

Peatlands

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Certification & Restoration



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16th International Peatland Congress



Tallinn, Estonia

2 - 7 May 2021

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Editorial

Peatland certification paving the way

When we discussed the certification of peat products, aimed at guaranteeing that companies manage their extraction areas responsibly, for the first time in the early 2000s, there was a spirit of hope - however, there were also considerable doubts.

"Of course, it will come" said IPS President Markku Mäkelä at the International Peat Congress in Tullamore in 2008, when Hanna Nikinmaa of Indufor introduced the first certification concept, customized fully to the IPS' and its members' requirements. Others were not so optimistic. Fears were expressed in relation to costs, and whether the system would be accepted by the



market. Would there be any benefit of offering certified peat? Is it not sufficient to put a stamp on the bags? What would the others do? Is national legislation not sufficiently binding?

Now that we are in 2020 (not the best year in history, admittedly), we know more: certificates, such as those issued by RPP in Europe and Veriflora in Canada, are widely accepted, and will soon be the only way to access certain market segments, for instance in the Netherlands and Germany.

Was it worth it? Taking into account the feedback from our member companies, probably yes. It is an excellent tool which proves that companies do care. That they invest in site selection, in environmentally friendly processes and in the responsible after-use of the cutover peatlands. Although certification is now in the hand of private companies or foundations, we are proud that we at IPS, have made the first step and that the

Peatlands International is the global magazine of the International Peatland Society (IPS). It provides the more than 1,700 individual, institute 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 or [subscribe](#) for € 59/year.

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Cover: Squishing at Bois-des-Bel peatland in
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www.peatlands.org/publications

Photo: Emma Wurfel.
P.S. Guess the name of the city,
email ips@peatlands.org by
30 December and win a copy of
the Crawdads book!

current certification systems are based on the IPS Strategy for Responsible Peatland Management (2010 and 2019). Read more in this issue!

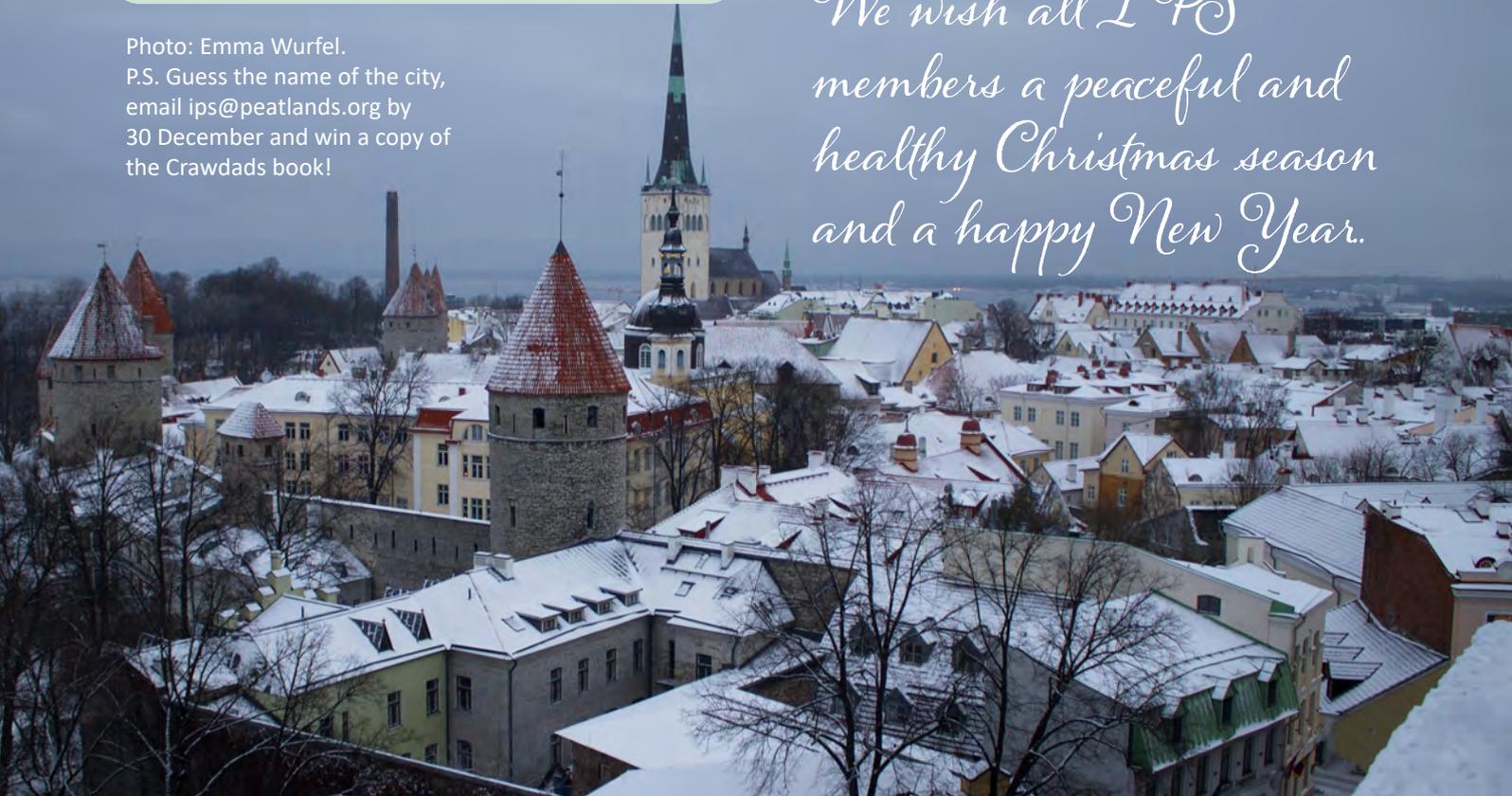
Furthermore, this magazine comprises a range of interesting reports on peatland restoration, carbon farming, literature and art. Did you know that squishing a bog actually encourages Sphagnum growth? And what crawdads are? We would also like to remind you of the Allan Robertson Grants 2021, the application deadline for which is 31 January. Share if you are over 30 and apply if you are a young manager or a research student.

The Executive Board of the IPS will hold its 112th meeting next Wednesday. We have serious issues to discuss, such as the financial future of the Society, especially as peat production in Ireland and Finland is decreasing rapidly. Will the peatland community survive this structural change? We sincerely hope so. And we need your help. Be active, recruit new members, comment on social media, spread IPS' message and provide content. We wish you all the best for 2021. May the bogs be with you!

Susann Warnecke

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*We wish all IPS
members a peaceful and
healthy Christmas season
and a happy New Year.*



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What is the IPS? Facts and thoughts by the Secretary General

The most common question I have been asked over the course of my two years at IPS is “What exactly is the IPS?”. This is somewhat surprising, considering that the IPS has existed for over 50 years. Founded in 1968, the International Peatland Society is a global, non-profit, non-governmental organization (NGO) of individual, corporate and institutional members, dedicated to the responsible management of peat and peatlands.

For more than 50 years, IPS has been the **leading global organization**, promoting a balanced and unified path for economic stability and environmental protection, as well as social inclusion for the responsible future of the world’s peatlands and their use. The scope of the IPS encompasses all types and uses of peatlands.

This is the core vision of the IPS.

The mission of the IPS is to address key peatland issues, including climate change, biodiversity, restoration and the need for responsible and wise use and management. Rather than being confrontational, the IPS does this by providing a platform for **open dialogue**, and by actively promoting this dialogue between all its members and stakeholders. In doing so, it combines factual accuracy, partner engagement, communication and technical expertise at national and international level.

By harmonizing **economic growth, social inclusion and environmental protection**, the IPS aims to develop and deliver balanced and responsible solutions for peatland and peat challenges. In that sense, the IPS is a globally unique organization.

The IPS serves its members and all those involved in the management of peat and peatlands, from

science to conservation, industry and political decision-making, through the acquisition, exchange, promotion and communication of knowledge and experience, by means of **communications, events and projects** which address key issues. The IPS is about the big picture, and the big picture is always bigger than the interests of single stakeholders.

Past IPS achievements have been substantial and have influenced the entire peat



The future: population growth, climate change and food availability. Photo: Kevindous

and peatland community. These include the quadrennial **International Peatland Congress** (IPC) which is widely considered the biggest and most influential peatland and peat-related event. Fifteen IPCs have been organized by the IPS since 1968; the 16th will be held in Tallinn, Estonia in 2021 and the 17th in China in 2024. In addition to the Congress, countless conferences, symposia and workshops have been organized for different target audiences every year. The first IPS Industry Summit was held in Rotterdam in 2018 and will be organized on a regular basis in the future.

Over the decades, the IPS has built a strong liaison with **key international conventions and multinational organizations** that formulate and discuss future peatland policies. Considering current concerns in relation to peatlands and greenhouse gas emissions, the role of the IPS as a balanced and knowledgeable NGO, is of great importance. Through its Commissions and Expert Groups, the IPS uses the unique knowledge base of its members to assist in making logical and unbiased recommendations for responsible peatland management that maximize the benefits in all dimensions of the environment-economy-society nexus.

The IPS has published several books, including *Global Peat Resources* (Lappalainen, 1996), *Wise Use of Mires and Peatlands* (Joosten & Clarke, 2002) and *Peatlands & Climate Change* (Strack (ed), 2008, (2nd edition in the making), and countless **proceedings of conferences**. Important achievements have been the booklet, *Strategy for Responsible Peatland Management* (SRPM) (Clarke & Rieley, 2010, 6th Edition, 2019) as well as the information booklet, *International Conventions, Agencies, Agreements and Programs* (Rieley, 2014; 2019).

The principles of SRPM were used to develop the current **peat certification systems**, RPP and Veriflora (see page 10 ff).

However, the biggest achievement over its 50 plus years of existence, and its greatest asset, is its member base, and the way in which the IPS **connects people from all fields** related to peatland and peat. With over 1700 members globally, the IPS community is large and diverse, and as a whole has a positive vision of peat and peatlands moving forward towards 2050.

Similar to the future of our planet, the future of peatlands and peat is a very challenging one. Concerns regarding **climate change and greenhouse gas emissions** are increasing worldwide, and the IPS fully acknowledges and understands the importance of peatlands in climate mitigation, and the urgent need to reduce CO₂ emissions in all sectors.

The steep decline of peat extraction for energy use in Ireland and Finland can be seen as an immediate consequence of the Paris Agreement of 2016. Will it stop there? Of course not. Within the EU, more and more governments drive strategies that aim to reduce not only peat extraction, but also peat use, such as in horticultural substrates, or growing media.

At the same time, the proportionally much higher emissions from drained peatlands used in agriculture are ignored. With more and more countries all over the world shifting traditional agricultural food production to growing-media-based greenhouse production, we may have to ask ourselves whether measures for climate protection have to be limited at the point where they endanger the existential **needs for food** of the world population.

Reducing emissions from agricultural peatlands by either restoration of these peatlands or the implementation of climate-smart agriculture on peatlands (e.g., Sphagnum Farming) may result in a much higher potential to cut total emissions than by simply prohibiting horticultural peat extraction.

With the exception of IPS' traditional activities, climate mitigation through peatland restoration, climate smart after-uses for agricultural and cutover peatlands, as well as the provision of environmentally, economically and societally viable solutions for the increasingly critical issue of the demand for global growing media, will be the key topics concerning the IPS in the future.

Welcome to IPC2021 to discuss these topics!

Gilbert Ludwig

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Successful UNEP Accreditation for IPS

On December 4, 2020, the United Nations Environment Programme (UNEP) Governance Affairs Office confirmed the International Peatland Society's successful accreditation to the United Nations Environment Assembly (UNEA) of UNEP.

Accreditation provides IPS with observer status to the Assembly and its subsidiary bodies according to Rule 70 of the rules of procedure of the United Nations Environment Assembly of UNEP. Accreditation brings many advantages for IPS with respect to participation in the work of UNEP's Governing Bodies, such as the United Nations Environment Assembly of UNEP and the Committee of Permanent Representatives.

Accreditation is the main entry point for Major Groups and Stakeholders into policy dialogue at UNEP. In the process leading up to sessions of the United Nations Environment Assembly of UNEP, IPS will have the opportunity:

- Participating in the Regional Consultation Meeting to be held in your region, in preparation for the Assembly
- Contributing to the preparation of Regional Civil Society Statements towards UNEP and the Assembly
- Receiving unedited working documents of the United Nations Environment Assembly at the same time as the Committee of the Permanent Representatives (CPR)
- Submitting to the UN Environment Secretariat written contributions to these unedited working documents for distribution to the Governments through the Committee of the Permanent Representatives (CPR)
- Participating in the public Meetings of the Committee of Permanent Representatives, the Assembly and the Global Major Groups and Stakeholders Forum, an associated meeting of the UN Environment Assembly (including via tele- or video conference)



Black grouse at Pirttilampi, Finland. Photo: Gilbert Ludwig

During the session of the Environment Assembly, accredited organizations have the opportunity:

- Attending the plenary sessions of the Committee of the Whole and the Ministerial Consultations as observers and to exchange views and interact with Governments present
- Circulating written statements to Governments, in the form of information documents through the UNEP secretariat
- Making oral statements during the discussions of the United Nations Environmental Assembly of UNEP

A list of accredited organisations can be found here: www.unenvironment.org/civil-society-engagement/accreditation/list-accredited-organizations.

For more information, please contact the IPS Secretariat.

Gilbert Ludwig

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Apply for the Allan Robertson Grants 2021!

The IPS Secretariat now welcomes applications for the Allan Robertson Grants for Research Students and Young Professionals 2021.

The terms of reference and an application form can be found at www.peatlands.org/about-us/honoursgrants.

Deadline is **31 January**, as usual, and there will be at least eight grants of €500 each available. By 4 December we have received already four applications.

Please share this opportunity within your networks! Applicants are typically under the age of 30 (thus **born after 1990**) and grants will be given next year for

- peat and peatland projects as well as for
- travelling to and attending the International Peatland Congress in May (depending on the pandemic situation).

Winners will be asked to report in Peatlands International next year and/or give a presentation at one of our future conferences.

If you are interested in providing additional funds to the grants, please send an email to ips@peatlands.org.

We are very glad that Allan's family as well as the National Committees of the United Kingdom and Estonia are giving their special support, in addition to the IPS. We look forward to receiving your inspiring ideas!

Susann Warnecke

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Certification of Peatland and Peat Products - Historical Background

Introduction

Discussion of the *raison d'être* for peatland and peat certification stretches back over more than 20 years and can be traced to the joint meeting with IMCG that took place in Surwold, Germany

in November 1997. This meeting identified a wide range of peatland and peat issues of common interest to both societies, including certification as a valuable tool of *Responsible Peatland*



Participants of the IPS 30 Year Anniversary Symposium in Jyväskylä in 1998. Photo: IPS Archives

Management. This was the first of many meetings over the subsequent 10 years that developed the concept further, and led to publication of several benchmark texts, culminating in the *Strategy for Responsible Peatland Management* in 2010.

Much effort and time were devoted to explaining the background to Wise Use and developing and fine-tuning principles. This led to publication of *Wise Use of Mires and Peatlands - Background and Principles including a Framework for Decision-making* (Joosten & Clarke, 2002), and adoption by Ramsar at COP8 in Valencia, Spain in 2002, of *Guidelines for Global Action on Peatlands* (GAP) (Resolution VIII.17). Certification has also been mentioned in IPS Strategic Plans.

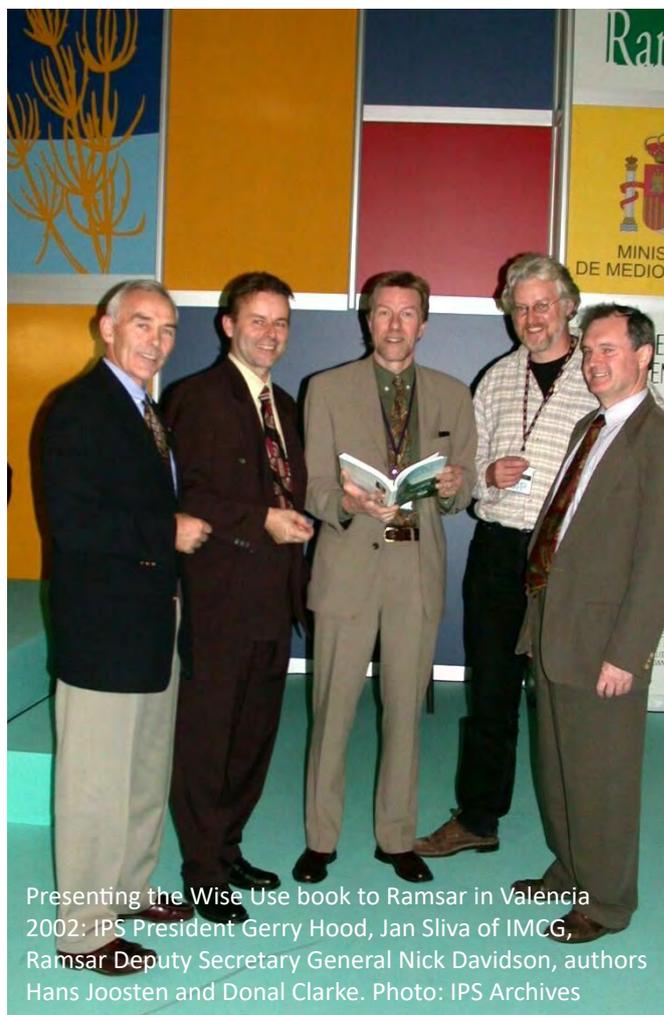
Between 2002 and 2006 numerous meetings were held to identify actions and priorities to implement the GAP in which peatland and peat certification featured. It was also a subject discussed at several meetings between the IPS and IMCG, at IPS Executive and Scientific Advisory Boards, and IPS Commission II (Peat Industry).

It was clear that certification was becoming a subject of major interest for industry that was keen to show it was not responsible for damaging actively carbon-sequestering peatlands, against a rising tide of opposition to their business by conservation NGOs. IMCG eventually dissociated from discussions with the IPS over certification, asserting it was an issue for industry alone and would wait to see what industry proposed.

Setting the scene

There was much activity and discussion on certification in the early 2000s. A joint IPS/IMCG meeting in Valencia in November 2002 during Ramsar COP8 produced the following points:

- Certification is a marketing tool so the first step must come from industry
- Certification brings added value so it must go further than existing legislation
- Certification is a logical extension of the Wise Use Principles
- Private consumers will not be prepared to pay more as they are not aware of the nature of the products and the problems involved
- Certification could function in a similar way



Presenting the Wise Use book to Ramsar in Valencia 2002: IPS President Gerry Hood, Jan Sliva of IMCG, Ramsar Deputy Secretary General Nick Davidson, authors Hans Joosten and Donal Clarke. Photo: IPS Archives

- to EIA and prevent extraction on virgin bogs and protected areas such as national nature reserves, national parks, and Natura 2000 sites
- Forestry certification should be looked to as a model
- What needs to be certified: is it countries, companies, sites, or products?
- The entire chain from production to use is involved, and must be reflected in a certification
- Certification should not deal only with products, but also the processes behind the products
- There was a strong objective amongst some IMCG members for growing media products to become peat-free, and certification could be a tool to further peatland conservation in the meantime
- Development of a certification mechanism must involve both industry and conservation; industry is familiar with the market while conservation knows the threats to peatland. There must be checks and balances
- Conservationists would formulate boundary conditions, tools, and check outcomes against

conservation objectives

- Certification would be a voluntary instrument unlike obligatory instruments such as EIA and legal (planning) frameworks
- Three phases of certification need to be addressed: 1) site selection (legislation, licencing); 2) site exploitation (extraction, after use); and 3) product marketing

Any certification will not be a one-off exercise but will need regular reviewing because things change over time. What is wise now may not be regarded so in the future.

This lively discussion, and many others held at the time indicate the breadth of opinion and feeling about certification.

Rationale for peatland and peat certification

In parallel with the joint wise use activities of IPS and IMCG the Ramsar Convention was developing guidelines for the wise use of wetlands, including peatlands. Ramsar embraced the Wise Use approach to the management of wetlands at COP3 in Regina, Canada in 1987 and has refined its definition and implementation since then.

At COP7 in San José, Costa Rica in 1999, Ramsar adopted Recommendation VII.1, which requested cooperation from Contracting Parties and other interested bodies to refine the *“Draft Global*

Action Plan for the Wise Use and Management of Peatlands”. Subsequently, because of the collaboration between IPS and IMCG, ‘Guidelines for Global Action on Peatlands (GAP) were formulated and accepted by Ramsar COP8 in Valencia, Spain in 2002 in Resolution VIII.17. At the same time the Wise Use Book was presented to Ramsar delegates.

An Annex to Resolution VIII.17, COP8 requested the Ramsar Secretariat to establish a ‘Co-ordinating Committee for Global Action on Peatlands’ (CC-GAP) to prepare an implementation plan with guidelines, recommendations and priorities.

Subsequently Resolution IX.2 of COP9 in Kampala, Uganda in 2005 focused on the future implementation of scientific and technical aspects of this plan and Annex 2 emphasised the promotion and securing of wise use of peatland ecosystems and their services. It also recognised the work of CC-GAP as a multi-sectoral mechanism to deliver the implementation plan.

CC-GAP consisted of representatives of a wide range of Ramsar and peatland bodies, including the IPS and IMCG, and was supported administratively by Tobias Salathé, Ramsar Senior Adviser for Europe. The Committee met for the first time in November 2003 and four times between 2004 and 2006. As a result of these meetings a ‘Draft Plan for the Implementation of Global Action on Peatlands’ was prepared and circulated for consultation.



CC-GAP meeting at Meripuisto, Espoo, Finland in 2006. Photo: Susann Warnecke

Amongst the various issues highlighted in this draft plan was implementation of wise use.

The Global Peatland Initiative (GPI), formed in 2001 to promote government/private sector partnerships for the promotion of wise use of peatlands and the CC-GAP, contributed to a dialogue between the peat industry,

scientists and NGOs on how to implement peatland wise use. The CC-GAP did not have an enforcing function to enable it to identify specific actions or mobilize stakeholders into action, because it could not prescribe who needed to do what.

A meeting held in Espoo, Finland in July 2006, concluded that the GAP implementation plan should provide a general framework only for international, regional, and local groups to identify, develop and launch their own actions. Further progress on key issues was delegated to a small Executive Team and the CC-GAP has not met since then.

In the meantime, the European Peat and Growing Media Association (EPAGMA) had asked the IPS to prepare a proposal for the certification of peat-based products.

This process commenced in March 2008 and initial proposals prepared by the consultancy company Indufor were reviewed at meetings held in Tullamore in June 2008 where members of EPAGMA and industry members of IPS felt this proposal was too complex and costly, and instead of proceeding with the whole certification concept decided instead to only support the formulation of a 'global peatland strategy' as a first step.

The next step

In November 2008 IPS Commission II held a workshop at Helsinki airport, Finland on a possible project for the certification of "sustainable" peatlands management. It was also attended by members of the IPS Executive and Scientific Advisory Boards.

The meeting received a briefing from the Secretary General of PEFC Finland (Programme for the Endorsement of Forest Certification schemes), on the processes which were employed in developing certification systems for the forest industries, who answered many questions and participated in the discussion. The meeting believed some form of internationally acceptable peatland certification is necessary and will become an unavoidable market demand. The meeting understood "market" to include customers and national and international regulators.

The meeting was of the view that a peat certification system should be based on peatland management. The meeting noted that both forestry and palm oil certification schemes referred to 'sustainable management' but was of the view that the concept of 'sustainable' needed urgently to be defined in the context of peatlands.



Indufor representative Hanna Nikinmaa presented the first certification concept to Commission II in Tullamore in 2008. Photo: Hannu Salo

Should a proposal for certification be adopted, it was agreed that it would be a task for the first *Strategy Development* stage to address how to approach sustainable peatland management based on the concepts of economic, environmental, and social responsibility.

The major benefit seen for a peatland management certification system was that it would communicate to customers, government bodies and regulators the high standards and environmental responsibility under which peat was and will be produced.

The major obstacles and disadvantages of a certification system were the costs involved and the timescale required. The meeting was of the view that there was no 'shortcut' way of setting up a certification system. The Secretary General of PEFC stated that a system which did not include systematic and open consultation and participation could not be called a certification system. An industry code established by the industry itself was not a certification system. The meeting noted the proposal document prepared by INDUFOR but believed it was too long and complex. The meeting noted its length and complexity but believed it could form the discussion basis for a proposal.

A proposal for the development of peatland certification was outlined as follows:

1. The purpose of a certification scheme is to provide assurance that peatlands are managed according to internationally agreed criteria for economically, socially, and ecologically responsible management of peatlands and peat.
2. Stage 1: the first step in the process is to **develop a global strategy** for sustainable peatland management as a foundation for a certification scheme. It sets out the general principles for peatland management. This work would be based on the Wise Use book



IPS certification meeting at Helsinki Airport in November 2008. Photo: Susann Warnecke

(Joosten and Clarke 2002), and international agreements on the use of natural resources (e.g. Biodiversity Convention), wetlands (e.g. Ramsar Convention), and social rights (e.g. ILO Conventions, UN Human Rights agreement). This stage could be managed by the IPS, and should involve all relevant stakeholders. The outcome of the stage should be an internationally agreed Charter for peatland management which would form the basis for the development of a standard.

3. Stage 2: The second step is the **preparation of a scheme of administration** which ensures the scheme is adequately supported, with internal rules governing monitoring and corrective actions based on internationally approved procedures. The necessary organisation structures, administration and management procedures should be designed by an Administrative Working Group and should be based on available best practice.
4. Stage 3: The third stage is the crucial one of **setting the standard** which will be the basis for certification. This standard is a document approved by all the relevant stakeholders which details the requirements to be met to achieve responsible peatland management in a cost-effective way.

A standard must be developed by an autonomous working group to which all interested parties have access and is subject to public consultation before adoption. The autonomous

working group only operates while the standard is being developed and when it is renewed.

Following the discussion and question-and-answer session, the Commission II meeting decided to recommend that IPS should proceed, on a stand-alone basis, with Stage 1 as outlined above. The meeting felt that the development of a global strategy for peatland management would be a valuable tool for the peatland community in general and specifically for the peat industries.

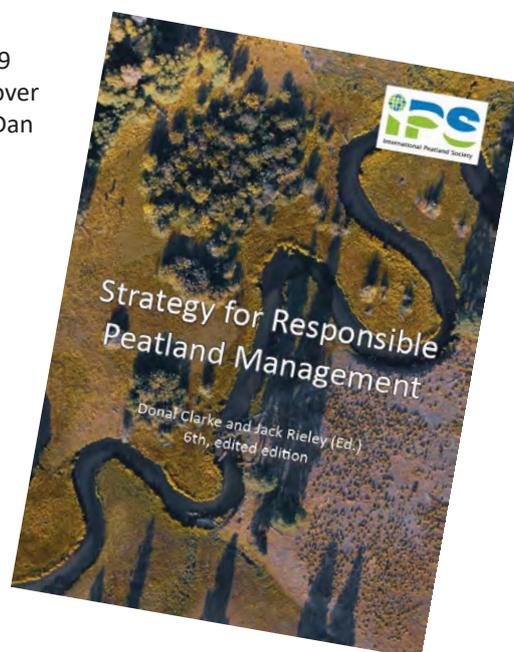
Such a charter, if accompanied by an accord agreement or sign-off by participating parties, could be a valuable end-result. Because this stage involved general principles and not detailed criteria it should be possible to encourage the participation of all relevant stakeholders. The meeting noted a report by the IPS Secretary General on a recent meeting he had with ENGOs (environmental non-governmental organizations) which was encouraging in this respect.

This proposal is only valid if it is supported by the relevant parts of the peat industries. The proposal states clearly that when Stage 1 is completed, further action will only take place (a) after the process has been reviewed by all interested parties; and (b) it has been adopted by the Executive Board of the IPS. The next stage is to seek the views of the peat industries on the proposal within a timeframe that would enable the development of a global strategy to begin in January 2009. The input of a range of other stakeholders would then be sought.

End of the certification road for the IPS

After having taken a leading role in the Wise Use, Global Action on Peatlands and Certification discussions for more than 10 years the IPS decided it could not take on the role of establishing a peatland and peat certification system because it was beyond its resources and expertise to do so. Instead the IPS focussed on Stage 1 of the process to develop a **global Strategy for Responsible Peatland Management** that would form the basis for standards to be decided by others.

SRPM 2019 edition. Cover photo by Dan Meyers



This provided the opportunity for others to take over the search for an acceptable peatland and peat certification procedure and set the scene for the two that are in existence today, namely, **Veriflora** in Canada and **Responsibly Produced Peat** in Europe. Both schemes will present their history and modes of operation in this issue of Peatlands International.

In the spirit of the GAP Draft Implementation Plan, and realising that there was a pressing need for guidance on practical wise use directed at peatland owners and managers, and those involved in extracting peat or timber, growing or gathering food, or distributing peat or peat products, the IPS took the initiative to encourage peatland stakeholders to participate in the formulation of the '**Strategy for Responsible Management of Peatlands**', so they could be confident their activities were carried out in the most sustainable and environmentally responsible way. The strategy was also of wider application than certification, but extended to **conservation, restoration, and after-use**.

All uses of peatlands and peat require their own specific guidelines for practical implementation, a task which is being undertaken now that the Strategy has been adopted.

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Veriflora: A Global Standard by Scientific Certification Systems (SCS)

The Historical Context of the Responsibly Managed Peatlands Standard in Canada

In 2008, the Canadian Sphagnum Peat Moss Association (CSPMA) formed a sustainability task force to examine elements of sustainability in the production of horticultural peat moss. This included the development of a certification system to be conducted by a third party and operated independently of the industry.

In February of 2009, following the recommendations of the sustainability task force, Scientific Certification Systems (SCS) was mandated by the CSPMA board to develop a certification scheme specifically for peat moss production. SCS has a long history of standards development in agriculture and it was determined that the simplest path for the creation of a

peatland certification program was to add a peat moss annex to the existing ornamental crops standard, Veriflora Sustainably Grown. Funding for the creation of this new Veriflora peat moss annex came from contributions by the CSPMA and ACCORD program through the Québec Peat Moss Producers Association (APTHQ).

In November of 2010, the SCS Veriflora Certification for Responsible Peatland Management Sector Specific Annex, Horticulture Peat Moss program was launched.

Beginning in 2011, participating firms submitted to annual on-site audits with high-bar requirements around social fairness and environmental protection. Over 80 bogs and production sites across Canada were brought into certification under the new program within a year.

In February of 2016, SCS conducted a review of the peat moss annex and made the recommendation to consider a standalone certification standard for the responsible production of horticulture peat moss. SCS followed best practices in developing this new independent peatland standard. A key component of the process involved the collection of input from diverse stakeholders,



Pitcher plants (*Sarracenia purpurea*) are among the peatland plants that establish quickly after restoration. Photo: PERG



including academia, NGOs, private citizens, and members of the peat industry.

On January 1st of 2018, SCS published the new standalone certification standard: Responsibly Managed Peatlands V1.0. The stated high-bar goals of the standard were:

- To encourage a growing segment of the peat moss production sector to implement best management practices in terms of environmental, social and quality performance;
- To stimulate innovation and promote continuous improvement over time;
- To provide a uniform standard and assessment matrix that can be applied when evaluating the performance of a diverse array of responsible peatland management approaches;
- To reduce the environmental footprint of peat moss production and enhance the degree to which peat moss production operations restore carbon-accumulating wetland ecosystems;
- To promote sound and responsible working conditions and ensure adequate health and safety measures for workers' protection;
- To encourage peat moss producers to be good neighbors in their engagement with the surrounding community;
- To raise public awareness about the issues and solutions associated with peat moss production; and
- To stimulate consumer purchases that reinforce responsible peatland management.

The newly published standard was developed around a continuous improvement process, with ongoing revisions to the program policies and

procedures in order to maintain best practices around social and environmental issues at certified operations. To that end SCS published its Greenhouse Gas Inventory policy in 2019. This policy standardized “a set of procedures that would assist Responsibly Managed Peatlands certificate holders in assessing greenhouse gas (GHG) emissions and climate benefits related to their operations”.

To date, roughly 80% of Canada’s horticultural peat production is now certified under the Responsibly Managed Peatlands program. Additionally, the standard has expanded into South America with the addition of a peat producer in Argentina.

A Novel Approach to Precompetitive Collaboration

SCS Global Services conducts sustainability audits globally for over 90 different standards across industries. Even given the company’s broad experience, the adoption of the Responsibly Managed Peatlands program has been unique due to the precompetitive collaboration approach adopted by the Canadian peat industry. Looking at the broader certification landscape for context, participation in voluntary schemes come with a mix of positive and negative outcomes.

The costs, both financial and temporal, of a rigorous sustainability certification can put participating firms at a competitive disadvantage when competing with operations that are able to externalize the negative impacts of production, i.e. environmental pollution, poor treatment of labor, etc. Certification costs can often be mitigated by first movers through operational efficiencies and marketing advantages due to product differentiation. However, as more firms in a given industry participate in a certification scheme, the benefits of product differentiation dissipate, and non-participants gain a competitive advantage by bringing goods to market with a lower cost of production.

This concept is exemplified in the organic foods market. For many years organic vegetable growers commanded a significant price premium for their

crops as growth in demand for organic vegetables far outstripped growth in the available supply. This price differential earned by organic crops offset the additional costs of organic production due to both the higher expenses of organically approved agricultural inputs as well as the costs of the annual certification process.

Recently the price premium organic growers command on the market has diminished as certified production becomes commoditized. As the organic pricing drops, conventional growers gain a market advantage through a lower cost of production and are further disincentivized from adopting organic vegetable production practices, even when these practices are shown to provide societal benefits through reduced environmental impacts.

What is unique with the adoption of the Responsibly Managed Peatlands certification program is that the Canadian peat industry, led by the CSPMA, built out a precompetitive process to circumvent the various market dynamics of first movers and late adopters. By agreeing as an industry to adopt high-bar management practices, the added expense of the rigorous third-party certification simply became a cost of doing business and did not put any individual players at a competitive disadvantage.

Furthermore, by incorporating the best practices and continuous improvement required by the Responsibly Managed Peatlands standard, the industry has been able to stay ahead of any

tightening of regulations by local and national governments. The rate of adoption, with participation by roughly 80% of the Canadian industry, is unprecedented in the broader certification landscape.

This speaks to the unique willingness of the Canadian peat industry to work together towards the common good. This collaborative sensibility ensures the resilience of the peat industry going into the future.

A tool to support the certified firms to meet the requirements of the GHG Inventory policy

Following the release of the Greenhouse Gas Inventory policy in 2019, the firms needed a tool to be able to calculate their carbon footprint in an accounting context and to comply with the new requirements. There was also a challenge to use homogeneous emission factors between certified companies.

A joint project was put in place last spring and a specialist consultant, the Chaire en éco-conseil of the Université du Québec à Chicoutimi, was mandated to develop a calculator to determine the carbon footprint of the peat moss production operations. The calculator, in the form of an easy-to-use Excel spreadsheet, was custom developed to consider the reality of peat producers and meet the specific requirements of certification. The calculator optimizes the time spent estimating annual GHG emissions so that they can easily be calculated and reported to the certification program. The calculator also allows peat producers to set GHG emission reduction targets.

The GHG inventory policy suggest the use of the “GHG Protocol Agricultural Guidance” (WRI/WBCSD 2014) for the identification and calculation of emission sources and balance structure. The GHG calculator



The MLTT for bog restoration focuses mainly on the transfer of *Sphagnum* and *Polytrichum*. It has also been shown that 82% of the donor material species establish successfully in the restored sites.
Photo: APTHQ

designed for peat moss production answers to both the guide and the ISO-14064-1 standards (CSA 2016).

The calculator includes mechanical and non-mechanical emissions due to peat moss production. Emission factors for mechanical GHG emissions from mobile, stationary and fugitive sources are derived from the “Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere” (Government of Québec 2020). The emission factors for non-mechanical sources (related to land management) are based on the most recent research in the area, available during the calculator’s conception, and were reviewed by a panel of experts.

Conclusion

For the firms, obtaining and maintaining the certification issued by an independent third party proves the excellence of the company’s practices regarding sustainable development in the field of horticulture. The requirements regard every aspect of the production: from field preparation before harvesting to bog restoration, including product quality control and team members’ work conditions, as well as the commitment of the firm to their communities and other stakeholders. For more information: www.scsglobalservices.com/services/responsibly-managed-peatlands.

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Responsibly Produced Peat (RPP)

A certification standard in the European region for peatland selection and management, during and after peat extraction and growing media production

Introduction

Peatlands are unique and important habitats, worth being protected. At the same time, as regards horticulture, peat products are an important constituent for growing media. The goal of Responsibly Produced Peat is to ensure that peat for growing media can be guaranteed to originate from responsible sources, and sources that do not meet the criteria are effectively excluded.

The aim of the certification is to ensure that peat is only extracted from sources with no high natural

value and to guarantee the future availability of sufficient quantities of high-quality peat for horticulture. Peat is an important constituent of growing media and will continue to be, if alternatives are not available in a sufficient quantity and quality, and at a competitive price. Several alternatives are already used (sometimes in combination) to make peat-free substrates.

However, there are issues that need to be addressed:

1. The quality of peat is difficult to match; it is free from human and plant pathogens, has a low pH, is low in nutrients and has a high water retention and aeration.
2. All alternatives to the use of peat in growing media for horticulture have carbon footprints and some have caused considerable damage to both the local and global environment, such as the loss of biodiversity and



Intensive debate during a stakeholder meeting in Amsterdam, December 2012.
Photo: Responsibly Produced Peat



Establishment Board in 2013. Photo: Responsible Produced Peat

- habitat and an increase in greenhouse gas emissions.
3. There is market competition for all peat alternatives, meaning security of supply cannot be guaranteed and costs will increase as demand for these alternatives increases.
 4. Market research by WUR, commissioned by the International Peatland Society (IPS), shows that the demand for growing media is expected to quadruple in the next 30 years. The share of peat is declining relatively, but due to the strong growth of the total market, the volume of peat required is expected to double.

History

In 2008 the Dutch government issued the policy programme “Biodiversity works for nature for people forever” with the objective of investigating environmental issues related to supply chains, including soy, palm oil, fish meal, biomass and peat. The questions relating to peat concerned the consequences of peat extraction and trade in

relation to biodiversity and climate. There was a need for answers on the potential for optimizing peat extraction conditions and developing alternative raw materials for substrates in horticulture.

The Dutch government commissioned Alterra, the Research Institute of Wageningen University, to provide an insight into the peat chain. The result of the project was published in the report “Sustainable Peat Supply Chain” (Bos, Diemont & Verhagen, 2011) which addressed issues including biodiversity and greenhouse gas emissions, and made the following recommendations:

- to explore the availability of peat from degraded bogs,
- to identify suitable alternative raw materials and
- to agree on criteria for maintaining and enhancing biodiversity, based on existing legislation and industry initiatives.

Inspired by the Alterra report, the Dutch organizations, RHP¹ and VPN², adopted the

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recommendation to formulate practical criteria for the responsible production of peat, in collaboration with the European Peat and Growing Media Association (EPAGMA) and IPS. The initial guidelines were:

1. the future availability of peat for substrates is essential for horticulture
2. the peat and growing media industries should publicize their ecological and social credentials in the market and in society in general

Evolution of the RPP Certification Scheme and Procedures

The goal was to develop a certification scheme that can objectively and independently assess whether a peat extraction company meets the criteria. Companies should regard Responsibly Produced Peat to gain access to markets.

In 2012, a Temporary Technical Committee (TTC) of seven experts organized field trips to Estonia and Latvia to gain an insight into real-life situations. As a result, Principles and Criteria were drafted with operational indicators to measure compliance, and in October 2012, the document was sent to stakeholders for comments.

Another meeting was organized in Amsterdam in December 2012. A total of 30 people attended the meeting, representing industry, NGOs and authorities. The international character of the meeting was reflected in the 11 nationalities which were present. Opinions and visions were shared and there was an intense debate. Fundamentally, there was clear support for the initiative and the further development of principles and criteria for the responsible production of peat.

The Foundation Responsibly Produced Peat was established in the Netherlands in August 2013, followed by a founding meeting in Riga, in which Board members were appointed. Peat producers, growing media producers and representatives of NGOs were equally represented on the Board. After the Board approved the proposals of the TTC, the practicality of the certification system could be tested. The Foundation set about designing

a certification scheme around the principles and criteria, to manage peat production for horticulture responsibly. The scheme can be used to guarantee that peat in growing media products has been obtained from ethically-selected and responsibly-managed extraction sites.

The procedure for test certifications started in 2014 and, when all required documents were collected, an inspection by a qualified independent inspector followed in 2015. The Committee of Experts (CoE) was established in 2014 with responsibility for checking the inspection reports and providing ecological and environmental advice to the Board across the certification scheme.

RPP principles and criteria are based on the *Framework for Wise Use*³, the outputs of several workshops and stakeholder consultation, organized by the IPS on responsible peatland management, in response to a request from the EPAGMA. These are elaborated in the *Strategy for Responsible Peatland Management*⁴ that has become the standard reference for this topic.

The geographical scope of RPP certification is the European Union and certain neighbouring countries. The main principles are as follows:

- Do not extract peat from peatlands of high conservation value, but focus peat production on degraded peatland.
- Secure the best possible environmental after-use.

State of expertise

An important aspect for RPP is multi-stakeholder involvement in the peat industry, environmental NGOs and scientists represented on the Board and the Committee of Experts of the organization. Full stakeholder consultation is also required by the RPP-scheme for the selection of peat production locations and their after-use.

The organization is backed by international soil scientists and NGOs, including Wetlands International and the Estonian Fund for Nature. Together with stakeholders from industry, there is a good mix of people with the knowledge to achieve effective and feasible criteria for the responsible production of peat.

The certification scheme is a 'living' standard, which means that adaptations to the scheme can be made every two years if necessary. This ensures that the scheme remains up-to-date and fits current environmental requirements (e.g., political decisions on climate change mitigation).

Locations certified

At the IPM In Essen, in early 2016, the first certificates were issued to Griendtsveen AG and Torf- und Humuswerke Gnarrenburg (Compo) both as production sites in Germany. Other companies were also certified later that year: Klasmann-Deilmann with production sites in Germany and the first production site in the Baltics (Lithuania); Lensli followed with the first production site in Sweden. Soon afterwards more companies began to certify production sites in the Baltics.

RPP has built up experience by continuous evaluation and consultation with all stakeholders, and when new questions arose as to how to mitigate the possible impacts of peat extraction

on adjacent natural peatlands, RPP organized an interactive workshop in Riga, in 2017. The workshop, "Best Practices in Mitigation Measures and Practical Experiences with RPP-certification" was attended by peat producers, consultants, scientists and other experts, where they shared knowledge and experiences resulting in a variety of mitigation options and anticipated results from which they could choose.

In 2019, RPP began to investigate the possibilities of benchmarking. In collaboration with experts in different countries, the national requirements and procedures for licensing cover were assessed to determine whether they met the RPP requirements for certification. The findings have been discussed and it was concluded that 'benchmarking' needs to be tested in practice before full implementation.

To date, RPP has granted certificates to 55 sites across Germany, Sweden, Finland and the Baltic states of Lithuania, Latvia and Estonia. Combined, these cover an area of approximately 14,200 ha. Currently, in November 2020, there are another



Fieldtrip of the Committee of Experts to examine the application of criteria in real life situations. Photo: Responsibly Produced Peat

23 applications for certification, which shows that there is increasing interest in bringing certified peat to the market. The goal of RPP is to become mainstream by having at least 150 sites certified, covering at least half of the volume of 'horticultural peat'. In Europe, the total area of peat production sites for horticulture covers around 60,000 ha.

The RPP certification scheme

The RPP certification scheme contains criteria for all phases within the peat production chain, from the early stages of site selection to the application of RPP-certified peat in growing media and soil improvers (from peat production to the Chain of Custody).

The Principles and Criteria Manual consists of five chapters governing peat production and one associated with the Chain of Custody, as follows:

1. Legality

Peat producing companies must comply with all the applicable laws and regulations of their country, as well as the relevant international laws and agreements.

2. Good governance

Peat producing companies shall be transparent in relation to their operations and shall organize stakeholder dialogue and participation.

3. Site selection

The selection of extraction sites must comply with all relevant EU-directives (including the EIA-, Habitats- and Birds Directive), with national legislation and with RPP regulatory requirements.

Local and regional stakeholder consultation must be part of the procedure, and peatlands of **high conservation value**⁵ shall not be selected. Instead, drained and degraded peatlands shall be prioritized for peat extraction.

Cut-off date: With regard to the criteria for site selection, it has been established that the requirements cannot be applied one-to-one at sites that were developed before the RPP criteria were drawn up. Therefore, a concrete date was defined to stipulate when the RPP requirements were established and could essentially be regarded as the cut-off date. This date was 1st January, 2014. Before that time, choices in site-selection may have been made that do not correspond to the RPP requirements. However, the selection criteria should apply in full in the case of sites taken into development after the cut-off date.

4. Site preparation and peat extraction

a. An Environmental Impact Assessment (EIA) of all potential on- and off-site impacts is required. Since EIA obligations can differ by country, the minimum topics and indicators, defined by RPP, must be addressed in the planned extraction area and its potential impact-zone, to avoid serious harm to nature.

If EIA has not been carried out, or data are either incomplete or out of date, according to RPP-standards, companies need to provide a professionally-prepared quick scan that covers all topics. An assessment of a quick scan determines whether a full EIA is necessary, or if certain aspects must be examined in detail.

b. Based on the EIA/quick scan, a mitigation and monitoring plan shall be prepared by the applicant that includes responsible site management and after-use.

5. After-use/Rehabilitation

As part of the application, an after-use plan, detailing the best possible option to maximize environmental benefits, including biodiversity enhancement and climate change mitigation, will be submitted.

The after-use plan must be developed in consultation with the relevant public authorities and relevant stakeholders, including local communities and NGOs.

Proof is required that funding has been secured to implement the after-use plan.

6. Chain of Custody

The criteria for the Chain of Custody ensure that peat in RPP-certified growing media is obtained from RPP-certified sites only. Traceability and on-site inspection are important measures for enforcement.

The RPP Chain of Custody is based on a mass balance concept, which means that if half of the peat that customers buy is RPP certified, they can put such a label on half of their peat mixes, even though these might not contain the RPP-certified peat. Since peat is shipped and processed in large quantities, this is very costly and it is not practical to keep certified peat separate from non-certified peat.

RPP's traceability system provides assurances that the certified peat that enters the value chain, originates from RPP-certified peat production sites, even though it is subsequently mixed with non-certified peat.

Securing the best after-use when peat production has ended

There are several different options for the after-use of a peat extraction site, including:

1. Restoration rewetting
2. Forestry
3. Agriculture
4. Paludiculture

For all peat extraction sites, companies must submit plans for after-use as part of their certification applications. RPP's preferred after-use is restoration of the peatland ecosystem to maintain a high-water table at or near the surface, to reduce greenhouse gas emissions and to recreate conditions for peat formation and accumulation.

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In only 1m³ peat substrate it is possible to produce up to 350,000 vegetable seedlings. Without peat efficient commercial horticulture is not conceivable. And our plates were nearly empty.





RPP issues the first certificates at IPM Essen, in 2016. Photo: Responsibly Produced Peat

This is not always possible or even the best option. Climate change mitigation and enhancement of biodiversity have become very topical and are important targets globally. Taking this in consideration, the Board recently decided that whatever after-use destination is chosen, the after-use plan should always demonstrate the best possible option to maximize environmental benefits, including climate mitigation.

Stakeholder consultation, with local authorities, NGOs and local communities, is an important part of this process. This must be transparent in order to show the advice of the different stakeholders and how the company has dealt with this advice.

Assuring the long-term availability of peat for horticulture

Looking to the future, peat will be needed for a long time to come, therefore, it is necessary to use peat that is produced in a responsible way that minimizes environmental impacts and leads

to the re-establishment of peat formation and accumulation. The mainstream application of RPP certification in Europe will result in the responsible management of peatlands to reach a balance between conservation and the utilization of peatlands. The use of RPP certification also makes responsible peat production accessible to the market and society.

When RPP completed the requirements for the Chain of Custody in 2018, certain companies participated in the same year. After a short quiet period, there is now an increasing interest, as there is more demand for responsible substrates and more RPP-peat is becoming available on the market. In general, there is more pressure to contribute to environmental and climate issues.

The VPN for example, has set ambitious goals regarding sustainability. Its members are jointly responsible for approximately 98% of the substrates, produced in the Netherlands.

Their ambitions are also high in relation to responsible peat extraction. By 2025, the Dutch substrate sector intends to use solely peat that is RPP certified.

In addition, on a European level, Growing Media Europe (GME) has included RPP in its sustainability agenda and members are encouraged only to use peat from certified peat production sites.

The development of RPP has been a long and intensive process and many have contributed to the knowledge and content of the scheme. The result is that peat for the purposes of growing media can be responsibly produced, a win-win situation for all involved.

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Peat is still the most important raw material for horticulture in Europe. However, climate and environmental requirements are increasing in all sectors. Photo: Nathan Dumlao

Footnotes

1. Knowledge centre for the quality of growing media
2. Association for Dutch potting soil and substrate manufacturers
3. Joosten, H. and Clarke, D. (2002) Wise Use of Mires and Peatlands - Background and Principles including a Framework for Decision-Making. International Mire Conservation Group and International Peat Society, Jyväskylä, Finland.
4. Clarke, D. and Rieley, J.O. (2010) Strategy for Responsible Peatland Management, International Peat Society, Jyväskylä, Finland (new edition issued in 2019).
5. High Conservation Value (HCV) Peatlands:

HCV peatlands are habitats of outstanding biological, ecological, social, or cultural value or critical regional, national and/or international importance.

RPP believes that peatland areas of HCV should be identified and conserved, for example, when the area is a habitat of rare wildlife or plants. Assessment of HCV status is included in the Environmental Impact Assessment (EIA) or quick scan (pre-assessment) that is required for certification. The RPP scheme specifies the minimum topics to be covered in the surveys for EIA/quick scan.

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Company Feedback on Certification

AS Torf, Estonia

The global population is growing, and our living standards are rising. This means we need more and higher-quality food products. We are facing a strongly increased global demand for raw materials, political developments, lockdowns, pressure on transport, and irregular weather and climate. Environmental policies are getting more important in all sectors, including the peat industry.

To adapt to the new conditions, the company has to develop its product and must also not forget its environmentally friendly image. In our company, peat is produced and handled in an environmentally friendly manner. This means we use the best technology possible and follow environmental guidelines from the state and nature conservation organizations. Nevertheless, customers who use our products would like to have confirmation of this knowledge on the global level. For this, the Foundation of Responsibly Produced Peat can help to acknowledge the companies that have high standards for our environment.

For a company to have the RPP quality mark, it has to be certified. During this process, experts from the Foundation of Responsibly Produced Peat will visit and make acquaintance with the company. The certification process will give the company an overview of the environmental requirements but also suggestions and proposals for improvements. By going through the process, the company can be sure that the production and handling of peat and other products is done in the best possible way. The work does not stop here. The RPP team always pursues the best outcome for all of

the concerned party members. There are many meetings and a lot to learn each year.

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Agaris Horti, Belgium

Sustainability and sustainable entrepreneurship is a very important topic within Agaris; it has even become one of our strengths throughout the years. To fortify this engagement, we decided a few years ago to participate in the RPP programme as one of the pioneers.

The RPP approach forced us to rethink our processes regarding peatland management, and monitoring of the daily impact our actions at peat bogs have on the environment has become a fixed component of our peatland management. The standards for obtaining the RPP certificate are high and participation is far from noncommittal.



Flower bulb arrangement.
Photo: Micheile Henderson

RPP gives us a clear framework and helps us to minimize our impact on the environment. We support the ban on exploiting new, valuable nature reserves in order to conserve the beauty of nature for the next generations.

In order to practise the RPP guidelines, we will upgrade our own peat bogs to a high-quality ecosystem after exploitation. This strategy is therefore a genuine benefit for everyone, as a deserted area with low biodiversity is being transformed into a natural ecosystem.

We notice that our participation in the RPP certification programme makes our clients think about their own sustainable choices, even in substrates. That's why we are a very proud partner of the RPP programme, because together, we can grow.

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Vapo Oy, Finland

We don't yet have much experience of RPP certifications in the Vapo Group's production areas, but the decision to apply for this certificate has been influenced by the following factors, among others: More and more horticultural peat is constantly needed to satisfy the demand for food produced nearby. Peat is also the most used growing media in greenhouses due to its unique characteristics. We want to support the use of responsibly produced peat raw material as a growing media, now and in the future.

In the countries where the Vapo Group operates, peat production is already strictly regulated by national legislation. We want to continuously improve our responsibility work at Vapo. The principles and criteria of RPP cover responsibility for peat production, from establishment of the production area to the end of operations, and the system harmonizes the criteria for responsible growth peat production.

With the RPP certificate, we can show our customers that the peat is responsibly produced. Alongside the certificates, the aim is to emphasize audits and the external perspective gained through

these, supporting continuous improvement of operations.

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Klasmann-Deilmann GmbH, Germany

By mid-2020, 86% of the total harvesting area of the Klasmann-Deilmann Group had already been RPP-certified. Therefore, 89% of our harvesting volume comes from RPP-certified areas. This gives our customers in commercial horticulture the reassuring certainty that they are always using good peat.

Moreover, we can prove to politicians and NGOs that responsible peat use is feasible. We really appreciate RPP's strong commitment to a maximum consensus between nature conservation and climate protection, as well as the necessity to cultivate plants in commercial horticulture using peat-based growing media.

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Compo, Germany

Our COMPO SANA® plays a very important role for us: In 1956, it was Germany's first potting soil in consumer-friendly packaging and was recently named 'Brand of the Century' by a well-known German publishing house. Our uncompromising commitment to high quality has been the foundation of our success from the very outset.

At the same time, our goal is to obtain and use resources as sustainably as possible. In this context, RPP is a seal of quality for the entire industry and consumers. It is therefore natural for us to get involved in RPP. (published in RPP newsletter 2019)

Stephan Engster
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Squishing moss for peat's sake!

When you picture the successful restoration of a vacuum-extracted bog peatland, you likely picture a thick squishy blanket of Sphagnum moss draped across the landscape. The last thing you might expect, then, is a huge tractor driving over the new moss in January, flattening the moss to well under half its original thickness, compressing and breaking the moss structure. But, recent work out of Québec, Canada, has shown that this is just what the bog doctor ordered!

Peatlands are incredible ecosystems with many internal processes that help the peatland thrive under changing weather and climate conditions. One such mechanism is mooratmung, or 'mire breathing' where bogs swell and subside (like

your chest does when you breathe) with changing water levels, which helps conserve water during drier periods, to keep the wetness in the bog 'just right'.

To understand why peat volume change is important we need to understand the different volume change processes in a peatland. Compression of the peat is the result of the peat structure unable to support the weight of itself as a result of a lower water table; basically, the water helps hold up the peat - remove the water and the peat compresses. Above the water table, volume change is largely due to shrinkage, which is the moss pulling in on itself as a result of increased soil water tension; this is why soils crack when they dry out.



The tractor driving over part of the restored Bois-des-Bel peatland in January of 2016. The snow cover prevented excessive damage to the regenerated Sphagnum moss. Photo: Colin McCarter

Understanding these differences allows us to understand how water flows in a peatland in both saturated and unsaturated conditions. Saturated flow (when the peat is as wet as it can be) in any soil occurs through the pore spaces, which is the empty space (orange arrow, Figure 1) between particles of soil - the larger and more numerous the spaces, the more water can flow.

When soil is drier, unsaturated flow occurs along the soil particles, flowing on the outside (yellow arrow) of the soil particles - the soil needs an unbroken connection of soil particles to allow the water to flow; the smaller the spaces, the more likely they contain water. This connection maintains the connectivity between the particles, and the easier it is for water to flow. If the distance between particles is too far, the water cannot bridge the gap and flow stops to the living Sphagnum at the surface.

The Sphagnum moss that creates bog peatlands needs the water to be 'just right'; meaning they can't be too wet, or too dry. For a plant with no roots, maintaining Sphagnum's water supply is much more complicated than meets the eye. Sphagnum mosses need to avoid both submergence (being under water) and desiccation (drying) to maintain important biological functions, such as photosynthesis. When wet, Sphagnum mosses are excellent at shedding water through a greater number of large and connected pores near the surface. However, maintaining sufficient water during dry periods is critical for Sphagnum's survival. Enter the importance of peat volume change.

When the peat volume decreases during dry periods, the larger pores that effectively prevent inundation by shedding the water, temporarily collapse, creating smaller pore spaces (Figure 1, right side). This shrinkage increases the unsaturated flow (yellow arrow) of water to the surface of the peatland, helping to maintain sufficient water for the Sphagnum to thrive during drier atmospheric conditions.

To understand why we want to squish the newly established moss layer at a restored bog peatland, requires us to know what was 'wrong' with the restoration. The restoration of the Bois del Bel peatland in Québec, Canada, found that within ~14 years the site was able to support a bog

vegetation community, and, importantly, become a net carbon sink. Yet, something was still 'wrong' with how water moved.

There was lots of water present in the restored peatland thanks to the blocking of the drainage ditches, but the water was confined within the remnant peat that the new, restored moss grew on. This prevented water from reaching the newly growing moss carpet on the surface.

Essentially, there was a hydrological disconnect between the water containing remnant peat and the newly restored moss layer. The new moss layer didn't have enough small pores to connect to the remnant peat, preventing the flow of water to the surface; this is a condition in layered soils technically known as a capillary barrier (Figure

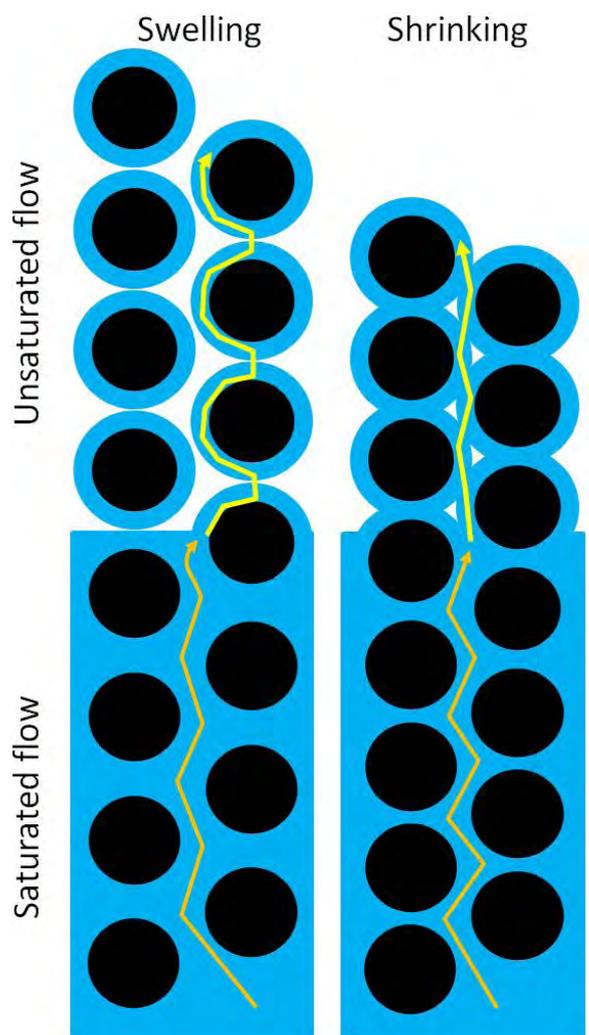


Figure 1: Flow lines for saturated (orange) and unsaturated (yellow) flow during wetter periods (swelling; left side) and drier periods (shrinking; right side). Copyright: Pete Whittington

2, left side). A natural peatland is not so much a layered soil, as a continuum of larger pores at the moss surface to smaller pores in the deep peat below, which facilitates water movement. As a result, the new moss layer experienced more frequent drying which could lower the potential for carbon sequestration in drier years.

The solution, therefore, was to reduce the spaces between peat particles in the new moss layer (Figure 2, right side). This was achieved by squishing the moss with a tractor in the middle of winter (Photo page 32)!

After thawing, the height of the moss layer was reduced by nearly half (47%). Squishing effectively decreased the proportion of large easily drained pores, increasing the flow of water in smaller well-connected pores. This resulted in an increase in water content at the surface of the moss by 10%. The increase in water retention and water supply will likely help maintain photosynthesis in drier years.

Although the restored peatland hydrology does not completely mimic that in a natural bog peatland, we expect the squishing to accelerate the return of these natural processes. Essentially, squishing mimicked peat volume change in the form of irreversible shrinkage, by reducing the peat layer in half, thereby manipulating the pores that sustain the Sphagnum moss.

However, like most things, too much of a good thing can be bad. Peat volume change can be too much, to a point that the volume change is irreversible. Like a piece of paper folded to create a crease; no amount of unfolding will make the crease go away. So, what might cause irreversible volume change in a peatland? If you guessed humans, you're right!

Peatlands are drained directly for many reasons, such as peat extraction or agriculture, but also indirectly through aquifer dewatering, such as around an open-pit mine. Once the water level has dropped beyond the natural limit of peat to

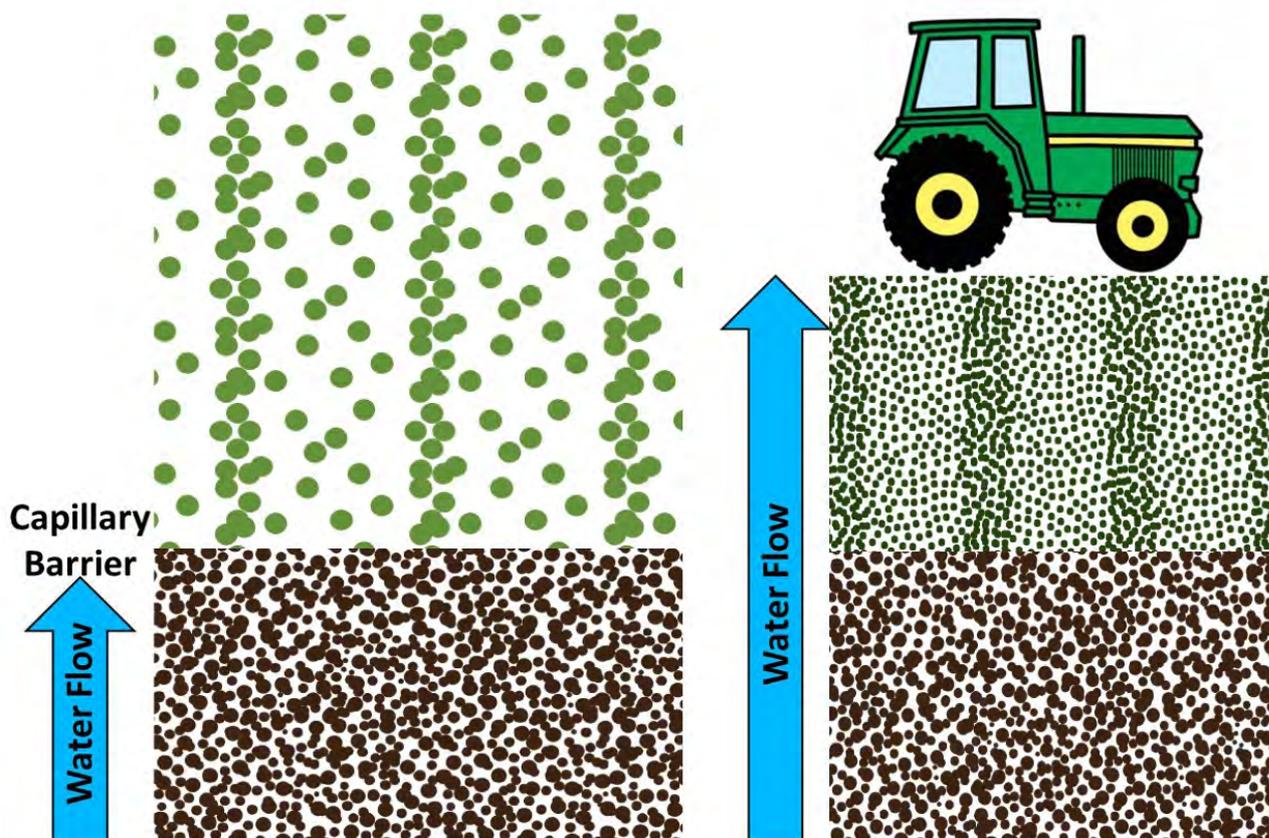


Figure 2: A conceptual diagram illustrating the effect of compressing the regenerated moss layer. The large pores in the regenerated moss (left, green) prevent the movement of water from the remnant peat (left, brown), resulting in a capillary barrier between the two peats. The compressed regenerated moss (right, green) is hydrologically connected to the remnant peat (right, brown) and water flow can reach the regenerated Sphagnum moss. Copyright: Pete Whittington

rebound, volume changes are no longer reversible. This is known more technically as secondary consolidation. Secondary consolidation results in a permanent decrease in the spaces between particles. While peat volume change can increase water flow in dry conditions, too much change can be irreversible and have negative consequences, such as increased evaporative losses drying out the peatland. This shift in the hydrologic regime can cause a shift in vegetation away from the critical Sphagnum mosses.

The importance of understanding peat volume change isn't limited solely to restoration of vacuum-extracted peatlands and the one-dimensional (vertical) flow of water. There are other disturbances to peatlands where a knowledge of peat volume change is critical to understanding the three-dimensional, or ecosystem scale, impacts that water table drawdown may have.

At the open-pit De Beers Victor Diamond Mine in Northern Ontario, Canada, this irreversible subsidence (secondary consolidation), caused by aquifer dewatering was observed in both bog and fen peatlands within the dewatering radius of the mine. Preliminary results suggest that the bogs are transmitting less water to the fens, decreasing landscape hydrological connectivity. This decrease in landscape connectivity may lower stream and river water levels impacting fish and wildlife downstream.

While these ecosystem-scale dewaterings are damaging to the peatlands, they have been proposed as surrogates for climate change (warmer, drier climates), allowing us to, potentially, better understand how climate change may impact these systems. The Bois del Bel peatland experiment was about manipulating the pore-size distribution to see what happened in a one-dimensional process. At the Victor mine, we were able to see the response of a disturbed landscape to an altered pore-size distribution due to water table drawdown. In essence, Victor was a massive landscape-scale experiment that would have been impossible without the mine.

What is unclear is whether water loss from below (i.e., mine dewatering) is the same as water loss from above (climate change enhanced evaporation)? Are the peat volume change

processes equal? Underdrainage (compression) is very quick (months to years), but sustained enhanced evaporative losses (shrinkage) is much slower, and biological processes may have time to adapt. Is it possible that mooratumung could keep pace with the atmospheric losses and mitigate these changes under a warming climate? We just don't know, yet.

Rather than waiting for natural processes to take over at Bois del Bel, and knowing that secondary consolidation is almost always bad for a peatland, we decided that careful application of irreversible peat volume change could be used for good.

By driving the tractor across the peatland for restoration, we caused permanent 'damage' to the moss layer, accelerating what natural processes would take decades to centuries to achieve, which we believe is just what the bog doctor ordered.

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The Winmarleigh Carbon Farm: The future of land management on peat soils?

Winmarleigh Moss Site of Special Scientific Interest (SSSI) is one of Lancashire's best examples of a lowland raised peat bog. However, this carbon storing haven for wildlife is a mere oasis fragmented by agricultural fields, many of which were created by draining areas of the peatland in and around the 1970's.

These fields are often waterlogged and low in nutrients and a challenge to the land-owners and tenants who are farming them.

However, one such field which sits directly adjacent to Winmarleigh Moss has undergone a change in land management. It has been transformed into a pioneering carbon farm, believed to be the first of its kind in the UK.

As part of the Interreg NWE funded Care-Peat programme, an area totalling 4 hectares has been re-wet and planted with 150,000 plugs of Sphagnum moss. The aim is to show that this alternative land use could be both financially viable and climate friendly if adopted as part



Winmarleigh Moss. Photo: Lancashire Wildlife Trust

of corporate carbon offsetting schemes or supported by government subsidies through the new Environmental Land Management Scheme (ELMS).

Care-Peat

Care-Peat is an EU funded project across five European countries; UK, Ireland, France, Belgium and the Netherlands, looking at peatland restoration techniques and alternative land management models for peat soils.

The partnership consists of five knowledge partners and four nature organisations who are working together to reduce the carbon emissions and restore the carbon storage capacity of different types of peatlands across North-West Europe. Together the partners aim to provide datasets relating to the development and testing of new techniques and socio-economic strategies for carbon reduction.

Winmarleigh Carbon Farm

After years of planning, the capital works required to create the carbon farm were started in May 2020.

Initially a 10 cm layer of turf and topsoil was removed from the site. This was to both expose the intact peat that still laid beneath the surface and to remove any excess nutrients from the area, resulting from years of lime fertilisation on the site.

Work then started on rewetting and controlling the hydrology of the site. A series

The carbon farm is part of Care-Peat, an Interreg NEW funded project. Photo: Lancashire Wildlife Trust



of bunds were constructed which bordered the entire carbon farm area and divided the site into a series of eight cells.

Historic drainage ditches were also blocked to raise the water table and a series of irrigation ditches were dug which further subdivided each cell. A water retention area was created at one end of the carbon farm site. This included two large sump pits which were designed to hold water even in periods of drought.

A solar-powered sump system was next installed to provide control of water levels within each individual cell of the carbon farm. Specially designed for the site, a ballcock level allows the system to pump water directly from the sump pits

The Winmarleigh Carbon Farm. Photo: Lancashire Wildlife Trust





A solar powered irrigation system controls hydrology on the carbon farm. Photo: Lancashire Wildlife Trust

the us to control the bog from home!

Then came the Sphagnum.

Over 150,000 plugs of specially grown Beadahumok™ moss were planted by hand across six of the eight carbon farm cells. Created and grown by Beadamoss®, each plug consisted of between five and ten species of Sphagnum, that had been chosen to optimise the site's return to a carbon sink.

The Sphagnum plugs were then covered in a blanket of straw to protect them and create a microclimate whilst they are getting established. Half of the cells will also be treated with a one-off application of additional nutrients.

and water retention into the Sphagnum beds, as soon as water levels on site dip below a set level. The system also allows water to be pumped out of the cells if water levels become high after periods of extreme rainfall.

The system also incorporates remote sensors which will send notifications as soon as any changes are detected in the site hydrology. Any adjustments can then be made remotely, allowing

The final two cells of the carbon farm which are closest to the ditch which removes any overflow water from the site have been planted with common reed (*Phragmites australis*). This is to filter the water leaving the site of any additional nutrient run-off. We are also trialling the



150,000 Beadahumok's™ of Sphagnum moss have been planted across the carbon farm site. Photo: Lancashire Wildlife Trust

Phragmites as a potential nurse crop, gathering data to see if it could be planted as an initial crop on future sites to remove nutrients and prepare sites for Sphagnum, without the need to strip the topsoil.

What next?

Working with project knowledge partners, Manchester Metropolitan University, we are taking regular gas flux measurements to study the greenhouse gases that are being emitted/sequestered by the site over time. Data will also be taken on adjoining drained agricultural land as a control.

The hydrology of the carbon farm, adjoining agricultural fields, and of the adjacent SSSI nature reserve is also being monitored. Assessment of effect of re-wetting this buffer zone land will hopefully demonstrate the viability of this approach on land next to wildlife restoration sites, showing an associated positive effect on these along with the carbon farm site itself.

This, along with the gas flux data will help us understand the carbon benefits from changing the land management to support the adoption of carbon farming and other wetter-farming, or paludiculture, practices for land on peat soils. Moving towards land management techniques that are both financially viable, climate friendly, and that provide biodiversity benefits to the wider landscape.

With the impending introduction of the new Environmental Land Management Scheme (ELMS), promising public money for public good, it is hoped that government subsidies could be provided to encourage the uptake of carbon farming practices.

It is also anticipated that private funds could be used to support carbon farming practices. For example, if companies and private organisations create carbon emissions that they are not able to reduce, paid-for offsetting schemes could provide another source of the finance needed.

To find out more about Care-Peat and the Winmarleigh Carbon Farm visit www.lancswt.org.uk.

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Peatland Restoration Guide: An Update of the Bog Restoration Chapter

The Peatland Restoration Guide, previously published in 2003, has been updated! Now presented in the form of four booklets covering the different steps of bog restoration, the content is the result of a long series of scientific research and continuous improvements in peatland restoration techniques.

The Peatland Restoration Guide is an inescapable tool for all peat producers and other wetland practitioners, wishing to successfully apply the

Moss Layer Transfer Technique (MLTT) for the restoration of Sphagnum-dominated peatlands.

In addition to incorporating the progress made in peatland restoration since 2003, the approach described in the new booklets is now based on the results of numerous restoration projects, carried out by the Canadian peat industry across the country.

The booklets cover the following topics:



Visit to a natural peatland during a peatland restoration workshop, to discuss the characteristics of good donor sites for restoration. Photo: Marie-Claire LeBlanc



Line Rochefort (at the back) during a peatland restoration workshop, showing a pile of plant material, collected from a donor site and ready to be spread. Photo: Stéphanie Boudreau

Planning Restoration Projects: This booklet begins with a brief review of the Moss Layer Transfer Technique (as in all the booklets) together with background information on the international standards for ecological restoration. It then details the steps involved in planning restoration projects, such as defining the restoration project, following site characterization, planning the work, preparing the restoration plan and planning for monitoring.

Site Preparation and Rewetting: This booklet describes how to prepare the site, manage

water flow and retention by building dikes, ensure the restored sector is connected to adjacent land and how to rewet the site through ditch blocking.

Plant Material Collecting and Management of Donor Sites: This booklet focuses on the plant collecting phase, as well as the selection and management of donor sites. The numerous restoration projects carried out since 2003 have demonstrated the importance of this step in relation to the success of the restoration work.



Spreading Plant Material, Mulch and Fertilizer:

This booklet focuses on the stages in which plant material, mulch and fertilizer are spread.

The methods described in the booklets provide both operationally realistic and scientifically valid restoration options for a variety of sites and conditions. In addition, the ideal residual peat and site conditions for restoration are presented, which should serve as indicators for responsible peatland use and management.

“After over 25 years of large-scale application for the restoration of Sphagnum-dominated peatlands under all kinds of climatic conditions, we now know the approach is robust. Thereby there is no longer any technological reason not to restore a degraded peat bog that has compatible site conditions (uncontaminated site with acidic pH)”, concludes Dr Line Rochefort, author.

The Peatland Restoration Guide is published jointly by the Peatland Ecology Research Group (PERG), the Canadian Sphagnum Peat Moss Association (CSPMA) and the Québec Peat Moss Producers Association (APTHQ). It was undertaken with the financial support of the Canada Economic Development for Québec Regions (DEC) and the



Sphagnum carpet established following restoration. Photo: Stéphanie Boudreau

Ministry of Economy and Innovation (MEI) via a structuring project of the ACCORD Peat and Substrates Cluster.



Francois Quinty.

About the authors

François Quinty, M.A. Geography - Following his Master's degree in Geography, completed in 1988, François Quinty specialized in peatlands; he joined the Peatland Ecology Research Group (PERG) in 1992 to work on the development of peatland restoration methods, in collaboration with the Canadian peat industry.

He was involved in many projects in Canada and the USA, aimed at restoring post-extracted peatlands or adapting restoration methods to specific conditions. He also worked on the vegetalization and stabilization of disturbed sites, such as sand and gravel pits, roadsides and mine tailings, as well as wetlands restoration and creation for compensation purposes, primarily in the Québec boreal zone.

Mr. Quinty led and participated in surveys and baseline studies on vegetation, wetlands and wildlife. He directed environmental impact



assessments for peatland development projects in Québec, New Brunswick, Saskatchewan and Manitoba. He also contributed to environmental impact assessments for power line projects. He joined WSP Canada Inc. in 2005.

Marie-Claire LeBlanc, M.ATDR - Marie-Claire LeBlanc is a geographer and graduated in Land Management (M.ATDR) in 2008. She has worked as a research professional with the Peatland Ecology Research Group (PERG), where she coordinated research teams and activities across Canada.

Mrs. LeBlanc has also participated in the design and supervision of numerous peatland restoration projects across Canada. Initially in charge of developing research projects relating to fen ecology, she then contributed to adapting restoration methods, developed in Eastern Canada to the Prairie and Western provinces.

She also worked on the restoration of linear disturbances related to hydropower lines and the oil and gas industry in Québec and Alberta.

Finally, Mrs. LeBlanc has developed and led numerous training courses, conferences, and peatland excursions to promote restoration methods and the latest scientific advances on the subject.

Dr Line Rochefort, Ph.D. (Botany) - Dr Line Rochefort is a pioneer in research related to peatland restoration. She is a professor in the Department of Plant Sciences and is the founder of the Peatland Ecology Research Group (PERG) at Université Laval in Québec, Canada.

PERG brings together researchers from several universities, the Canadian industrial peat partners and federal and provincial government agencies to advance the understanding of peatland ecosystems and make informed decisions regarding their use and conservation. Dr Rochefort has instigated a whole new stream of research in the peat industry: the development of techniques for the restoration of peatlands after peat extraction.

The technique for bog restoration is now used not only in North America but also in South America (Chile) and Europe (particularly in the Baltic countries, Denmark and Belgium). From 2003 to 2018, Dr Rochefort held the Natural Sciences and Engineering Research Council's (NSERC) Industrial Research Chair for Peatland Management.

Since 2018, she has led a new program under an NSERC Collaborative Research and Development (CRD) grant, allowing for continued collaboration between researchers and the Canadian peat

industry. In 2004 she received the prestigious Synergy Award for Innovation from the NSERC, and in 2011, she was honoured with the IPS Award of Excellence. Dr Rochefort has been the National Correspondent for Canada for the Ramsar Convention's Scientific and Technical Review Panel (STRP) since April 2019.

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IPS Commission 2: Peatlands and the Environment

A short insight into ongoing projects

From next year onwards, Commission 2 will have a dedicated infobox here to provide news on the work of the Commission and its Expert Groups. The format should be as open as possible and interesting contributions should be sent to the Chair of the Commission. The topics should concern the areas of the Commission and its Expert Groups:

- Peatlands and Climate Change
- Peatlands and Biodiversity
- Peatland Restoration
- Tropical Peatland Round Table

I am looking forward to exciting contributions and hope to be able to contribute a little bit myself!

Initiative Paper of Commission 2

Following the Prague Expert Meeting in early March 2020, the Commission has begun drafting an initiative paper on the Peat Concept 2050. Having taken into account the initial opinions relating to the structure and content of this paper, the first chapter is currently being worked on,

in which the current situation of peatlands with regard to greenhouse gas-relevant gas exchange is to be presented. Existing data for 1990 and 2008 are analysed. Data from the National Inventory Reports (NIR) to the UN for 2018 are to be compiled.

As soon as a draft is available, it will be discussed in the working group and then agreed with the Commissions team. This should have been completed by the end of 2020. The remaining chapters are scheduled for 2021.

Review of the IPS Climate Change Book

From Commission 2 Gerald Jarusinski and Bernd Hofer are involved in the review of the IPS Climate Change Book. If funding can be obtained, a first draft can be expected until the IPC in Tallinn.

Bernd Hofer

Chair Commission 2 Peatlands and Environment
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In memoriam and dedication: Matteo Sottocornola (1973-2019)

The sudden and untimely passing of Dr. Matteo Sottocornola on 10 August 2019 is a huge loss for the peatland science community. In addition to making a lasting contribution to peatland science he was always ready to engage in discussion about science and education as well as historical and contemporary issues in relation to a wide range of topics including society and the environment.

At the time of his passing, Matteo was a Lecturer in Forestry at Waterford Institute of Technology where he was admired as a colleague and teacher. Matteo began his education at the University of Milan with a MSc in Natural Sciences. The Erasmus programme enabled him to complete part of this at the University of Bergen. He subsequently undertook a Research Fellowship at Université Laval after which he moved to University College Cork to undertake a PhD on greenhouse gas exchange in blanket peatland. This was followed by several postdoctoral roles including a Marie Curie Fellowship in both Ireland (University College Cork) and Italy (fondazion Edmund Mach).

Peatlands are a consistent theme throughout Matteo's career. His PhD work was undertaken at an undisturbed blanket bog at Glencar in south west Ireland and used eddy covariance techniques to investigate carbon dioxide (CO_2) exchange. This work established that undisturbed blanket bogs are a small sink for atmospheric CO_2 (Sottocornola and Kiely, 2005) and that the highest CO_2 uptake took place during summer periods with intermediate weather conditions, low vapour pressure deficits, intermediate soil water content, air temperature and light radiation (Sottocornola and Kiely, 2010a).

Further work found that blanket bogs have higher winter and lower summer rates of evapotranspiration, with the former driven by the relatively mild Irish climate and the latter by the lower temperature and vapour pressure deficits compared to other peatlands at northern latitudes (Sottocornola and Kiely, 2010b).



Matteo's PhD work clearly emphasises the importance of blanket bogs as sentinels of the role of peatlands in biosphere/atmosphere exchange of CO_2 and their potential response to climate change. This work underpinned further research undertaken by others at the Glencar blanket bog, such as that of Koehler et al. (2011), which combined additional greenhouse gas data with measurements of dissolved organic carbon (DOC) loss to show that for two years of a 6-year study period, the loss of methane (CH_4) and DOC exceeded the uptake of CO_2 .

Matteo's expertise in eddy covariance is evident in more recent work such as Pullens et al. (2016), which reported high interannual variation in net ecosystem exchange of CO_2 at a small-scale fen in the Italian Alps and, Lund et al. (2015) who investigated CO_2 exchange at a blanket bog in Northern Norway.

During his postdoctoral career, Matteo's interests and expertise broadened to include other research

themes such as the carbon balance of grapevine cultivation (Gianell et al. 2015), forest carbon inventories (Rodeghiro et al. 2010) and the effect of heatwaves on energy exchange in forest and grassland (Teuling et al. 2010).

However, peatlands remained at the forefront of Matteo's research and he contributed to several high level synthesis papers across a range of topics such as (i) the upscaling of biosphere-atmosphere fluxes of carbon and energy from eddy covariance flux tower sites to the global scale (Jung et al. 2011); (ii) an assessment by Petresco et al. (2015) which shows that conversion of natural wetlands to agricultural or forested land causes an increase in atmospheric radiative forcing, and (iii) the relationship between energy balance closure and landscape heterogeneity (Stoy et al. 2013).

Matteo also contributed to the application and development of models for the study of water, energy and carbon dynamics in peatlands (e.g. Pullens et al. 2017; 2018).

During his time at Waterford Institute of Technology, Matteo was further broadening his expertise into applied forestry research through work on short rotation forestry (De Miguel Muñoz et al. 2016; De Miguel et al. 2017).

Matteo was often found at the forefront of scientific endeavour and continued to apply his extensive knowledge of peatland carbon and greenhouse gas dynamics in the rehabilitation of degraded peatlands as a climate mitigation strategy, a topic of significant scientific and political interest today.

This short description illustrates the impact Matteo had on the scientific world during his all too short career. His Google Scholar profile provides a comprehensive list of his publications, which will continue to serve future generations of scientists in the years to come. His legacy continues not only through his contribution to scientific literature but also through his influence on friends, colleagues and collaborators.

He will be greatly missed not only for his keen intellect and scientific curiosity but more than anything else for his warm smile, kind heart and engaging manner. We extend our deepest

sympathy to his partner Sinéad, children Niamh and Seán, his father Nello and sisters Elena and Barbara, as well as his extended family and friends.

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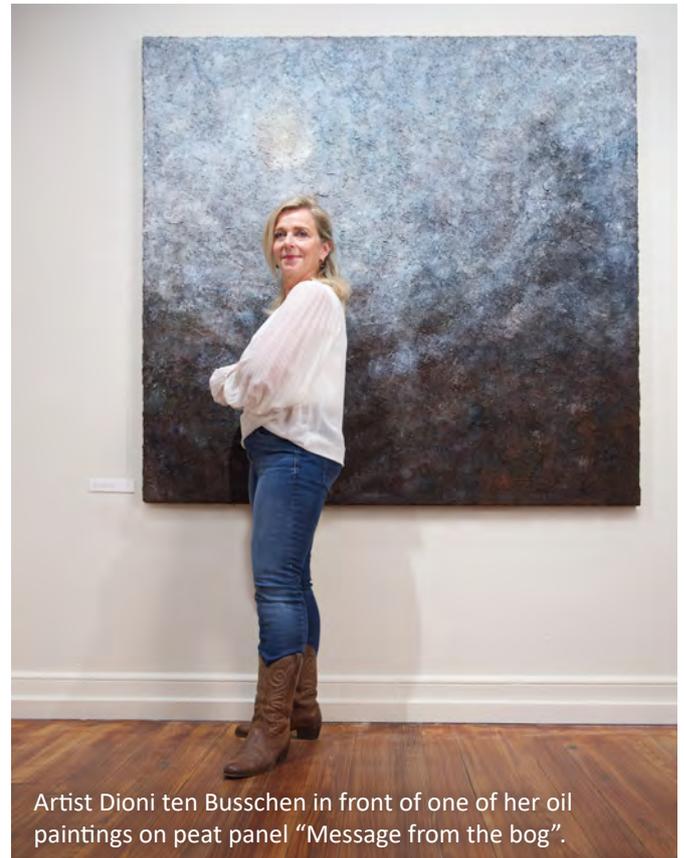
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Peatart Exhibition in Veendam

Since September, Dioni ten Busschen has been exhibiting another Peatart exhibition in the four halls of the Veenkoloniaal Museum in the city of Veendam in the North of the Netherlands. This is the museum where the Dutch King and Queen visited her last exhibition.

The title of this exhibition is: "Mummia, Driven by Uncertainty. Sculptures from the Peatbog". Until 1920 it was quite normal in Europe to go to the pharmacy and have a bottle filled with a few spoonfuls of mummia powder. Many people believed that this not only had a good potency-enhancing effect but was also an effective remedy for all kinds of pains and disorders.

In Egypt, even 12 centuries before Christ, people believed in the powder of ground mummies. In the



Artist Dioni ten Busschen in front of one of her oil paintings on peat panel "Message from the bog".



From Mummia pharmacy; "Peatladon" collection, belonging to the circular "glass-waste" project; inspired by the beautiful colours of Celadon ceramics from SE Asia.



The Lamb of God. All photos: Doon van de Ven

Netherlands, bog bodies were used for this. The main exhibit in the museum is "Mummia rain" which shows the amount of bog body necessary for one little pot of mummia.

In other halls she exhibits circular pieces of art in a "glass waste" project with beautiful colours, paintings on a peat panel that show "Turner like" views of patches of fog over swamps, gifts for the grave, such as collar neck vases for a life after death, an eternal life and finally, a sacrifice which shows the sister of one of the famous Dutch bog bodies, the girl from Yde and the Lamb of God. The exhibition will remain open until 2nd May, 2021.

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Where the Crawdads Sing: A Book Review

B iologist and non-fiction author Delia Owens' first novel, 'Where the Crawdads Sing' was published just two and half years ago and more than eight million copies have already been sold worldwide.

It has been on the bestseller list of the New York Times for more than 100 weeks. In the near future it will be made into a movie. In Finland, the Finnish translation was on the top of the order list of the main libraries for at least two weeks in August 2020. The book is now in its seventh edition and the total number of copies sold, exceeds 30,000 which is high for such a limited linguistic region.

Across the timeline (1945-2009) the novel's themes ran on three levels: the rough coastline of North Carolina with tide-affected lowlands, penetrated by winding fresh water channels creates the background at landscape level. In the centroid of the second level is an incredible coming-of-age narrative of an orphan girl, "Kya" - the Marsh Girl - struggling to live alone as a troglodyte and isolated by the coastal wetlands. The third act is centred around an accident or murder mystery in which a handsome youngster, Chase Andrews was found dead under a fire tower.

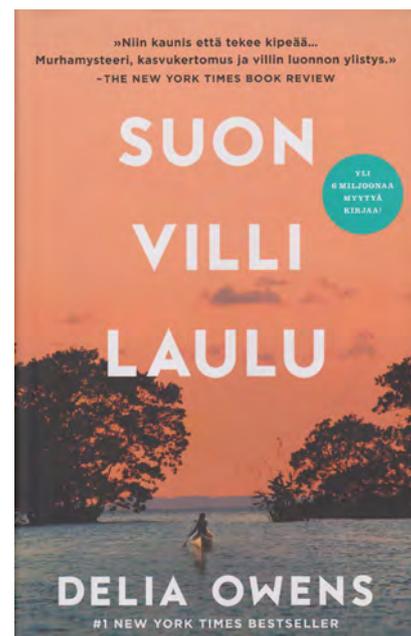
The book is divided into two parts: The Marsh and The Swamp. The episodes start in the year 1952, but the well-titled chapters do not run in chronological order. The story itself is narrated by means of several flashbacks, thus effacing the separation of the two parts.

The critic who had plodded throughout his entire career in rubber boots in the mires, peatlands and wetlands of the northern hemisphere would not have been able to avoid temptation; he had to buy the book both in English and in Finnish. This

gave him the opportunity to learn how well the subtle meaning of the English words and phrases, describing both nature and Kya's feelings, were translated into beautiful Finnish.

Even the American slang that uneducated Afro-Americans used, was successfully transposed into the equivalent Finnish slang. Congratulations to the Finnish translator of the novel, Maria Lyytinen.

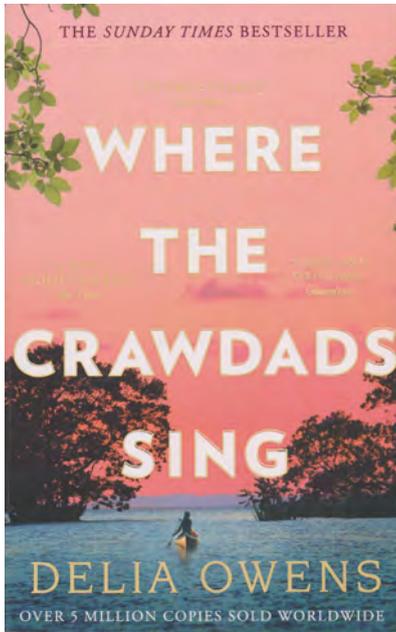
Furthermore, both books were critically examined at source, to ascertain how well Delia Owens commands the difficult terminology of wetlands,



A bestselling novel, set in a North Carolina marsh

Delia Owens: Where the Crawdads Sing. First published in the USA, GP Putnam's Sons. 2018 and in Great Britain, Corsair 2019. 370 p. ISBN: 978-1-4721-5466-8.

Delia Owens: Suon villi laulu. Finnish translation by Maria Lyytinen. WSOY 2020. 416 p. ISBN: 978-951-0-44600-3.



and at the same time to appreciate how the Finnish translator, Maria Lyytinen, has been able to translate the terms into Finnish.

Even the mire specialists have had difficulties to agree with the heavily varying English terms relating to mires

and peatlands. As an example, Joosten and Clarke (2002) refrained from using the words 'marsh' and 'swamp', which they considered confusing in their book, 'Wise Use of Mires and Peatlands'.

However, the word 'marsh' plays a central role in the book. Since fiction books do not include a list of terminology with definitions, the reader has to get by using his/her own knowledge and background information. This does not, of course, pose any problem to the layman who enjoys the well-written landscape description, however, a nature scientist or a conservationist could be anxious to know more about the key-note ecosystem of the book.

According to Hofstetter (1983, p. 203) the dominant coastal saline area in North Carolina can be described as follows: "Regularly Flooded Salt Marshes: Covered at average high tide with 30 cm or more of salt or brackish water during the growing season. Graminoids and forbs." The term 'marsh' used by Delia Owens is in accordance with this definition.

The reader should stop for a while to contemplate the prologue on the first page of the book, providing the background: "Marsh is not swamp... within the marsh, here and there, true swamp crawls into low-lying bogs. The marsh with narrow water courses and ponds and especially the flat terrain against the ocean is supporting a noisy bird fauna and thus... compared to the marsh, the swamp is quiet because decomposition is cellular work."

A draft map - without a scale - illustrates at landscape level the evocative coastline of North Carolina where the novel is set. The territory is made up of sandbanks, capes and semi-islands. Between and behind them is the marsh with labyrinth-forming narrows, channels and water ponds where the salt water tide comes up against the slowly running fresh waters of the river estuary and turns back as brackish water towards the sea.

The marsh plays a central role by linking "the land to the sea, both needing the other" (p. 365). The flat soil surface covered by silt and mud is consumed twice a day by the incoming tide, wiping out any marks in the mud, even footprints. This phenomenon made it impossible for the accident or murder to be solved, and thus the court of justice was not able to pronounce judgment.

A mire and peatland scientist will certainly appreciate the accurate description of the lowlands of North Carolina. This is sufficiently good a reason to read the book. On the other hand, for those who remain with the facts, the surprising story of an uneducated girl's progress to a beautiful sought-after young woman and, at the same time, marsh wildlife expert and text book author, may appear to be a well-written - but unbelievable - story. This part of the novel has to be considered as an entertaining and touching storyline, set against the background of this remote and impassable terrain. One has to admit that the author has achieved the objective: tears are welling up in the reader's eyes. On a third level, murder mystery lovers may try to solve the case by their own logical deductions.

Delia Owens used an expression for her book's title that her mother had taught her during her childhood. A 'crawdad' is an aquatic animal that looks like a crayfish or a small lobster, and lives in rivers and streams. "The crawdads don't really sing. But I learnt from my mother that if you go far enough into the wilderness by yourself and there is nothing but you and nature, you will hear the crawdads sing." This allegory emphasizes that nature itself will teach the essential.

For a Finn, the English title bearing the name of an unknown animal, 'crawdad' would have been difficult to translate. Thus the translator and publisher decided to use another symbolical

phrase 'Suon villi laulu' that means 'Wild Song of Mire (or Marsh)' The Finnish wording renders the original, symbolic expression very well, with a touch of mystery.

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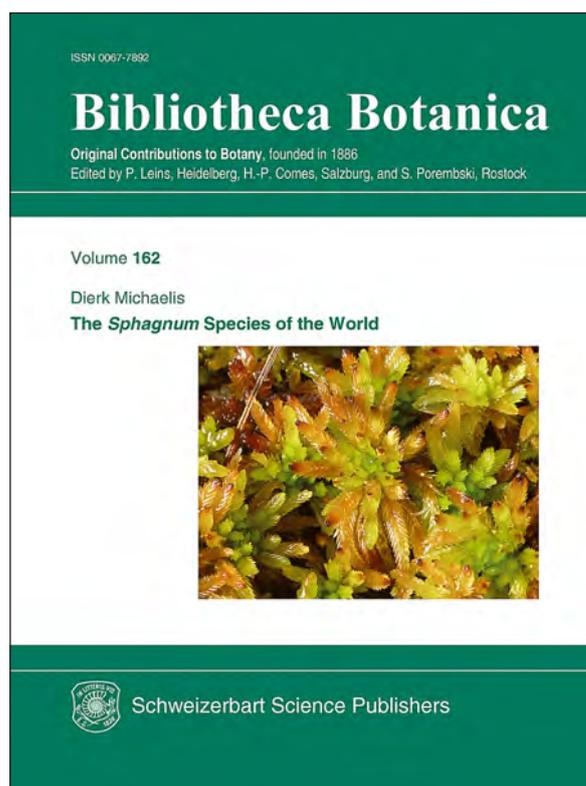
A "heavy" book on the world's Sphagna

Firstly, let me define what I mean by "heavy" in this context. This book is big and heavy in terms of size but also in relation to its contents. It is not a field guide. The book is approximately 32 x 24 cm and weighs 2 kg!

It includes the detailed descriptions of 292 species, with supplementary data on habitats, geographical distributions and lists of synonyms. The book is divisible into 14 sections, with a key in each section, as well as for all Sphagnum species, separated by continents; in addition there are species' lists for 20 phytogeographical regions of the world.

This book is the updated and supplemented English version of the author's original peat moss flora in Germany (2011) which was the first overall

presentation of Sphagnum since Warnstorf's "*Sphagnologia Universalis*" (2011). Compared to the earlier book, 12 species and 23 figure plates have been added, the chapters of phylogeny and



Sphagna in Focus

Michaelis, D. 2019. The Sphagnum Species of the World. Bibliotheca Botanica 162: 1-435. Schweizerbart Science Publishers. Stuttgart. ISBN 978-3-510-48033-3

research history have been revised and a new chapter on Sphagnum ecology has been added.

I like the book which is very well written. It starts with an introductory section which comprises six chapters with 16 pages, gradually introducing the reader to the subject.

Next is the key to the sections which is followed by the identification keys and regional species' lists. The descriptions of species constitute the main section of the book (280 pages) and towards the end of the book, there is a glossary, references, a list of journals and monograph series, illustration credits and an index.

Within this type of book, the index is a central feature, enabling the reader to check, for example, how the different species have been described previously. The synonyms provided at the start of all species' descriptions are important, as Sphagnum species vary considerably, according to the habitat conditions in which they are growing; the same species may have been described as a new species or a subspecies previously.

The book is printed in black and white, with 219 drawn plates, taken either from the original publications or drawn by the author. The only colour photograph is on the cover (*S. pulchrum*) which is a very beautiful species, with straight leaf rows on its pending branches. Although the photograph is clear with typical individuals of *S. pulchrum*, it lacks the glamour of this species.

I compared the species' list of Europe with that of Laine et al. (2018) which concentrated on European Sphagna. Michaelis notes 54 species while Laine et al. note 60 species. The difference was primarily due to the new species, described by Flatberg. In the section, Sphagnum, the new information relating to the status of *S. magellanicum* is not included in the keys or the species' lists. This means that *S. divinum* and *S. medium* are not featured. Michaelis notes these changes in the text but states that at this stage he could not support a separation of these taxa, on the basis of the given morphological differences. In addition, in the section *Cuspidata*, three species described by Flatberg are missing: *S. brevifolium*, *S. isoviitae* and *S. viride*. Their taxonomic status is treated in different ways in different moss flora. Michaelis clearly describes the confusing history of these species in his text.

Dierk Michaelis' book is an excellent continuation of the series "*Bibliotheca Botanica*" the first volume of which was published as early as 1886. "*The Sphagnum Species of the World*" is recommended for anyone interested in this fascinating, ecologically important but complicated bryophyte genus. Congratulations, well done!

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In Memoriam: Prof. Dr Romas Pakalnis

A great sense of loss and sadness surrounded the recent death of Prof. Dr Romas Pakalnis, who passed away on the 20th of September, 2020.

The Lithuanian society, science, nature conservation and cultural heritage communities, as well as the family of peatland restoration practitioners lost an outstanding person, whose entire life was dedicated to the investigation and protection of natural and cultural heritage, the restoration of Lithuanian independence, the maintenance of national identity and of the Lithuanian language, and who demonstrated sincere concern for the future of Europe's wetlands.

Professor Pakalnis helped initiate the restoration of the Lithuanian wetlands and was an active member of the IPS Lithuanian National Committee. Romas Pakalnis was an intelligent man, with progressive ideas and a determination to implement them in practice. He was a caring and sincere colleague, and a generous teacher and mentor, who educated many doctors of natural sciences and nature conservationists. He would have celebrated his 80th birthday in early 2021...

After graduating from the Faculty of Forestry of the Lithuanian Academy of Agriculture in 1963, Romas Pakalnis started work as a forestry engineer. In 1971, he finished his postgraduate studies at the Institute of Botany of the Lithuanian Academy of Sciences. He defended his dissertation "Investigation of the dynamics and ecological optimum of the major components of a hilly landscape with lakes" at Vilnius University Council.

During an active research career, Dr Romas Pakalnis was a researcher at the Institute of Botany and was also Head of the Laboratory of Landscape

Ecology (1981-2010). In 1989, during the first democratic elections, he was elected Director of the Institute of Botany (Vilnius), a post he held for 14 years.

Together with Prof.

Habil. Dr Kazimieras Èringis, he established the original School of Landscape Ecology in Lithuania and taught the disciplines of landscape ecology and sustainable development to the students of the Lithuanian University of Educology and of Šiauliai University (Lithuania).

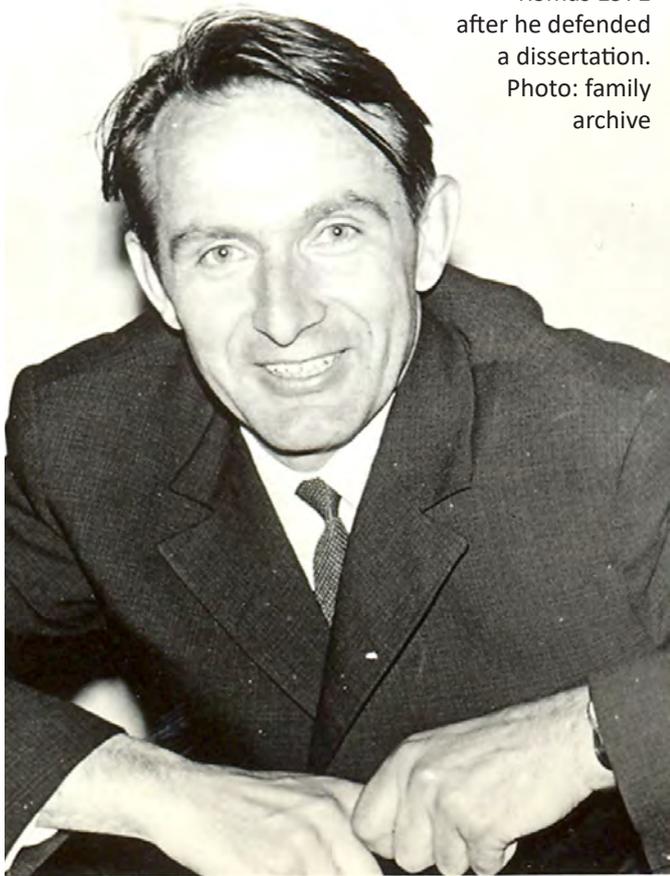
Prof. Dr Romas Pakalnis was interested in many areas such as innovation in science and education, the problems of preserving natural and cultural heritage, the maintenance of Lithuanian identity, the national language and the Lithuanian State.

Romas Pakalnis was secretary of the Lithuanian National Committee for the International Programme, "Man and Biosphere" (1981-1985), and was an active member of the Lithuanian Independence Movement, "Sajūdis" (a political organization, which led the struggle for Lithuanian independence in the late 1980s and early 1990s).

He participated in the establishment of the first protected areas in Lithuania. He was Chairman of the Radio and Television Commission of Lithuania



Romas Pakalnis. Photo: Jūratė Sendžikaitė



Romas 1971
after he defended
a dissertation.
Photo: family
archive

For the last fifteen years Prof. Dr Romas Pakalnis, has been working at the Institute of Botany and subsequently, at the State Service for Protected Areas and the Lithuanian Fund for Nature, where he concentrated on the protection and restoration of the Lithuanian wetlands. Romas Pakalnis has been interested in peatlands since the early years of his professional career, starting with research and later, initiating restoration projects.

In 1968, together with the Head of the Laboratory of Landscape Ecology, Prof. Habil. Dr K. Eringis, he prepared recommendations for the protection of the central region of the forested Polyma bog (Lithuania), which was planned to be drained during the intensive reclamation period of the Soviet era, to expand the areas of perennial cultural pastures. Thanks to these recommendations, it became possible to influence the functionaries - a reclamation project was modified, and the central region of the wetland complex was preserved.

Forest and mires were among his favourite and most beloved objects of interest. His works in peatland restoration are more well-known for initiating the restoration of the world-famous Aukštumala raised bog and facilitating the

(2002-2008) and also of the Lithuanian National Commission for UNESCO (2009-2018).

The Professor was a co-author of the National Integrated Nature Protection Scheme (1984), the General Concept of Education (1992), the Lithuanian Environmental Strategy (1995), the Biodiversity Conservation Strategy and Action Plan for the Republic of Lithuania (1998) and the Lithuanian National Strategy for Sustainable Development (2003), and was active in many citizenship committees.

Prof. Romas Pakalnis was the author of over 220 research and science communication publications encompassing ecology, botany, environmental protection and nature conservation issues. He was one of the developers of the ideas relating to the Natural Framework, the initiator of Lithuania's accession to the European Landscape Convention and was co-author of Lithuania's Landscape Policy.

From 2010 until 2020 Romas Pakalnis worked intensely in the system of the State Service for Protected Areas, under the Ministry of Environment of the Republic of Lithuania and focused on the management of Natura 2000 sites and the restoration of drained peatlands.

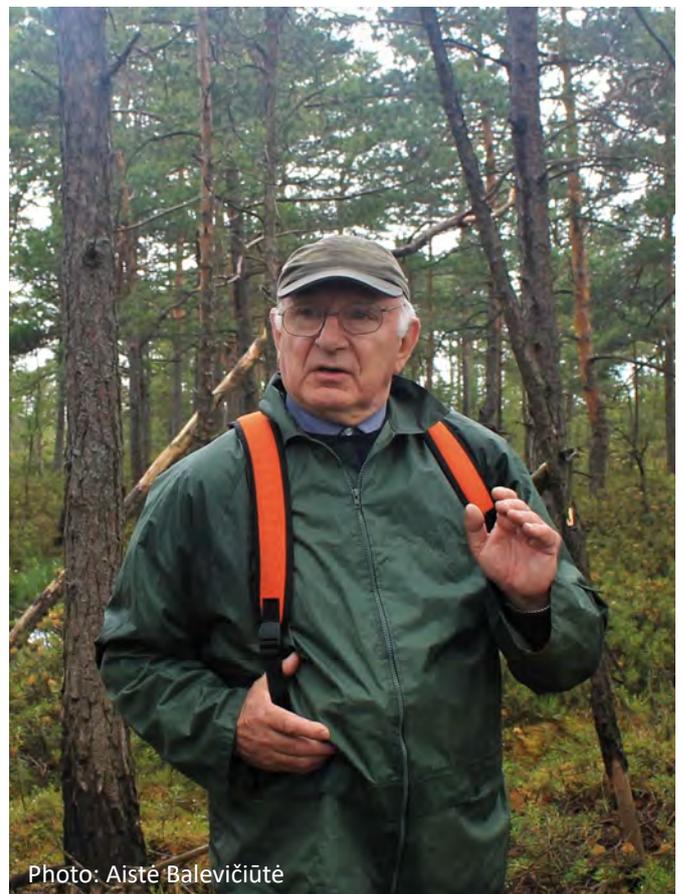


Photo: Aistė Balevičiūtė



installation of protective measures to isolate the raised bog from the adjacent peat harvesting fields. Later he continued the ecological restoration activities in the Aukštumala raised bog as a member and a generator of ideas within the project, LIFE Aukštumala (2013-2017; www.aukstumala.lt).

The Professor initiated the translation of the first scientific monograph in the world relating to the raised bog into Lithuanian, written in 1901 by German botanist, Dr C.A. Weber. In the introduction to the Lithuanian edition of the monograph, Prof. Dr Romas Pakalnis noted that the LIFE project "... will help to improve the condition of the protected raised bog in the Aukštumala Telmological Reserve. Unfortunately, it will never be what Dr C.A. Weber described it 114 years ago".

Romas Pakalnis was delighted to accompany the grandson and great-grandson of the famous Professor C.A. Weber to the Aukštumala raised bog and the Nemunas River Delta in 2017. The Professor repeatedly hinted that it was a great joy and honour for him to work in Aukštumala.

Romas Pakalnis paid particular attention to the rehabilitation of the extracted part of the Aukštumala peatland, by establishing Sphagnum mosses. Just a month ago, the Professor regretted that due to unexpected health problems and

unfavourable circumstances in the world in 2020, he could not visit the Aukštumala raised bog and the experimental Sphagnum planting field, established in 2019. Still, he sincerely believed that he would visit it later this year.

In 2019, during the international conference in Grodno (Belarus), Prof. Dr Romas Pakalnis stated: "Life is very short... we must preserve mires so that we have the opportunity to sit on the Sphagnum hummock and think where we are in a hurry...".

Life is very short... we, his team and followers, colleagues and friends will continue the great work to restore the Lithuanian peatlands, started by Romas.

*Dr Jūratė
Sendžikaitė*

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*Nerijus Zableckis,
Dr Leonas Jarašius
& Žydrūnas
Sinkevičius*

Lithuanian Fund for Nature/ Foundation for Peatland Restoration and Conservation (Lithuania)



Prof. Pakalnis with Matthias Frieling and Axel Weber at Aukštumala in 2017. Photo: Jūratė Sendžikaitė

New Members of the IPS

New members (or new contact persons for corporate and institute members, and industry partners) are mainly approved by our National Committees.

For all other countries, the approval is made by the Executive Board of the IPS. Each National Committee is asked to compare their membership list to that of the IPS at least once a year (status below as of 7 December 2020).

Student members:

Austria: Irmgard Sedlmayr

Germany (DGMT): Eva Ntara, Fabian Striebe, Julia Nicklisch, Mareille Wittnebel

Finland (Suoseura): Helena Rautakoski

Malaysia: Longwin Sii

*Welcome to the
peatland family :)*

Individual members:

Canada (CSPP): Slava Golod, Emily Prystupa, Bidhya Sharma

China: Qingfeng Chen, Zhong Du, Lu Feng, Chuanyu Gao, Xianyu Huang, Xiaoming Kang, Danwen Li, Min Luo, Fengli Ma, Dehua Mao, Mao Rong, Jianqing Tian, Junfeng Wan, Zheng Wang, Jiaoyue Wang, Zhiwei Xu, Zhenan Yang, Gang Yang, Zhiguo Yu, Ke Yuan, Zhiyang Zhang

Germany (DGMT): Anna Bartel, Angéline Bedolla, Silke Bohrmann, Holger Brux, George-Laurentiu Constantin, (Daniela) Nadine Conze, Hartwig Drechsler, Eva Frei, Alf Grube, Jens Kungl, Tjark Martens, Raphael Müller, Rudolf Specht

Finland (Suoseura): Sari Jaakkola, Antti Kämäräinen, Pauliina Latvala-Harvilahti, Maritta Liedenpohja-Ruuhijärvi, Anuliina Putkinen, Peter Sale, Hanna Silvennoinen, Päivi Väänänen, Marika Viljanen

Japan: Michiko Hosobuchi

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Belgium: Marco Croon (Agaris Belgium NV)

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Denmark: Torben Brændgaard (Pindstrup Mosebrug A/S)

Finland (Bioenergia ry): Mika Virtanen (Central Union of Agricultural Producers and Forest Owners MTK), Jarkko Ylä-Kotola (Kotkan Energia)

Germany (DGMT): Ludger Meyer (Ing.-Gesellschaft Heidt + Peters mbH), Arjen van der Meer (Kekkilä-BVB), GeOs GmbH

Lithuania: Marc Peray (Premier Tech Systems and Automation)

United Kingdom: Paul Alexander, Neil Bragg, Alex Julien (Bulrush Horticulture Ltd.), Nadeem Shah (Forest Research), Ben Williamson (Westland Horticulture)

You can ask for, change or delete your membership information any time by contacting susann.warnecke@peatlands.org.

More info, membership benefits and membership form: www.peatlands.org/join-us

(50% off if you join before 16 December, valid until 10 May, non-NC countries)

Peat and Peatland Events

Cancellations or changes of dates due to Covid-19 threat possible. Check the event websites for updates!

112th IPS Executive Board Meeting
9 December 2020, online

IPS Scientific Advisory Board Meeting
9 February 2021, online

113th IPS Executive Board Meeting
February 2021, online

IUCN World Conservation Congress
Marseille, France 2021 - date to be announced
www.iucn.org

Convention on Biological Diversity COP 15
Kunming, China
Second Quarter of 2021
www.cbd.int

IV. ISHS International Symposium on Horticulture in Europe (SHE)
Virtual event
8 - 12 March 2021
<https://she-ihs-fav2020.de>

European Geosciences Union
General Assembly 2021
Virtual event
19 - 30 April 2021
www.egu21.eu

16th International Peatland Congress
Tallinn, Estonia & online
2 - 7 May 2021
www.peatlandcongress2021.com

2nd Global Peatland and Peat Industry Summit
Tallinn, Estonia
4 May 2021

IPS Annual Assembly & General Assembly
Tallinn, Estonia
6 May 2021

10th International Symposium on Land Subsidence (TISOLS)
Delft-Gouda, the Netherlands
17 - 21 May 2021
www.tisols2021.org

2nd World Peatlands Day
2 June 2021, online
www.peatlands.org/event/world-peatlands-day

9th SER World Conference on Ecological Restoration
A New Global Trajectory: Catalyzing Change Through the UN Decade on Ecosystem Restoration
Virtual event
19 - 24 June 2021
www.re3-quebec2021.org

ISHS-IPS II International Symposium on Growing Media, Soilless Cultivation, and Compost Utilisation in Horticulture
Ghent, Belgium
22 - 27 August 2021
www.ishs.org/symposium/712

SER Europe: 2021 Conference
Alicante, Spain
31 August - 4 September 2021
<https://sere2020.org>

AsiaFlux Conference 2020
Kuching, Sarawak, Malaysia
21 - 23 September 2021
www.asiaflux.net

UNFCCC COP 26 CMP 16 CMA 3
Glasgow, Scotland, United Kingdom
1 - 12 November 2021
<https://unfccc.int>

German Peat and Humus Day 2021
Bad Zwischenahn, Germany
4 November 2021
www.ivg.org/veranstaltungen/deutscher-torf-und-humustag

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Next issue...

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Please send your manuscript (500-2000 words, A4, Arial, no full cap lines, with author contact details, language proofread if possible, e.g. www.englishproofread.com), photos and illustrations (separate jpg files with the names of the photographers, you need to have copyrights and persons' consent) and advertisements (pdf files, prices according to Media Kit) to susann.warnecke@peatlands.org.

Submission deadline: PI 1.2021: **28 February**

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