as well as associated biogeochemical and ecohydrological properties.

How land use and management (options) affect these properties is important in order to understand the indirect impact on the climate footprint of these large areas; such an evaluation forms the main objective of the AUGER project.

Building on the expertise from site-specific GHG investigations in this country, and by developing the capacity to model the response of peatlands to changes in management, land use and climate, the AUGER project will allow for a more accurate estimation of GHG emissions/removals from peat soils, which cover a fifth of the land area of Ireland.

In addition, by reviewing the national need for monitoring GHG emissions/removals and the C stocks within peatland sites, this project will help Ireland, which is closely engaged with the Integrated Carbon Observation System (ICOS), to prioritize long-term investment in peatland observation platforms that are, thus far, lacking.

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MIRES AND PEAT

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THE INTERNATIONAL MIRE
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New members of the IPS

New members (or new contact persons for corporate and institute members) are approved by our National Committees or, in other countries, by the Executive Board of the IPS. Fill in our new online membership form at www.peatlands.org/join-us! (status 30 March)

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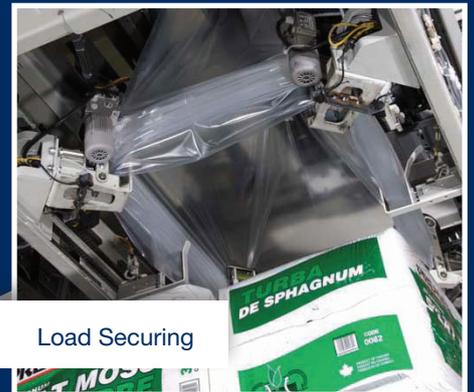
Mixing Line



Bagging & Baling



Palletizing



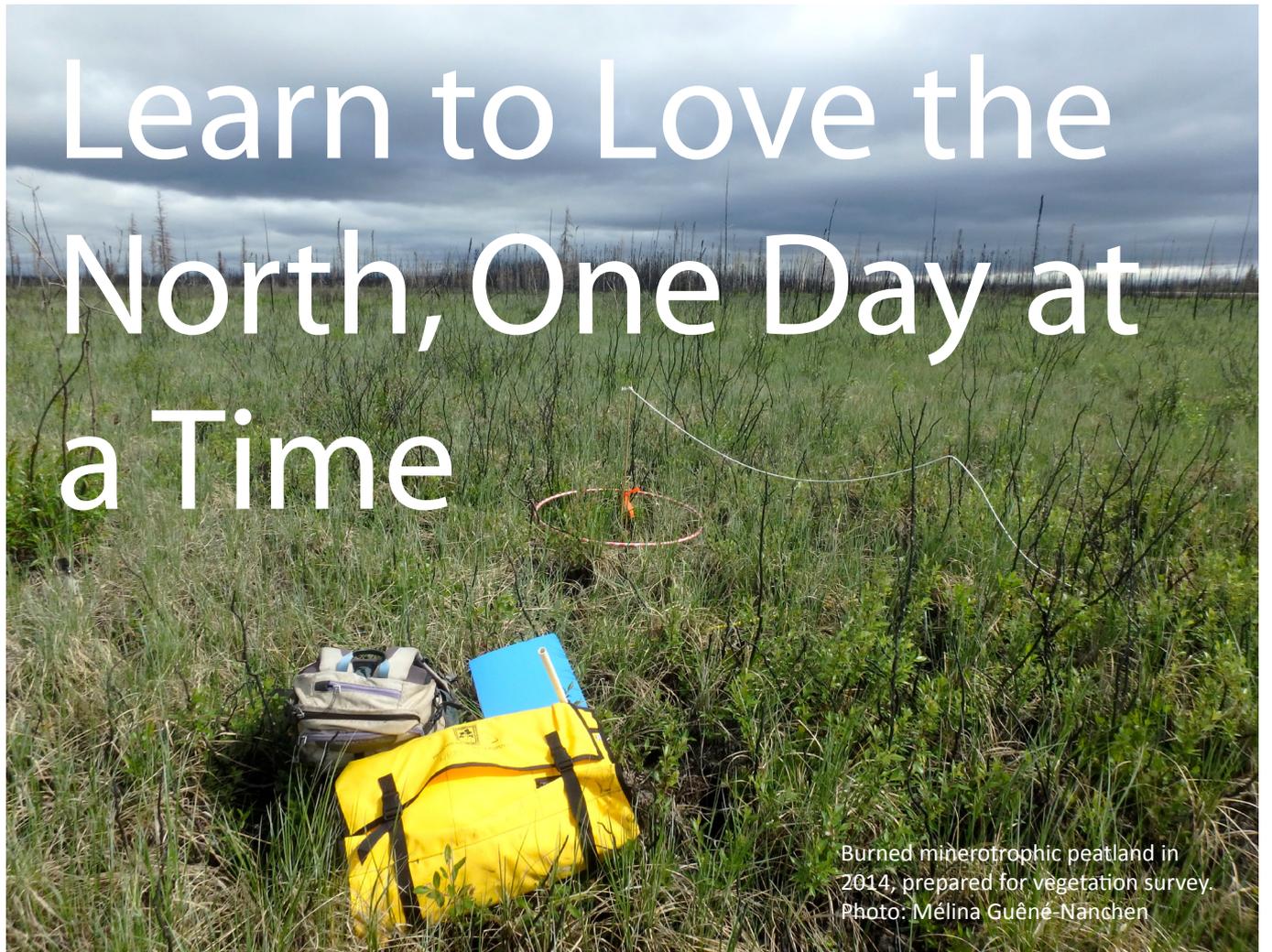
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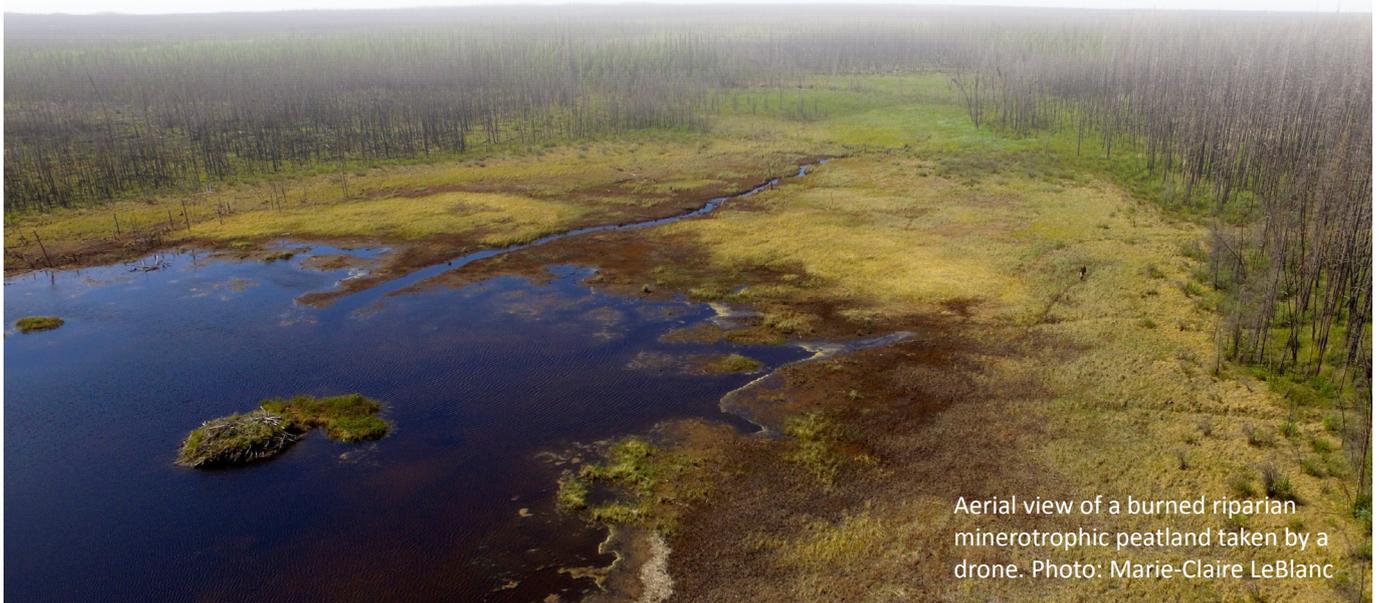
Learn to Love the North, One Day at a Time



Burned minerotrophic peatland in 2014, prepared for vegetation survey. Photo: Mélina Guêné-Nanchen

A few months ago, I was still a neophyte of the North. Allow me to paint you a picture of my first experiment there, in Canada's Northwest Territories. This part of Canada is wonderful, with a unique landscape and wilderness as far as the eye can see. It can also be full of surprises. Every day there is chance

that you will have to rethink your day of fieldwork, as there may be a herd of bison feeding on your research site. Another day, you can come across hundreds of kilometres of burned forest, make the acquaintance of black bears or harvest fire morels for supper.



Aerial view of a burned riparian minerotrophic peatland taken by a drone. Photo: Marie-Claire LeBlanc

One thing is for sure: it only took me 30 seconds to fall in love with this place. However, there is still a lot to learn about this biome. This is why I have spent two months in the Northwest Territories carrying around my plant press and my quadrant for sampling vegetation, while biting flies swarm around me. I was interested in moss regeneration in burned minerotrophic peatlands, which were burned in 2011, 2014 and 2015.

The goal was to gain a better understanding of the natural succession of vegetation in this ecosystem and to apply this knowledge to restore human-disturbed minerotrophic peatlands. Back in Quebec, complete with data sheets, plants to identify, peat samples and unforgettable memories, the only question I keep asking myself is, when I can go back again?!

Mélina Guêné-Nanchen

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Université Laval, Québec, Canada
melina.guene-nanchen.1@ulaval.ca

Infobox GRET

The Peatland Ecology Research Group (PERG/ GRET) was formed through the partnership of the university scientific community, the Canadian peat moss industry and federal and provincial agencies. Our common objective is the integrated sustainable management of Canadian peatlands. The research team is headed by Dr. Line Rochefort. Since 2003, PERG's projects are going on within the Industrial Research Chair in Peatland Management, with still the support and collaboration of the Canadian peat industry. The third term chair program (2013 to 2018) is divided in three main research avenues: plant propagation of fen species; establishment and facilitation of fen and bog species in degraded peat ecosystems; and biology of Sphagnum. PERG's expertise in restoration and conservation has created a strong interest from the private sector, governments, and conservation bodies. www.gret-perg.ulaval.ca



Natural minerotrophic peatland. Photo: Mélina Guêné-Nanchen

New tool evaluates peatland sensitivity to climate change

Scientists at the University of Nottingham are using radar waves as part of a new tool that has been developed to evaluate peatland sensitivity to global climate change. The new method is based upon an Interferometric Synthetic Aperture Radar (InSAR) technique that uses radar waves to measure vertical land surface motion.

It is being utilised in a two-year long Natural Environment Research Council (NERC) Soil Security Programme survey of two sites in Scotland's Flow Country – the single largest soil carbon store in the UK and the largest blanket bog in Europe. The study aims to improve our understanding of the ability of peat to resist, recover and adapt to climate change in different landscape settings.

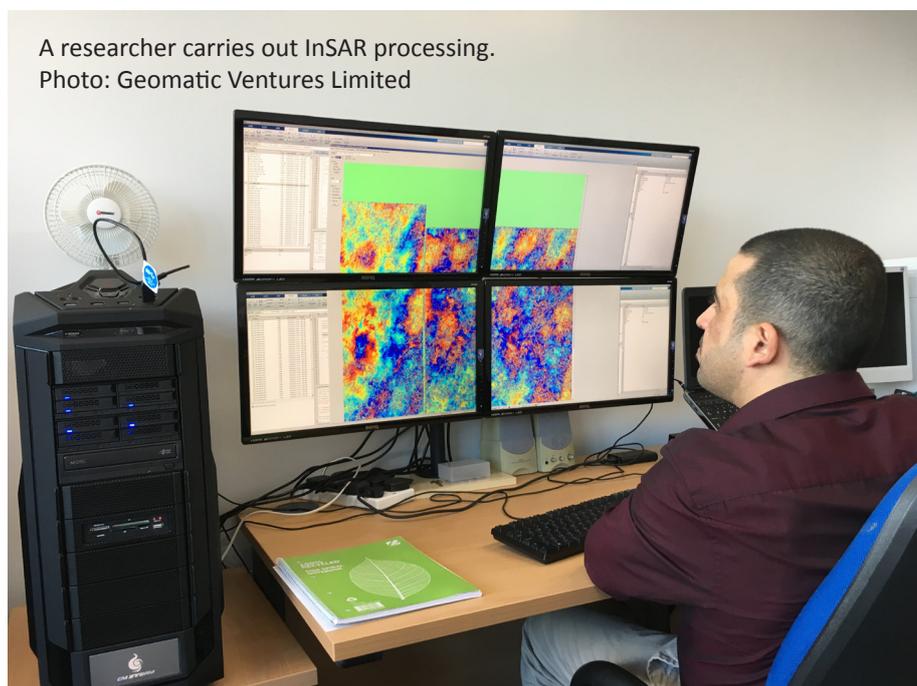
Peatlands serve a vital natural function in tackling climate change and maintaining our water supply as well as being beautiful habitats for wildlife. They account for one-third of the earth's soil carbon, a quantity equivalent to the amount of carbon in the atmosphere.

Dr David Large, Head of Department for Chemical and Environmental Engineering at The University of Nottingham, who is leading the groundbreaking study, explained the importance of peatland.

He said, "Peat contains up to 95 per cent water and five percent organic matter. When peatland soil is damaged through human intervention or climate change, organic matter is lost, which can lead to a detrimental impact on carbon storage,

water quality and ecosystems. Consequently, protecting peatland is a priority and considerable effort is being devoted to its management and restoration."

This NERC-funded study brings together collaborators from the University of Nottingham's Geohazards and Earth Processes Research Group and the Nottingham Geospatial Institute, as well as the University of Highlands and Islands' Environmental Research Institute and the University of Glasgow. The project is also supported by Geomatic Ventures Limited,



A researcher carries out InSAR processing.
Photo: Geomatic Ventures Limited

which is a University of Nottingham spin-out company that provides satellite-based ground motion surveys for environmental safety and security.

The study will test the new transformative InSAR technique, which will provide near continuous coverage across all land surfaces irrespective of ground cover. Established InSAR techniques provided only patchy coverage over rural areas and were therefore ineffective over peatland.

Dr Large added, “The new technique will help us better understand how peat responds to climate change within a landscape while reducing long term monitoring costs. In addition, it will help us evaluate peatland restoration methods and create effective management plans for large areas.”

The accuracy of the new InSAR technique has been demonstrated over solid slow moving surfaces. However, peatland has an unusually dynamic surface that can move rapidly over short periods of time in response to changes in water and gas content. So to realise the potential that InSAR offers over peatland, the validity of results obtained needs to be checked against field data.

The study will address this issue in two key areas including:

- Is the ground motion measured by InSAR a true indicator of the magnitude and direction of the ground motion?
- Does the InSAR indicate the general condition of the peatland?

A case study: Irish Midlands

Earlier studies conducted by the University of Nottingham and Geomatic Ventures Limited, from 2002 to 2009 and then from 2015 to 2016, compared the surface motion of peatland in the Irish Midlands using the Intermittent Small Baseline Subset (ISBAS) technique. The latter was developed to survey all terrains.

This technique opened up the possibility of monitoring peatlands continuously over large areas using Differential Interferometric Synthetic Aperture Radar (DInSAR).

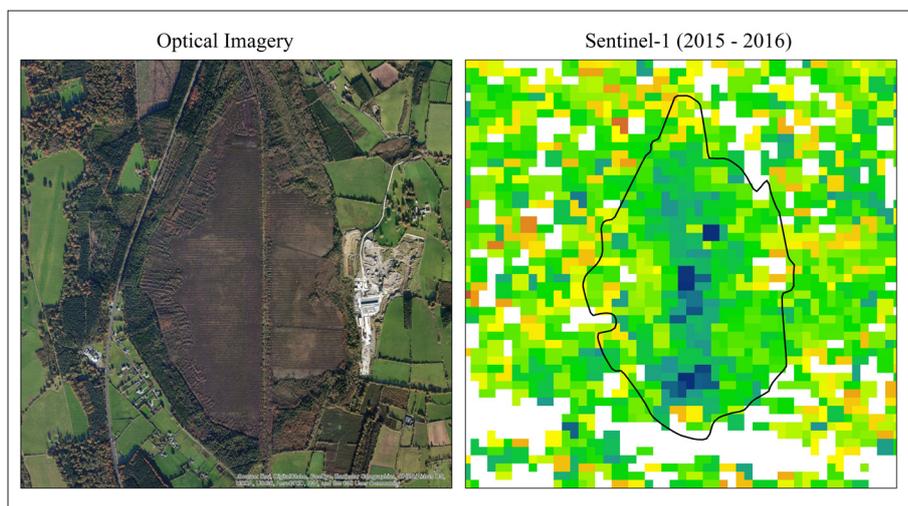
The studies monitored the degradation and recovery of peatland in lowland raised bogs across the Irish Midlands including Abbeyleix Bog, Clara Bog and Knockahaw Bog. By drawing on Sentinel-1 data and archive ENVISAT data, researchers were able to highlight issues that needed to be addressed.

Abbeyleix Bog

In the late 1980s, drainage ditches were created at Abbeyleix Bog which caused the peat surface to subside. In 2009 the ditches were blocked. InSAR results for the period 2014 to 2015, indicate rapid uplift in response to ditch blocking. Uplift is most rapid to the West of a disused railway line that runs north-south through the centre of the bog. This raises many, as yet unanswered, questions as to the cause of the rapid localised uplift of the peat body and the relationship of this to gas fluxes and the condition of the peat.

Clara Bog

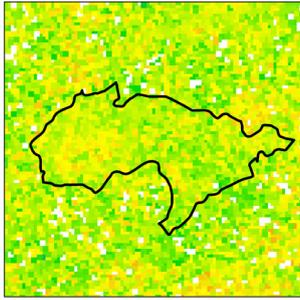
Data from the 2002 to 2009 study of Clara Bog indicated a slow sustained subsidence, which was confirmed in the results of the 2015 to 2016 study. The latter showed a well-defined area of rapid subsidence in west Clara Bog, with stabilisation and uplift in central Clara Bog.



Abbeyleix Bog. Screenshot: Geomatic Ventures Limited 2016

Clara Bog - Peatland Collapse

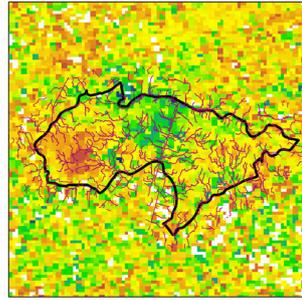
ENVISAT (2002 - 2009)



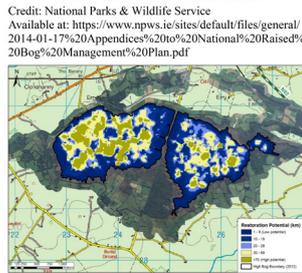
Optical Imagery



Sentinel-1 (2015 - 2016)



Restoration Potential



Credit: National Parks & Wildlife Service
Available at: <https://www.npws.ie/sites/default/files/general/2014-01-17%20Appendices%20to%20National%20Raised%20Bog%20Management%20Plan.pdf>

Legend

Ground motion (Millimetres per year)
-10 0 10
Subsidence Uplift

Peatland

0 1 2 Kilometers



influence on water retention and uplift.

The new study which was launched earlier this year brings together collaborators from the University of Nottingham's Geohazards and Earth Processes Research Group and the Nottingham Geospatial Institute, as well as the University of Highlands and Islands' Environmental Research Institute and the University of Glasgow.

Land motion data of the collapse and recovery of Clara Bog. Screenshot: Geomatic Ventures Limited 2016

These patterns of surface motion appeared to be strongly linked to drainage.

The InSAR results appears to provide an excellent means of delineating areas of collapse and recovery that could be used to revise the existing restoration potential map and restoration strategy for Clara Bog.

The project is also supported by Geomatic Ventures Limited.

Dr David Large

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david.large@nottingham.ac.uk

Knockahaw Bog

In the late 1980s drainage ditches were created in Knockahaw Bog. The period from 2002 to 2009 saw some subsidence in the south and east while the northwest section was stable.

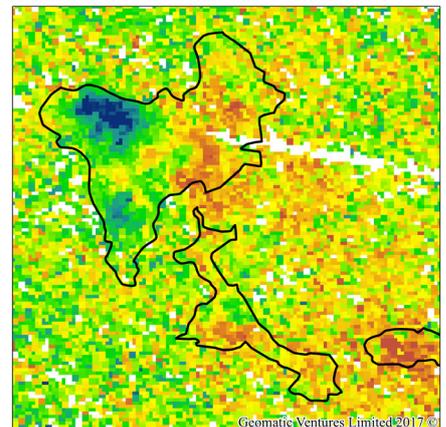
In 2013 Bord na Mona noted some natural infilling of drains in the northwest section and around flushes. The period from 2014 to 2015 was marked by a rapid uplift of the peat surface in the northwest area and upstream off flushes.

Small changes to the drainage appeared to have had a major

Optical Imagery



Sentinel-1 (2015 - 2016)



Knockahaw Bog. Screenshot: Geomatic Ventures Limited 2016

Changing demands in industry require new baling machine

More than just easily transportable bales

Text and photo: Apollo ISC

With changing demands in the industry and from listening to their customers, Apollo ISC decided to develop a brand new baling machine. This new machine had to deliver more than just easily transportable bales.

The bales needed to be easily transportable, enable lengthy outside storage and have minimal film changing. After a year of researching, developing and testing, Apollo ISC can proudly say they have developed a new machine which offers the perfect baling solution.

The machine

This new machine is called the Flat Film Press. It represents the latest technology in baling systems and can be considered the successor to the Big Bale Press. It's a compact and fully automatic installation for compressing, packing and palletizing bulk products, and can be used for many types of compressible and cohesive products (such as peat).

It's an extremely user-friendly machine which operates fully automatically. Also, you can change the settings of the machine at any time so you can always produce the bale size that suits your company. The costs per bale are brought down to a minimum by the Flat Film Press. These low costs are the result of minimizing the frequency of film changing.

In comparison with the Big Bale Press, the Flat Film Press roll needs to be replaced only every 700 bales instead of every 20-25 bales. One roll contains up to 2500 metres of flat film! This way the new Flat Film Press has maximum uptime and a high net capacity.

Foil material

The foil material - flat film - the press uses is a very important aspect of the new baler. Flat film is a firm and high-quality product which gives you important advantages. One of these advantages is that a stretchhood is no longer needed when lengthy outside storage is required.

To stack and store your bales has never been so easy. Another advantage is that the flat film can be pre-printed with your logo or a text. This way your bales are an effective marketing resource.

Reliability

With this new technology and advantages the Flat Film Press offers you more than just easily transportable bales. As the base technology of the FFP is the same as the BBP, you're guaranteed to have the reliability and quality Apollo is known for.

Check all technical specifications and possibilities by visiting: www.apollobv.com.

About Apollo ISC

Apollo ISC is part of the Apollo Group BV. Our core business is the design, manufacturing, sales and installation of components for material handling and transport installations for the bulk and the packed goods industry. For every challenge we find a solution.



Research in the Peruvian High Andean Wetlands (Bofedales)

The bofedales are a type of high Andean wetland. These areas are a key resource for traditional land management at high altitudes. Because they retain water in the upper basins of the cordillera, they are important sources of water and forage for domesticated livestock, as well as biodiversity hotspots.

Although these ecosystems are under a lot of pressure (from grazing, mining, the development of infrastructure, etc.), not enough about them is yet known. Authors have different opinions about their altitudinal range, with at least three different starting points (3100, 3500 and 3800 MASL).

There are also varying opinions on their plant communities, the most commonly referenced being *Distichia* peatland, although several others can be found (stream grassland, *Plantago rigida* peatland, peatland with mosses and shrubs, etc.), including mixed communities. Other unknown factors include whether they are all mires, peatlands or just wetlands; if they are minerotrophic or ombrotrophic; what their actual capacity is to store and provide water and details of their carbon storage.

Some of these issues were part of the Forum entitled “Bofedales: Definition and classification”,



Sampling water levels and chemistry,
Nor Yauyos-Cochas Landscape Reserve.
Photo: Mónica Maldonado

held as part of the First Peruvian Wetlands Congress, between 3 and 4 February in Lima.

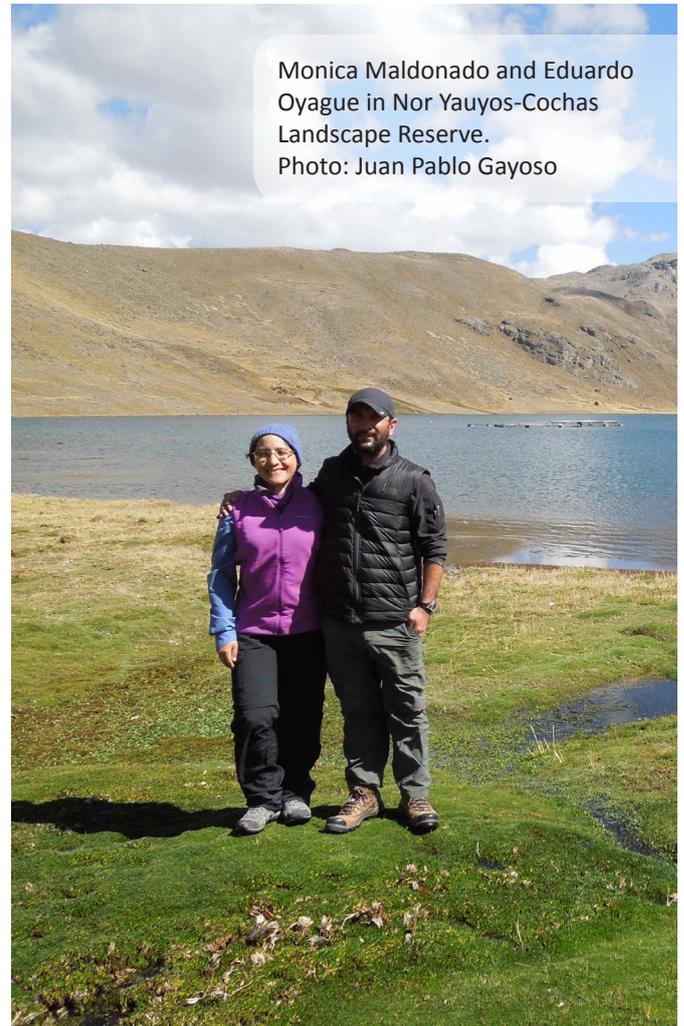
The Forum was organized by a group of specialists working in several parts of the country. As part of this group, and in order to answer many of the questions in the above paragraph, the Divisions of Vegetation Ecology and Limnology of CORBIDI are working on several research projects across the country. The main topics that we are working on are related to hydrology, hydrochemistry and vegetation ecology.

Part of this work was carried out with the patronage of the Nor Yauyos-Cochas Landscape Reserve.

Further information can be requested from

*Monica Maldonado
Fonken & Eduardo
Oyague Passuni*

mmaldonado@corbidi.org
eoyague@corbidi.org



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Peat and peatland events

Global Peatlands Initiative side event
at UNFCCC SBSTA 46
Bonn, Germany
9 May 2017
www.globalpeatlands.org

German Peat and Peatland Society
Seminar und Excursion
Zeven, Germany
12 - 13 Mai 2017
www.dgmtev.de

Global Peatlands Initiative
Jakarta, Indonesia
15 - 17 May 2017
www.globalpeatlands.org

Global Landscapes Forum: Peatlands Matter
Jakarta, Indonesia
18 May 2017
www.landscapes.org/peatlands

German Peat and Peatland Society
Naturschutzfachliche Leitplanken für Tourismus
und Umweltbildung an und in Mooren
Drübeck, Harz, Germany
22 - 24 May 2017
www.dgmtev.de

Wood Meadows & Pastures
Sheffield, United Kingdom
23 - 24 May 2017
www.britishecologicalsociety.org/event/wood-meadows-pastures

CGU and CSAFM Joint Annual Scientific Meeting
Vancouver, Canada
28 - 31 May 2017
www.cgu-ugc2017meeting.ca

Annual Convention 2017
Aberdeen, Scotland
28 - 31 May 2017
www.peatlands2017.net

28 May: IPS business meetings: EB, SAB and open
Commission workshops

29 and 31 May: Symposium and workshop
"Responsible Management of Peatlands"
30 May: Excursions
31 May: Annual Assembly

Fen Peatlands After Drainage –
organic soils in mountain areas
Kudowa Zdrój, Poland
10 - 13 July 2017
<http://uwm.edu.pl/peat>

Conservation and Management
of Wetland Habitats
Riga, Latvia
11 - 12 July 2017
www.mitraji.lv

IMCG field symposium
Mires of the Northern Part of European Russia
22 July - 4 August 2017
www.imcg.net

Finnish Peatland Society
From Oulu to the Hossa National Park
16 - 18 August 2017
<http://suoretki2017.blogspot.fi>

ISHS-IPS Joint International Symposium on
Growing Media, Soilless Cultivation, and
Compost Utilization in Horticulture
Portland, Oregon, USA
20 - 25 August 2017
<http://newbeginningsmanagement.com/compsubsci2017>

10th International Carbon Dioxide Conference
21 - 25 August 2017
Interlaken, Switzerland
www.icdc10.unibe.ch

More at: www.peatlands.org/events





Release of NEWEST Big Bale machine

Bales compressed and packed in flat foil from a foil roll

Output: 25 Bales/hour of 6M³ based on 2 compressions

The benefits of this new type of baling machine:

- High output per hour/day
- Nice shape and good looks of the bale
- Can be stored outside without an additional stretchhood. (Saving on foil!)
- Nice rectangular shape for easy (container) loading.
- Fully automatic machine that works without an operator
- Bale height can be easily adjusted, within a minute.
- Bale height 1,2-2,6 Meter.
- Bales can be filled based on volume, or,
- Bales can be filled based on weight and density = volume
- Bales can be made with 2 or 3 compressions
- High capacity, without interruptions for foil-roll change
- Machine is built out of the best industrial components
- Your company logo can be pre-printed on the foil-roll



YouTube



This new big bale baling machine produces one broad sheet from two rolls of flat foil in which the compressed bales are packed. This state of the art machine includes a number of additional technical features, such as better product dispersion in the press chamber and a two or three-fold compression of the (6m³) bale to give a firm footing.

The machine works fully automatic. The filling, compression, bag making and the bale outfeed process is controlled by the machine and works without the assistance of an operator.

The bales are produced in a **stationary** compression chamber. During outfeed/lowering the bale is tidily packed in flat foil.

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Submission deadline: PI 2/2017: **3 June**

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From Peatland to Textile

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What Saves a Peatland from Development in Ireland?