Tow Hill peatland, Haida Gwaii, British Columbia, Canada. Photo: Hans Joosten.

IMCG Bulletin: Aug. - Nov. 2018

INTERNATIONAL MIRE CONSERVATION GROUP

www.imcg.net

Contents of this Bulletin

IMCG issues

Word from the Secretary-General

Dear mire friends

Let me start with wishing you all a happy and productive 2019 with sufficient progress in international mire conservation! And with less obsolete, postfactual fallacies that peat extractors, peat fuel burners and oil palm drainers keep on using bluntly of which this bulletin presents various examples.
This quadriple issue illustrates both the manifold activities going on in peatland conservation ànd the related lack of time to report and evaluate achievements. The end of the year provided a nice opportunity to catch up.
Next to the 'normal' news and information, this Bulletin provides the results of the IMCG General Assembly (Utrecht, NL, August 31, 2018) and short reports of participants of the Field Symposium in the Netherlands. Especially the resolution on subsurface drainage caused a stir in the Netherlands, more about that in the next Bulletin. The next Bulletin will also cover the events and side events of the December 2018 Katowice UNFCCC meeting, whereas this Bulletin pays attention to the recent Conference of Parties to the Ramsar Convention.
Keep sending news, photographs, papers and other contributions for the next Bulletin **by January 9, 2019** to Hans Joosten at joosten@uni-greifswald.de.

Minutes IMCG General Assembly, Academiegebouw Utrecht, the Netherlands, August 31, 2018, 9:00-13:00

Participants: Susanne Abel, Angéline Bedolla, Olivia Bragg, Zhao-Jun Bu, Beverley Clarkson, Samer Elshehawi, Marte Fandrem, Stephan Glatzel, Ulrich Graf, Ab Grootjans,Althea Grundling, Piet-Louis Grundling, Shane Grundy, Jenny Hammerich, Bettina Holsten, André Jansen, Hans Joosten, Philippe Julve, Annemieke Kooijman, Wiktor Kotowski, Siew Yan Lew, Tapio Lindholm, Tanya Lippmann, Weier Liu, Monica Sofia Maldonado, Tjark Martens, Tatiana Minayeva, Asbjørn Moen, Berit Moen, Francis Muller, Eric Munzhedzi, Jürgen Nauber, Mara Pakalne, Jan Peters, Line Rochefort, Jean Rousselot, Rob Stoneman, Franziska Tanneberger (minute taker), Michael Trepel, Jos Verhoeven, Remco Versluis, Alma Wołejko, Leszek Wołejko.

1. Opening and Welcome (Jos and Hans)
Jos Verhoeven welcomed the participants in the historic Academiegebouw.
Hans informed that following art. 13.1 of the IMCG constitution, the Main Board (MB) has – by decision of August 30, 2018 - chosen Ab Grootjans to act as chairman of the General Assembly (GA).
Hans asked all participants of the 18th Field Symposium to submit short contributions (incl. the nicest pictures) of their experiences and impressions to the IMCG Bulletin: joosten@uni-greifswald.de

The following agenda was adopted:
1. Opening and Welcome
2. Minutes of the General Assembly of August 28, 2016 in the Cameron Highlands, Malaysia
3. Biennial report (2016 – 2018) on the state of affairs in the IMCG and on its policy
4. Balance sheet and the statement of profit and loss
5. Election of the Main Board
6. Nomination of Honorary Life Members
7. Conference resolutions
8. Next venues
9. Any Other Business
10. Closing of the General Assembly

2. Minutes of the General Assembly of August 28, 2016 in the Cameron Highlands, Malaysia (Hans)
The minutes of the General Assembly of August 28, 2016 in the Cameron Highlands, Malaysia were published in the IMCG Bulletin June-July 2018.
The chairman proposed to adopt the minutes. The GA adopted the minutes.

3. Biennial report (2016 – 2018) on the state of affairs in the IMCG and on its policy (Hans + others)

After Piet-Louis Grundling had resigned as IMCG-Chair in July 2016, his tasks were assumed by the secretary-general. There were four additional Executive Committee members: secretary-general: Hans Joosten, treasurer: Francis Muller, members: Ab Grootjans and Rodolfo Iturraspe. There were ten additional Main Board members: Olivia Bragg, Beverly Clarkson, Eduardo Garcia-Rodeja, Tatiana Minaeva, Tapio Lindholm, Eric Munzhedzi, Faizal Parish, Line Rochefort, Jan Sliva and Lesław Wołejko. The Main Board had decided in 2016 not to organize new elections (constitution allows to keep MB members for 6 years), but to organize elections for a completely new Main Board in 2018.

The website www.imcg.net was regularly updated and maintained by Michael Trepel. (Applause)

The monthly production of the IMCG Bulletin was coordinated by Hans Joosten, and distribution handled by Michael Trepel. (Applause)

The membership database was administered by Jan Sliva. (Applause)

There were successful IMCG Field Symposia in Malaysia/ Brunei 2016 with 29+ participants, Conference and GA, and in Polar Urals/Russian Arctic 2017 with ± 50 participants and with Conference. More information can be found in the Bulletin. (Applause)

IMCG was represented in the European Habitat Forum (EHF) by Rudy van Diggelen. (Applause)

IMCG European Mires Book (by Asbjørn Moen/Franziska Tanneberger)

Asbjørn reminded the GA of the beginnings of IMCG and the long history of IMCG field symposia. He encouraged everybody to join and continue with this tradition, and explained how much he had learned and benefitted from it. He also described the start of compiling this book in 1991 and the contribution of Michael Löfroth in earlier stages of editing. After 26 years (!), the book was eventually published in May 2017. Franziska briefly explained the content of the book, showed the three key maps and a list of all authors. (Applause) The book has been launched in May 2017 at the Bonn UNFCCC climate conference and the first copy was handed over to the head of the UNFCCC delegation of Indonesia, Nur Masripatin. By now, 530 copies have been sold and c. 670 copies are distributed in total.

Mires & Peat (report by Olivia Bragg)

Mires and Peat is the multidisciplinary scientific journal that IMCG has been publishing jointly with the International Peat/Peatland Society (IPS) since 2006. It is scientific in the broadest sense, also encompassing 'social science' topics. The main point is that it adheres to academic standards including peer review. Unlike most academic journals it is produced on a free and open access basis, which means there is no cost to authors or readers. Anybody who is interested can easily find our website, which is perfectly maintained by Michael Trepel alongside the IMCG website.

Shortly before the last biennial symposium and general assembly of IMCG in 2016, there was a meeting with IPS during their Congress in Kuching to review the collaboration on the journal. Both parties agreed that it should continue and financial arrangements were renewed.

Mires and Peat has continued to grow and improve over the last two years.

Up to the end of 2015 we had published ten 'standard' volumes, one *per year*, with the number of articles per volume ranging from 4 up to 13. The 2016 standard volume was double that size, with 26 articles. The 2017 volume was slightly smaller, with 24 articles. The 2018 standard volume currently contains 18 articles.

Mires and Peat also publishes themed 'special' volumes, which run in parallel with the standard volumes although they often open partway through a calendar year and straddle two years. Up to the end of 2015 there had been six special volumes and two have been added since then. In fact, the latest special volume 'Growing *Sphagnum*' was completed this week. Three new special volumes are already being prepared.

The increase in interest from authors over the last two years is probably related to the fact *Mires and Peat* got its first Impact Factor (IF) in 2015; that was 0.806. The two-year IF went up to 1.095 in 2016, 1.129 in 2017 and 1.326 in 2018.

The team involved in producing *Mires and Peat* has also grown. We started with just two editors - myself as Editor (-in-Chief) and Jack Rieley as my deputy, plus the Editorial Board (Associate Editors, whose main function has been to provide some of the peer reviews). At the end of 2015 we had six 'article editors', and now there are twelve including six IMCG members in addition to the people I have already mentioned by name (Frank Chambers, Dicky Clymo, Stephan Glatzel, Ab Grootjans, Katherine (Katy) Roucoux, David Wilson).

All of this doubling-up is a reflection of success, but it also creates a need to modify the way that the editorial workflow is organised and a responsibility to make the journal truly sustainable. It is no longer practical to do everything by email; we need an online manuscript management system. During this year Katy Roucoux has facilitated a rather successful trial of the 'OJS' system hosted by the University Library at St Andrews (Scotland), and we plan to fully implement this - including direct online submission by authors - in the coming weeks. To help consolidate our working practices within this new system, the core group of editors will meet for the first time in October. This is possible because Jack Rieley has offered funding from the UK Peat Society to bring together the Europe-based editors in Leeds (England), with those from farther afield joining by Skype.

Hans underlines that we cannot be thankful enough to Olivia for developing this journal from scratch to a well-functioning key platform for peatland science. Ab and Line stress that more associate editors and reviewers are needed.

Membership (report of Jan Sliva)

Hans presented membership development between 2016 and July 2018. There was an increase of 52 members and six additional countries.

In Africa, members come from 13 countries: South Africa 58, Kenya 4, Ghana 3, Botswana, Lesotho, Mozambique each 2, and Algeria, Egypt, Ethiopia, Namibia, Rwanda, Tanzania and Zimbabwe each 1. Piet-Louis informed the GA that Paul Fell passed away last night. He had been very active to bring peatlands in South Africa to the media. In Asia (excl. Russia), members come from 9 countries: China 12, Malaysia 9, Japan 3, Myanmar 2, and Indonesia, Mongolia, Pakistan, South Korea and Sri Lanka each 1. There are 22 members from Australia and 6 members from New Zealand. Central America has only one member (from Cuba). North America is represented by the USA (14) and Canada (33). South America has 15 countries with IMCG members, with most from Argentina (4). Russia has 22 members. Europe is represented by 35 countries, with most members (86) coming from Germany. Other European countries with more than 10 members are: Estonia (15), Finland (29), France (23), Ireland (12), Norway (15), and Poland (17). Not all authors of the European Mires Book are yet IMCG members.

IMCG Regions	**members**		**countries**	
date	2016	July 2018	2016	July 2018
Africa	72	77	11	13
Asia (excl. Russian Federation)	23	30	7	9
Australia/Oceania	29	28	2	2
Europe (excl. RF)	401	438	33	35
Russian Federation (Europe + Asia)	23	22	1	1
North America	45	47	2	2
Central America / Caribbean	1	1	1	1
South America	12	15	5	5
Total	**606**	**658**	**62**	**68**

Agendapoint 4: Balance sheet and the statement of profit and loss (report Francis Müller)

The 2016 income was € 2500.46, and the expenses €231.49. This lead to an end-of-year budget of € 4691.88. The 2017 income was € 0.41, and the expenses € 255.88. This lead to an end-of-year budget of € 4436.41. Substantial finance flow related to IMCG goes via self-financing and via (bi- and multilateral) donations outside IMCG accounting. The decision of the General Assembly of 2014 to install a membership fee of 25 € (incl. exemption on request) was not implemented. The GA discusses the pros and cons of a membership fee. A trial with voluntary membership fee was not very successful, only a few people paid (mainly from Africa). It is difficult to establish criteria for different categories.

The MB proposes that the GA reconfirms its decision to install a membership fee. The GA reconfirms its decision.

Agendapoint 5: Election of the Main Board

By July 6, there were exactly 15 candidates for 15 Main Board positions: Olivia Bragg, Zhao-Jun Bu, Ab Grootjans, Samantha Grover, Piet-Louis Grundling, Rodolfo Iturraspe, Hans Joosten, Wiktor Kotowski, Tapio Lindholm, Tatiana Minayeva, Francis Muller, Faizal Parish, Line Rochefort, Rob Stoneman and Franziska Tanneberger. All suggestions are supported by at least 2 members (Hans Joosten and Ab Grootjans). In accordance with article 9.1 of the constitution, no voting was necessary and all candidates were included in the new Main Board.
The chairman thanks all members of the former MB for their work. He proposes that the GA confirms the new Main Board. The GA confirms the new MB.
The new IMCG Main Board will now start the procedure to elect the Executive Committee, incl. the chair, from among its members. Yesterday, the MB had first short discussions. By 15.09.2018, MB members can nominate themselves for positions in the Executive Committee.

6. Nomination of Honorary Life Members

According to the Constitution, „4.7. Honorary members shall be those individuals who have been nominated as such by the Main Board by reason of their exceptional merits to the objects of the Society, and who have been granted the status of honorary member by the General Assembly, and who have accepted this status." The MB nominates R.S. (Dicky) Clymo (UK).
Olivia Bragg presents a short appreciation of Dicky Clymo's work.
The MB proposes that the GA decides to grant Honorary life membership to Dicky Clymo. The GA decides to grant this status. All participants sign the European Mires Book for Dicky. Hans and John will drive tonight to him to pick up his library, which he decided to hand over to the Peatland and Nature Conservation International Library (based at the Greifswald Mire Centre, Germany).

7. Conference resolutions

<u>IMCG Resolution concerning the Dutch OBN Network 2018</u>
The draft resolution has been prepared by Ab Grootjans and André Jansen. The text is read to the GA by Hans. André explains that it is short but very clear to people involved in OBN. It follows-up an intensive, on-going discussion within OBN about its research agenda. Jenny argues that the text must clearer express that IMCG has received information about planned changes in how OBN sets its research agenda. Tanya asks to add a footnote what OBN is. Berit adds that IMCG has been impressed by the focus on raising public awareness by facilitating public access in the restored areas. Wiktor adds that IMCG also discussed much about conservation targets and how Natura2000 is interpreted. Dutch participants stress that this leads to far and that the text should remain focused.
The text is changed accordingly. The resolution will be addressed to Teo Wams (director nature protection of Natuurmonumenten), in copy to Wim Wiersinga (programme coordinator of OBN).
The chairman proposes to adopt the resolution. The GA adopts the resolution.

<u>IMCG Resolution on drained peatlands, with special reference to the Netherlands</u>
The draft resolution has been drafted by Hans Joosten, Jos Verhoeven and Ab Grootjans. The text is read to the GA by Hans. Jürgen Nauber adds that IMCG must state its competence re. wise use in the first paragraph. Serena suggests to add increased fire risk from drainage. Tanya Lippmann suggests mentioning also the need for evaluation of rewetting re. increased methane emissions. Jos Verhoeven suggests including 1-2 sentences that the IMCG appreciates the peatland restoration work in the Netherlands. Michael Trepel argues to shorten the text and focus in the main issue as it is too long for people from administration and media. Several other improvements are suggested.
The text is changed accordingly. The resolution will be addressed to the Dutch Minister of Agriculture and the most relevant governmental person in charge of climate change issues. Ab and André will do this. A press release will be prepared.
The chairman proposes to adopt the resolution. The GA adopts resolution.

IMCG Resolution to Poland regarding coal mining plans threatening mires in the Ramsar site "Poleski National Park"

The draft resolution has been drafted by Wiktor Kotowski. Wiktor explains the background and answered several questions. Franziska proposes to use 'globally threatened' instead of 'endangered' to make the statement about the Aquatic Warbler stronger. Small language improvements were suggested.

The text is changed accordingly. The resolution will be translated into Polish by Wiktor and addressed to the relevant Polish authorities.

The chairman proposes to adopt the resolution. The GA adopts the resolution.

IMCG Resolution on Olmany (Belarus)

The draft resolution has been prepared by Marina Abramchuk and Wiktor Kotowski. Tatyana Minayeva stresses that the resolution must be shorter and clearer. All information about biodiversity values should be brought to footnotes or annexes. Several parts were agreed to be shifted to an annex.

The text is changed accordingly. The resolution will be translated into Russian by Marina and addressed to the relevant Belarusian authorities.

The chairman proposes to adopt the resolution. The GA adopts the resolution.

8. Next venues

There are proposals for the next four years, each briefly explained by the respective member:

- 2019 Mongolia: Field Symposium (Tatyana Minayeva)
- 2020 Zambia: Field Symposium + General Assembly (Piet-Louis Grundling)
- 2021 New Zealand: Field Symposium (Beverley Clarkson)
- 2022 Germany Field Symposium + General Assembly (Jan Peters)

The GA applauds all four proposals. Information about the 2019 Field Symposium will appear soon in the IMCG Bulletin.

9. Any Other Business

Tatyana presents briefly the history of IMCG's involvement in international conventions. Work is increasing, and competent people are only a few. She asks permission from GA to reinstate or establish IMCG's observer status in Ramsar, CBD and UNFCCC. Also more involvement in IPBES is important. Jan offered to register IMCG as observer under UNFCCC. More participation of IMCG members is needed. The MB will further discuss this.
Asbjørn informs that the Sphagnum flora or Europa is printed.

The chairman closes the GA.

Permafrost peatland west of Khovsgol Lake, Mongolia. Photo: Hans Joosten.

Honorary member Richard S. (Dicky) Clymo.

Olivia Bragg (o.m.bragg@dundee.ac.uk)

According to his characteristically clear and meticulously maintained website, Dicky Clymo's research interests include:

a) physiology and general population ecology of the bog-moss *Sphagnum*; growing out of that interest
b) ecology and the rate of growth of peatlands; a special part of that interest is in
c) the production and movement of methane in the anoxic conditions in peat.

His publication record starts in the early 1960s with experiments on cation exchange in *Sphagnum*. In the early 1970s he published the first measurements of CO_2 and CH_4 efflux from a peatland, reporting differences between hummocks and hollows that have been repeatedly confirmed since. He also gave us the long-time standard 'cranked wire' method for measuring *Sphagnum* growth. As a lecturer at what was then Westfield College, University of London, he was based in one of the less convenient locations for research on mires in the UK, and important insights came from experiments conducted in petri dishes on the window-ledge and in buckets on the roof of the laboratory. But he was no stranger to the blanket bog at Moor House in the English Pennine Hills and, eventually, to his main research site Ellergower Moss in south-west Scotland - where the investigation of gas production and movements deep in the peat proceeded, and his models of peat bog growth matured.

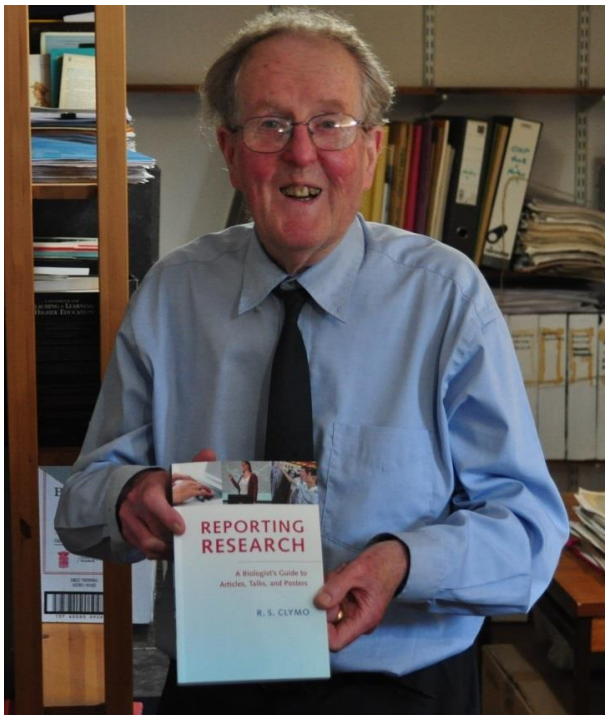
Dicky demonstrating how Sphagnum *turns rainwater acid during his valedictory public lecture in London on 12 October 2016. Photo: Olivia Bragg.*

Although Dicky's interest has always been mostly in building an understanding of how peat bogs work, his research must be regarded as a foundation for at least two of the major directions of applied peatland research today. Anybody setting out to grow *Sphagnum* in paludiculture or to measure greenhouse gas emissions from peatlands cannot fail to come across relevant reference material amongst the publications of R.S. Clymo.

His publication record continues throughout the 1990s and the 20-noughties. It is indeed difficult to say whether he ever retired from research and, if so, when. He is now in his mid-eighties and his valedictory lecture at Queen Mary University of London was rather recent, in October 2016; it was posted on U-tube in 2017 and is well worth viewing at https://www.youtube.com/watch?v=5Bn7GiUcZDA. Even that event did not mark the end. On his website we read:

"I am too old to get grants any longer (quite right: it is the young who need the grants), so continue to work only on simple inexpensive areas among the interests above. But I am always happy to discuss possibilities without restriction".

Since his 'official' retirement (from university employment), Dicky has been a prominent contributor to the activities of IMCG. He was with us in Tierra del Fuego in 2005, when he was the one who remembered to bring a bottle of Scotch whisky to fuel late-night revelries, and the one who led the UK contingent in performing our national songs. As a former editor of *Journal of Ecology*, he was soon conscripted as Assistant Editor of *Mires and Peat* and at one time he and I were alternating as the article editor for successive submissions to the journal. That didn't stop him from also submitting his own research manuscripts; one was published in 2012 and they became annual events in 2015, 2016 and 2017. The latest of these exploits the potential of the 'electronic-only' format in a way that nobody else has tried - it contains moving pictures.



Dicky Clymo, the day after becoming IMCG Honorary Member. Photo: Hans Joosten.

Dicky told me recently that the total number of other people's *Mires and Peat* manuscripts on which he had contributed in some way had reached 50. He also let it slip that part of his motivation for taking on the Assistant Editor role was for its educational possibilities. He has certainly helped numerous authors to achieve their publication goals. He has also pulled me up on certain 'sloppinesses' and thus helped to raise the standard of the journal.

I don't know how much of that experience contributed to the successful completion of yet another of his long-standing projects, namely the book Reporting Research which was published by Cambridge University Press in 2014; but I am carrying it with me this trip to continue familiarising with its content as a basis of 'best practice' for all *Mires and Peat* editors and authors.

The only question in my mind about the proposal that Dicky should be awarded Honorary Life Membership of IMCG is why it has taken us so long to think of recognising his extraordinary contributions to mire science, and to the work of IMCG, in this way.

IMCG General Assembly 2018 resolutions

IMCG resolution 2018 on the preservation of intactness of the Olmany mire complex in Belarus

The International Mire Conservation Group (IMCG) is a worldwide organisation of mire (peatland) specialists with a particular interest in peatland conservation. The IMCG held its biennial General Assembly in Utrecht, The Netherlands on 31 August 2018, attended by members from 23 countries and 6 continents. At that Assembly the following resolution was adopted.

IMCG expresses its concern about the on-going and planned construction of a system of roads on Olmany mires. IMCG noted that Olmany in Polesie, southern Belarus, is the largest transboundary Ramsar mire site in Europe preserved in a natural state. IMCG appeals to the Belarusian government to ensure that the extent of the mire ecosystems and their predominantly untouched natural character and integrity will remain intact.

It is with high concern that IMCG learnt about a system of roads currently being built across the mire complex. IMCG is concerned about the purposefulness of the investment. Its declared aim is to facilitate access for fighting wildfires. However, fires normally do not pose a serious threat to undrained peatlands, because of the permanent waterlogging of the peat soils. On the contrary, the damming effect on one side of the road may actually cause a drop of water levels on the other site, which - along with the enhanced access and car traffic - increases rather than lowers the risk of fires.

The last large mire complexes preserved in a natural state should, in any part of the world, be preserved as the heritage of humankind and for the sake of nature. Furthermore, their preservation is substantial for current and future scientific research, including as a reference for the conservation and restoration of mires, where they have been degraded by unsustainable use.

Mire scientists and conservationists associated in IMCG have reviewed the road construction plans on the basis of the available information and call for reconsideration of the plans and cessation of the project. The IMCG offers the experience and expertise available through its network to enable the Government to find a sustainable solution. We offer this support in recognition of the international importance of the Olmany mires.

Annex

The high international values of the Olmany mire complex arise from the following unique features:

- The lack of human-caused fragmentation of the mire. In Europe large natural areas have become extremely rare and should be given special value and conservation priority. Large size and inaccessibility allow for the preservation of wildernesses where natural processes support the conservation of elsewhere threatened species in their natural environment, without the need to carry out costly conservation measures. Although some signs of early hydrological reclamation can be seen in Olmany, its impact is now very limited due to overgrowing of canals by vegetation.
- A unique diversity of mire types forming the largest European complex of poor fens (i.e. transition mires, reported to cover c. 66% of the area of the Olmany Ramsar site), rich fens (c. 32%) and raised bogs (2%), preserved in their natural zonation. The habitats are approved as an Area of Special Conservation Interest of the Emerald network (BY0000012 Olmanskiye bolota).
- The abundance of wildlife species that demand vast natural areas, such as wolf, lynx, and birds of prey, e.g. the globally threatened Spotted Eagle (*Aquila clanga*), as well as the general importance of the area for nesting birds, for which it has been recognized as an Important Bird and Biodiversity Area (IBA BY018).

The roads, built on high sand dikes, are planned to extend several dozens of kilometers. They will facilitate access for people and possible further exploitation of the peatland. They are also likely to act as dispersal corridors for invasive species of non-native plants and animals. Moreover, it is probable that the roads will exert a significant negative impact on the ecological integrity of the mire complex, by modifying local eco-hydrological conditions. Dikes exert pressure on the peat body, obstructing water flow and thus acting as dams. Flow of water through the peat body is the key eco-hydrological process constituting ecosystem integrity, being expressed in its zonation.

Explanation of subsurface drainage at IMCG Field Symposium 2018. Photo: Hans Joosten.

IMCG Resolution 2018 on drained peatlands, with special reference to The Netherlands

During the period August 20 - 31, 2018, in the 34th year of its existence, the International Mire Conservation Group (IMCG[1]) held its 18th International Field Symposium in the Netherlands, as part of IMCG's regular field assessments and symposia. An IMCG delegation from 23 countries and 6 continents, accompanied and supported by Dutch researchers and management professionals, travelled across the Netherlands studying the diversity and functionality of peatlands and the issues facing them, with a special focus on their restoration and wise use.

The experiences collected during and in preparation of this Field Symposium brought the IMCG General Assembly, held in Utrecht, August 31, 2018, to adopt the following considerations:

1. Peatlands drained for agricultural use have become large sources of greenhouse gases and contribute significantly to global warming, with SE Asia and the European Union as major global emission hotspots. Drained peatlands are furthermore subject to ongoing land subsidence, leading to increased flood risks, fires, salt intrusion, management costs, damage to rural and urban infrastructure, and eventually to the loss of productive land. These negative trends, which are expected to be aggravated by climate change, urgently necessitate adaptation of land use.
2. With respect to the Netherlands, IMCG is concerned about the widespread promotion of 'underwater drainage' in various modifications as an 'adaptation measure' and the planned large-scale implementation of these techniques. Adaptation measures with major consequences for future land use should only be implemented after their short- and long-term effectiveness has been convincingly demonstrated. IMCG wishes to point out that
    - The substantial reduction of subsidence and greenhouse gas emissions claimed by the proponents of underwater drainage is not substantiated by research of generally accepted scientific standards. The conclusions drawn from published studies are not supported by the respective data[2].

[1] The IMCG internationally promotes, encourages and, where appropriate, co-ordinates the conservation of mires and related ecosystems; and internationally enhances the exchange of information and experience relating to mires and factors affecting them.

[2] See for an in-depth meta-analysis of the research result and conclusions Couwenberg, J. 2018. Some facts on submerged drains in Dutch peat pastures. IMCG Bulletin June-July 2018, pp. 9 – 21. Available under http://www.imcg.net/modules/download_gallery/dlc.php?file=294

- The proposed measures are too easily presented as ultimate solutions and distract from the real problem: the inherent unsustainability of all drainage-based peatland agriculture. Even if they would work, the measures are no long term solution, but only retard the degeneration process and continue aggravating the subsidence problem. Eventually –and preferably as soon as possible – measures have to be implemented that not only reduce, but stop and possibly reverse subsidence and minimize emissions. The current focus on subsurface drainage may frustrate the necessary transition to a more sustainable land use.

3. Research into alternative production systems on wet soils should be intensified. First results of paludiculture (cattail, reed, peat moss) are promising but need to be tested at the field scale and evaluated in the overall context of climate-change mitigation and adaptation.
4. A clear vision is needed for mitigation and adaptation in the Dutch peat meadow landscape. A pathway to reach this vision should be set-out, including a legal framework and effective incentives that prevent that short term farm-level gains are chosen above the long-term goal of a sustainable future for all.

IMCG Resolution 2018 concerning the Dutch OBN Network

During the period August 20th –31, 2018, in the 34th year of its existence, the International Mire Conservation Group (IMCG)[3] held its 18th International Field Symposium in the Netherlands, as part of IMCG's regular field assessments and symposia.

An IMCG delegation from 23 countries and 6 continents, accompanied and supported by Dutch researchers and management professionals, travelled across the Netherlands studying the diversity and functionality of peatlands and the issues facing them, with a special focus on their restoration. The IMCG General Assembly, held in Utrecht, August 31, 2018, adopted the following considerations:

The IMCG is impressed by:

- the high ecological qualities of the mire areas visited, despite the enormous environmental impacts, especially by drainage, eutrophication of surface and groundwater and atmospheric nitrogen deposition;
- the successes of restoration measures in many of the visited sites: valuable habitats and species have profited from these measures, whereas in the larger reserves natural processes have been re-activated that allow the preservation of the valuable components while considerably reducing the degree of human intervention and intensive management;
- the focus on public awareness by facilitating public access;
- the close co-operation between nature managers, researchers and policy makers in preparatory research, planning and implementation of restoration measures.

The IMCG compliments the Dutch OBN[4] network with these results and wishes to stress that the Symposium participants were strongly inspired by the efficiency of the knowledge network in restoration practises in The Netherlands.

However, the IMCG has learned that the research agenda is becoming dominated by short-term policy considerations at the expense of necessary, innovative research of ecosystem functioning before and after restoration.

The intense cooperation between managers and researchers has proven to be successful and cost-effective. IMCG therefore urges that the common priorities of scientists and nature managers remain the corner stone of the Dutch knowledge network.

[3] The International Mire Conservation Group is the global network of over 600 specialists from 63 countries having particular responsibility for and interest in the conservation and wise use of mires and peatlands worldwide.

[4] The Dutch OBN Knowledge Network for Nature Restoration and Management is an independent and innovative platform where policy makers, site managers and scientists cooperate in the management and restoration of natural areas; OBN develops and disseminates knowledge to enhance nature quality management and conservation in the Dutch landscapes and in the Atlantic Region.

IMCG resolution 2018 for Poland regarding coal mining plans threatening mires in Ramsar Site „Poleski National Park“

The International Mire Conservation Group (IMCG) is a worldwide organisation of mire (peatland) specialists with a particular interest in peatland conservation. The IMCG held its General Assembly in Utrecht, the Netherlands on 31st August 2018, attended by members from 23 countries and 6 continents. At the General Assembly the following resolution was adopted.

At its General Assembly in 2010 in Goniądz, Poland, IMCG expressed its appreciation for the achievements of Poland in identifying and selecting valuable mires for the Natura 2000 legislation and including them in a network of protected areas. We also stated our hope for the successful implementation of this policy. Special attention was paid by our delegates to mires of the Polesie region, which had been visited during a field symposium and recognised as sites of special international biodiversity value. Recently, however, we have been informed about threats to these ecosystems arising from new plans to develop a black coal mine in the Polesie region. Hereby, IMCG wishes to express its deepest concern and requests the Polish government to reconsider these plans.

Mires of the Polesie region (Lubelskie voivodship, SE Poland) are internationally recognised as unique well-preserved wetlands, supporting numerous threatened species of plants and animals. The region is protected as Poleski National Park under the Polish Law, whereas its international conservation status has been secured as UNESCO Biosphere Reserve, Ramsar Site (Wetland of International Importance), International Bird and Biodiversity Area (IBBA) and several Natura 2000 sites. Here, we specially want to mention the Bubnów mire (Natura 2000 area „Bagno Bubnów“, 2344 ha), one of the largest well-preserved alkaline fen ecosystems in Europe, hosting 3-4% of the global nesting population of the globally threatened Aquatic Warbler, as well as viable populations of several red-listed plant species, including *Pedicularis sceptrum-carolinum*, *Betula humilis* and 13 species of orchids. The exceptional biodiversity of Bubnów mire arises from its geological and eco-hydrological settings, almost not disrupted by reclamation works. Unfortunately, the permit for exploring black coal deposits issued in 2018 by the Chief Geologist of Poland may lead to opening mining activities only a few kilometres from Bubnów mire. According to our best knowledge, such mining activities will have an inevitable impact on regional water conditions and will degrade mire eco-hydrology in the areas affected by mining. Therefore, we feel obliged to notify Polish authorities and international society about the very high risks of degrading the unique wetland habitats if the plans are implemented.

In addition to the biodiversity threats, we want to highlight the climate-conservation context of this affair. Peatlands constitute the most effective carbon stores of the terrestrial biosphere. Carbon stored in peat during thousands of years of mire functioning is, however, emitted as carbon dioxide to the atmosphere as soon as peatlands are drained, thereby aggravating global warming. As a society of experts concerned about the state of nature and the human environment, we denounce both the jeopardizing of large undisturbed mire ecosystems, and the exploitation of new coal deposits in times of increasing climatic calamities caused by greenhouse gas emissions from fossil fuels. We appeal to the government of Poland, as signatory of the 2015 Paris Agreement and host of the 24th Conference of Parties to the United Nations Framework Convention on Climate Change, to stop coal exploitation in Polesie and to secure the preservation of mires in this region and elsewhere in Poland, fulfilling international commitments. We offer our assistance to the Polish government and regional authorities in strengthening the conservation of mires, as hotspots of biological diversity and regulators of biosphere integrity.

Impressions from the Field Symposium

In this Bulletin we publish short impressions of participants to the IMCG Field Symposium 20-31 August 2018 in the Netherlands. Please share your thoughts with your fellow IMCG members!

Participants of the IMCG Field Symposium 2018 in front of the Hunehuis in Drenthe. Photo: Michael Trepel.

To do or not to be, that is the question

Weier Liu (weier.liu@rug.nl)

What I found fascinating was the "to do or not to be" philosophy and "preserving by interfering" strategy of the Dutch peatland restoration projects. On the one hand, instead of minimizing human intervention and let the ecosystem develop freely, these projects include engineering measures to manipulate hydrological systems (e.g. building peat dam network in Bargerveen and installing plastic sheets in Wierdense Veld) to achieve specific environmental conditions, therefore shift the vegetation development to a preferred path. On the other hand, it was impressive how scientists and local managers worked together to reveal the story and logic behind the whole process of succession of the systems up to the latest stage, therefore to identify the most unique and valuable systems as goals for the restoration. It was surprising to see that in this way of restoration, by identifying target ecosystems and stimulating their resilience with managed environmental conditions, heavily degraded or intensively used lands could be transformed into promisingly recovering semi-natural habitats.

I think these restoration works also reflected a "biodiversity as an ecosystem service" perspective. The intrinsic values of these unique restored systems and endangered species are also emphasized in addition to their cultural and recreational services (e.g. management that prefers species-rich meadows rather than forests in several projects). This could give insights to some other nature conservation strategies that are more function-oriented and emphasize more on ecosystem services like climate and water regulation. Especially considering the huge amount of money and resources spent on these Dutch peatland restoration projects, it could be interesting to compare the overall effectiveness of these conservation efforts in terms of a broader ecosystem services concept. It should be necessary to also consider the presence of ecosystems themselves as one of their services, whether referring to their intrinsic values of rareness or uniqueness, in addition to their functions of carbon sequestration or water retention.

IMCG members examining vegetation in National Park Weerribben-Wieden, veldweg. Photo: Weier Liu.

The Dutch experiences from a South American view

Mónica Sofía Maldonado Fonkén (mmaldonado@corbidi.org)

Behind the lovely channels and extensive agricultural land, The Netherlands is an example of "extreme land management" where almost everything is somehow controlled by man, especially the water. In this country the landscape has been changed for centuries, mires were turned into crops and grasslands for livestock, or were destroyed by peat extraction for fuel. Activities that led to strong subsidence and the almost complete disappearance of mires. The need for land and resources has probably been one of the most important drivers of humankind. It happens all over the world. The relationship of human groups with their environment (influenced for example by religious beliefs), the variety of the landscape (mountains, valleys, forest, etc.), the density of the population, and their needs (related with an "ideal life standard"), money and technology available, etc. determine the way on how resources are used. For a person who comes from a country with only 24 hab/km^2 (Peru), to find "natural mires" in a place with 488 hab/km² seemed impossible. Also, the concept of natural could be tricky. What to look for? The "original ecosystem" before human heavy use or the one existed from 200 years ago. Where a nice forest could be unwanted because it is not "the original mire"; or where natural protected areas are artificially maintained lands (that need frequently sowing, water management, etc.) that sometimes looked like a crop field. I was puzzled. Also, the amount of resources to do research, restore and maintain those areas are something unheard in my country. Comparisons are unavoidable but it is important to realize that a different reality requires an ad hoc approach and objectives, and is related to different values and priorities. What lessons could I take to my country? The practical and theoretical information shared in the field trips and in the Symposium from an amazing group of specialist from all over the world about peatlands (peat types, species, restoration methods and results, carbon sequestration, ecosystem services, hydrology, etc.) was highly valuable. But there was more: how private initiatives (and individuals) made and still make the difference in natural protected areas. It´s an example of how civil society can influence and change things in a country. The Netherlands also showed us what our countries could become if we don´t plan ahead and protect a significant amount of our natural ecosystems, enough to preserve species, process and ecosystem services, including buffer zones and corridors. The importance of wise use,

sustained in trustworthy research, even if that implies a change in the traditional activities (for example paludiculture instead of livestock and crops); or in the availability and consumption of resources. Also, that when something is gone, it is gone forever, that artificial maintenance has its limits, and that nature is permanently changing. This is just not about individual countries anymore. The unbridled development, the loss of species and ecosystems, and climate change (where peatlands play an important role) are a call to broaden our vision and seriously think about the planet as a whole. The Dutch experiences showed us that if there is a will, it is possible; but also that we can (and have to) take action as conservationists, managers, researchers, etc. sharing the knowledge and making our voices heard. For the sake of common future, let´s keep the peatlands wet!

The cultural landscape

Tanya Lippmann (t.j.r.lippmann@vu.nl)

Biodiversity is a beautiful aim that often hosts a range of ecosystem services. However, I query whether the protection of nature is for nature's sake or whether biodiversity protection is inherently an anthropocentric ideal. The Netherlands has completely bypassed my inconclusive philosophising by establishing a new concept, the cultural landscape. The cultural landscape recognises the relationship between the landscape and human values, emotions, attachments and ideals. During the IMCG symposium we visited many restored peatland sites and for the first time, I observed a cultural landscape. These sites that were not necessarily restored to their most natural state (how would one define this?). Instead these sites were restored to preserve the cultural landscape. This poem was written to say thank you to the participants and particularly the organisers, Ab Grootjans, André Jansen and Jos Verhoeven.

Tanya Lippmann and Weier Liu jumping peatland in Veldweg, Overijssel. Photo: Michael Trepel.

The Peat Kingdom

The peat was drained, shovelled and burned
Not to remove people from fens
but what we have learned

is that

a naked landscape is a kingdom
and a cultural landscape is one that is
drained, burned, and returned.

peat bogs are old.
But this information is new.

Water tables are raised,
Water quality maintained -
Restoration is no longer due.

Please accept this gift
to restore our gratitude in you.

Tanya Lippmann

30 September 2018

New peatlands in the pipeline in the Nieuwkoopse Plassen… Photo: Hans Joosten.

Artificiality has no limits

Hans Joosten (joosten@uni-greifswald.de)

The Netherlands forces you to think about the relation between biodiversity and naturalness. “In nature conservation, the ‘means’ are an implicit part of the ‘ends’. Every conscious act increases the artificiality of the resulting patterns and processes. The essence of nature, selfregulation, is not benefitted by "consciously acting", only by "consciously omitting": creation destroys nature. Any evaluation of conservational instruments … has to take account of these contradictions”, I wrote in 1996. My assertion that ‘artificiality’’ (with ‘nature’ as zero value) has no upper limit was again confirmed by tubes running through the Nieuwkoopse Plassen (see photo). The tubes transport topsoil removed from a too eutrophic fen restoration site to another fen restoration site that is being raised because its surface is too low…

Joosten, H., 1996. Naturalness and the nature of conservation. Mires Research News 7: 2 - 4.

“My boggy is under erosion”

Christin Dammann (Christin.Dammann@hnee.de)

It was the first time I’ve been in the landscape of the Netherlands and I was overwhelmed by the intensity of agricultural land use and the management or manipulation of hydrology. It seemed to me that there was no puddle not regulated, which was also very impressing in a way. For the peatlands and thereto related the future of agriculture and living, this way of cultivating land is extremely problematic due to subsiding land. Although the consequences of draining peatlands are known, the majority of land, which is already below sea-level, is continuously used as intensive grassland.

Since a study showed the costs in cities for repairing supply lines as drinking water pipes and rebuilding of houses (about 22 billion Euro per year), some regional governments started a campaign for adapted land use (https://www.youtube.com/watch?v=Z0y1SCzJ3Q8&sns=em) to push new ideas and approaches.

What we have also seen were the efforts of the nature conservation institutions such as Natuurmonumenten, which promotes study and rewetting of peatlands at a large scale. We visited the Polder Westbroek/Tienhoven near Utrecht, a former peat bog, which was converted in agricultural land. In that area peat was extracted and we could see a huge turf pond structure. In this area the major conservation agencies developed a restoration plan to promote different stages of succession. On this site many restoration activities were undertaken (some for the first time), which have been studied over a long time period. It was impressive to see the scale of these experiments and also the approaches to restore peatlands in their different stages of succession. For me the activities to promote the species-rich floating mats was the most interesting and of course to walk carefully on these mats.

I would like to thank everybody who organized this field trip, especially Andre, Ab and Jos. I really enjoyed the exchange and discussions with the peatland specialists from all over the world. I think this field trip again underlined the importance of an organization such as the IMCG and the need for sharing knowledge and experience. Thanks for the friendly and familiar atmosphere.

Go Big or Go Down …

Jenny Hammerich (Jenny.Hammerich@hnee.de)

… will likely be the future slogan of Dutch land use policy and restoration methods. What we have seen during our two weeks field symposium in the Netherlands was overall enormous. One quarter of the whole country lies below sea level. The lowest point is situated at -7 meters. (Nearly) all former mires have been drained, exploited and are now in agricultural use. The current solutions are higher and higher dikes and a highly managed watersystem throughout the whole country. But also the restoration projects stand out in their scale and size. An example: we visited the very impressive Bargerveen Reserve, a 23 km² large site situated at the border to Germany. To preserve this remnant of the former 3000 km² big Boertanger Moor, estimated 50 million Euro have been spend and another 34 million are scheduled until 2026 for restoration measures and the establishment of buffer zones. Enormous.

In my opinion this year’s symposium showed all of us the importance of protecting our natural and near natural mires and the relevance of science based, thought out restoration projects. And for the Netherlands there is just one option: Go big on restoration and sustainable land use or go down deeper and deeper under the sea level.

Thanks to everyone for sharing their knowledge and experiences in such an open and friendly way, free of hierarchy and level of experience. I was benefitting greatly from all presentations, explanations and professional as well as personal conversations. A big thank you also to Ab, Andre, Jos and all other organizers of this well planned field symposium.

Succisa pratensis *as a local seepage indicator in the Reest valley fenlands, the Netherlands. Photo: Jenny Hammerich.*

Reflections on the IMCG Excursion to The Netherlands

Michael Trepel (mtrepel@ecology.uni-kiel.de)

IMCG excursions and field symposia are always a valuable experience for getting in touch both with mire and peatland landscapes and even more important with mire loving people. This time, in The Netherlands we experienced how difficult it is to protect the last remnants of formerly wide spread mire and peatland ecosystem types. In a completely regulated landscape far away from any natural processes on landscape scale, which normally ensure that different site conditions evolve over time, the Dutch scientists and site managers are impressively effective in mirroring natural processes and establishing specific site conditions for the development of protected species and habitat types.

The field excursions are a wonderful teaching concept, where after one or two days, participants forget about their backgrounds and start lively, sometimes controversial discussions in the field. In my opinion, this is the best way to teach and learn at the same time for everybody. Secondly, the excursions are a source of joy and motivation. Jumping on wet peat is always a fantastic experience and shows that our bodies and minds were even in The Netherlands in complete harmony with wet landscapes.

Understanding landscape, sharing knowledge, making friends = IMCG

Susanne Abel (abels@uni-greifswald.de)

The two IMCG weeks were very intense. The organizers had focused on complex studies on each excursion stop and offered lots of information. It was very well organized. I was impressed about the extent of land use history, how the Dutch people managed to change hydrology and to reclaim land. We learned that understanding the history and the landscape properties – a holistic approach – is necessary for successful restoration projects. Furthermore, such approach leads also to a better understanding and new findings about

peatland growth and dynamics. In some areas only through failed restoration measures, it became clear that the hydrology is different than expected and a profound study of the area had to follow. We learned that one small peat bog does not function in the same way as another only some metres further and that a stone is not a stone (see figure). The land use history has left many traces and alterations. We asked ourselves what is natural? What is worth saving? The primary landscape that developed without human interference? In the Netherlands millions of Euros are spend to conserve habitats that are only semi-natural.

For me, conservation measures on Texel were very impressive, too. Here, the scientists first provided data, described scenarios but avoided recommendations. The decision then came as a bottom up approach and thus is accepted and sustainable until today. The approach prevents conflicts, but it needs a lot of patience and trust in society.

I am very thankful for the chance to be in such brilliant company in these two weeks. I enjoyed good conversations, stupid jokes and even the volleyball game without helmet. The crowning glory was the touching thank-you event organized by Michael and Jenny. They had found nice personal gifts for each of the three musketeers (the organizers: Jos, Ab and André). Tanya made it all perfect with a self-written poem and Hans through a powerful vocal insert from "my boggy is all in erosion". No eye stayed dry...

Stephan Glatzel, Piet-Louis Grundling, Eric Munzhedzi, Andre Jansen and Tjark Martens studying peat stratigraphy in Drenthe. Photo: Michael Trepel.

IMCG group watching a "stone" near the Hune Huis - a piece of art made by Sarah van Sonsbeeck that was not allowed to be included into an old stone grave. Therefore, the artist placed it next to it, directly on the road, where everyone is confronted with it. Modern culture and history had to be separated. Photo: Susanne Abel.

Impressions of the Netherlands 18th IMCG Field Symposium and General Assembly

Shane Grundy (shane@bushdoctor.com.au)

Thanks to all the participants and the organisers of the field excursions and Symposiums. The Netherlands trip certainly was a lesson in water management. The management issues associated with the restoration of base rich fen meadows with water that contains increased nutrients, as well the essential calcium and bicarbonate to maintain and restore the meadows is complicated. As a result of urban and rural activities this base rich water has been polluted with nitrogen and phosphorous; the efforts undertaken to strip the increased nutrients are staggering. Achieved through annual slashing and removal of vegetation mass, an activity that is required long term unless there is significant improvement in water quality. Added to this, the problem of aerial nitrogen deposition, it seems efforts to manage these fen meadows will be substantial for many years to come.

Transport across the canal to a wet meadow, Eernewoude. Photo: Shane Grundy.

The problems faced by the Netherlands in the future with the continued land subsidence, the threat of sea level rise and the pollution of its rivers are considerable. I enjoyed the local people and envied their lifestyle, the bike riding, the beautiful villages and cities. The skies in the Netherlands caught my attention; I can see why they inspired many famous Dutch painters in times past.

It seems like every inch of the Netherlands is managed in some aspect, pumping water out of the polders in winter, pumping it back in in summer, slashing vegetation, digging out forests in old drainage ditches….the list goes on. Strong leadership and community will is required to stop the further loss and promote restoration of its peatlands and natural environment. Visiting a country with so little of its natural history remaining makes me feel lucky to have so much of ours remaining in Australia, we need to work much harder to ensure we stop our environmentally degrading practices. Thank you again.

Skies over Kiersche Wijde. Photo: Shane Grundy.

IMCG Symposium, The Netherlands: Peat subsidence

Bev Clarkson (Clarksonb@landcareresearch.co.nz)

The extent and ramifications of ongoing peatland subsidence in The Netherlands was the major theme that struck me during the 2018 IMCG symposium. Much of the arable land is located on an alluvial floodplain, which originally supported large peatlands. Drainage and development of the peat, particularly for dairy farming, dates back many centuries, and ingenious methods for avoiding flooding and removing water, e.g., windmills, pumping stations, have been devised. However, currently 26% of the land is below sea level and more than two-thirds is vulnerable to flooding, with peat subsidence and inundation predicted to increase under future climate change scenarios. As a result, The Netherlands has invested heavily in mitigating the threats, including investigating land use change from dairying to paludiculture. Paludiculture is crop production on wet peatland soils, promoting the preservation and restoration of peatlands by rewetting soils, increasing biodiversity benefits, reducing greenhouse gas emissions, and removing nutrients. Many of the sites we visited showcased paludicultural practices, with the crops being used for fodder, fuel, fibre, and construction material.

I investigated the issue of peatland subsidence on my return to New Zealand, and found that Waikato agricultural peatland subsidence rates range from 17 to 33 mm yr^{-1}, depending on when drainage originally

occurred (Pronger et al. 2014). In addition, some parts of the Hauraki Plains pastoral peatlands in northern Waikato are already below sea level, requiring stop banks (dykes) and pumping to maintain land use. In areas close to the foreshore, the effects of peat shrinkage will be compounded by sea level rise. These are important issues that urgently need to be addressed, and we can learn from many of the approaches being researched and demonstrated in The Netherlands and elsewhere. I would like to thank the IMCG Dutch committee for organising such an informative and memorable field symposium.

Pronger J, Schipper LA, Hill RB, Campbell DI, McLeod M 2014. Subsidence rates of drained agricultural peatlands in New Zealand and the relationship with time since drainage. Journal of Environmental Quality 43: 1442–1449.

Removal of crop biomass via barge at Nieuwkoopse Plassen. Photo: Bev Clarkson

Respects

Stephan Glatzel (stephan.glatzel@univie.ac.at)

The IMCG Field symposium in the Netherlands was my first one and it won't be my last one. I was truly impressed by the scientific strength of the meeting. Having organized much shorter meetings myself, I can remotely imagine how much work went into this. So I cannot comment the meeting without a big Thank You to Ab, André and Jos.

The Netherlands, in many respects, are the most advanced nation as far as peatland destruction, but also awareness for peatlands and revitalization are concerned. It was amazing to learn about this first-hand. What also struck me, was the trade-offs one faces when conservation and restoration efforts need to involve intensive water and landscape management efforts that touch what may be called geo-engineering. I was also fascinated by the very friendly and nice group which was more diverse (geographically and by specialization) than I had imagined.

Mara Pakalne and Hans Joosten showing practical aspects of peatland subsidence. Photo: Stephan Glatzel.

Peatland rewetting in the Netherlands. Photo: Stephan Glatzel.

Mires and Peat

From August to November 2018 the following papers were published in Mires and Peat:

- Plant diversity and structure of the Caimpugan peat swamp forest on Mindanao Island, Philippines. [L.G. Aribal & E.S. Fernando] Volume 22: Article 7 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=292
- A preliminary study of the macroinvertebrate fauna of freshwater habitats in Maludam National Park, Sarawak. [E.M. Dosi, J. Grinang, L. Nyanti, K.L. Khoon, M.H. Harun & N. Kamarudin] Volume 22: Article 6 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=290
- Utilising highly characterised peats to remove cadmium from aqueous solutions. [A.M. Rizzuti, K.D. Mouzone, L.W. Cosme & A.D. Cohen] Volume 21: Article 21 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=289
- New insights into postglacial vegetation dynamics and environmental conditions of Península Avellaneda, southwest Patagonia, revealed by plant macrofossils and pollen analysis. [M.E. Echeverría, G.D. Sottile, M.V. Mancini & S.L. Fontana] Volume 21: Article 20 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=287
- Holocene carbon accumulation in the peatlands of northern Scotland. [J.L. Ratcliffe, R.J. Payne, T.J. Sloan, B. Smith, S. Waldron, D. Mauquoy, A. Newton, A.R. Anderson, A. Henderson & R. Andersen] Volume 23: Article 3 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=285
- Knockfin Heights: a high-altitude Flow Country peatland showing extensive erosion of uncertain origin. [M.H. Hancock, B. England & N.R. Cowie] Volume 23: Article 2 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=284
- Peatland afforestation in the UK and consequences for carbon storage. [T.J. Sloan, R.J. Payne, A.R. Anderson, C. Bain, S. Chapman, N. Cowie, P. Gilbert, R. Lindsay, D. Mauquoy, A.J. Newton & R. Andersen] Volume 23: Article 1 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=283
- The Flow Country Peatlands of Scotland: Foreword. [R. Andersen, N. Cowie, R.J. Payne & J.-A. Subke] Volume 23: Article 0 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=282
- Peatland fish of Sebangau, Borneo: diversity, monitoring and conservation. [S.A. Thornton, Dudin, S.E. Page, C. Upton & M.E. Harrison] Volume 22: Article 4 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=281
- Some preliminary observations on peat-forming mangroves in Botum Sakor, Cambodia. [J. Lo, L.P. Quoi & S. Visal] Volume 22: Article 3 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=280
- A limited seed bank in both natural and degraded tropical peat swamp forest: the implications for restoration. [L.L.B. Graham & S.E. Page] Volume 22: Article 2 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=279
- Unique Southeast Asian peat swamp forest habitats have relatively few distinctive plant species. [W. Giesen, L.S. Wijedasa and S.E. Page] Volume 22: Article 1 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=278
- Tropical peatland biodiversity and conservation in Southeast Asia: Foreword. [M.E. Harrison & J.O. Rieley] Volume 22: Article 0 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=276
- Morphology of Chrysophycean stomatocysts in three peatlands in central China. [X. Bai, Z.J. Bu & X. Chen] Volume 21: Article 19 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=275
- Mid- to Late Holocene elemental record and isotopic composition of lead in a peat core from Wolbrom (S Poland). [F. Pawełczyk, A. Michczyński, J. Tomkowiak, K. Tudyka & N. Fagel] Volume 21: Article 18 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=274
- Sphagnum farming from species selection to the production of growing media: a review. by G. Gaudig, M. Krebs, A. Prager, S. Wichmann, M. Barney, S.J.M. Caporn, M. Emmel, C. Fritz, M. Graf, A. Grobe, S. Gutierrez Pacheco, S. Hogue-Hugron, S. Holzträger, S. Irrgang, A. Kämäräinen, E. Karofeld, G. Koch, J.F. Koebbing, S. Kumar, I. Matchutadze, C. Oberpaur, J. Oestmann, P. Raabe, D. Rammes, L. Rochefort, G. Schmilewksi, J. Sendžikaitė, A. Smolders, B. St-Hilaire, B. van de Riet, B. Wright, N. Wright, L. Zoch & H. Joosten] Volume 20: Article 13 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=273
- Physical growing media characteristics of *Sphagnum* biomass dominated by *Sphagnum fuscum* (Schimp.) Klinggr. . [A. Kämäräinen, A. Simojoki, L. Lindén, K. Jokinen & N. Silvan] Volume 21: Article 17 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=272
- *Sphagnum* regrowth after cutting. [M. Krebs, G. Gaudig, I. Matchutadze & H. Joosten] Volume 20: Article 12 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=271

- Sequence-based identification and characterisation of cultivated filamentous fungi in the Alan Bunga peat ecosystems of Sarawak, Malaysia. [Z. Ayob, N.A. Kusai & S.R.A. Ali] Volume 21: Article 16 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=270
- Effects of grazing pressure on plant species composition and water presence on bofedales in the Andes mountain range of Bolivia. [N. Cochi Machaca, B. Condori, A. Rojas Pardo, F. Anthelme, R.I. Meneses, C.E. Weeda & H.L. Perotto-Baldivieso] Volume 21: Article 15 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=269
- Surface energy exchange in pristine and managed boreal peatlands. [P. Alekseychik, I. Mammarella, A. Lindroth, A. Lohila, M. Aurela, T. Laurila, V. Kasurinen, M. Lund, J. Rinne, M.B. Nilsson, M. Peichl, K. Minkkinen, N.J. Shurpali, E.-S. Tuittila, P.J. Martikainen, J.-P. Tuovinen & T. Vesala] Volume 21: Article 14 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=268
- *Sphagnum* mosses cultivated in outdoor nurseries yield efficient plant material for peatland restoration. [S. Hugron & L. Rochefort] Volume 20: Article 11 http://mires-and-peat.net/modules/download_gallery/dlc.php?file=267

Find the journal online at http://mires-and-peat.net/ Electronic submission is required using our dedicated electronic submission system. If you experience any problems please contact the Editor-in-Chief Olivia Bragg (o.m.bragg@dundee.ac.uk) who can offer alternative routes for electronic submission.

Uros in Lake Titicaca, Peru. Photo: Hans Joosten.

Papers

Paludiculture in Peru: present and former use of wetland species *Schoenoplectus*, *Typha*, *Arundo* and *Phragmites*

Mónica Maldonado (mmaldonado@corbidi.org) & Debbie Graus (debbie_sibyl@hotmail.com)

Paludiculture is an alternative to stop peat decomposition, subsidence and the emission of greenhouse gases in peatlands. With several advantages, including a wide variety of uses and economic benefits, paludiculture is becoming attractive in various parts of the world. But, whereas many benefits are better appreciated now, the use of wetland vegetation has been a common traditional practice. In Peru, wetlands have been managed and manipulated since pre-Columbian times (figure 1) in order to use plant species like: “totora, inea” *Typha dominguensis* (syn. *Typha angustifolia*), “totora” *Schoenoplectus californicus* (syn. *Scirpus californicus*, *S. tatora; S. californicus* subsp. *tatora*), “junco” *Schoenoplectus americanus* (syn. *Scirpus americanus*), “carrizo” *Phragmites australis* (syn. *P. communis)*, etc. (Rostworowski 2014, Fernandez & Rodriguez 2007, Ríos 2005, Banak et al. 2004, León & Young 1996). And even introduced species like “carrizo, caña brava” *Arundo donax* are also used after the Spanish conquest (Aponte et al. 2014, Ríos 2005, Tovar 1993). All these species are reported from Coastal and Andean regions, while *Typha dominguensis* and *Phragmites australis* are also present in the Amazon (Aponte et al. 2014, León & Young 1996, Brako & Zarucchi 1993, Tovar 1993).

One of the best known traditional uses of wetland plants at the Peruvian coast is that of *Schoenoplectus californicus* for making the fishing boats called “caballitos de totora” (literally ‘little horses’, figure 2a). The dry stems of the plant, properly soaked to prevent breakage when handled, are used to make the “caballitos”. When using these boats, water impregnates the *Schoenoplectus* stems and the "caballito de totora" becomes heavy, so it usually does not last more than a month (Fernandez & Rodriguez 2007, Banak et al. 2004, Pulido & Castro 1998). According to Rostworowski (2014) the fishermen cultivated these plants in coastal lakes, and there are also reports from the XVIIIth century of several hectares of crops of this species in swamps. However, the lakes and swamps dried out (and many disappeared) due to agriculture (change of land use) and lowering of the water table. Nowadays the plant is cultivated in the north of Peru (Hunachaco, Trujillo) in rectangular depressions of various sizes (100-120 m^2) and with a water depth of 1-2 meters, in zones near the beach. The sunken beds were called pukios, wachaques, balsares, or totorales (figure 2b, c). Fragments of rhizomes (20-40 cm) are sown with a separation of 50 cm between them. Then when they take root, the water rises by pressure difference, creating a puddle or artificial lagoon by filtration. The harvest is done after nine to twelve months (before they begin to deteriorate). The plants are cut at water level, dried (for 15-20 days) and classified by size. Since “junco” *Schoenoplectus americanus* competes with *S. californicus*, the beds are weeded. This procedure is repeated for 5 to 7 years, the maximum time to obtain stems tall enough for the boats. Also after 2-3 years (or when needed) the beds are thinned by removing the rhizomes intermittently (Fernandez &

Figure 1: Mochica Culture (200 BCE - 700 CE): a) Iconography of “caballito de totora” with sea animals; b) Flora and fauna of coastal wetlands (Hocquenghem 1989); c) Sculpture of vessel representing person fishing manta rays on totora boat (Larco Museum – Lima, Perú); d) Lambayeque Culture (600 - 1000 CE) bottle whistler with two persons on totora boat (Larco Museum – Lima, Perú)

Rodriguez 2007, Banak et al. 2004; Pulido & Castro 1998). *S. californicus* grows also in Lake Titicaca (3 810 m a.s.l., South of Peru), and is used by the Uros to make the well-known floating islands (figure 3a), their houses, boats, etc.

The islands are made of *Schoenoplectus* roots (2.5 meters height) tied together (figure 3b) using attached stones and ropes as anchors (Fernandez & Rodriguez 2007, Vasileya et al. 2015). Most Uros islands are part of the National Reserve of Titicaca Lake, while the entire lake is a RAMSAR site of international importance (SERNANP, 2018). According to the database of the Peruvian Ministry of Culture, around 650 indigenous or original people lived in 2007 on the floating islands in the Lake.

Figure 2. a) Caballitos de totora. Pimentel (north of Peru), January 2012. Photo: Indira Barrantes. b) and c) Wachaques Photo: Rodríguez (2013) in Rodríguez et al. (2015)

According to Banak et al. (2004) the Uros actively transplant rhizomes along the shore of the lake to ensure adequate supply of the plant. Orlove (1991) reported that *S. californicus* is planted as a community activity or per family. Occasionally, rhizomes of the plant are dug up and planted in the bottom of the lake with long poles, and the cutting of totora is limited to certain months of the year and days of the week in most communities.

In his study of the National Reserve of Titicaca, Escobar (2004) presents an interview that shows how local communities explain the conservation, use and sustainable management of resources:

"*The water and the totora are like a couple, like us, man and woman, like birds, female and male, if one is missing we would be in imbalance, sooner or later failure will come. If the totorales dry, in the absence of water*

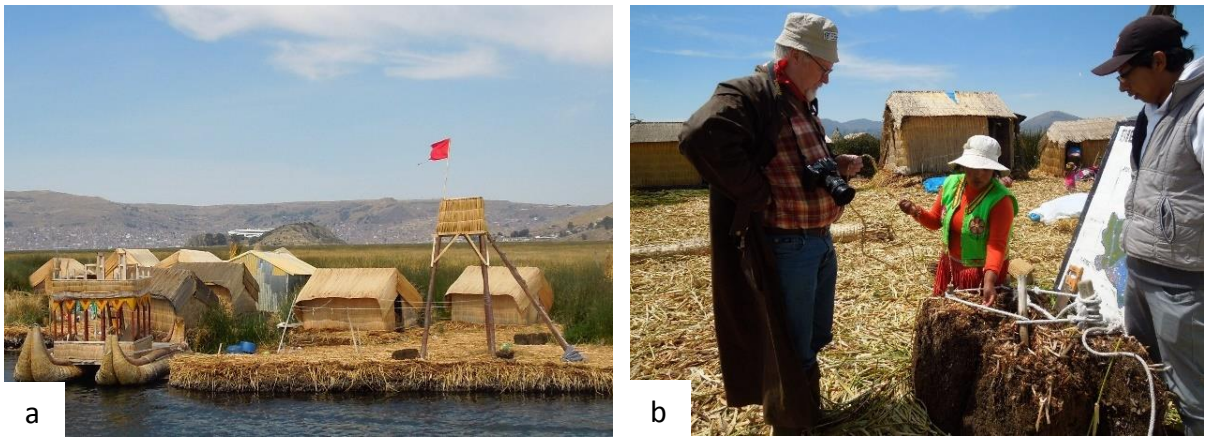


Figure 3 a) One of the Uros floating islands. B) Uros woman explaining how the floating islands are made December 2014. Photos: Mónica Maldonado

they will resist little and without them there won´t be totora, the birds will go to another place to find no place to lay eggs, and we will be in danger ... Nothing is separated for us, we can not live without our lake and we can not leave it, he also needs us, that's why we cut him the mature totora, so that it regenerates and has oxygen for its depths, that is to say let the light penetrate to the roots. This is like changing clothes, the lake and our Pacha mama. Therefore, we belong to this integrated system all we need each other, that's why we can not abandon what is ours nor will we never do it"

Another *Schoenoplectus* species, *S. americanus*, is one of the most used plants of the Peruvian coastal wetlands, thanks to its fibre, which is used in various types of handicrafts (Aponte et al. 2014). According to the artisans, the place (wetland) and time of extraction influence the fiber quality (Aponte et al. 2014). Nevertheless, the artisans just buy the plants, the extraction is done by "junco" rush extractors. Sanchez (2007 in Aponte 2009) mentions that the plant is pulled from the stems by hand leaving the rhizomes in the substrate. This activity is done through the year in 1 ha parcels (letting them rest between 7 and 10 months), avoiding summer (due to pest problems). After the extraction the plants are levelled and dried under the sun (figure 4), with a yield of 1.5 Kg/m^2.

Figure 4: Albufera de Medio Mundo Wetland (central coast of Peru), with "junco" Schoenoplectus americanus *drying on the sand, and an extraction zone. August 2016. Photo: Mónica Maldonado.*

The Peruvian Ministry of Culture (previously the National Institute of Culture-INC) declared as Cultural Heritage of the Nation: the "caballito de totora" (2003); the knowledge and ancestral practices of totora management developed by the Uro (2013); the traditional use of "totora" in the northern coast of the country (2013), including the cultivation, management and use for several activities like fishing, trade, housing construction, crafts, and forage plant. And in 2015, the Ministery also declared the knowledge and practices related to basketry with "junco" and "totora" in the provinces of Huaura, Huaral and Barranca (department of Lima, central coast) as cultural heritage.

The former and present uses of wetlands plants of the genus *Schoenoplectus*, *Typha*, *Phragmite*s and *Arundo* are summarized below:

Schoenoplectus californicus (Cyperaceae) “totora de balsa” is used for making “caballitos de totora” (boats), build floating islands, houses, bridges, mats, walls, containers, partitions, fences, and the manufacture of clothing, string, fans, baskets and rugs known as “petates”, as fertilizer, fuel, and even food since pre-Columbian times. The species is also used in the construction of some roofs (Banack et al. 2004, Fernandez & Rodriguez 2007). *Schoenoplectus americanus* (Cyperaceae) “junco” is used for making handicrafts like baskets, purses and in the manufacture of umbrellas, beds and mattresses (Aponte 2014, Aponte 2009).
Typha dominguensis (Typhaceae) ”totora” was used in the manufacture of mats, baskets, “soguillas” (ropes) and “petates” (mats) and this custom continues unto this day. Currently the pollen is also used in pharmacy, the escapes to make decorative objects and the rhizomes are used as food (Fernandez & Rodriguez 2007). Another utility is its use in waste water treatment (Chafloque & Gómez 2006).
Phragmites australis (Poaceae) “carrizo” is used for making baskets, mats and shrimp trap as already was done in prehistory. This plant is suitable for making musical instruments like “antara” (figure 5b) and “quena”. (Chafloque & Gómez 2006, Sanchez 2012, Rios 2005).
Arundo donax (Poaceae) “carrizo, caña brava” is cultivated because it is useful in the construction of rustic houses (Tovar 1993). The species is also used as lathes, for fishing rods, and in the crafting of wind instruments (Gambichler et al 2004).

Figure 5 a) Several types of baskets made of junco by the Association of Craftswomen Saint Mary of Huacho – Agricultural Fairs (Lima) 2018. b) Antara (Nazca Culture, 900 BCE – 700 CE) Antonini Educational Museum Nazca, 2015. Photos: Mónica Maldonado.

Wetlands and its traditional use in Peru have several threats that if they are not considered, will lead to the disappearance of both the ecosystems and the associated traditional practices. The threats identified were: agricultural, livestock and urban expansion; drainage; periodic burning, that is part of the management in some places and is also done to eliminate pests or to clear the land; invasion of species; pollution due to sewage; urban growth; the loss of traditional knowledge, related with migration and change of economic activities. Also the increase of temperature and the changes in water availability and abundance related with climate change could affect the conditions of the wetlands, changing the composition of the flora communities, etc. (Aponte 2016, Heredia 2014, Aponte & Ramirez 2011, Aponte 2010, Balnak et al 2004, Escobar´2004, Pulido & Castro 1998).

References

Aponte, H. (2010). Flora diversity of Coastal and High Andean Wetlands: Effects of Global Climate Change. Ministry of Agriculture. Caring for Wetlands: A Response to Climate Change. Book of Abstracts World Wetlands Day, 8 (in Spanish)

Aponte, H. (2009). Junco: Classification, biology and management. Scientific Magazine 6 (1), 2009. Scientific University of the South. ISSN: 1997-700X (in Spanish)

Aponte, H., Pérez-Irigoyen P.& Armesto M. (2014). Notes on the use and market ff *Schoenoplectus americanus* "Junco" on the central coast of Perú: Implications for management and conservation. Científica 11 (3), 218-229 (in Spanish).

Aponte, H. & Ramírez, D. W. (2011). Wetlands of the central coast of Peru: structure and menaces of its vegetal communities. Applied Ecology 10(1), 31-39. (in Spanish)

Aponte, H., Ramírez, W., Lértora, G., Vargas, R., Fernando, G., Carazas, N. & Liviac, R. (2016). Fire on wetlands of the central coast of Peru: a common threat? Científica 12(1). (In Spanish)

Banack, S. A., Rondón, X. J., & Diaz-Huamanchumo, W. (2004). Indigenous cultivation and conservation of totora (*Schoenoplectus californicus*, Cyperaceae) in Peru. Economic Botany 58(1), 11

Brako, L. & Zarucchi, J.L. (1993). Catalogue of the Flowering Plants and Gymnosperms of Peru. Missouri Botanical Garden. 1286 pp

Chafloque, W. A. L. & Gómez, E. G. (2006). Diseño de humedales artificiales para el tratamiento de aguas residuales en la UNMSM. Revista del Instituto de Investigación de la Facultad de Ingeniería Geológica, Minera, Metalurgica y Geográfica 9(17), 85-96.

Escobar, F. (2004) Manejo Sustentable de Recursos Naturales de la Reserva Nacional del Titicaca: el caso Jatun Isla de sector Ramis y la Isla Flotante los Uros de sector Puno (Sustainable management of natural resources of the Titicaca National Reserve: the case of Jatun Isla of Ramis sector and the Floating Island of Uros of Puno sector). Thesis for the Master degree in Social Sciences with Mention in Ethnic Studies. Latin American Faculty of Social Sciences (FLACSO) Headquarters Academic Of Ecuador, Quito, 234 pp (in Spanish).

Fernández, A. M. & Rodríguez, E. F. (2007). Fernández, A. M., and E. F. Rodríguez. 2007. Etnobotánica del Perú Pre-hispano. Ediciones Herbarium Truxillense (HUT), Universidad Nacional de Trujillo, Trujillo, Peru.

Gambichler, T., Boms, S. & Freitag, M. (2004). Contact dermatitis and other skin conditions in instrumental musicians. BMC Dermatology 4(1), 3.

Heredia, F. G. (2014). Resignification of the Totora, through the design and innovation of techniques, uses and forms. Catholic University of Córdoba. Faculty of Architecture. (in Spanish)

Hocquenghem, M. (1989). Mochica Iconography. Third Edition. Pontifical Catholic University of Peru, Lima. 279 pp. (in Spanish)

Larco Museum. On line collection. On line at: https://www.museolarco.org/coleccion/#catalogoenlinea Accessed on 7 of October 2018

León, B. & Young, K. (1996). Aquatic plants of Perú: diversity, distribution and conservation. Biodiversity and Conservation 5: 1169-1190.

Rostworowski, M. (2014). Prehispanic Peruvian Coast. Complete Works III. Series: Andean History, 26. IEP Institute of Peruvian Studies. Lima 376 pp. (in Spanish)

Sánchez, C. (2012). Origins and evidences of the first Pan flutes in Peru. Haylli Bulletin N ° 19, July. University Center of Folklore. UNMSM. Lima (in Spanish)

Pulido, V. & Castro, G. (1998). Experiencias de Manejo Participativo en El Balsar de Huanchaco. Reporte Humedales 1992-1997. Program for the Conservation and Sustainable Development of Wetlands Lima, pp. 111-123 (in Spanish).

Peruvian Ministry of Culture. Data base of indigenous or original people. Online at: http://bdpi.cultura.gob.pe/node/22 Accessed on 6 October 2018.

Peruvian Ministry of Culture. Declarations of Expressions of the Intangible Cultural Heritage as Cultural Patrimony of the Nation. Online at: http://administrativos.cultura.gob.pe/intranet/dpcn/consulta.jsp Accessed on 6 October 2018.

Orlove, B. S. (1991). Mapping reeds and reading maps: the politics of representation in Lake Titicaca. American Ethnologist 18(1), 3–38.

Ríos S. (2005). The art of weaving from vegetal fiber: The basketry of Santa Rosa of Chontay. In: Handycrafts of America. Inter-American Center of Handycrafts and Popular Arts, CIDAP. N ° 59-60, Cuenca. (in Spanish)

SERNANP (National Service of Natural Protected Areas). Del Titicaca. Online at http://www.sernanp.gob.pe/del-titicaca Accessed on 6 October 2018.

Tovar, O. (1993). Las Gramíneas (Poaceae) del Perú. Royal Botanical Garden of Madrid, Madrid, 480 pp (in Spanish)

Tropicos.org. Missouri Botanical Garden. 24 Sep 2018 http://www.tropicos.org

Rodríguez, E.F.R., Licera, K.M., Torres, B.M., Trujillo, V.L., Horna, M.M., Luis, B.S., Velásquez, L.P., Izquierdo, E.A. & Costilla, M.M. (2015). Comunidades vegetales del Complejo Arqueológico Chan Chan, provincia Trujillo, región La Libertad, Perú (Plant communities of Chan Chan Archaeological Complex, province Trujillo, region La Libertad, Peru). Arnaldoa 22 (1), 119 – 138. (in Spanish)

Vasilyeva, D., Martinez, V., Londra, L. & Prisco, S. (2015). TUYUYAÑA floating community centre for Los Uros. Puno, Peru.

Briefing Paper on the role of peatlands in the 2021 European Union's Common Agriculture Policy (CAP)

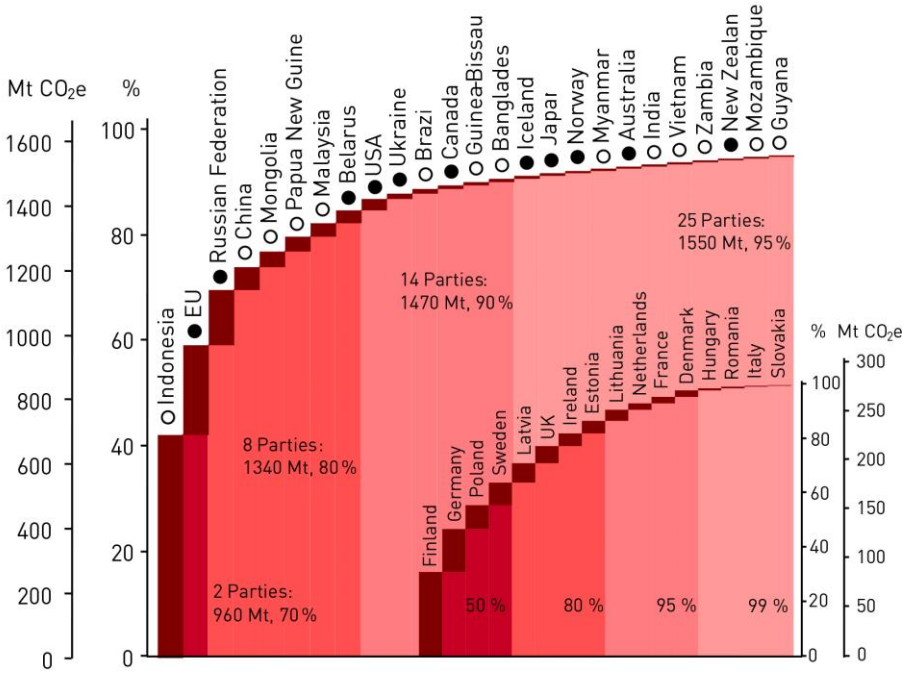
Compiled by the Greifswald Mire Centre, June 2018

Peatland utilisation: An interplay of agricultural and climate policies

Peatlands are lands with a peat layer at the surface. Peat accumulates when soil is permanently waterlogged and died-off plant remains do not completely decompose. It contains a large proportion of organic carbon. Over centuries, peatlands have been drained for agriculture, forestry and peat extraction. The negative consequences of this use become more and more obvious. Drainage allows oxygen to enter the soil, leading to microbial decomposition of the peat and thereby to emission of substantial amounts of CO_2 and N_2O. Further negative consequences of drainage are mobilisation and discharge of nutrients to ground- and surface water, and soil subsidence (1-2 cm yearly) which results in increasing drainage costs, higher flooding risks and - ultimately - to loss of productive land.

Peatlands and organic soils in the European Union:

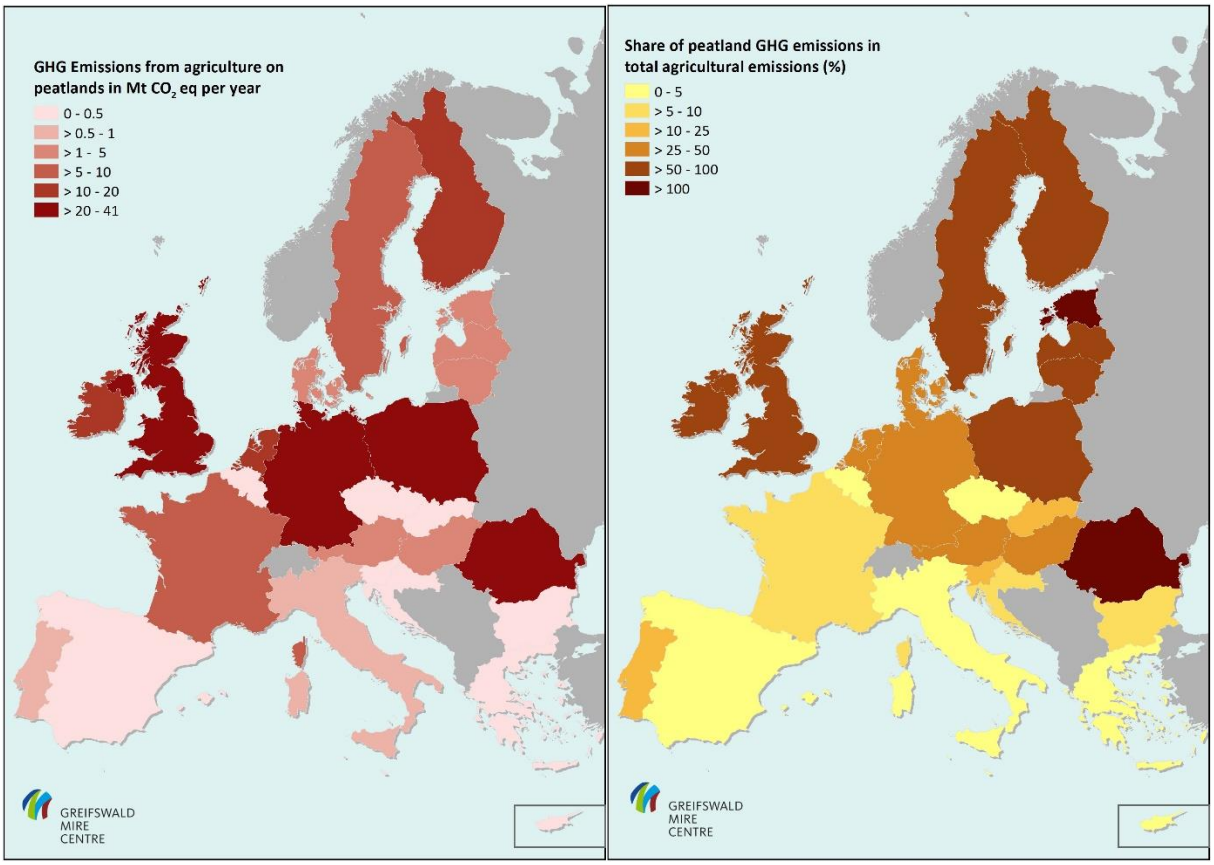
- The **EU is globally the second largest emitter of** greenhouse gases from drained peatlands (270 Mt CO_2eq./year = 17 % of total global peatland emissions).
- **Finland is the largest emitter in the EU**, followed by Germany, Poland, Sweden, Great Britain, Ireland and the Baltic states.
- **99 % of the EU emissions** are caused by **16 out of 28 EU member states.**



Key countries with respect to emissions from drained organic soils. Graph shows the amount of GHG emissions in a cumulative way in Mt CO_2 eq. per year and as percentage of the total emissions from degrading peatlands. Emissions are shown for the 25 Parties to the UNFCCC responsible for 95% of the emissions. White dots denote non-Annex 1 Parties, black dots Annex 1 Parties. The inset depicts the relative contributions of the 16 key EU countries. (Wetlands International 2015).

These problems can largely be solved by rewetting. In the long term, a complete cessation of peatland drainage is unavoidable if we want to reach the core goal of the Paris Agreement, which implies zero net emissions by 2050. The EU and all its Member States have unanimously affirmed this goal. However, rewetting makes conventional land use impossible. If we want to continue productive land use on rewetted peatlands, a paradigm shift is required involving new concepts, crops and techniques as well as adjustment of the current agricultural policy framework. Appropriate climate policy measures, especially in the frame of the Common

Agricultural Policy (CAP), must enable the land use sector (agriculture and LULUCF[5]) to minimize its emissions. The EU Commission (2017) has declared environmental protection and the fight against climate change as the greatest challenges of the future CAP. This paper demonstrates how wisely adjusted peatland management can achieve low-emission goals and further benefits for farmers, the economy, society and the environment.



Left: Greenhouse gas emissions from agriculture on peatlands in the EU Member States[6]. Right: Their share in the total agricultural emissions[7]

Paludiculture as low-emission land use alternative for peatlands

In contrast to drainage-based agriculture, paludiculture[8] cultivates crops that are adapted to high water levels, such as reed, cattail and peat mosses. Using a variety of established techniques, the biomass can be processed to insulation and construction materials, growing media and bio-refinery products as well as to fodder and fuel. Innovative products, including medical and food products, are under development. Large-scale implementation, however, requires agricultural policies to set explicit incentives.

Peatlands (and paludiculture) in the current CAP

Within the 1st and 2nd pillar of CAP, financial support is provided for drainage-based peatland use without any restrictions. In this way, public money supports land use that causes high societal costs and counteracts European and national goals with respect to climate change mitigation (National Determined Contributions, Climate Action Plans), water protection (Water Framework Directive) and biodiversity conservation (EU Biodiversity Strategy, Natura 2000). In Germany, drained peatland agriculture annually causes € 2.8 – 8.6 billion worth of climate damage (UBA 2012) and receives € 300 Million of subsidies in the form of CAP direct

[5] LULUCF for ‚Land use, land use change and forestry'

[6] Data compiled by the Global Peatland Database at Greifswald Mire Centre. Area data of drained peatlands and organic soils mainly taken from National Inventory Reports 2017 and Joosten et al. 2017, completed with data from soil and peatland science and own estimates based on the evaluation of satellite images. Emission factors after IPCC 2014 (incl. CO_2, N_2O, CH_4 and DOC).

[7] Data on total agricultural emissions as reported in the National Inventory Reports 2017 (Sectors Agriculture, LULUCF - Cropland and Grassland); data on peatland emissions, see A. Mind that values may exceed 100% when countries do not adequately report emissions from peatlands.

[8] Paludiculture is defined as productive land use of wet peatlands that stops subsidence and minimizes emissions (Wichtmann et al. 2016).

payments. This damage is hitherto accepted and encouraged, although the agronomic benefit of drained peatland use is in many cases so low that cultivation is only economically viable by high public payments.
In contrast, the present CAP discriminates against paludicultures, because many species suitable for cultivation on wet or rewetted peatlands (reed, cattail, peat mosses,…) are currently not eligible for payments within the 1st pillar of the CAP (Kölsch et al. 2016). Furthermore, Greening requirements for the preservation of permanent grassland hinder establishment of paludiculture crops on currently deeply drained grasslands on peat (Czybulka & Kölsch 2016).

Future incentives for low-emission peatland use

It is high time to set the course towards a comprehensive low-emission peatland management strategy, which guides peatland farmers and peatland-rich regions towards an economically, ecologically and socially sustainable future. Similar to large-scale drainage and reclamation of peatlands in the past, clear political targets and effective economic incentives are needed to bring about the necessary paradigm shift. Implementation will require regional flexibility and creativity in order to develop custom-made solutions and transition scenarios jointly with all stakeholders.
According to the Commission's proposals (EU Commission 2017, 2018) this means that the future CAP will set **specific targets for emission reduction in agriculture** and that peatland-rich Member States obtain flexibility to reach the desired outcomes by **incorporating peatlands and paludiculture into their national CAP strategies**. The Commission proposes a system of **conditionality**, including a standard for good agricultural and ecological conditions called **'Appropriate protection of wetland and peatland' (GAEC 2)**.
The protection of carbon-rich soils can only be achieved by installing high water levels and should explicitly include all currently drained organic soils. Member States should therefore use national regulations to define good practice guidelines for the management of peatlands. Additionally, they can specifically support sustainable land use alternatives on peatlands with **environmental and climate programmes within both CAP pillars**. However, as the EU Commission and EU auditing bodies demand (cf. European Court of Auditors 2016), support has to be linked to specific results, i.e. verified emission reductions. Therefore, a **GHG emission audit and effective monitoring** have to be established. The German Scientific Advisory Board on Agricultural Policy, Food and Consumer Health Protection (WBAE) even suggests the establishment of a separate EU policy sector funding GHG emission reductions from peatlands through tendering (WBAE 2018). By keeping peatlands in productive use, paludiculture projects will deliver lower mitigation costs compared to rewetting without further utilisation. Sufficient **earmarked funds** have to be provided to finance climate programmes.
The CAP framework is in general suitable for realising an EU-wide realignment of peatland agriculture and supplying (co-)funding for reaching the goals. Additional support may come from the European Regional Development Fund (ERDF) (cf. funding directives in Bavaria[9] and Lower Saxony[10], planned funding directive in Brandenburg, Germany). A combination of the following actions can pave the way towards low-emission peatland utilisation (Wichmann 2018):

- **Phasing-out CAP funding for drainage-based peatland utilisation** (direct payments, agri-environment-climate schemes, investment promotion for drainage systems etc.) in order to create coherence between agricultural and climate policies and to underline the necessary paradigm shift for reaching the climate protection goals under international law;
- Guaranteed **eligibility of paludicultures for 1st and 2nd CAP pillar payments**;
- **Remuneration of ecosystem services**: Providing attractive incentives for reducing GHG emissions and for supplying other ecosystem services (e.g. nutrient retention);
- **Establishment of long-term programmes** (15-20 years) to ensure planning security and permanence of positive climate and environmental effects;
- **Application and refinement of existing instruments** (e.g. EAFRD, ERDF) to provide incentives for all implementation steps, including site preparation, establishment of suitable crops and techniques, raising the water level, selection and breeding, management and harvest with adapted agricultural equipment, processing and marketing;

[9] http://www.stmuv.bayern.de/themen/naturschutz/foerderung/efre.htm
[10] Klimaschutz durch Moorentwicklung https://www.klimaschutz-niedersachsen.de/_Resources/Persistent/da7070a86b48a9853a1a5126d3cb77cf250d8add/Richtlinie%20Klimaschutz%20durch%20Moorentwicklung.pdf

- **Promotion of knowledge transfer**, consultation and establishment of demonstration farms;
- **Support for land consolidation and co-operation** for implementation on the landscape scale;
- **Exchange of experience between peatland-rich regions** in Europe to develop regionally customised solutions, including participation and acceptance of all stakeholders, output orientation and cost-efficiency.

Paludiculture as win-win-option

Paludiculture, supported by existing and adapted agricultural policy measures, will provide win-win-options for various sectors of society:

- **Agriculture**: New income opportunities on marginal organic soils, soil protection, better social image, climate adaptation (reduction of risks of crop failures after heavy rains, floods or droughts);
- **Society**: Securing and creating employment in rural areas, regional recreation and tourism, identity, reduction of economic collateral damage caused by drainage;
- **Economy**: Substitution of fossil resources (energy sources, mineral oil-based construction material, peat in horticulture) by renewable biomass materials from wet peatlands, bio-economy, sustainable food and fodder production;
- **Environment**: Climate, water and biodiversity protection with comparatively low costs, support of wide-ranging ecosystem services.

References

Czybulka, D. & Kölsch, L. (2016): The legal framework. In: Wichtmann, W., Schröder, C. & Joosten, H. (eds.): Paludiculture – productive use of wet peatlands. Schweizerbart, Stuttgart. pp. 143-149.

EU Commission (2017): Communication of the EU Commission: The Future of Food and Farming (COM (2017) 713 final). Brussels.

EU Commission (2018): Proposal for a Regulation of the European Parliament and of the Council establishing rules on support for strategic plans to be drawn up by Member States under the Common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulation (EU) No 1305/2013 of the European Parliament and of the Council and Regulation (EU) No 1307/2013 of the European Parliament and of the Council (COM (2018) 392 final). Brussels.

European Court of Auditors (2016): Spending at least one euro in every five from the EU budget on climate action: ambitious work underway, but at serious risk of falling short - Special Report No. 31. Luxemburg.

IPCC (2014): 2013 Supplement to the 2006 IPCC guidelines for national greenhouse gas inventories: Wetlands. Hiraishi, T., Krug, T., Tanabe, K., Srivastava, N., Baasansuren, J., Fukuda, M. & Troxler, T.G. (eds). Geneva.

Joosten, H., Tanneberger, F. & Moen, A. (eds.) (2017): Mires and peatlands of Europe - Status, distribution and conservation. Schweizerbart, Stuttgart.

Kölsch, L., Witzel, S., Czybulka, D. & Fock, T. (2016): Agricultural policy. In: Wichtmann, W., Schröder, C. & Joosten, H. (eds.): Paludiculture – productive use of wet peatlands. Schweizerbart, Stuttgart. Pp. 146-152.

UBA (Umweltbundesamt) (2012): Methodological Convention 2.0 for Estimates of Environmental Costs. Dessau.

Roßkopf, N., Fell, H. & Zeitz, J. (2015): Organic soils in Germany, their distribution and carbon stocks. Catena 133: 157–170.

Wetlands International (2015): Briefing paper: accelerating action to Save Peat for Less Heat! Ede. accessible at: https://www.wetlands.org/publications/briefing-paper-accelerating-action-to-save-peat-for-less-heat/

WBAE (Wissenschaftlicher Beirat für Agrarpolitik, Ernährung und gesundheitlichen Verbraucherschutz beim BMEL) (2018): Für eine gemeinwohlorientierte Gemeinsame Agrarpolitik der EU nach 2020: Grundsatzfragen und Empfehlungen. Stellungnahme. Berlin.

Wichmann, S. (2018): Economic incentives for climate smart agriculture on peatlands in the EU. University of Greifswald, Partner in the Greifswald Mire Centre. Report, 38 p. http://incentives.paludiculture.com

Wichtmann, W., Schröder, C. & Joosten, H. (eds.) (2016): Paludiculture – productive use of wet peatlands. Climate protection – biodiversity – regional economic benefits. Schweizerbart, Stuttgart, 272 p.

The Greifswald Mire Centre is a cooperation between the University of Greifswald, Michael Succow Foundation and DUENE e.V.. Over 50 peatland experts of various disciplines are working at the interface between science, policy and practice. We analyse the climate effect of peatlands, study and advise on peatland rewetting and paludiculture, and develop innovative instruments and methodologies for climate action on peatlands.

Contact: Greifswald Mire Centre
Ellernholzstr. 1/3
D-17489 Greifswald, Germany
URL: www.greifswaldmoor.de
E-Mail: info@greifswaldmoor.de
Twitter: @greifswaldmoor

UNIVERSITÄT GREIFSWALD
Wissen lockt. Seit 1456

Succow Stiftung

DUENE e.V.
am Institut für Botanik und Landschaftsökologie

Peatland news

Global

Ramsar Convention COP13, 22-29 October 2018, Dubai

The thirteenth meeting of the Conference of the Parties to the Ramsar Convention on Wetlands (COP13) was held from 22-29 October 2018, in Dubai, United Arab Emirates, under the theme "Wetlands for a Sustainable Urban Future." Over 1360 participants representing 143 of the 170 parties to the Convention, as well as the International Organization Partners (IOPs) of the Ramsar Convention, UN agencies, intergovernmental organizations and non-governmental organizations attended the meeting.

COP13 adopted 25 resolutions, including on adding Arabic as the fourth Convention language; gender; peatlands; blue carbon ecosystems; sustainable urbanization; agriculture: intertidal wetlands; wetlands in West Asia; and Arctic and sub-Arctic wetlands. The release of the Global Wetland Outlook provided a touchstone for discussions on challenges ahead to ensure the conservation and wise use of wetlands. In this contribution we present the discussions and decisions directly relating to peatlands.

Delegates from Canada, the EU (incl. Mires and Peat Editorial Board member Stephan Glatzel), Kenya, the Philippines, and the US consulting on the resolution on intertidal wetlands. Photo: IISD/ENB | Francis Dejon

The Convention on Wetlands of International Importance (the Ramsar Convention) was signed in Ramsar, Iran, on 2 February 1971, and entered into force on 21 December 1975. The Convention provides a framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

Originally emphasizing conservation and wise use of habitat for waterbirds, the Convention subsequently broadened its scope, recognizing the importance of wetlands as ecosystems that contribute to both biodiversity conservation and human well-being. Wetlands cover an estimated 6% of the Earth's land surface, and contribute significantly to the global economy in terms of water supply, fisheries, agriculture, forestry, and

tourism. The Convention currently has 170 parties. A total of 2,326 wetland sites, covering nearly 250 million hectares, are included in the Ramsar List of Wetlands of International Importance (Ramsar Sites). The Ramsar List includes the Montreux Record, which is a register of wetland sites where changes in ecological character have occurred, are occurring, or are likely to occur as a result of technological developments, pollution, or other human interference.

Parties commit themselves to:

- designate at least one site that meets the Ramsar criteria for inclusion in the Ramsar List and ensure maintenance of each site's ecological character;
- include wetland conservation within national land-use planning to promote the wise use of all wetlands within their territory;
- establish nature reserves on wetlands and promote training in research and management; and
- consult with other parties about Convention implementation, especially regarding transboundary wetlands, shared water systems, shared species, and development projects affecting wetlands.

Contracting parties meet every three years. In addition to the COP, the Convention's work is supported by a Standing Committee (SC), a Scientific and Technical Review Panel (STRP), and the Ramsar Bureau, which carries out the functions of a Secretariat.

Global Wetland Outlook: On Tuesday, 23 October, Secretary General Rojas Urrego introduced the GWO, noting it is the first global report on the status of wetlands and the services they provide. STRP Chair Gardner and STRP Scientific Expert Max Finlayson (Australia) presented the GWO, focusing on the process of development, context, status and trends, drivers, responses, and next steps.

They emphasized that:

- accuracy of global wetland area data is increasing;
- natural wetlands have declined and artificial wetlands have increased, noting that 35% of wetlands sites with available information have been lost since 1970;
- the populations of many wetland dependent species are declining and different taxa groups are highly threatened, with a quarter of animal and plant species at risk of extinction;
- water quality trends are mainly negative; and
- wetlands play a critical role in providing valuable ecosystem services.

The Global Wetland Outlook - Status and Trends 2018

The new Global Wetland Outlook of the Ramsar Convention provides a current overview of global wetlands: their extent, trends, drivers of change and the responses needed to reverse the historical decline in wetland area and quality. Wetlands provide us with water, they protect us from floods, droughts and other disasters, they provide food and livelihoods to millions of people, they support rich biodiversity, and they store more carbon than any other ecosystem. Yet, the value of wetlands remains largely unrecognized by policy and decision makers. Up to 87% of the global wetland resource has been lost since 1700. We lose wetlands three time faster than natural forests.Wetland-dependent species are in serious decline. Since 1970, declines have affected 81% of inland wetland species populations and 36% of coastal and marine species. The loss of wetlands continues with direct and measurable negative impacts on the quality and availability of water, food security, biodiversity and carbon sequestration. Healthy, functioning wetlands are essential to delivering a range of global targets, including the UN Sustainable Development Goals, the Aichi biodiversity targets, the Paris Agreement on Climate Change and Land Degradation Neutrality. The purpose of the Global Wetlands Outlook is to increase understanding of the value of wetlands and provide recommendations to ensure that wetlands are conserved, wisely used and their benefits recognized and valued by all. Find out more

- https://www.devdiscourse.com/Article/science-environment/196771-world-losing-wetlands-at-alarming-speed-amid-urbanization-shifts
- https://phys.org/news/2018-09-wetlands-faster-forests.html

They further highlighted major direct and indirect drivers of change, as well as megatrends, and offered insights on the way forward, including potential responses related to institutions and governance, management, investment, and knowledge. They specifically called for:

- enhancing the network of Ramsar Sites, noting that half of them lack a management plan;

- integrating wetlands into 2030 Agenda for Sustainable Development;
- strengthening legal and policy arrangements; and
- applying economic and financial incentives.

Plenary began work on 26 draft **resolutions** on Wednesday, 24 October. One draft resolution was withdrawn and two on governance were combined, with all resolutions adopted by consensus.

World Wetlands Day: On Wednesday, the United Arab Emirates (UAE) introduced the draft resolution on World Wetlands Day (COP13 Doc.18.9), noting that the annual celebration of wetlands on 2 February supports efforts focusing on wetlands conservation. Many supported the draft resolution, noting that official recognition by the UN General Assembly (UNGA) will increase the visibility of the Ramsar Convention, help raise public awareness of wetlands conservation, and strengthen synergies with other Multilateral Environmental Agreements (MEAs). The UAE suggested he will work with the Secretariat and others to submit the draft resolution to the UNGA.

In the final resolution (COP13 Doc.18.9) the COP welcomes the celebration of World Wetlands Day in a growing number of countries and invites the UNGA to recognize 2 February, the date of adoption of the Ramsar Convention, as World Wetlands Day. The COP further invites parties and others to facilitate cooperation and information exchange in support of 2 February as World Wetlands Day.

Guidance on Identifying Peatlands as Ramsar Sites for Global Climate Change Regulation: On Thursday, STRP member Lars Dinesen (Denmark) presented the draft resolution (COP13 Doc.18.13), noting that the document: has incorporated comments by the SC; includes in Annex 1 revised guidelines for identifying and designating peatlands; and flags peatlands' importance as carbon sinks. Germany for the EU, South Africa for the African Group, Uruguay, Costa Rica, Malaysia, Ecuador, the Philippines, and others supported the draft resolution. Belarus, Uruguay, Malaysia, the Philippines, and Ecuador outlined national and regional efforts to address peatland degradation. The African Group stressed the need to address peatland under-representation in Ramsar Sites, drawing attention to peatlands in semi-arid areas that are dependent on groundwater flows. The EU highlighted the revised guidelines for peatland identification and designation. Belarus called for including quantitative and qualitative criteria to characterize peatlands as degraded. Canada requested deletion of a paragraph recognizing that permafrost loss and overgrazing may act as significant factors of peatland degradation, noting they link two separate items on land-use change and consequences of human activities. The US offered suggestions to avoid prescriptive language and streamline the focus on peatlands. The Philippines called for ensuring available funding, and supported the establishment of regional and global peatland inventories to assist monitoring and assessment, and formation of regional strategies. Colombia emphasized the importance of placing the discussion within the climate change framework and analyzing the provision of ecosystem services. Bolivia expressed concern about focusing solely on peatland carbon sequestration capacity, suggesting an integrated approach that examines the potential of peatlands to increase resilience of socio-economic systems. The China Biodiversity Conservation and Green Development Foundation underscored the need to recognize the importance of peatlands in Southeast Asia and tropical peatlands. An informal working group met to resolve differences, and a revised draft resolution was adopted on Sunday, with minor amendments.

In the final resolution (COP13 Doc.18.13 Rev.1) the COP, *inter alia*:

- adopts the revised guidelines for identifying and designating peatlands, found in Annex 1 to the resolution;
- urges parties to use the revised guidelines in their consideration of potential peatland Ramsar Sites, as appropriate; and
- encourages parties to use all available methods, including remote sensing, to help identify sites, as appropriate.

The resolution has two annexes. Annex 1 contains revised guidelines for identifying and designating peatlands, which replace and supersede Appendix E2 of the Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance, revised in 2012, as adopted by Resolution XI.8. Annex 2 contains a case study of designation of a peatland as a Ramsar Site using climate mitigation relevance as an additional argument, using the example of Lille Vildmose, Denmark.

Ramsar Convention Briefing Note 9 'Guidelines for inventories of tropical peatlands to facilitate their designation as Ramsar Sites' is available on the Ramsar website in English, French and Spanish: https://www.ramsar.org/document/briefing-note-9-guidelines-for-inventories-of-tropical-peatlands-to-facilitate-their.

Lille Vildmose, Denmark. Photo: Tobias Dahms.

Restoration of Degraded Peatlands: On Thursday, plenary considered the draft resolution on the restoration of degraded peatlands to mitigate and adapt to climate change and enhance biodiversity (COP13 Doc.18.14). Germany, for the EU, and South Africa, for the African Group, along with Belarus and Mongolia, supported the draft resolution. The EU also proposed adding "reduce disaster risks" to the title of the draft resolution, noting that an important but neglected function of wetlands is water retention. The African Group called for including references to peatlands in semi-arid regions, not just those in temperate and tropical climates. Belarus suggested including a paragraph encouraging parties to develop or improve national legislation on peatland conservation, protection, and restoration. Canada said requesting the STRP to develop appropriate guidance on integrating peatland restoration projects into NDCs is outside the scope of the Convention. The US noted that the STRP will review all requests made to it by the COP, to ensure they are within its purview. New Zealand suggested inviting parties to consider how peatland restoration and conservation could contribute to implementing NDCs, rather than encouraging or urging parties to include peatlands in their NDCs.

On Sunday, plenary took up the revised draft resolution (COP13 Doc.18.14 Rev.1). Austria reported that all parties had reached consensus on the revised draft, subject to several amendments, including adding several references to climate change adaptation. The draft resolution was approved as amended.

In the final resolution (COP13 Doc.18.14 Rev.1) the COP, *inter alia*:

- urges parties to report, in their national reports, on progress regarding implementation of Resolutions VIII.17 (guidelines for global action on peatlands) and XII.11 (peatlands, climate change, and wise use);
- invites parties with peatlands to engage in the Global Peatlands Initiative;
- requests the STRP to consider further elaborating on practical experiences of restoration methods for peatland types not yet covered by Ramsar guidance;
- requests the STRP, in developing its proposed workplan for presentation at SC57, to consider making an assessment of the status of implementation of Resolution VIII.17, elaborating on the practical experiences of restoration methods based on the integrated approach to ecosystem restoration, developing guidance for the cost-benefit analysis, cost-effectiveness analysis, and multiple criteria analysis of peatland restoration projects, and developing templates for reporting on peatland restoration;
- invites parties to provide peat-related information and case studies for inclusion in such guidance, and to disseminate outputs, and to report progress at COP14; and
- invites parties to consider options for developing and applying positive incentives to foster peatland restoration and conservation and to phase out incentives harmful to peatlands.

In addition, the COP encourages parties to:

- develop or improve legislation on restoration and rewetting of degraded peatlands, as well as on the protection and sustainable use of peatlands in general;
- conserve existing peatlands and to restore degraded peatlands in their territory;
- contribute to a compilation of experiences on peatland restoration and rewetting methods;

- consider stimulating the shift from drainage-based peatland agriculture and forestry, to rewetting followed by paludiculture (wet agriculture and forestry on peatlands) when identified as the best management option, and away from non-sustainable uses of peatlands, such as overgrazing and construction;
- seek to ensure that rewetting and paludiculture can take place where paludiculture is considered to be the best land use for climate change mitigation and adaptation, and restoration where biodiversity values are not compromised, taking into account the peatland type, the site's present ecological status and the ecological potential after rewetting;
- foster collaboration and synergies among MEAs and to support an initiative to develop a joint declaration of MEAs with respect to peatland conservation, restoration, and wise use; and
- as appropriate within their national circumstances, pursue peatland conservation and/or restoration measures that reduce anthropogenic emissions and increase removals, as a way, *inter alia,* to contribute to their NDCs.

L-R: Jonathan Barzdo, Ramsar Deputy Secretary General; Martha Rojas Urrego, Ramsar Secretary General; COP13 Alternate President Mohamed Saif Al Afkham; Marwa Al Amiri, UAE; and COP13 Vice President Kristiina Niikkonen, Finland. In the background on the screen right: Michael Steiner, delegate of Austria and IMCG founding and honorary member. Photo: IISD/ENB | Francis Dejon

Promoting Conservation, Restoration and Sustainable Management of Coastal Blue Carbon Ecosystems: On Thursday, Australia introduced the draft resolution on promoting conservation, restoration, and sustainable management of coastal blue carbon ecosystems (COP13 Doc.18.15). Algeria, for the African Group, along with Canada, Costa Rica, Malaysia, UAE, US, New Zealand, Philippines, Fiji, Republic of Korea, Indonesia, Belgium, Bahrain, and the Food and Agriculture Organization of the United Nations (FAO) supported the draft resolution. Austria, for the EU, welcomed the draft resolution but expressed doubt as to whether its "comprehensive" suggested tasks could all be dealt with due to limited resources. Brazil, supported by Argentina and Bolivia, opposed the resolution, saying it has implications for the negotiations on the Paris rulebook and therefore interferes with the UNFCCC's mandate. She emphasized, with Venezuela and Cuba, that wetlands should be protected, not turned into potential commodities, and said financing approaches that have environmental integrity already exist. China called for more research and policymaking on blue carbon, and more support for CEPA, in particular to developing countries. South Africa noted that freshwater abstraction, development pressures, and poor water quality are negatively affecting blue carbon ecosystems, in addition to dredging and land reclamation. Malaysia expressed concern that the UNFCCC has not yet approved a methodology for blue carbon. The Dominican Republic opposed using the term "blue carbon," and noted that many of these

ecosystems are already subject to restoration and protection under existing initiatives. Venezuela, Cuba, Colombia, and Uruguay noted that the term "blue carbon" has not yet been defined multilaterally. Uruguay proposed using the term "coastal zones" instead. Bolivia and Cuba stressed the need to include adaptation, not just mitigation, in the draft resolution. Belgium queried whether estuaries fall under the definition of blue carbon ecosystems. Peru underscored that the Convention aims to treat wetlands as ecosystems, not as individual components, whereas this draft resolution singles out carbon as one component of one type of wetland. A contact group met on Friday and Sunday to discuss COP13 Doc.18.15 Rev.1. A further revised version (COP13 Doc.18.15 Rev.2) was then prepared.

On Sunday, the Czech Republic, in a paragraph that notes concern about the adverse impacts of agriculture, requested an amendment to instead note concern that the expansion of agriculture does not often include land use planning processes that incorporate evaluations of local soil, hydrology, and climatic conditions to assess how to maximize productivity while maintaining landscape functionality and species diversity.

Regarding a paragraph encouraging parties to review and, if appropriate, improve their respective programmes and policies to support of agricultural production, the US, opposed by New Zealand, called for deleting specific reference to funding policies. Mexico said the paragraph should encourage parties to review their subsidy programmes to include sustainability criteria. Ecuador, supported by New Zealand and Colombia, highlighted that the text should refer to sustainable traditional practices, noting that many traditional practices are not sustainable. Brazil called to list several other key drivers of wetland loss and degradation, in addition to agriculture.

Through further informal discussions delegates reached consensus. In plenary on Monday, delegates considered the revised draft resolution (COP13 Inf.10) for adoption. The COP approved the resolution, subject to an amendment from Ecuador to include a footnote in the Spanish translation referring to the definition of agriculture set by the FAO.

In the final resolution (COP13 Inf.10) COP13 encourages parties with coastal blue carbon ecosystems in their territories to, *inter alia*:

- analyze data (including from citizen science and indigenous knowledge), map these ecosystems, and make this information publicly accessible with a view to, *inter alia*, estimating the carbon storage and fluxes of their coastal wetlands, and updating their national greenhouse gas inventories to better reflect data for wetlands;
- facilitate information sharing, among Ramsar Sites and other wetland sites with coastal blue carbon ecosystems, on the values and benefits of these ecosystems;
- apply the STRP's developed or updated guidance to prioritize coastal blue carbon ecosystems and develop and implement plans for conservation, restoration, and sustainable management of these ecosystems, as appropriate; and
- maintain and restore coastal blue carbon ecosystems alongside coastal infrastructure to avoid, minimize, and mitigate impacts which detrimentally affect these ecosystems and lead to significant greenhouse gas emissions and reductions in ecosystem services.

In addition, the COP requests the Secretariat to, *inter alia*:

- survey interested contracting parties to determine their requirements in relation to managing coastal blue carbon ecosystems; and
- facilitate capacity building for interested contracted parties to apply the guidance under the UNFCCC and the Paris Agreement, implement policies on conservation and sustainable use of these ecosystems, and promote the establishment of regional training courses aimed to enhance knowledge and capacities of parties and to promote regional cooperation.

The COP also requests the STRP to consider continuing its work on climate change and wetlands, including coastal blue carbon ecosystems, as a high priority, consistent with the relevant Intergovernmental Panel on Climate Change (IPCC) guidelines, including by:

- undertaking a desktop study of coastal blue carbon ecosystems across the Ramsar Sites of those parties that express their interest in participating;
- reviewing and analyzing regional modelling of carbon stocks, greenhouse gas emissions, and carbon dynamics in coastal blue carbon ecosystems and providing information, as appropriate, to the IPCC to inform future updates to the IPCC Wetlands Supplement;
- developing guidance for prioritizing coastal blue carbon ecosystems for conservation and restoration; and

- reviewing and, as appropriate, updating existing guidance on the preparation of plans for conservation, restoration, and sustainable management of coastal blue carbon ecosystems at Ramsar Sites.

The resolution contains a footnote stating that not all parties endorse the resolution's definition of blue carbon – "The carbon captured by living organisms in coastal (e.g., mangroves, saltmarshes and seagrasses) and marine ecosystems and stored in biomass and sediments" – nor recognize the Convention as the competent forum to address mitigation reporting and accounting arrangements.

Blue carbon is often also brown carbon, like these mangroves on peat in Cuba. Photo: Hans Joosten.

Agriculture in Wetlands: On Friday, the Czech Republic introduced the draft resolution on agriculture in wetlands (COP13 Doc.18.21). He noted that many wetlands have been drained for agriculture, and emphasized the need to acknowledge the connections between wetlands, agriculture, biodiversity, climate change, and extreme weather events such as floods.

Many supported the draft resolution. Argentina, supported by Brazil and Chile, said the emphasis placed on agriculture is excessive, stressing the importance of looking at all activities that impact on wetlands, and urged using language that covers certain inadequate practices, rather than agriculture as a whole. Brazil and Panama called for the recognition of sustainable agriculture in wetlands. Indonesia highlighted that the potential of paludiculture should be recognized in the draft resolution. Myanmar, on a paragraph requesting the STRP to provide data on and an overview of the extent of intact wetlands and those damaged and destroyed since the 1970s, said this duplicates an existing priority task for the STRP over the next triennium. The Netherlands, on behalf of the EU, stressed the need to strengthen CEPA activities in local communities. The Dominican Republic suggested adding acknowledgement that tourism development is a key driver in wetland loss and degradation. Colombia highlighted that wetlands can be a tourist attraction. Ecuador suggested an additional paragraph regarding land management for the protection of wetlands. New Zealand called for a stronger emphasis on protecting wetlands and maintaining their ecological character. Supported by Australia, he suggested the title be changed to "agriculture and wetlands," rather than "agriculture in wetlands." The Philippines suggest changing the title to "use of wetlands for agriculture," stressing there are wetlands that are agricultural in nature, for example fish ponds and rice paddies. Australia, supported by India, said text requesting the Secretariat to advise on withdrawing subsidies that endanger wetlands is too difficult to implement and would put the Secretariat in the position of criticizing practices of individual countries. The US emphasized that all provisions of the draft resolution regarding subsidies are outside the Convention's mandate. Uruguay said parties are sovereign in terms of subsidies. Thailand stressed the need to invite parties to share lessons learned

and best practices on a voluntary basis, including through national reports. South Africa highlighted that IPLCs depend on the cultivation of wetlands through drainage for daily subsistence and require alternative methods of growing food. Rwanda suggested including a paragraph on alternative livelihoods.

Following informal discussions on a revised draft, the COP adopted the resolution on Monday, with an amendment. Ecuador requested adding a footnote in the Spanish translation referring to the definition of agriculture set by the FAO, which was approved.

In the final resolution (COP13 Doc.18.21 Rev.2) the COP encourages parties to, *inter alia*:

- develop sustainable agricultural practices that promote the conservation of wetlands by discouraging further wetland drainage and properly managing aquifers, enhancing water retention time in the landscape, recreating local atmospheric water cycles, and contributing to climate change mitigation and the alleviation of adverse impacts of droughts, as well as reducing peak water discharges coupled with high nutrient and organic matter runoff;
- identify and support traditional as well as innovative uses of wetlands and their biodiversity, while maintaining the ecological character of wetlands, and to search for and promote novel uses of wetlands;
- support and develop guidance tools for the co-management of wetlands, other surface water resources and ground water resources;
- review and, if appropriate, improve their respective programmes and policies in support of agricultural production, and to assess their effects on wetlands and their sustainability, including the integrity of wetlands and long-term impact upon the sustainability of local livelihoods;
- adapt incentive schemes to consider criteria for sustainable use of natural resources, conservation of biodiversity, and prevention of degradation of wetland-related ecosystems; and
- in their National Reports, assess the relevant domestic legislative, regulatory, and wetland protection policy frameworks for their effectiveness and comprehensiveness to ensure that wetlands in highly intensive agricultural landscapes have necessary and adequate protection.

The COP also requests the STRP to:

- compile and review information on the positive and negative impacts of agricultural practices on wetlands in terms of their biodiversity and ecosystem services, and document best practice examples of wetland use for agricultural production that preserves wetland integrity and is sustainable in the long term and in the context of climate change; and
- provide data on, and an overview of, the extent of intact agricultural wetlands and those damaged and destroyed through conversion to agricultural land-uses since the 1970s.

Summer harvest of cattail, Northeast Germany. Photo: Hans Joosten.

Wetlands in the Arctic and Sub-Arctic: On Wednesday, Sweden presented the draft resolution (COP13 Doc.18.25), noting that, following consultations, references to the Antarctic Treaty, the Antarctic and sub-Antarctic region, and protected areas have been deleted. Argentina and Colombia called for maintaining the scope of application of the Ramsar Convention and, with Chile and Ecuador, respecting the mandate of other instruments such as the Antarctic Treaty. New Zealand noted that some recommendations in the draft resolution duplicate discussions under the Antarctic Treaty. South Africa, for the African Group, supported deletion of references to the Antarctic Treaty and highlighted potential biosecurity issues in polar and subpolar wetlands. Denmark urged taking into account relevant work on wetlands by other bodies, supported by Japan, and suggested deleting references to protected areas and inserting references to Ramsar Sites. She expressed concern on new assessments and inventories of Arctic wetlands, noting that such an exercise is extremely time- and resource-intensive. Norway, the US, the UK, Australia, and Japan suggested focusing on the Arctic and sub-Arctic regions and requested deletion of references to the Antarctic and the Antarctic Treaty. Norway cautioned against the designation of Ramsar Sites or protected areas in areas beyond national jurisdiction.
Canada called for ensuring linkages between the proposed activities and deleting activities that fall outside the relevant mandates of listed organizations. Sweden, supported by many, suggested the establishment of a working group to present the changes in detail and hold further discussions. On Monday, plenary adopted a revised draft, without further amendment.
In the final resolution (COP13 Doc.25 Rev.1), on knowledge and awareness, COP13 encourages the concerned parties to, *inter alia*:

- obtain sufficient data about Arctic and sub-Arctic wetlands to take necessary measures for the conservation and sustainable use of wetlands;
- undertake assessments of the state of Arctic and sub-Arctic wetlands, to include hotspot analyses for wetland biodiversity, and gaps in the network of Ramsar Sites and other protected areas including wetlands; and
- raise awareness of the biodiversity, ecosystem services, and socio-economic importance of Arctic and sub-Arctic wetlands.

Sampling Storflaket palsa peat profile in Abisko, subarctic Sweden. Photo: Hans Joosten.

On Ramsar Sites and other wetlands of high conservation value, the COP encourages the concerned parties to designate new Ramsar Sites within their territories that comprise under-represented wetland types and/or important links in flyways and other migratory routes.

On wise use and mitigation of impact on wetlands and restoration, the COP encourages concerned parties to:

- seek to ensure that restoration measures in wetlands in the Arctic and sub-Arctic are prioritized and undertaken to improve the connectivity between habitats;
- seek to ensure that analysis of the impacts of development projects, transportation, and tourism activities are undertaken to support parties' efforts to maintain the ecological character of wetlands;
- where there are herds of domestic or semi-domestic grazing animals in Arctic or sub-Arctic areas, work with stakeholders to ensure that herd population size is kept at a level that does not affect wetland populations of wild grazing animals; and
- seek to put in place measures to eradicate existing invasive alien species and prevent the future spread of existing and new invasive alien species in Arctic and sub-Arctic regions.

On international cooperation, the COP requests the Secretariat to share with the UNFCCC information on relevant activities under the Ramsar Convention.

A Brief Analysis of Ramsar COP13

Ramsar, the oldest of the modern global intergovernmental environmental agreements, finds itself in a changing international environment. Since COP12 in Uruguay three years ago, the 2030 Agenda for Sustainable Development and its 17 SDGs and the Paris Agreement on climate change were adopted. The momentum these instruments provide gives Ramsar the challenge and opportunity to raise the profile of wetlands and, by linking to the SDGs, the Paris Agreement and other MEAs, to expand the tools at its disposal to achieve its core mission: conservation and wise use of wetlands.

Heading into COP13, some expressed concern about the Convention and its Secretariat The organizational problems at the previous COP, coupled with issues about previous management, made many wonder whether a major restructuring is necessary to refocus and rejuvenate. However, the radical reshuffling of the Secretariat, with new staff in top positions, including the Secretary General, left most delegates more hopeful about the future. During the closing plenary, many praised the fresh composition of the Secretariat, with comments on "restoring parties' confidence," "providing leadership in challenging times," and "increased cohesion and sets of skills." While criticism was not absent, especially on the Secretariat's relative lack of experience, or on forfeiting valuable institutional knowledge and memory, the overall feeling was optimistic and the proceedings at COP13, compared to COP12, were productive and forward-looking.

The sheer amount of work done over the last triennium, especially by the STRP, but also by the Standing Committee, the Secretariat, and under the Convention's programme on communication, capacity building, education, participation, and awareness (CEPA) left many participants impressed. When prompted to identify the single most important outcome of the meeting, delegates almost unanimously pointed to the publication of the GWO.

The GWO is the first-ever comprehensive report on the state of the world's wetlands and their services to people. It provides a snapshot of wetland status, trends, and pressures. The GWO undoubtedly paints a grim picture of the world's wetlands, solidifying our increasingly accurate knowledge of global wetland area data. The report highlights that wetlands, although still covering a global area almost as large as Greenland, are declining fast. It underscores that the quality of remaining wetlands is also suffering and that many wetland-dependent species face high levels of extinction threats. The GWO also stresses the negative trends in water quality and emphasizes that wetland ecosystem services are enormous, far outweighing those of terrestrial ecosystems.

Still, as STRP Chair Gardner repeatedly noted, these facts don't tell the entire story. The GWO further articulates a broad range of effective wetland conservation options available at the national, international, catchment, and site levels, underscoring the need for good governance, knowledge generation, management, investment, and public participation. Regarding immediate, tangible results, the GWO has already raised public awareness, as evidenced by the impressive response on social media, elevating the Convention's profile and making links with other MEAs, especially the UN Framework Convention on Climate Change (UNFCCC).

Addressing the linkages between climate change and wetlands is, as one long-time observer pointed out, a sign that the Convention is changing with the times. As repeatedly heard in plenary, wetlands not only play a crucial role in climate change adaptation and mitigation, but are particularly vulnerable to climate impacts. Still, the question of how to enhance interlinkages without overstepping the Ramsar Convention's mandate proved difficult. For example, a proposal that parties to the Ramsar Convention should be encouraged to include

wetland-related information in their nationally determined contributions (NDCs) under the Paris Agreement faced resistance, with opponents highlighting that NDCs should focus on greenhouse gas emissions reductions only, and cautioning against prejudging the outcome of current negotiations on the Paris Agreement Work Programme. In the end, language relating to NDCs was considerably softened. Some questioned whether this was a missed opportunity, while one seasoned delegate saw this step, albeit small, as "opening the door" to further enhancing synergies in the future.

Many highlighted as an important achievement for supporting climate change mitigation the adoption of revised guidelines for identifying and designating peatlands to the Ramsar List. Unlike the resolution on NDCs, the proposal was not considered to overlap with the Paris Agreement because it focuses specifically on the Ramsar List. The resolution provides guidance on using the importance of peatlands for climate change mitigation as an additional argument to support the designation of peatlands as "Wetlands of International Importance." These guidelines were adopted with relatively little discussion. In contrast, the resolution on blue carbon proposed by Australia proved "extremely politically sensitive," in the words of one delegate. It encountered protracted opposition, with delegates working into the final hours to reach agreement. The resolution was adopted with a footnote that not all parties to the Convention accept the concept of blue carbon. Although this may be another small step forward to integrate climate change-related matters in wetland conservation, some delegates observed Ramsar still has some way to go.

Delegates also highlighted the interlinkages between Ramsar and the SDGs. As many noted, not only is the Convention a co-custodian with UNEP of SDG indicator 6.6.1 (water-related ecosystems), but wetlands contribute directly or indirectly to 75 SDG indicators. This places Ramsar in a privileged position, providing a unique platform to foster collaboration and generate co-benefits. It simultaneously offers a great opportunity to raise its profile and gain momentum in the battle against time to save one of the most biologically productive ecosystems on Earth.

Because Ramsar is outside the UN system, the development of synergies is especially important. The momentum that the SDGs and the Paris Agreement provide has been observed by Ramsar aficionados, and efforts to link with these processes were evident during COP13. The degree to which these endeavors are successful will define to a great extent the visibility of the Ramsar Convention and its increased relevance.

In addition, finding innovative ways to attract additional funds, agreeing on an effective and efficient governance structure, promoting on the ground implementation, keeping up with knowledge generation, and balancing conservation and wise use of wetlands will all be crucial and determine its relative success. As the Convention approaches its 50th birthday, will it reach a new level of maturity, or fall into decline? The decisions, passion, and endurance of those engaged in the management and implementation of the Convention will ultimately decide whether the negative trends on wetlands can be reversed.

More information: https://iisd.cmail19.com/t/i-l-njiiyid-qjjkltjjy-d/

Convention on Biological Diversity

The Conference of Parties to the Convention on Biological Diversity has on its Fourteenth meeting in Sharm El-Sheikh, Egypt, 17-29 November 2018, adopted a resolution 'Biodiversity and climate change' Agenda item 21, which refers as follows to peatlands: "8. Encourages Parties to collaborate on the conservation, restoration and wise/sustainable use of wetlands so that their importance, within the context of climate change and disaster risk reduction, is recognized, and to support the process towards developing a joint declaration of multilateral environmental agreements with respect to peatland conservation, restoration and wise use, thereby safeguarding the multiple benefits of peatlands, including restored peatlands, and contributing to the Sustainable Development Goals;"

ITPC expected to promote sustainable peatland ecosystem management

Indonesian ambassador to Germany Arif Havas Oegroseno shares Indonesia's experience in restoring peatland in the German Peatland Dialogue Conference held by Greifswald Mire Centre on October 26 in Berlin.

Indonesia`s peatlands store a huge amount of carbon of up to 60 billion metric tons, which makes it a virtual carbon bomb. The country used to have 22.5 million hectares of peatlands, but nearly half of them have already been deforested and drained. Given the important functions of peatlands globally, Indonesia and the Republic of Congo and the Democratic Republic of Congo have joined with international organizations to push forward a sustainable peatland agenda at a launch event for the new International Tropical Peatland Center (ITPC) in Jakarta on Oct 30, 2018. The three countries - all home to extensive areas of tropical peatland - comprise the founding member states of the center, which is expected to become a holistic platform for peatland science and practice. ITPC is also a center for information and knowledge about peat management that can be accessed by countries across the world. When managed sustainably, tropical peatlands offer not only substantial environmental gains but also potential livelihood benefits to those living in and around them. During the event, Indonesia`s Environment and Forestry Minister Siti Nurbaya Bakar, the Republic of Congo`s Tourism and Environment Minister Arlette Soudan-Nonault, and the Director General of Forest Resources for DRC`s Ministry of Environment and Sustainable Development Jose Ilanga Lofonga launched an interim secretariat ahead of the formation of the center itself within one year. ITPC is a real effort by the Indonesian government to be consistent in maintaining the sustainability of the peat ecosystem, according to Bakar. It will be a learning center for other countries who want to know about tropical peat and how to restore and manage the ecosystem for the benefit of the world`s environmental in the future. The Indonesian Forestry and Environmental Research Development and Innovation Agency (FOERDIA), together with the Center for International Forestry Research (CIFOR) in Bogor, will function as the ITPC Secretariat.

ITPC also plans to establish field sites in South Sumatera, West Kalimantan, Riau, Jambi, and Central Kalimantan. "If we cannot conserve peatlands, there is no way we can win against climate change," said Erik Solheim, head of UN Environment, during the inauguration of the center. Effectively protecting peatlands would represent a "triple win" for humanity, he explained - benefiting people and their health, the environment, and the economy.So far, Indonesia has done many researches on peat. These studies will be available at the ITPC.The Indonesian government also invites countries that have tropical peatlands, as well as international scientists and collaborators, to join the ITPC to increase knowledge and protect the ecosystems. The initiative of Indonesia`s peat management comes from President Joko Widodo, who had previously

initiated to establish the Peat Restoration Agency (BRG), Bakar revealed. As the first activity of ITPC, in collaboration with FOERDIA and BRG, as well as support by International Peatland Society (IPS) and the Japan Peatland Society (JPS), a Tropical Peatland Roundtable Discussion was organized in Batam, Riau Islands Province, from Nov 12 to 16, 2018, to bring Jakarta Declaration into action. Meanwhile, global peat expert from Greifswald Mire Centre Germany Professor Hans Joosten stated that Indonesia has successfully outperformed Europe in restoring peatland as green areas that support the absorption of carbon. "What Indonesia has done in restoring peatland is more than what Europe has done throughout history," Joosten remarked, as cited in the statement from the Indonesian Embassy in Berlin, Germany, recently. Joosten made the statement in response to Indonesia`s experience in restoring peatlands, as told by Indonesia`s Ambassador to Germany Arif Havas Oegroseno, who was invited as one of the panelists in the German Peat Dialogue held in Grieswald Moor Centrum and Germany`s Ministry of Environment on Oct 26. Oegroseno also noted that Indonesia`s experience in restoring peatlands, through an intensive, systematic, and structured program by BRG, has resulted in the wetting of over 200 thousand hectares of peat in just one year. Earlier, BRG had claimed that fewer hotspots were found in the peatland area under its restoration program through the 3Rs approach (rewetting, revegetation, and livelihood revitalization). BRG Chief Nazir Foead noted on Oct 17, 2018, that the intervention, which included peatland rewetting by establishing canal blocks, building artesian wells, and livelihood revitalization by making fish ponds and farms, had successfully reduced the number of hotspots. Public involvement in the projects, according to Foead, has played an important role in increasing awareness over hot spots. BRG has targeted to complete its intervention on 600 thousand hectares of peat land area in 2017-2018. The remaining 400 thousand hectares of peatland, from the total 2.4 million hectares of peat land prioritized for restoration within five years since 2016, would be completed in 2019-2020.

- https://en.antaranews.com/news/120583/news-focus--itpc-expected-to-promote-sustainable-peatland-ecosystem-management-by-fardah-assegaf
- http://foreststreesagroforestry.org/peatlands-from-marginal-lands-to-essential-ecosystem/
- https://news.globallandscapesforum.org/30814/new-center-begins-corrective-era-for-peatlands/
- https://en.antaranews.com/news/120068/indonesia-has-intl-tropical-peat-center
- https://www.tropicalpeatlands.org/event/itpc-soft-launching/

Siti Nurbaya, Minister of Environment and Forestry, Indonesia, and Arlette Soudan-Nonault, Minister of Environment and Tourism, Republic of Congo, sign the Memorandum of Understanding. Photo by CIFOR

South-South cooperation on peatlands: Indonesia, Republic of Congo solidify their collaboration

On 30 October 2018, Indonesia and the Republic of Congo signed the first ever agreement on the protection and management of peatlands between an African and an Asian country. The five-year memorandum of understanding says, among other things, that the two sides should develop sound management of peatland and cooperate in promoting best practice in sustainable peatland management. They also agreed to help each other with capacity building and exchanges of information.

- https://www.unenvironment.org/news-and-stories/story/south-south-cooperation-peatlands-indonesia-republic-congo-solidify-their

For the two Congos, lessons in a peatland partnership with Indonesia

Central African countries are taking a lesson from the experiences of Indonesia, suffering from one of the world's highest deforestation rates, as they look to protect their own tropical peat forests. Environmental officials from the Democratic Republic of Congo (DRC) and the Republic of Congo visited Indonesia recently to learn how the Southeast Asian country was managing its peat forests, which account for 36 percent of the world's tropical peatlands. Arlette Soudan-Nonault, the Republic of the Congo's minister of tourism and environment, and José Ilanga Lofonga, the DRC's director-general of forestry and sustainable development, said they had learned much from their visit to peat forests in the Bornean city of Pontianak. Lofonga said his country, home to the second-largest swath of peat forest, after Indonesia, stood to gain from Indonesia's peat-management experience. "What's clear is that it's not a waste of time visiting peat forests here," he told reporters in Jakarta. "Because there are many things that have been done here that could be replicated in the DRC because we have a lot of similarities, like climate."

Government officials from the Democratic Republic of Congo and the Republic of Congo are accompanied by Indonesian environment minister Siti Nurbaya Bakar during a visit in Jakarta. Photo: Indonesian Ministry of Environment and Forestry.

One of the key takeaways from the visit was the need to avoid the mistakes made by Indonesia in the exploitation of its peatlands and its forests in general. Huge expanses of peat forest in Sumatra and Indonesian Borneo were razed and drained from the 1970s onward for timber and for new land for plantations. The rich stores of carbon locked in the peat soil were released in massive volumes as the land was dried and burned. At one point, Indonesia's deforestation rate surpassed that of the Brazilian Amazon.

Today, nearly all of Indonesia's peat ecosystems — an area spanning 239,600 km^2, or two-thirds the size of the Republic of Congo — are damaged from mild to very severe. The turning point came after particularly

devastating forest fires in 2015 that sickened hundreds of thousands of people across Sumatra and Borneo and in neighboring countries. In response, President Joko Widodo rolled out a set of policies to overhaul the way the country manages its peatlands, including a moratorium on the clearing of peat forests.

"The present era can be labeled as the corrective era," said Siti Nurbaya Bakar, the Indonesian environment minister. She said the results of the policies since then had been "dramatic," with the number of fire hotspots down 89 % in 2018, and the size of burned area similarly diminished by 93 %, to 1,940 km^2 this year. Soudan-Nonault said Indonesia's history of peat management would serve as an important cautionary tale for how her government and the DRC planned to manage the peat forests in the Congo Basin's Cuvette Centrale region. Soudan-Nonault said her government would build on Indonesia's experience "to avoid some of the past that Indonesia had gone through." "We know it'll be a disaster to drain the peatland," she said. "We know that large-scale agricultural conversion will be a bad thing, it will dry the peatland. We know slash-and-burn conversion is not good."

Yet both the Republic of the Congo and the DRC have economic development plans for the Cuvette Centrale, including agriculture, oil and gas extraction, and logging. Some of these activities have already begun, according to a report by Greenpeace Africa, which has warned of an alarming threat to the peatland region.

The DRC's environment minister, Amy Ambatobe, has reportedly granted three logging concessions covering a combined 6,500 km^2 to Chinese-owned companies. Two of the concessions overlap onto the Cuvette Centrale peatlands.

DRC President Joseph Kabila has also signed three oil exploration blocks, largely in the Cuvette Centrale. The government defending the decision against criticism by environmental activists, saying the country has the right to explore for oil anywhere on its territory and that no area under its jurisdiction should be off-limits.

Scientists have warned that draining these peatlands would release huge amounts of greenhouse gases.

Officials from all three countries earlier this year signed the Brazzaville Declaration in the Republic of Congo, at the culmination of the third meeting of the Global Peatland Initiative. The declaration commits the three countries to working together to prevent the Congo Basin's peatlands from being drained and degraded. The 11 commitments listed in the declaration include establishing and finalizing land-use plans that promote the conservation and protection of peatlands.

The countries have also pledged to carry out more research on tropical peatlands, which Siti called "among the least understood ecosystems in the world." Soudan-Nonault said mapping the Congo Basin's peatlands was one of her priorities. "Once the mapping is done, we need to move toward sustainable peatland management," she said.

The three governments have also agreed to cooperate on establishing the International Tropical Peatland Center (ITPC), with an interim secretariat hosted in Indonesia and assisted by the Center for International Forestry Research (CIFOR). Once up and running, the ITPC will carry out research aimed at informing and supporting peatland management policies. Its stated goal is to "govern peatland knowledge to ensure sustainable ecosystems and human well-being for national and international benefits."

As part of its research activities, the ITPC will set up demonstration plots in Indonesia, the DRC, the Republic of Congo and Peru from 2019 onward. In addition to marshaling science in defense of the Congo Basin's peatlands, the new centre will also help advise the Indonesian government in its own peatland restoration initiative, according to CIFOR director general Robert Nasi.

> The ITPC's main objective is to lead and inform efforts to conserve and sustainably manage peatlands throughout Southeast Asia, the Congo Basin and Peru by engaging with and connecting researchers, governments, civil society and other concern stakeholders. Additionally, ITPC states that it will seek to find effective, cost-efficient and equitable solutions for peatland conservation, support national sustainable development and climate change goals, and provide more international visibility for peatlands research.
> https://www.tropicalpeatlands.org/corporate-news/four-global-governments-cooperate-to-form-the-new-international-tropical-peatland-center/

Under the slate of policies launched after the 2015 fires, the Indonesian government aims to restore more than 20,000 km^2 of degraded peatland across the country to prevent future outbreaks of fire. "What we need to know is how to restore a large area of degraded peat and for what," Nasi said.

Erik Solheim, executive director of the United Nations Environment Programme (UNEP), welcomed the move to set up the ITPC, saying efforts to better understand peatlands in service of protecting them were crucial in the

fight against climate change. “If we can’t conserve peatland, there’s no way we can combat climate change,” he said at the soft launch of the ITPC’s interim secretariat in Jakarta. “Because there’s so much carbon stored in peatland. We will lose spectacularly in our fight against climate change [if we fail to protect peatland].”

- https://news.mongabay.com/2018/11/for-the-two-congos-lessons-in-a-peatland-partnership-with-indonesia/
- https://www.cifor.org/corporate-news/indonesia-partners-lead-peatland-preservation-efforts-with-new-research-center/

At Global Landscape Forum, partners deliberate on a triple win for Climate, People and the Planet

In order to protect some of the world’s most fragile ecosystems – locking in some of the largest stocks of global soil carbon – tropical countries zeroed in on how to manage their peatlands and celebrated the launch of the International Tropical Peatland Center, at the Global Landscape Forum in Bonn early December.

The countries engaged in an urgent sharing of knowledge, challenges and best practices at the Forum, which saw more than 1,000 representatives of government, international, non-governmental and indigenous organizations, activists, finance, the private sector, youth, scientists and media come together.

Ministers of Environment from the Republic of Congo and Indonesia, both countries home to some of the biggest peatlands in the world, followed up on their commitments made in the Brazzaville Declaration earlier this year, which laid out the parameters of cooperation for countries to manage their peatlands.

If nations act on their commitments to effectively manage their peatlands, these invaluable ecosystems can provide sustainable livelihoods that are essential to human health and well-being – while retaining their unique biodiversity. Leaving peatlands undisturbed as much as possible can limit air and water pollution in the direct vicinity and carbon emissions on a global scale.

“We need better knowledge on peatlands to better protect this critical ecosystem,” said Joyce Msuya, Acting Executive Director and Assistant Secretary-General of the United Nations.” “Countries must come together and act fast to protect our peatlands. Sustainable development on this planet depends on it!

The discussion particularly focused on the Cuvette Centrale in the Democratic Republic of the Congo. It is the largest, carbon-rich and relatively undisturbed peatland in the world with a unique ecosystem hosting both threatened species and endemic species only found in the Congo basin region. The discovery of their extent and significant carbon stocks is especially relevant to climate mitigation but also to the sustainable development goals on health, water and life on land

“Peatlands are fragile ecosystems which are not yet well understood. We need to support efforts such as those here in the Congo Basin to achieve sustainable development, rather than risk the degradation and destruction of peatlands” said Tim Christophersen, Coordinator of the Freshwater, Land and Climate Branch, UN Environment.

- https://www.unenvironment.org/news-and-stories/press-release/global-landscape-forum-partners-deliberate-triple-win-climate-people
- https://www.tropicalpeatlands.org/video/side-event-3-2-lessons-learned-and-best-practices-for-the-management-of-tropical-peatlands/
- https://www.tropicalpeatlands.org/video/side-event-3-1-high-level-south-south-cooperation-in-action-protecting-tropical-peatlands-together/
- https://www.tropicalpeatlands.org/video/why-peatlands-matter-indonesias-minister-of-environment-at-glf-bonn-2018/
- https://www.tropicalpeatlands.org/video/rewetting-indonesias-peatlands/
- https://www.tropicalpeatlands.org/video/peatlands-valuable-assets-for-indonesia/
- https://www.tropicalpeatlands.org/video/inside-perus-peatlands-a-scientist-explains/

Revised RSPO Manuals on Best Management Practices (BMPs) for Peat

The RSPO Peatland Working Group 2 (PLWG2) has revised the current "RSPO Manual on Best Management Practices (BMPs) for Existing Oil Palm Cultivation on Peat" and the "RSPO Manual on Best Management Practices (BMPs) for Management & Rehabilitation of Natural Vegetation Associated with Oil Palm Cultivation on Peat" which was originally published in June 2012. This revision incorporates updates from the current guidance and best management practices, based on the most recent research on GHG emissions and water management. Both documents can be downloaded here.

Peat: first RPP certified growing media

responsibly produced peat

www.responsiblyproducedpeat.org

Responsibly Produced Peat (RPP) has in October announced that four growing media enterprises from the Netherlands, Belgium and Germany have produced the first RPP certified growing media and will shortly bring them on the market. This is the first time that not only mining areas, but also products have been RPP-certified.

The horticultural journal TASPO asked Alexander Workert, Managing Director of Euflor/Stender AG (Germany), why this step was taken. For quite some time now, the company has been restoring and managing peat extraction areas after extraction had been completed. "With RPP products we want to educate the end consumer about peat extraction so that he can form his own impression of our positive actions and can loose himself somewhat from the political, in part one-sided, discussion," says Workert. The main challenge will be to disseminate the knowledge through trade and directly addressing the end customer. In terms of communication, as many channels as possible are used: The packaging of the products was adapted, communication on the web is planned, as well as at events and trade fairs. Workert explains that the limiting factor is the availability of land. At present, around 150 hectares of company-owned land are RPP-certified, and all other mining permits are also to be included in the RPP certification. "We are in constant dialogue with state policy and the licensing authorities. We can only shape further development with the appropriate support from the authorities. Here we are often in direct competition with agriculture for land," explains Workert. "On top of that, the procedure is an investment and a return is not guaranteed. Here, all market participants must question their motivation to pay into this sustainability issue."

According to the RPP Foundation, 11,641 hectares in a total of seven countries are now RPP-certified. RPP managing director Maureen Kuenen expects at least 50 more certifications next year, but not in Germany, "because Germany plans to phase out peat production," she explains. According to Kuenen, the RPP Chain of Custody certification has only just begun. At the moment there are two more companies aiming for this certification, another one has just applied.

The German Industrieverband Garten (IVG) also attaches great importance to the issue of RPP in its argumentation in favour of peat. As a basis for a possible phase-out of peat extraction, the politicians primarily cite CO_2 emissions from peat. But in the long term, the rewetting and the associated conversion of areas formerly used for agriculture into peatland conservation areas will even lead to a reduction in CO_2 emissions, explains Dr. Arne Hückstädt, IVG's Horticulture and Environment Officer. "These could be decisive arguments in the discussion for the further use of peat, as far as RPP-certified products are concerned".

Hückstädt hopes that RPP certification will probably increase consumer demand in the long term and encourage other manufacturers to offer products with RPP-certified peat.

https://taspo.de/gruene-branche/torf-erste-rpp-zertifizierte-substrate/

The Foundation Responsibly Produced Peat (RPP) was established on 19 August 2013. IMCG had been involved in the preparation of the initiative but refused to join. Whereas IMCG supports the movement to less harmful peat extraction, RPP solely focuses on the production and not on the consumption side of peat. RPP insufficiently balances the harm of peat extraction against possible benefits (i.e. allows “responsibly produced peat” to be used for irresponsible purposes) and therewith violates the IPS/IMCG Wise Use principles. Furthermore the claim that RPP-peat is “responsibly produced” because it is only mined from land drained for agriculture or forestry is false. The reasoning incorrectly assumes that that peat would anyhow oxidate and uses one harmful land use activity (drainage-based peatland use) to trivialize another harmful use (peat extraction). Since the Paris Agreement it must be clear that you cannot claim post 2050 peat oxidation to offset current peat extraction. “Responsibly Produced Peat” may be less harmful than extracting peat from undrained sites, but it remains – like all peat extraction and drainage based peatland use – an irresponsible way to deal with our common future.

Photo: Hans Joosten.

Peatlands will store more carbon as planet warms

Global warming will cause peatlands to absorb more carbon – but the effect will weaken as warming increases, new research suggests. This effect – a so-called "negative feedback" where climate change causes effects which slow further climate change – will increase over the coming decades but will decline after 2100 if warming continues, according to an international team of 70 scientists, led by the University of Exeter.

Most peatlands are in cold climates in places such as Siberia and Canada, and here warmer temperatures will lengthen the growing season for plants – meaning more plant matter falling into peat bogs. But this initial increase in carbon storage – estimated to be about 5% – will be offset by reduced storage in tropical peatlands in places like Borneo and the Amazon region.

"Plants living in cold-climate peatlands have it tough for most of the year, but rising global temperatures will give them a longer growing season," said lead author Dr Angela Gallego-Sala, of the University of Exeter. "Decomposition in peatlands will speed up as the climate warms – meaning more carbon and methane released – but the overall effect in these high-latitude regions will be increased storage of carbon. "However,

as warming continues, tropical peatlands will store less carbon because decomposition will speed up but higher temperatures in these already warm regions will not boost plant growth."
The researchers looked at a range of estimates for future warming – from an average warming of between 1°C and 3.7°C by 2100. Modelled future projections under all scenarios suggest that the present-day global sink in peatlands will increase slightly until about 2100 but will decline thereafter. In both cases decomposition in the tropics will overturn the gains in the higher latitudes (nearer the poles) due to lengthening of the growing season. "We have detailed models to predict future climate change, but the models don't yet account for all of the effects of the biosphere (living things) on climate," joint lead author Prof Dan Charman, also from the University of Exeter, added. "The biosphere will either slow or accelerate climate change in various ways. Our results show that peatlands are an ecosystem that could help slow future climate change, as long as we protect them from further damage."
Sue Page, Professor of Physical Geography from the University of Leicester's School of Geography, Geology and the Environment, said: "Our work highlights the fact that peatlands store huge amounts of carbon and can play a vital role in global efforts to control climate change. "The study also highlights the vital importance of protecting intact peatlands and restoring drained peatlands, particularly in the tropics where the effects of future global warming are likely to lead to more rapid rates of peat decomposition. "Peatland restoration efforts, such as rewetting drained and degraded peatlands, can restore the waterlogged conditions needed to prevent the release of peat carbon. "These efforts need to be intensified if we are to avoid accelerating peatland CO_2 emissions into the future."
The paper, published in the journal *Nature Climate Change*, is entitled: "Latitudinal limits to the predicted increase of the peatland carbon sink with warming."
https://scienmag.com/peatlands-will-store-more-carbon-as-planet-warms/

IPS 2018 SUMMIT COMMUNIQUE

50 YEARS IPS International Peatland Society

"The information provided was illuminating but made uncomfortable listening for some in the audience."
Donal Clarke, Peatlands International 2018-4

The International Peatland Society held the first 'Global Peatland and Peat Industry Summit' on September 10th2018, in Rotterdam, The Netherlands. It was attended by 75 participants. The 'Summit' brought together senior executives of peat and peat products industries, and companies involved in peatland management for agriculture and forestry from 20 countries, with senior representatives of International Conventions, Agreements and Programmes, academia/science and regional regulators. The main objective of the 'Summit' was to inform peat industry companies how their businesses are affected by policies that originate from these international and regional bodies and are implemented at national or regional levels. In exchange, peat industry companies explained about their businesses including their nature, focus and regard for the environment. This dialogue included discussion of biodiversity, climate change, economy, ecosystem services, food security, growing media, international conventions, responsible peatland management, and societal wellbeing.
It was concluded that in this rapidly changing world there is a need for further high-quality research and better understanding of the importance of peatlands and the role they play in maintaining and improving environmental quality. The IPS will continue to engage with all participants to promote resolution of global challenges facing peat and peatlands.

"I understand that the public are not full acquainted with everything surrounding peat use. Peat should be eligible for electricity certificates and treated in the same way as wind, solar and other renewable fuels. The UN Climate Panel has also classified peat as an intermediate between renewable and fossil fuels, but what complicates the situation is that the energy consumer is also licensed with emission allowances. We are working hard to change the fact that it's only the incineration of peat that is taken into account by the EU. Peat from drained land has major climate benefits, which the EU must also take into account", says Ingrid Kyllerstedt, CEO of the Swedish Peat Producers Association in Peatlands International 2018-4. .

Africa

What's threatening the Congo Basin's peatlands?

With a 145,500 km^2 swath of peatlands in Central Africa newly identified as an important storage of carbon, researchers, decision-makers and practitioners are now discussing the likelihood of and means for keeping this water-logged area intact. "There's a lot of carbon in those peatlands," says Dr. Greta Dargie, a forest ecologist who co-authored recent articles with a team of scientists and served on the technical advisory group of the Global Landscapes Forum Digital Summit spotlighting the issue.

Yet, a number of threats could cause this carbon to release into the atmosphere, adding to the threats of climatic changes. Research in recent years has found that greenhouse gases emitted from a small area of peatlands amount to 5 percent of global human-induced emissions.

"Being seemingly largely dependent on rainfall, the Cuvette Centrale peatlands are particularly vulnerable to climate change," says Dargie. She expressed pointed concern about a reduction in rainfall or a change in its distribution, which could lead to the peatlands drying, increased peat decomposition and subsequently the release of carbon. Dried-out peatlands burn easily, not only destroying ecosystems but also potentially leading to intense regional smoke and haze, as occurred in the deathly 2015 fires in Indonesia.

Other potential threats to the peatlands' hydrology include drainage-based farming and logging, mining, oil extraction and infrastructure building. Combined with potential future scenarios of better roads and river access as well as hotter, drier conditions resulting from global warming (which Dargie's article refers to as 'synergies of degradation'), these impacts from human activity could lead to deforestation, contamination of soil and water, and overall landscape degradation, especially given the lack of effective conservation and land management.

Currently, only about 11 % of Cuvette Centrale falls under official national protected areas. Other conservation initiatives, such as inclusion in Ramsar's Wetlands of International Importance, cover more of the area but do not legally require protective action.

To better protect the rest of the Congo Basin's peatlands, Dargie stresses the need for improved understanding of how the Cuvette Centrale ecosystems function, in order to better inform land use planning and management as well as related policy- and lawmaking. There is an evident need to raise awareness among governments, civil society and the private sector on the importance and preservation of peatland ecosystems at large, as well as convene a wide range of stakeholders around these landscapes. Zooming out, these peatlands are connected to international efforts to reduce greenhouse gas emissions and to limit the degree of climate change. They could serve as an entry point for efforts to mobilize funds for climate mitigation, adaptation and disaster risk reduction. "Climate change emerges as a particularly pressing concern, given its potential to destabilize carbon stocks across the whole area," says Dargie. "But the low level of human intervention at present suggests that the opportunity still exists to protect the peatland landscapes and people living in them."

- https://news.globallandscapesforum.org/30225/whats-threatening-the-congo-basins-peatlands/

Discussing the protection of one of the world's largest carbon hotspots

In 2017, a UK-Congolese research team published a study that increased the coverage estimations of the peatlands located on the border between the Republic of the Congo and the Democratic Republic of the Congo to approximately 145 500 km2 (roughly the size of Nepal). The discovery made the Cuvette Centrale the most extensive, continuous peatland complex in the tropics. The research highlighted the immense significance of these swamp forests for the stability of our planet's climate that consequently generated interest and questions about the Cuvette Centrale peatlands. To explore the inquiries, the Food and Agriculture Organization of the United Nations (FAO) together with the Global Landscapes Forum (GLF) organised a Digital Summit "Peatlands: A landscape to discover" on 4 October 2018. The Summit's experts presented and responded to participants' questions such as "What are peatlands?", "What kind of peatlands can be found in the Congo Basin?", "What threats are peatlands facing and how can they be reduced?" and others. The summit was held in French and gathered more than 65 participants from around the world, half of them from French-speaking African countries. The session also gave an opportunity to promote the importance of these often-overlooked ecosystems.

As only about 11 percent of Cuvette Centrale falls under official national protected areas, the participants discussed current and potential threats Cuvette Centrale peatlands are facing, including drainage-based

farming and logging, mining, oil extraction and infrastructure building. Combined other impacts from human activity such as road construction as well as changing weather conditions (in particular hotter, drier climate) resulting from global warming, peatland are facing threats of deforestation, contamination of soil and water, and overall landscape degradation, as so many other wetlands, globally.

Benjamin Toirambe from the Ministry for Environment and Sustainable Development of the Democratic Republic of Congo (DRC), highlighted the need for making a land use plan for peatland landscapes. The plan, Mr Toirambe is convinced, should also address the poverty and livelihoods of the people living close to the peatland area. “We need to find a peaceful way for co-habitation and avoid damages caused by drainage-based activities” underlined Mr Toirambe, who was born in the region himself.

Francis Müller, from Pôle-relais tourbières à la Fédération des Conservatoires d’espaces naturels, summarised the session by saying that all peatland-related decisions need to take into account social aspects. “We should remember that people can live in the area only if the peatlands are kept wet. This is exactly what they have already been doing: living in these areas for a long time, fishing. Indonesia’s experience has taught us that these soils are not adapted for cultivating rice. Similarly, the damages and fire risks caused would largely outweigh the benefits, should the forest, oil or mining concession owners or road builders proceed with the discussed activities.”

What are countries and the international community doing to protect peatlands?

The Republic of the Congo is currently considering the expansion of the Lac Télé Community Reserve to protect further areas of the swamp forest. Efforts to promote the conservation of the Congo peatlands go hand in hand with the National REDD+ Strategy developed by the country with support from its many partners, the UN-REDD Programme among them.

To protect the resource, in **the Democratic Republic of the Congo**, work to complement the national forest inventory on additional peatland areas is currently taking place. Supported by FAO, several field teams are collecting soil and tree data of several important peatland locations in the North of the country. Sponsored by the Central African Forest Initiative (CAFI), the work supports the estimation of above and belowground biomass in peatlands that will eventually lead to data-driven actions and policies to protect the country’s natural resources. This work complements the field studies that Greta Dargie, Simon Lewis, Ifo Suspense and Yannick E. Bucko and other members of the UK-Congolese research team are continuing to verify peatland location.

Knowledge sharing between various stakeholdersss such as governments, conservation and scientific communities as well as local communities of the Cuvette Centrale will play a crucial role in efforts to improve local livelihoods without compromising the integrity of this globally significant region.

All interested in the topic are invited to join the online community of practice focusing on peatlands and climate change at: https://dgroups.org/fao/peatlands/join

- https://www.unredd.net/announcements-and-news/2936-equipped-with-knowledge-discussing-the-protection-of-one-of-the-world-s-largest-carbon-hotspots.html

Republic of Congo greenwashing efforts exposed at Africa Oil Week

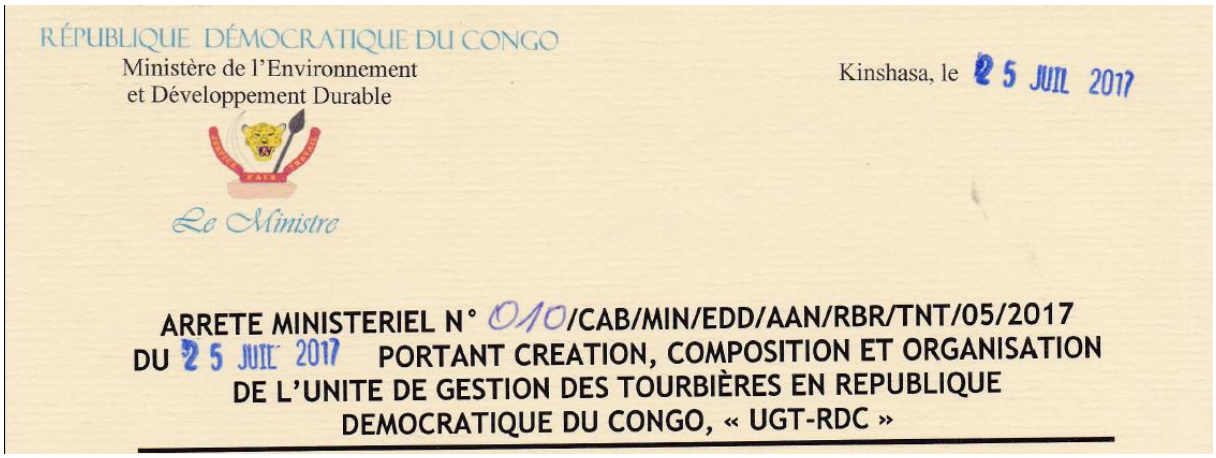
Greenpeace Africa (www.Greenpeace.org) blew the whistle on the Republic of Congo's most recent greenwashing campaign by exposing its plans to tender three oil blocks in the heart of newly-discovered peatlands that Environment Minister Arlette Soudan-Nonault has vowed to protect. Four peatland oil blocks are already under allocation, awaiting development. Tendering for the "Licence Round Phase 2" blocks began in September and was actively promoted by the Congolese regime at the Africa Oil Week conference in Cape Town early November. “It is shocking to see how the Congolese regime is playing the international community on peatlands. The same regime that claims to champion peatland protection at big media events is now showing the world its real intentions. This is a set back for peatland protection and we cannot just sit and watch while green commitments are used to hide the quest for financial profit,” says Victorine Che Thöner, Project Leader of Congo Basin Project at Greenpeace Africa.

The Republic of Congo's Environment Minister was applauded only a week ago by the FAO and UN Environment at the launch of a new International Tropical Peatland Center in Jakarta. In her keynote speech, she waxed poetic about the "rich biodiversity" of the Congo Basin peatlands and vaunted the region's role in the regulation of the world climate. In March 2018, she and her DRC counterpart signed an 11-point "Brazzaville Declaration" promising to "put in place land use plans that guarantee the conservation and

protection of peatlands." But a clause about the "sustainable management" of zones covered by "economic activity" left the door open to business as usual.

After "sustainably managing" the destruction of Congo's Intact Forest Landscapes for the international timber market, the regime of Denis Sassou Nguesso – in power discontinuously for more than 34 years – is now extending the phony "sustainable management" concept to peatland oil exploration. One of the four peatland blocks already allocated is held by Italian major ENI, whose Milan offices were searched and documents seized last April in an investigation by an Italian court into alleged corruption in Congo. One of the others is held by French giant Total. In all, 91% of Republic of Congo's peatlands are covered by oil blocks. The new blocks span 17,915 km² of peatlands – the size of Kuwait. International bidding to tear up the peatland oil blocks closes in June 2019? Greenpeace Africa demands the immediate cancellation of tendering of Republic of Congo's three new peatland oil blocks and of the contracts of its four existing peatland blocks.

- http://www.africanews.com/2018/11/07/republic-of-congo-greenwashing-efforts-exposed-at-africa-oil-week/ #
- https://it-online.co.za/2018/11/08/greenpeace-calls-congo-on-greenwashing/



RÉPUBLIQUE DÉMOCRATIQUE DU CONGO
Ministère de l'Environnement
et Développement Durable

Kinshasa, le 25 JUIL 2017

Le Ministre

ARRETE MINISTERIEL N° 010/CAB/MIN/EDD/AAN/RBR/TNT/05/2017
DU 25 JUIL 2017 PORTANT CREATION, COMPOSITION ET ORGANISATION
DE L'UNITE DE GESTION DES TOURBIÈRES EN REPUBLIQUE
DEMOCRATIQUE DU CONGO, « UGT-RDC »

Ministerial decision to create a peatland management unit in the Democratic Republic of Congo.

Democratic Republic of Congo

Civil society actors on training for peat land advocacy in the DRC

Twenty environmental civil society delegates have had high-level training in Kinshasa from 13th to 14th of August for advocacy on peatlands in the Democratic Republic of Congo. "This training follows the sitting of the political day organized on the ship Greenpeace" Esperanza "last October, at the port of Matadi, during which the participants had adopted a roadmap proposing activities to be carried out in the next six months, from January to June 2018, "Serge Ngwato, Forest Campaigner at Greenpeace-DRC, told reporters. Greenpeace DRC supported this training as a floow-up of the work in October 2017 through the scientific research that was carried out in the village Lokolama and continued in the village Mweko in the territory of Bolomba in the province of Equateur. For Greenpeace-DRC, it is important that the environmental civil society is endowed with the knowledge and capacities needed to build its advocacy on this emerging issue. In 2017, during the last tour of the ship Esperanza, in some countries of the Congo Basin, on behalf of the DRC, the preliminary research of the discovery of these peat bogs was shared with all the stakeholders involved and At the end of the work, the stakeholders had elaborated and adopted a roadmap submitted to Greenpeace-DRC that had agreed to accompany the work that had started to build the capacities of environmental civil society actors and to prepare for future discussions in the news. The aim is to equip them more in order to get them to work as professionals in the field. Prof. Corneille Ewango of Kisangani University (east of DR Congo), said that at the present stage it is not yet possible to deliver results related to field research, because it is necessary to wait for analyzes in progress to be made on all the fragmented samples on the peats.

http://acpcongo.com/acp/en/civil-society-actors-on-training-for-peat-land-advocacy-in-the-drc/

Asia

Indonesia

Real-time plantation map aims to control deforestation in Papua

The developers of a new interactive map hope to shine a light on deforestation in Indonesia's easternmost region of Papua, where industrial-scale agriculture threatens one of the world's last great expanses of untouched tropical forest. The Papua Atlas is developed by the Center for International Forestry Research (CIFOR), with financial assistance from Britain's Department for International Development (DFID) and is scheduled for publication in 2019. While other platforms are already available that can track deforestation, including Global Forest Watch, the Papua Atlas is set to differentiate itself by tracking the actual progression of plantation areas and road developments. As a result, users will be able to see the number and extent of oil palm or pulpwood concessions or roads cut through the forest over time, says David Gaveau, a research associate with CIFOR who's developing the map with his colleague Mohammad Agus Salim. Combined with a function to search for concessions in various ways, such as by looking at the identity of a parent company of a concession holder, this makes the Papua Atlas a powerful tool to increase transparency in the plantation sector, Gaveau says.

"The Atlas links this land use and land cover change map that we derive based on satellite imagery with [a] land ownership map," Gaveau tells Mongabay. "So one is able to query, not only at individual concessions, but also big groups [behind them]." Gaveau says the map was conceived to address the current lack of information on how concessions are being farmed out in Papua, a region that encompasses the western half of the island of New Guinea and comprises the two provinces of Papua and West Papua. "The main idea is to be more transparent about what's been going on, and link deforestation with ownership to understand who's responsible," he says. "To increase corporate accountability, we need to understand how much deforestation has happened, and to what extent plantation areas and road developments have caused deforestation."

The Papua region accounts for 35 percent of Indonesia's remaining rainforest, spanning 294,000 km^2— an area the size of the state of Arizona. Its remoteness — the largest city in the region, Jayapura, is more than five hours by plane from the capital, Jakarta — and dearth of infrastructure such as roads, electricity, telecommunications and piped water, have long rendered the region the least developed and most impoverished in Indonesia. On the flipside, though, it has meant the rich forests of Papua, home to exotic birds of paradise and myriad other animal and plant species, have stayed largely out of reach of the mining and plantation outfits that have ravaged the forests of Sumatra and Indonesian Borneo.

But that's changed in recent years, thanks to a renewed government focus on boosting development in the region. Palm oil companies have begun moving in, quickly mowing down vast swaths of some of Indonesia's last pristine forests.

"As prime land becomes scarce on other islands, companies are turning their eyes to Papua," Gaveau says. A study he did using data from the University of Maryland showed the Papua region had lost 6,000 km^2 of forest between 2000 and 2017. The rate of deforestation has accelerated in recent years, hitting highs of 980 and 850 km^2 respectively in 2016 and 2016.

Since 2000, meanwhile, the span of industrial plantations in the region, mainly for oil palms, has nearly quadrupled, with the fastest growth coming in the districts of Boven Digoel and Merauke, in Papua province. According to Gaveau's study, about 30 % of all forest loss since 2000 in the region has been caused by clearing for industrial plantations.

In the past two years, the Indonesian Ministry of Environment and Forestry has relinquished to palm oil companies several tracts of land previously designated as forest zones. In the most recent such instance, dozens of square kilometers of forest, including carbon-rich peatland, were handed out to PT Sawit Makmur Abadi, an oil palm company operating in Papua's Nabire district. Gaveau says that when he presented his findings to officials in Papua, they denied that any new concessions had been granted in the years when the data suggested deforestation had peaked. Another surprise finding was that after the spike in 2015 and 2016, there was a sharp dip in deforestation in 2017. Gaveau says he doesn't have the answers to those questions yet, and that eventually the Papua Atlas will be able to shine a light on them. "Our concession maps [used in the atlas] are better than what we used to have, but there's still a lack of information," he says. "For example, we don't always know the permit date [of the concessions]."

While the Papua Atlas is a work in progress, it already marks an improvement over its predecessor, the Borneo Atlas. Also developed by CIFOR, the Borneo Atlas allows users to verify the location and ownership of more than 460 palm oil mills on the island and monitor deforestation in surrounding areas. Data about ownership show which companies linked to plantations are encroaching on forests and peat lands. It falls short, though, in its concession data, Gaveau says.

The key difference between the Papua Atlas and the Borneo Atlas is that this time around, CIFOR is working closely with local officials to ensure that their planning and policymaking benefits from the tool, Gaveau says.

"We are consulting with local government people in charge of land-use planning like the regional development planning board [Bappeda], the environmental agency [DLH], and the public works agency," he says. "We had good feedback from Bappeda and DLH because they think the data we're presenting will be useful to them to review licenses."

Gaveau says local officials are now reviewing oil palm licenses, a process begun before President Joko Widodo signed a nationwide moratorium in September on palm oil plantation licenses. The moratorium freezes the issuance of new licenses and instructs national ministries and local governments to carry out a sweeping review of oil palm licensing data.

"Papua is essentially an area slated with development, there's a lot of road development," Gaveau says. "It's still in pristine state but things are changing rapidly, so by understanding [the region] on a real science basis, it will make the local government better manage the region."

Papua is one of the richest regions of Indonesia in terms of natural resources, but ranks at the bottom for human and infrastructure development. Over a quarter of its residents live below the poverty line, more than double the national average of 10.7 percent, according to March 2017 data from the Central Statistics Agency.

The government's development plans for the region include the Trans Papua highway, expected to go into operation this year; full electrification across Papua and West Papua by 2019, from the current 47 percent; and building seaports that are part of the wider maritime highway program.

Researchers and environmentalists have voiced concerns over the scale of the programs, however, citing the potential environmental impact and social cost to local communities. Papua is home to a large number of indigenous communities that rely heavily on the island's forests, rivers and pristine coastlines for their food, fuel, housing materials and general livelihoods.

"New roads are being built to link the provinces of Papua and West Papua, and we know that with roads comes deforestation," says CIFOR's Agus, a geographic information systems (GIS) expert. He says he hopes that the Papua Atlas he helped develop can guide policymakers to a development path for the region that doesn't entail mass destruction of its forests and indigenous communities. "Papua is important — it's the last frontier of Indonesia, and one of the last in the tropical world," Agus says. "The question is, what do its people want for the future?"

- https://news.mongabay.com/2018/10/real-time-plantation-map-aims-to-throttle-deforestation-in-papua/

Indonesia halts new palm oil plantation development

Indonesian President Joko Widodo has signed on Sept. 19 a moratorium on new licenses for oil palm plantations for three years. The policy appears to constitute a freeze on the entire licensing process for oil palm plantations in Indonesia, the world's top producer of palm oil. The moratorium explicitly applies not just to new requests for licenses but also to projects that have obtained some but not all of the permits needed to begin operating.

A moratorium on conversions of new peat lands was established in 2011 to improve management and reduce fires, but campaigners say this is sometimes ignored when local governments grant concessions. Poor spatial data and overlapping forestry maps are a major hindrance for authorities trying to enforce regulations governing them. In 2015, the government banned new development on all peat lands after swathes of peatlands were drained for use as plantations in recent years, creating highly flammable areas. The decision comes as Indonesia and Malaysia battle a move by the European Parliament to ban the use of palm oil in biofuels.

The policy constitutes not just a freeze on new licenses, but an order for the relevant central government ministries and regional governments to conduct a massive review of oil palm licensing data. The review is to be presided over by the Coordinating Ministry for Economic Affairs, which is supposed to report to the president every six months on the progress of the initiative.

The Indonesian Forum for the Environment (Walhi), the country's largest environmental NGO, welcomed the issuance of the moratorium but suggested the president should have signed it much earlier. Ideally, Walhi said in a statement, the moratorium would stay in place for 25 years, because "environmental recovery takes a long time."

- https://news.mongabay.com/2018/09/indonesian-president-signs-3-year-freeze-on-new-oil-palm-licenses/
- https://www.france24.com/en/20180920-indonesia-halts-new-palm-oil-plantation-development
- http://en.tempo.co/read/922794/wetland-international-lauds-jokowis-peatland-protection-act/full&view=ok

Smallholder oil palm: the big challenge in peatland oil palm control. Riau, Indonesia. Photo: Hans Joosten.

Indonesia tries another moratorium - Comment in Palm Oil Monitor –1st October 2018

The Indonesian government has said that it has put in place a presidential instruction that halts new palm oil developments for three years. Various environmental groups have welcomed the announcement, but it should be viewed with a degree of scepticism. First, it's a presidential instruction or 'inpres'. This means it is a declaration from the office of the President, rather than a piece of legislation created by the President ('Perpres'). 'Inpres' declarations are best described as lower-level laws in Indonesia's legal hierarchy. Often these lower-level laws lack implementing regulation from the relevant ministry, and/or the relevant sub-national government. These means that although it is a legal instrument, the lack of regulation means it can't be implemented. Second, even with implementing regulation, that doesn't mean the laws themselves are enforceable, meaning compliance might be low. Any number of decrees may be issued from Jakarta that will require implementing regulation from provincial authorities. But as has sometimes been the case, the provinces can have an adversarial relationship with Jakarta. Added to this is that resources for compliance and enforcement aren't always there. Indonesia is a big country, but has limited resources. Provincial heads may simply not have the fiscal means to support large-scale reviews of oil palm plantation permits. Third, we've been here before. In 2009, in the lead-up to the Copenhagen climate conference, President Yudhoyono issued what was effectively a moratorium on forest clearing. This was partnered with a USD 1 billion grant from the government of Norway as an incentive payment. But the fact of the matter was that the moratorium simply did not slow forest loss. In the six years after the announcement forest loss *increased*.
So why has the announcement been made now? The EU's planned restrictions on palm oil biofuels for the Renewable Energy Directive are without doubt causing producer nations a high degree of concern. Much of the language that the EU is using concerns risk of land use change (direct or indirect) in high carbon stock forests. A moratorium – if enforceable – would lower that perceived risk.

Hanging in the balance: Preservation, restoration and sustainable management in Indonesian peatlands

The need to protect remaining peatlands while restoring degraded lands resounded throughout the Tropical Peatlands Exchange, held at the Center for International Forestry Research (CIFOR) headquarters on Aug. 8, 2018. The event aimed to provide recommendations and data to support Indonesia's policies and goals related to its peatland ecosystems. The country's nationally determined contribution (NDC) to the Paris Agreement targets a 29% reduction in carbon emissions by 2030, or 41% if provided with external assistance, which some have described as ambitious. The Indonesian Ministry of Environment and Forestry's Climate Change Mitigation Director Emma Rachmawaty said that Indonesia's NDCs could be achieved by implementing mitigation actions across four areas – reducing deforestation; reducing degradation; rehabilitation of forest and land; and peatland restoration. If all stakeholders complied with existing government regulations, Rachmawaty posited, the country could be confident about achieving its targets by 2030.

- http://foreststreesagroforestry.org/hanging-in-the-balance-preservation-restoration-and-sustainable-management-in-indonesian-peatlands/

Shoot-on-sight order issued in Riau as growing forest and peatland fires cause choking haze

A commander tasked with preventing fires in Riau said he has issued a shoot-on-sight order across the Indonesian province against those found clearing land by burning, as growing forest and peatland fires shroud several areas in smog ahead of the Asian Games. The order came as satellites detected 121 hot spots in Riau on Aug 16 - a big jump from the 22 spots detected the day before. "Ninety-nine per cent of the land and forest fires in Riau Province are related to the intentional acts of irresponsible people," Brigadier-General Sonny Aprianto, Commander of the Riau Land and Forest Fire Task Force, was quoted by Antara news agency. He said he had ordered army personnel to shoot "arsonists" across Riau. The Indonesian military has previously issued similar orders, as was the case in Jambi, central Sumatra, last year, to deter fire culprits.

- https://www.straitstimes.com/asia/se-asia/shoot-on-sight-order-issued-in-riau-as-growing-forest-and-land-fires-cause-choking-haze

Using fire for clearing land in Kalimantan, Indoensia. Photo: John Couwenberg.

Malaysia

New money for Sarawak Tropical Peat Research Institute

The Sarawak government will allocate RM5 million for the research on peat soil by the Sarawak Tropical Peat Research Institute (Tropi). Chief Minister Datuk Patinggi Abang Johari Tun Openg said journals that the funding of the research will help counter the campaign against the palm oil industry. "This funding is also to be used to compile all the scientific and academic research in one book," he said when attending Tropi's 10th anniversary dinner on November 21. He added that the books, once they are made available globally, will also show Sarawak's commitment to environmental conservation through proper planting of oil palm on peat soil based on the research by Tropi. "We need to do a lot of research for people to better understand peat soil. It is vital to counter the negative perceptions of oil palm plantations establishedon peat soil," said Abang Johari. This, he pointed out, is important as 13 per cent of land in Sarawak is peat – forming up to 70 per cent of all peat land in Malaysia. On another note, he also called upon Tropi to expand its scope to not only conducting research on oil palm, but also on other commodities. "If you cannot get funds from the federal government, the GPS (Gabungan Parti Sarawak) government can give you funds," said Abang Johari in response to an earlier speech by Tropi director Dr Lulie Melling, who lamented that the centre's research budget from the Malaysian Palm Oil Board (MPOB) had been terminated. Meanwhile, Lulie in her speech said the RM3-million research grant from MPOB was terminated just as Tropi was about to publish the findings of its research in the High Impact Factor Journals.

"We have done so much for the oil palm industry which has also benefitted MPOB and the Ministry of Primary Industries; for example, in combating the EU's current bias against palm oil," she said. She added had the RM3-million MPOB allocation for research by Tropi was fully justified as Sarawak had been paying millions in oil palm cess to the federal government and last year, the total amount paid was RM53 million. "Yet, our allocation of a mere RM3 million was recently terminated. Our research progress had been greatly crippled by the withdrawal of the much needed resources, just as Tropi has started to run as a world class laboratory," she added. She also said the centre was established under the mandate of the Sarawak government in June 2008. "Tropi was established to counter the unjustified onslaught of world criticism of our attempts to convert peat lands into arable land." Lulie said that while the West has been blatantly utilising their peat lands unabated, their non-governmental organisations had been condemning the utilisation of peat soil for agriculture in Sarawak.

- http://www.theborneopost.com/2018/11/22/countering-negative-claims/

Recent peat swamp destruction for oil palm in Sarawak. Photo: Hans Joosten.

KUCHING: Sarawak's very own tropical peat soil expert Dr Lulie Melling has once again done Sarawak and the country proud by becoming the first from Asia to be elected as a member of the Executive Board of the International Peat Society (IPS). The Malaysian Peat Society (MPS) chairperson's appointment into IPS Executive Board following the IPS 2018 meeting held in Rotterdam, Netherlands recently proves that Malaysia is now recognised as among the top in tropical peat and scientific research.

"Tropical peatland is a very important Sarawak resource. With both research and innovation, tropical peatland, which was once regarded as a wasteland, has now become a very important arable land for both food and economic security to the state. "Therefore, being in IPS is a very good platform of cooperation at the international forum and my appointment will help to draw their attention towards the state's commitment to both development and conservation," Dr Lulie told The Borneo Post here yesterday [September 18, 2018].

- http://www.theborneopost.com/2018/09/18/another-feather-in-the-cap-for-dr-lulie/
- http://www.theborneopost.com/2018/10/28/championing-the-cause-of-peatland/

Mongolia

Do Mongolian peatlands have a future? News from Mongolia.

Tatiana Minayeva (Tatiana.Minayeva@wetlands.org), who also made all pictures

While the grandson of Chimed (see Mongolian story in the IMCG Bulletin of April 2018) is waiting for future, we are trying to maintain the peatlands in his homeland Khashat. This year was extremely wet in Mongolia. While Europe was suffering from heat waves, it was raining in Mongolia and temperatures did not exceed 20 degrees. Mongolia became green!

The mire restoration experiment in Khashat funded by the Asian Development Bank as a one year pilot involved fencing of three springs, placing small dams in flows - both natural ones and originating from cattle paths, and the reparation and fencing of a large dam in order to create an alternative water source for animals. The project was described in detail in the IMCG Bulletin of April 2018.

In July we had planned a volunteer camp to continue with restoration and monitoring. As not many volunteers could participate because of the short notice, our company 'Care for Ecosystems' (CfE) decided to organise a

small expedition to monitor the restoration processes, assess the status of the installations and where possible do further restoration. We got support from the Mongolian-Russian Biological Expedition, which provided a car with driver and gasoline. We thank them very much.
The expedition was held at the end of July for one week and involved Mongolian scientists (Dugarjav, Zoyoo, Bureenbataar), Tania (CfE) and two angels - Tsogoo of CfE and Nikolay of the Mongolian-Russian Biological Expedition – who were driving us around and looked that all went smoothly. The installations we found in great condition. The local administration had put signs on all fences (springs and dam), explaining that behind the fence is a 'water object'. The list of forbidden activities does not include pasturing, but nevertheless. We found it very nice.

The pond behind the dam was more than full and we again and again insisted on the implementation of Ab Grootjan's recommendation to install an overflow duct. The concrete pipe is still lying on top of the dam in the wrong direction and not being used. Local people are extremely suspicious to pipes as well as to fences. Difficult to convince them.
In the fenced area around the spring we saw a nice vegetation development with peatland related species establishing installed promising populations, only one year after fencing, with *Carex caespitosa* on the hummock and a good collection of sedges, grasses and mosses in the spring area. The purple moor-grass *Molinia caerulea* is frightening active there.

Small dams had been ruined and 'cattle channels' are perfectly further draining peatland.

We were considering to restore and fence the small dams. And then suddenly six volunteers from "Scouts of France" materialised on the spot. Chimed, Nikolay and the volunteers built a new beautiful dam under the

scientific supervision of Dugarjav and Zoyoo. And the boys under guidance of Tsogoo constructed a fence from material provided by Chimed. And everybody was happy at the end.



We thank all “angels of the year” very much, especially the Scouts of France whose names are in the piece of paper below. We have no contact data of the volunteers. So in case anybody recognises the boys: please share these notes with them.

Wetlands International leads strategic planning for peatlands of Mongolia

Wetlands International implemented a consultancy project for the development of a Strategic Plan for peatland restoration and sustainable management in Mongolia, funded by the Asian Development Bank. Mongolia’s peatlands preserve permafrost and other water reserves in its riverine and highland landscapes which prevents desertification and supports livelihoods and biodiversity downstream. They are also the most productive pastures and important carbon stores. Their current rapid loss leads to disasters for people and their cattle during long periods of droughts.

The peatlands of Mongolia used to cover almost 2% of the country and now they are rapidly vanishing. Being located in large river valleys and highlands, these naturally wet ecosystems accumulate a lot of precipitation, serving as water storage basins. As such they maintain wet habitats and pastures, feed rivers, prevent soil erosion, maintain levels of groundwater necessary for forest and crop growth, and keep wells full of water.

The overgrazing of peatland based pastures and mining for subsoil resources are however threatening the peatlands. Combined with increased periods of drought causing forest fires and permafrost thawing, thousands of hectares of peatlands have been lost in the Orkhon, Ider and Onon valleys and Darkhat intermountain basin and a number of other areas.

Current information regarding the distribution, natural functions, threats, and status of peatlands in Mongolia is poor and insufficient. This contributes to the lack of attention to peatlands in national development plans and land use planning. Wetlands International and its partners implemented a rapid assessment study, contributed to enhancing capacity of key stakeholders at the national and local levels, and assisted to enable nationwide dialogue with stakeholders to facilitate the national priority actions for sustainable peatlands management in Mongolia. The strategic planning had been supported by a demonstration pilot project on peatlands management and restoration. The pilot demonstrated a possible peatland management approach developed together with local herders.

The carbon emissions from Mongolia's peatlands are estimated at up to 45 million tons per year which makes Mongolia the seventh largest global emitter of CO_2 from degrading peatlands. These are not yet included in Mongolia's total net GHG greenhouse gas communications, which in 2006 amounted to only 15.6 million tons of CO_2 equivalent, largely from the energy sector. The up-to-date overview of the distribution and status of peatlands in Mongolia is urgently needed to improve estimation of GHG emissions and formulate priority actions. Mongolia intends to establish a cross-sectoral Technical Working Group that facilitates NDC implementation explicitly aligned with national development plans/policies and the SDG. Wetlands International came with a proposal to assist Mongolia in integration of peatlands related activities in the next version of the NDC.

The project is implemented by the Mongolian Ministry of Environment and Tourism in collaboration with the Institute of General and Experimental Biology of the Mongolian Academy of Sciences, the Institute of Geography of the Mongolian Academy of Sciences, MonMap Ltd and SarVision. The project is managed by Wetlands International, which is also providing international peatland expertise. Know more about the work from this report by Asian Development Bank. For more information, see

- https://www.wetlands.org/download/15560/
- https://www.wetlands.org/download/15566/
- https://www.wetlands.org/news/wetlands-international-leads-strategic-planning-for-peatlands-of-mongolia/

Singapore

Burning Indonesian peat causes haze in Singapore

Every several years, an El Niño affects the Pacific Ocean regions, causing significant drought and fires. During the 2015 El Niño, Indonesia experienced an intense fire season which lasted from September through October, emitting an abundance of carbon dioxide and methane into the atmosphere and causing massive smoke plumes to form over neighboring countries, including Singapore. Department of Civil and Environmental Engineering Professor Charles Harvey and Fuu Ming Kai, a former postdoc from the Singapore-MIT Alliance for Research and Technology, worked in collaboration with researchers from the University of California at Irvine to publish a paper in the *Proceedings of the National Academy of Sciences,* where they discuss radiocarbon measurements on the Indonesian fires and confirm that the smoke is originating from burning peatlands, rather than the popular belief of deforestation and waste burning. Their study found that the carbon of the smoke plume had an age ranging from 1,000 to 3,000 years old. This confirmed that approximately 85 % of the smoke was come from burning peatlands.

- http://news.mit.edu/2018/mit-researchers-peat-burning-sumatra-causes-severe-haze-singapore-1121
- https://www.eurekalert.org/pub_releases/2018-11/uoc--uor111418.php

Singapore firms can now get insured for damages caused by the smog from burning Indonesian peatlands

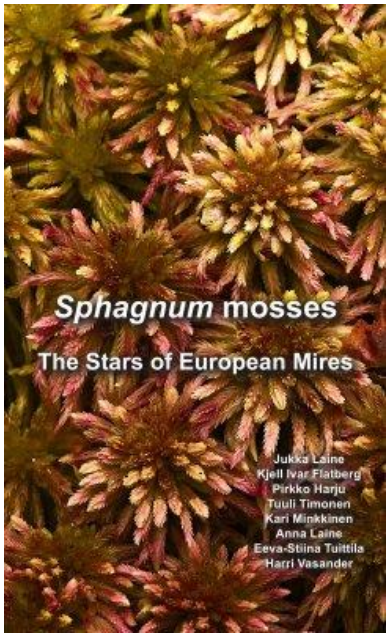
Zurich-based insurer Swiss Re has launched the first insurance product that specifically protects companies against the seasonal air pollution caused by burning peatlands in neighbouring Indonesia. Payouts for Swiss Re's HazeShield insurance are triggered when the air quality deteriorates beyond a certain threshold on the National Environment Agency's Pollutant Standard Index (PSI)—there's no need to give the insurance company evidence of losses or damages to make a claim. To prevent abuse of the scheme, for instance agribusiness firms buying insurance cover and then deliberately starting fires, companies in Indonesia and Singapore-based firms

that maybe involved in slash-and-burn forestry in Indonesia are not eligible. Businesses in the city-state lost an estimated US$1.3 billion to the last two major haze events, in 1997 and 2015, with the tourism, hospitality, transport, and education sectors the most severely affected.

- https://www.eco-business.com/news/lost-business-to-the-haze-theres-insurance-for-thatand-payouts-are-triggered-by-air-pollution/

Europe

Sphagnum Mosses: The Stars of European Mires



Jukka Laine, Kjell Ivar Flatberg, Pirkko Harju, Tuuli Timonen, Kari Minkkinen, Anna Laine, Eeva-Stiina Tuittila & Harri Vasander proudly present the 60 Stars of European *Sphagnum* mosses for both identification in field conditions and for microscopic work in the laboratory. The main emphasis is on the illustrations, mainly photographs, showing both macroscopic and microscopic characteristics of the species. Distribution of each species in Europe is given as well as the latest changes in taxonomy. This book is a collaboration among museum based botanists, field ecologists and peatland scientists and teachers. This new magnificent book will help both field ecologists and palaeo-ecologists/geologists in their demanding work of *Sphagnum* identification, and — also hopefully — reveal the beauty of the peatlands even in the smaller forms. The book includes 326 pages and appr. 1000 high quality photos, bw line drawings, tables etc. Price: 69 € + postage. Orders, questions etc: https://holvi.com/shop/Sphagna/, kari.minkkinen@helsinki.fi, harri.vasander@helsinki.fi

Austria

Can it be a little moor?

Many peatlands in Austria are drained for peat extraction and agriculture. A drained peatland soil compacts and sinks, many meadows or fields often suffer from waterlogging despite drainage, and rush can spread and reduce the fodder value. The waterlogging also causes problems with the passability of conventional machines. Forestry can also be difficult, as the risk of wind shedding is high.

When switching to wet farming, these disadvantages are eliminated. In addition, a wet peatland can retain the water, provides flood protection, is an important carbon reservoir and habitat for special animal and plant species. Paludiculture could above all serve as a buffer zone between well-preserved peatland areas and areas with more intensive agricultural use, where both sides benefit.

Peatmosses (*Sphagnum*) grow naturally in acidic, wet habitat. They are successfully planted on rewetted raised bog soils in long-term trials in Germany and Canada and represent an alternative to peat in garden soil. A first project in Ibmer Moor, Upper Austria, will investigate peatmoss growth on a rewetted area. Fens are usually more nutrient rich and less acidic than raised bogs. Paludiculture possibilities on fen soils include, for example, reed, bulrush or reed grass, for energy production (in biomass power plants) or material use (for roofing and wall insulation) or low-intensity grazing with water buffalos or other robust bovine species. Mowing litter meadows, which has been practiced for centuries, also belongs to this form of agriculture as well as cultivating black alder, of which the wood can be used as timber. If you are interested, please contact: stephan.glatzel@univie.ac.at

Belarus

Belarus to restore over 12,000ha of forest peatlands

More than 12,000 hectares of disturbed forest peatlands will be restored in Belarus. The project will be carried out in the four territories of Zhad, Ostrovo, Berezovik and Gorodok. Plans are in place to use the experience to

develop a long-term plan for the sustainable use of 260,000 hectares of drained peatlands covered with forest in Belarus. Today, Belarus is one of the world leaders in the wetland restoration. According to international technical assistance projects, 51,000 hectares of drained wetlands have already been restored in the country. The Wetlands project, which is funded by the Global Environment Facility and implemented by the UNDP in partnership with Belarus' Natural Resources and Environmental Protection Ministry, will also contribute to this work. The project started in November 2017 and is designed to run for five years. Belarus' Natural Resources Ministry has drafted the bill on the protection and use of wetlands (peatlands) which is unmatched in Europe. The document has been submitted for public discussion. Read full text at: http://eng.belta.by/society/view/belarus-to-restore-over-12000ha-of-forest-peatlands-under-wetlands-project-115346-2018/

Bulldozers over Almany threaten the Greater Spotted Eagle

Road construction through Belarus' Almany Mires is devastating ancient bogs in one of the country's Important Bird & Biodiversity Areas. With globally threatened species like the Greater Spotted Eagle (*Clanga clanga*) in jeopardy APB – BirdLife Belarus is leading the charge to stop the bulldozers.

Two years ago, plans for 'Forestry road #3' quietly received an official stamp of approval in a ministry office in Minsk. Construction work began without fanfare in August 2017. And then, earlier this summer – and quite by chance – conservationists were alarmed to discover what was happening. Bulldozers are ravaging Belarus' Almany Mires (Al'manskija baloty), the largest complex of intact natural bogs in Europe. 20 km of road are planned with at least 6 km over ancient bog.

Almany Mires, Belarus. Photo: APB-BirdLife Belarus

The devastation wrought upon nature is astounding, which begs the question – how did plans to build in a protected area make it past the country's Environmental Impact Procedure? If officials hoped to escape public debate over the road, then they severely miscalculated. BirdLife partner, APB is leading the charge to stop the road construction by informing the public of what exactly is at stake.

The road will undoubtedly alter Almany's unique landscape. It will act as a dam: on one side, the bog will collect water, gradually turning into a reservoir; on the other side, drainage will dry out the bog. Either way, local flora and fauna will be very adversely affected. This is all the more worrying as a national wildlife sanctuary covers some 942 km^2 of the mires and the whole area is a BirdLife IBA (Important Bird and Biodiversity Area), home to stunning species such as Black Stork, Short-toed Eagle, Common Crane and Great Grey Owl.

Almany Mires, Belarus. Photo: APB-BirdLife Belarus

Conservationists are particularly concerned about the road's impact on the mires' Greater Spotted Eagle population. Belarus is one of the few countries where this globally Endangered species can still be found and the country's biggest population (18-20 pairs) is found right here. This eagle is extremely sensitive to human disturbance and ornithologist Dr. Valery Dambroŭski notes that "The Greater Spotted Eagle nesting area is just one kilometer off the place where the road is being built. It is crystal clear that the habitat transformation as well as other disturbing factors will impact the birds."

APB – BirdLife Belarus has already put its case to both the Public Prosecution Office and the Ministry of Natural Resources and Environmental Protection in the hopes of securing an immediate injunction to construction. In the long term, it is clear that the Almany Mires needs to get official 'Wilderness Reserve' status as the presence of the wildlife sanctuary does not prohibit economic activity. APB is also hopeful that international intervention may yet secure the fate of the whole Prypiać Paleśsie territory, including Almany, with preparations for a UNESCO World Heritage proposal already under way for next year. With the recent announcement that the government plans to build more roads, the ancient peatlands of Almany may not have that long to wait.

- https://www.birdlife.org/europe-and-central-asia/news/bulldozers-over-almany-threaten-greater-spotted-eagle

Germany

New Chair for peatland research at the University of Greifswald

The government of the German federal state of Mecklenburg-Western Pomerania and the University of Greifswald are setting up a W3 professorship for Peatland Sciences. "Climate change and climate protection concern us all," stressed Science Minister Birgit Hesse at the signing of the agreement in the state capital of Schwerin. "Peatlands do a lot for the ecological balance, but are strongly threatened through human use. The scientists from Greifswald are working on how people and agriculture can use peatlands without exploiting them. We want to support this commitment with the new professorship," said Hesse.

Mecklenburg-Western Pomerania has about 300,000 hectares of peatland. This corresponds to about 13 percent of the state's surface area. In the past, a considerable part of the peatlands was drained for agricultural use, as were 98 percent of the peatlands in Germany. With emissions of more than six million tonnes of carbon dioxide equivalents per year, drained peatlands are by far the largest single source of greenhouse gases in the federal state. They must be consistently rewetted. At the University of Greifswald, approaches are being developed that combine plant production at high water levels with the potential to utilize these plants.

"Peatland research at the University of Greifswald is recognised throughout Germany and makes an important contribution to the management and conservation of these natural resources. It is an outstanding example of how administration and research cooperate very well in various areas for the good of the state," emphasised

Agriculture and Environment Minister Dr. Till Backhaus. "With the establishment of a peatland professorship, this branch of research will be placed on a reliable long-term foundation and the scientific location of Vorpommern will be further strengthened," said Backhaus.

- https://www.regierung-mv.de/Landesregierung/bm/Presse/Aktuelle-Pressemitteilungen/?id=145767&processor=processor.sa.pressemitteilung

The first high-quality growing media produced from pure Sphagnum biomass. Photo: Hans Joosten.

Germany promotes innovations for the reduction of peat in growing media

The German Federal Ministry of Food and Agriculture has announced a major research program to reduce peat content in growing media and to develop peat alternatives. The use of peat in growing media in Germany is an important national and international issue in the field of horticultural production. The 2016 Federal Climate Protection Plan 2050 contains measures to gradually reduce peat extraction and the use of peat as a growing medium and to discontinue it in the long term. There is considerable potential for reducing greenhouse gas emissions by reducing the use of peat. Peat replacement has been the subject of R&D projects for some time now, but peat is still the most important raw material for growing media. This is due to its good availability, favourable price, very good plant cultivation properties and associated high crop safety. On the other hand the climate-damaging effects of peat use incite an increasing interest in alternatives if equivalent alternatives are available under economically justifiable conditions. The Federal Ministry of Food and Agriculture (BMEL) therefore wants to promote the development of alternatives and in particular minimise obstacles to the conversion to peat-reduced or peat-free substrates.

The program focuses on new strategies in organic farming as well as other forms of sustainable agriculture without peat and on the sustainable production and use of renewable raw materials as peat substitutes in growing media. In particular, support will be given to projects aimed at innovation in the following areas:

a) Availability, quality improvement and practical use of alternative substrate raw materials (substitutes), targeted cultivation of plants supplying substrate raw materials and the use of horticultural cultivation substrates that lead to a substantial reduction in the use of peat (the peat content in the substrate should be as low as possible as 50 %; less peat or freedom from peat is desired)
b) Identification of relevant biological quality parameters
c) Revision of existing and establishment of new quality control methods.
d) Peat-free or strongly peat-reduced cultivation methods

Peat extraction site in the Esterweger Dose, Germany. Photo: Hans Joosten.

The international **WETSCAPES Conference**, September 10-13, 2019 in Rostock, Germany, will bring together researchers and practitioners working on pristine, drained and rewetted fen peatlands and coastal wetlands.

Conference topics:

- Greenhouse gas exchange in space and time
- Element cycling and export
- Peatland bio-hydrology
- Plant growth and decomposition
- Microbial pathways
- Palaeoecological methods in restored peatlands
- Legacy of degradation in biotic communities
- Mapping with GIS and remote sensing

Make sure to take part!

MoorFutures from Polder Kieve sold out!

Moor Futures

Ihre Investitionen in Klimaschutz

The world's first site for the generation of carbon credits from peatland rewetting, Polder Kieve, is sold out! The 14,325 MoorFutures at a unit price of 35€ per ton CO_2 were sold in full five years. The proceeds of €500,000 are used to cover the project costs

Mecklenburg-Western Pomerania's Environment Minister Dr. Backhaus is delighted: "We have shown that it works: climate protection projects for the voluntary carbon market can also be realised in Germany! When we started the project in 2011/2012, very few people thought we would be able to do so". At around 70%, the

proportion of purchases by private individuals is surprisingly high, even if this only accounts for just under 10% of the MoorFutures due to the relatively small individual quantities per purchase. Minister Backhaus: "I am very pleased that so many private individuals have also bought MoorFutures, as it shows that climate protection has arrived in the middle of society". Private purchases mainly serve to voluntarily offset their own greenhouse gas emissions, but MoorFutures have also been used as an attractive gift on various occasions. About 90% of the certificates were purchased by a wide variety of industries. The buyers include companies based in Mecklenburg-Vorpommern, supraregional active enterprises, like the management consultation Cassini, McDonalds or the Commerzbank AG. MoorFutures have also been included in the portfolios of relevant intermediaries such as ForestFinance or Klimapatenschaft. Last but not least, scientific institutions such as the Helmholtz Centre for Environmental Research (Helmholtz-Zentrum für Umweltforschung) offset emissions caused by their business travel by purchasing MoorFutures.

"The success is spurring us on to implement further projects in the country," emphasizes Minister Backhaus, "we will soon be starting a new location. One of the most recent buyers is the textile company Engbers GmbH & Co KG, which operates in Germany and Austria. In addition to a further project abroad, the company voluntarily improves its greenhouse gas balance by participating with a larger share in MoorFutures from Polder Kieve. The main focus here is on the logistics of imported goods, packaging, the vehicle fleet and business travel. Environment Minister Backhaus: "The fact that a supra-regional company like Engbers supports MoorFutures shows me that the high quality of our carbon certificates is now recognised throughout Germany! Voluntary measures like these are becoming increasingly important if we are to achieve the goals of the Paris Agreement." "We are part of a whole. That also means assuming ecological responsibility," says Bernd Bosch, owner and managing director of Engbers GmbH & Co KG. "For many years now, we have been actively committed to environmental protection, from photovoltaic systems to reduced energy consumption and climate-neutral shipping. With the climate protection project MoorFutures, we have now taken the next step, whereby it was particularly important to us to promote a project in Germany in addition to nature and biodiversity."

- https://www.regierung-mv.de/Landesregierung/lm/Aktuell/?id=144478&processor=processor.sa.pressemitteilung

Groundbreaking sundew cultivation ceremony with (l-r) minister Till Backhaus and enterpreneurs Jenny Schulz and Balázs Baranyai. Photo: Hans Joosten.

First commercial sundew cultivation site

Agriculture Minister Dr. Till Backhaus of the German federal state of Mecklenburg-Western Pomerania celebrated on 2 October the start of a promising paludiculture project in the Schaalsee biosphere reserve. Starting in spring 2019, sundew plants will grow on 3.5 hectares of the Breesener Moor, the rewetting of which is currently being prepared. The plants will later be processed into medicines, especially for respiratory diseases. The project sponsor is PaludiMed GmbH from Greifswald.

"With today's ground-breaking ceremony, we are showing the world that paludiculture is not just a theoretical concept, but that it is filled with life in Mecklenburg-Western Pomerania," said the Minister. "Thus I can justifiably say that today we are all writing a piece of history in matters of paludiulture".

With emissions of more than six million tons of carbon dioxide equivalents per year, drained peatlands are by far the largest single source of greenhouse gases in Mecklenburg-Western Pomerania. "If we really want to achieve the climate protection goals of Paris by 2050, that clearly means that the drained peatlands must be consistently rewetted," Backhaus emphasized. However, not all peatland sites used for agriculture can be taken out of production. In Mecklenburg-Western Pomerania, almost 60 percent of the peatlands are being used for agriculture, about 21,000 hectares as arable land and 144,000 hectares as permanent grassland. For this reason, the University of Greifswald is developing approaches to cultivate commercial crops at high water levels. The Ministry of Agriculture supports this research with its "Paludiculture Strategy" adopted in December 2017.

PaludiMed GmbH emerged from a paludiculture research project at Greifswald University. The current managing directors developed a method to cultivate sundew on peatmoss on a large scale. Due to drainage of its habitats, sundew, which requires wet, nutrient-poor soil, is on the Red List of endangered species in many European countries and is only collected from nature in Finland and Africa. The global market potential for sundew as a raw material for pharmaceuticals is estimated at up to 100 million euros. "I would of course be very pleased if this project were to be followed by further examples of the successful implementation of paludicultures as soon as possible," said the Minister. Information on the project: www.paludimed.eu

- https://www.sueddeutsche.de/news/wissen/umwelt---roggendorf-fleischfressender-sonnentau-wird-im-breesener-moor-angebaut-dpa.urn-newsml-dpa-com-20090101-181002-99-208574
- https://www.regierung-mv.de/Landesregierung/lm/Service/Presse/Aktuelle-Pressemitteilungen/?id=143380&processor=processor.sa.pressemitteilung

Wet peatlands do not burn

At the beginning of September, a peatland fire broke out on a test site of the German Armed Forces (Bundeswehr) near Meppen, Lower Saxony. On their behalf, an Airbus combat helicopter had fired a rocket with a so-called high-explosive warhead for test purposes. Extinguishers were not on the scene, so that the fire got out of control and could spread over up to 12,000 hectares. The smoke swaths temporarily went as far as Bremen, 130 kilometres away, and the smoke could even be seen from space. The county had to declare a catastrophe. The public prosecutor's office is investigating on suspicion of deliberate arson. More than 1500 firefighters were engaged in fire-fighting operations. The fire catastrophe does not only cast a bright light on the problems of the Bundeswehr. It also raises awareness of a topic that otherwise receives little attention: that peatlands are not simply fallow land with which one can do whatever one wants. Rather, they are special ecosystems that require special protective measures - especially when it comes to climate protection.

According to Federal Environment Agency figures, German peat soils cause emissions of almost 50 million tons CO_2-e per year, being four percent of Germany's total greenhouse gas emissions. In addition, drained bogs - such as the one on the Bundeswehr premises near Meppen - represent a major fire risk and are very difficult to extinguish. Underground peat fires continue to smoulder for a long time. It is even possible for a fire to continue under a blanket of snow in winter and to break out again in spring. This releases a lot of carbon dioxide, estimates for the Meppen peatland fire being estimated between one and two million tonnes of CO_2.
For climate protection it is therefore important to restore peatlands by raising water levels. This is already happening, but on a very small scale. "A much larger area of peatland in Germany must be rewetted," Franziska Tanneberger of the Greifswald-Mire-Centre told the Frankfurter Rundschau. This would also enable the Federal Republic to meet its climate policy obligations. There is also a promising alternative for peatlands used for agriculture, says the landscape ecologist, namely "paludiculture". This can be used to earn money and at the same time the peat is preserved and even newly formed. The Mire Centre calls this a "win-win option". Now the EU only has to change the funding guidelines of its agricultural policy, which until now have been aimed at the opposite, namely drainage-based peatland use. This makes double sense because the EU is the second largest emitter of global greenhouse gas emissions from bogs after Indonesia. And Germany is one of the largest emitters within the EU...

- http://www.fr.de/wissen/klimawandel/klimawandel/bundeswehr-nasse-moore-brennen-nicht-a-1593035
- https://mobile.twitter.com/search?q=moorbrand%20meppen&src=tyah
- https://www.kreiszeitung.de/lokales/niedersachsen/moorbrand-meppen-gestank-auch-bremen-landkreis-osterholz-wahrnehmbar-10253353.html
- http://www.spiegel.de/wissenschaft/natur/meppen-moorbrand-setzt-hunderttausende-tonnen-co2-frei-a-1229135.html
- https://mediandr-a.akamaihd.net/progressive/2018/1107/TV-20181107-1118-4900.hi.mp4

Lower Saxony (light grey), district Emsland (dark grey), Military Technical Site 20,000 ha (purple) and the expansion of haze and smell of burning *https://www.noz.de/media/2018/09/20/grafik-noz_201809201218_full.jpeg*

Iceland

Government unveils steps to combat climate change

The Government of Iceland has unveiled an ambitious plan to fight climate change. The plan includes 34 major steps designed to limit CO_2 emissions with the goal of making Iceland fully carbon neutral by 2040. Among the steps outlined in the plan is a ban on the registration of new petroleum or diesel vehicles in 2030. The plan also calls for carbon sequestration through peatland restoration and reforestation. Katrín Jakobsdóttir, the Prime Minister of Iceland unveiled the plan at a press conference on Monday 10 September during the SER Europe Conference in Reykjavík. At the conference also two workshops on peatland restoration were held and a

keynote was given by Hans Joosten on ‘Progress, challenges and perspectives of peatland restoration for climate change mitigation’.
Katrín Jakobsdóttir told reporters that the task at hand was enormous, and that it was necessary to surmount many obstacles to achieve the goals outlined in the plan. It was therefore extremely important that the government had dedicating the necessary resources to achieve the goals. "We are embarking on a journey I hope will prove to be of enormous benefit to Icelandic society," Katrín said.

- https://icelandmag.is/article/government-unveils-steps-combat-climate-change-vehicles-using-fossil-fuels-banned-2030

Discussing peatland restoration at the SER Conference in Iceland, September 2018. Photo: Hans Joosten.

Ireland

End of an era as Ireland closes its peat bogs 'to fight climate change'
When Bord na Móna, the semi-state company that mines Ireland’s peatlands, recently announced the closure of 17 bogs, the news was greeted as the end of an era. Turning the soggy landscape that covers much of Ireland’s midlands into a fuel source had been a great national project, an ambitious undertaking launched by the republic’s founding fathers in the 1930s. Draining and cutting hundreds of thousands of hectares of turf on an industrial scale generated desperately needed jobs and reduced dependence on oil imports for almost a century. So there was some nostalgia when Bord na Móna announced it was closing 17 of its “active bogs” and would close the remaining 45 within seven years. Nostalgia but also acceptance, given the growing awareness that peat extraction emits greenhouse gases that worsen climate change, requiring a shift to renewable energy. “Decarbonisation is the biggest challenge facing this planet,” said Tom Donnellan, the company’s chief executive. The announcement followed promises by the Irish taoiseach (prime minister) Leo Varadkar to make Ireland a global leader in protecting the planet, backed by a €22bn government plan for climate action. By the end of 2019, the Irish government will eliminate all of the roughly €100 million in annual industry subsidies it now pays for peat-generated electricity. Bord na Móna, which supplies peat to the three remaining power stations burning it for electricity, announced in October that it would cut its peat supply for electricity by a third by 2020 and end it completely by 2027.
The problem, according to environmentalists and academics, is that it is all hot air. Renouncing peat extraction, they say, is too little, too late – a false solace because the ravaged peatlands will continue to emit greenhouse gases. And the government’s climate leadership pledge, they say, does not cancel out a dismal environmental record that has left Ireland potentially facing up to €600m in fines for missing emissions targets. John Sweeney,

a climate expert and geography professor at Maynooth University, said: “Climate change requires long-term thinking but the political cycle is much shorter and that of economically vested interest groups is shorter still.”

Bord na Móna appears to be morphing from climate villain to climate champion. Its annual peat extraction volume is forecast to tumble: from 3m tonnes in 2015 to an estimated 2m in 2020 and less than 1m by 2025. Its power plant in Edenderry, County Offaly, no longer burns peat and relies increasingly on biomass. During the 2017-18 financial year renewable energy, including wind and solar, accounted for more than 60% of the company’s power generation. Pat Sammon, a spokesman at the company’s headquarters in Newbridge, County Kildare, on the edge of the Bog of Allen, said: “We’re heading to a new era because the main business of the company had been extracting peat and that’s falling away now.”

But environmental experts are unimpressed. “It’s a bit of a smokescreen. It’s all revenue-driven,” said Florence Renou-Wilson, a research scientist and peatland expert at University College Dublin. Bord na Móna was closing bogs that were exhausted and no longer profitable, she said. “They’re all done and dusted.”

The company was seeking new markets for peat in horticulture, she said, and, worse, it seldom “re-wet” used bogs, so the ravaged land continue to emit greenhouse gases. “They’ve just been leaving them abandoned.”

Bord na Móna’s as well as those developed by private operators produce about 2.6 million tonnes of “fugitive” emissions from their extraction sites a year. Rehabilitation could make many of the bogs carbon neutral or even carbon sinks. Catherine O’Connell, the head of the Irish Peatland Conservation Council, said Bord na Móna’s decarbonisation talk was spin. “It’s genius what they’ve done. They’ve come out of this looking green. But they’re miners – they remove the living surface of the bog and dig down. Death by a thousand cuts.”

As an environmental policy goal, ending the cutting and burning of peat should have been “low-hanging fruit”, said Tony Lowes, the director of the group Friends of the Irish Environment. “But we have struggled to truly bring it under control because of its emotional attachment and cultural heritage.” Environmentalists say this fits a pattern of state authorities ducking climate commitments. Ireland emits 13 tonnes of greenhouse gases per person a year, the third-highest level in the EU. The UK emits eight tonnes per person. Under EU commitments, by 2020 Ireland is supposed to cut emissions by 20% from 1990 levels. The target for 2030 is 40%. Ireland is on track to exceed the first target by 16m tonnes and the latter by 50m tonnes, triggering fines estimated to range from €230m to €600m. "The country's decarbonization agenda is driving Bord na Móna's step down from peat," says Joe Lane, the company's chief operating officer. Even so, Ireland will miss its goal. Despite rapid growth in wind power and increasingly energy efficient homes and vehicles, it will struggle to reduce emissions by even 1%, says Phillip O'Brien, scientific officer for the Irish Environmental Protection Agency in Dublin. But in a country where peat smoke rises from chimneys every day, that's just a start. People cut peat to burn in their houses from another 600,000 hectares of peatlands, and there are few plans for rehabilitating these degraded bogs.

Last month, David Boyd, a UN special rapporteur on human rights, said Dublin’s failure to tackle climate change breached human rights. He made the comments in a legal submission to support a court case brought by Friends of the Irish Environment, accusing the government of “knowingly contributing to dangerous levels of climate change”. Earlier this year, Varadkar raised expectations of a rise in carbon tax, widely seen as a basic, vital step to curbing emissions. But last month’s budget left it unchanged at €20 a tonne. Richard Bruton, the minister for climate action and environment, acknowledged that Ireland was “far off course” and announced a plan to make every department responsive to climate change.

- https://www.theguardian.com/world/2018/nov/27/ireland-closes-peat-bogs-climate-change
- https://www.sciencemag.org/news/2018/12/power-peat-more-polluting-coal-its-way-out-ireland

BORD NA MÓNA	Bord na Móna has announced its strategy to decarbonise, accelerating moves away from its traditional peat business into renewables, resource recovery and new sustainable businesses. New Chief Executive, Tom Donnellan, has launched a *Brown to Green* strategy that aligns the company with National and EU Decarbonisation policies.

It aims to accelerate the development of renewable energy assets to support national climate and energy policy targets as well as accelerating investment in higher-value recycling and resource recovery business. It will include developing new business to support sustainable employment in the Midlands. The strategy will commence engagement with employees flagging possible reduction of 380-430 managerial, administrative and peat operations roles. The complete end of using peat for energy will also be brought forward by two years to 2028. Announcing the move Chief Executive, Tom Donnellan, said: *“Decarbonisation is the biggest challenge*

facing this planet. By accelerating the move away from peat into renewable energy, resource recovery, and new businesses we are supporting national policy and seizing the opportunity presented by decarbonisation. Standing still is not an option for Bord na Móna. We are embarking on a transition phase now which will see us become a leading provider of renewable energy on the Island of Ireland by 2026, a leader in high-value recycling and provider of a range of new low carbon goods and services. Allied to all of this, a key focus of our decarbonisation plan is ensuring that Bord na Móna remains a very significant employer in the Midlands of Ireland for the decades to come."
https://www.bordnamona.ie/company/news/articles/bord-na-mona-accelerates-decarbonisation/

Peat extraction in county Kerry, Ireland. Photo: Hans Joosten

Letter warns Minister for Agriculture over booming peat bedding market

An environmental group has called on to the Minister for Agriculture to exercise his powers to tell Teagasc, the Irish Agriculture and Food Development Authority. to "refrain" from advicing the use of peat for animal bedding. In a letter sent in September, Friends of the Irish Environment (FiE) asked Michael Creed TD to "ensure" that further environmental damage is "not caused by this initiative". Demand for the product shot up this summer as straw prices skyrocketed following the summer drought, with Teagasc issuing a factsheet in July recommending peat as an alternative to straw. FiE director Tony Lowes said that it is ironic that this new market arises from extreme weather events due to global warming that will "only be increased by the use of peat for animal bedding". In a letter sent to Teagasc Director Gerry Boyle, FIE points out that any backing for peat as animal bedding will "undermine" the body's support for a more sustainable agriculture future in Ireland. In a statement to *The Green News*, Teagasc said it recognises the role of peatlands as a "valuable carbon reserve" and their "high biodiversity value". "Given an anticipated shortage of straw this year, some farmers are examining the option. When peat is used for bedding, it is returned to land via land-spreading the following year."

FiE also wrote to Bord na Mona Chairman Geoff Meagher asking why the company was selling peat bedding while also promoting itself as having a "clear focus on environmentally and economically sustainable approaches". "All of these are undermined by your promotion of the use of peat for animal bedding. We would be grateful if you re-examined this initiative in view of your stated objectives," the letter reads.

- https://greennews.ie/letter-warns-minister-booming-peat-bedding-industry/

Grant funding for local peatland conservation and improvement initiatives under pilot scheme

Josepha Madigan, Minister for Culture, Heritage and the Gaeltacht, announced that she has approved grant funding of just under €137,000 for twelve local community groups and organisations for a variety of projects focused on the conservation and revitalisation of raised bog Special Areas of Conservation, Natural Heritage Areas and other raised bog areas in 2018. Announcing the funding on September 19 the Minister stated that she was delighted to see the diverse range of initiatives put forward by these active community groups and environmental organisations under the pilot of the Peatlands Community Engagement Scheme. This funding will support the work of the Community Wetlands Forum, the development of walking trails and looped walks around bogs, visitor facilitation in local community buildings, local area amenity improvements along with restoration works to the raised bog areas.

- https://merrionstreet.ie/en/News-Room/Releases/Minister_Madigan_announces_grant_funding_for_local_peatland_conservation_and_improvement_initiatives_under_pilot_scheme.html

Large-scale peat extraction at Westmeath bog an 'ecological disaster'

One of Ireland's largest peat extraction companies stands accused of the unlicensed stripping of peat from a bog in Co Westmeath currently subject to court proceedings. Harte Peat has been excavating wet peat up to five metres deep on 11 hectares at the site in Derrycrave, Co Westmeath. The end result is a "great big pit" in the ground, Friends of the Earth Director Tony Lowes said, which is nothing but a "complete ecological disaster". Harte Peat is operating without the appropriate license from the Environmental Protection Agency (EPA). The EPA brought a legal case against Harte Peat in 2013 for unregulated peat activities. In a statement, Westmeath County Council said that it is aware of ongoing peat extraction at the site. The Council said that it has served two warning letters to Harte Peat for "unauthorised peat extraction" at the bog. On November 21st, 2018, the High Court adjourned injunction proceedings until at least March 2019 with the motivation that the EPA must have been aware of wet peat extraction at the site since 2012. In his judgement, Mr Justice Charles Meenan said that if the case was not ready for hearing by 22 March 2019, the High Court would reconsider the injunction sought by the EPA.

- https://greennews.ie/large-scale-peat-extraction-at-disputed-westmeath-says-ngo/
- https://greennews.ie/high-court-adjourns-injunction-unlicensed-peat-extraction/

Netherlands

Tenure-Track Assistant Professor of Wetland Biogeochemistry and Conservation (0.8 - 1.0 FTE)

Faculty of Science, Radboud University Nijmegen. Application deadline: 6 January 2019

https://www.ru.nl/werken/details/details_vacature_0/?recid=601794

For more information: Prof. Leon Lamers, +31 24 3652902 E-mail: l.lamers@science.ru.nl

Dutch appeals court upholds landmark climate case ruling

A Dutch appeals court on Tuesday Oct. 9, 2018 upheld a landmark ruling that ordered the government to cut greenhouse gas emissions by at least 25 percent by 2020 from benchmark 1990 levels. The original June 2015 ruling came in a case brought by the environmental group Urgenda on behalf of 900 Dutch citizens. "Considering the great dangers that are likely to occur, more ambitious measures have to be taken in the short term to reduce greenhouse gas emissions in order to protect the life and family life of citizens in the Netherlands," the court said in a statement. The Court disagrees with the State that courts have no right to take decisions in this area. The Court has to apply directly effective provisions of treaties to which the Netherlands is party. These provisions form part of the Dutch legal order and even take precedence over deviating Dutch laws. Similar cases are now underway in several countries around the world.

- https://www.nytimes.com/aponline/2018/10/09/world/europe/ap-eu-netherlands-climate-change.html
- https://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:GHDHA:2018:2591
- https://www.rechtspraak.nl/Organisatie-en-contact/Organisatie/Gerechtshoven/Gerechtshof-Den-Haag/Nieuws/Paginas/State-must-achieve-higher-reduction-in-greenhouse-gas-emissions-in-short-term.aspx

Verdict in English: https://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:GHDHA:2018:2610

Movie made by the Province Zuid-Holland on peat subsidence:

https://www.youtube.com/watch?v=Z0y1SCzJ3Q8&sns=em

National congres on subsidence Veenomeen 2018

At the national congress on soil subsidence, Veenomeen, on 22 November in Zaandam 350 participants from the national government, water boards, provinces, municipalities, knowledge institutes, market parties and interest groups discussed the results achieved in the past year with regard to the management of soil subsidence of clay and peat soils. Practical experiences were shared about wet crops,, underwater drainage and innovative soil elevation techniques. The presentations are available on the website, photos of the congress can be found here.

Poland

Alkaline fens in northern Poland

At the end of June 2018, we completed a nearly 6-year project for the protection of alkaline fens in the young glacial landscape of northern Poland LIFE11 NAT / PL / 423. We invite you to read the Scientific Reports: in the version for a layman and the full scientific version.

Among several dozens of alkaline fens, the sites with the best preserved and representative vegetation are "Bagno Stawek" reserve, "Mechowisko Radość" reserve, " Mechowisko Manowo", Rospuda Valley, Morgi Fen, Zocie, and Kobyla Biel.

Conservation measures including the regulation of groundwater level, removal of trees and shrubs and mowing suppresses forest vegetation expansion in hydrologically disturbed alkaline fens to some extent. Raising the water level in sites where the top layer of peat is mineralized leads to the expansion of rush vegetation.

Maintaining or restoring vegetation characteristic for alkaline fens in highly degraded sites is possible by raising the water level with simultaneous intensive removal of biomass. However, sometimes this does not bring the desired effects even not for many years. for unknown reasons. Occasional (once every three to five years) removal of trees ensures that - in the case of least transformation - the characteristic vegetation of alkaline fens is maintained. The mowing of fens with heavy machinery, however, adversely affects the ecosystem, by unifying the structure of the fen and its biodiversity. In the case of shrub removal it is necessary to remove the root spikes in subsequent years.

Alkaline fens have many specific features depending on the local hydroecological conditions and require an exceptionally individual treatment in the selection of protection methods.

- http://alkfens.kp.org.pl/en/zakonczenie-projektu-ochrony-torfowisk-alkalicznych-w-polnocnej-polsce/

Russian Federation

Galkina's Readings

Komarov Botanical Institute
Founded in 1714

Dear colleagues!

You are kindly invited to participate into our annual conference **E.A. Galkina's Readings - X**
February 4 – 6, 2019

The conference is dedicated to the International Wetlands Day. Main conference topic: **Structure and Functions of mire ecosystems: results and research methods**.

The conference will take place in the Komarov Botanical Institute RAS. Russia, St. Petersburg, Professor Popov Street, 2; 197376 , phone +7(812) 372-54-19; e-mail: rbo.mire@binran.ru

Organizing Committee: Tatiana Yurkovskaya, Oleg Kuznetsov, Viktor Smagin, Olga Galanina, Oleg Sozinov (Belarus), Tatiana Ivchenko, Grigory Tyusov.

Papers (theses) can be submitted until January 13, 2019 by e-mail: rbo.mire@binran.ru

Registration fee will be 500 Rub, to be paid at the registration desk.

'Problems and prospects of sustainable development of the peat industry in Russia', 17-19 September, 2018

Tatiana Minayeva (Tatiana.Minayeva@wetlands.org)

This international conference aimed at evaluating the status of the peat industry in Russia. The conference was held in Tver, the former and current scientific and educational centre for peat industry development in Russia. The peat institute and research station in Tver had in the old times been the centre of peat related science and engineering. Over the last 20 years the peat industry dramatically declined in Russia due to the total change of the economic structure. No wonder that many peat industry related people came from 13 regions of Russia to Tver hoping to find solutions to go ahead in-line with "business as usual". Peat use related scientists and engineers (45 experts) and representatives of peat enterprises (30 including one from Lithuania) made up a majority of the participants. Around 10 experts affiliated with the project "Restoring peatlands of Russia", IMCG and/or IPS from Russia, Germany, The Netherlands and Poland were leading discussion explaining that the approach to peat use should be totally revisited and reorganised in-line with international standards with reference to Sustainable Development Goals (SDG), the latest decisions and findings of the multilateral environmental agreements and based on modern science. The positive news is that the participants decided to restore the Russian Peat Society as a new organisation and there is hope that Russia will be back in IPS and join the international discussion on peat and sustainability.

Tatiana Minayeva in discussion during the peat conference in Tver, September 2018. Photo: Hans Joosten

Switzerland

„Faulenseemoos needs support!

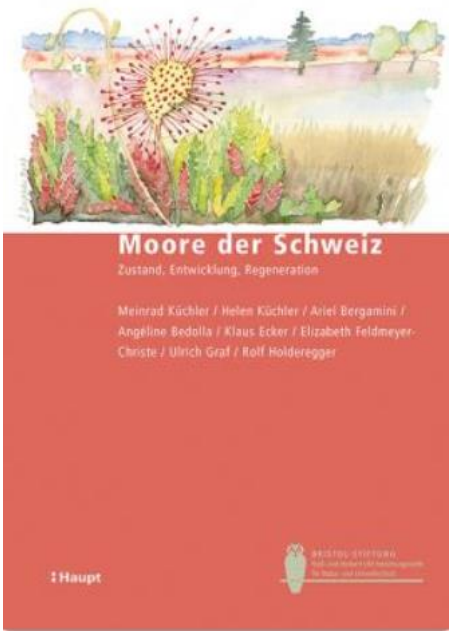
A famous palaeoecological site, the mire Faulenseemoos in the Canton of Bern, is in danger because of urbanization pressure. The Faulenseemoos is a unique climate and environmental archive in Switzerland and is of outstanding national and international scientific importance. Parts of the up to 14 m thick deposits are annually laminated, which allows reconstructing past climate and environmental changes with the greatest precision. The Faulenseemoos is the site at which, based on the analysis of annual laminations, Max Welten estimated first pollen influx or accumulation rates already in 1944.

The core from the Faulenseemoos clearly shows the warves - the change between light summer and dark winter sediments. Photo: Andy Lotter-

Due to modern land use, road construction, trade and industry, the Faulenseemoos has increasingly come under pressure. At the beginning of the 20th century the mire was partially drained and houses and warehouses were built on its fringes. The drainage led to an increasing degradation (oxidation) of the deposits, i.e. to the disappearance of archive information. For example, since the 1930s and 1940s, the surface peat layers in the southern area have shrunk from one metre to 30-40 cm. The drainage also led to trees and bushes spreading over the formerly open mire area. Trees and bushes additionally extract water from the peat body and lead to root growth and destruction (bioturbation) of the deposits, especially the warves. New buildings have sealed the surface, they stand partly on long piles or deep foundations, which destroyed the deposits at these places lastingly. Sealed areas such as parking lots or the expansion of roads and paths exert pressure on the peatland body, which in turn can lead to shearing or sliding processes and therefore greatly endanger the valuable deposits. All in all, the irreplaceable climate and environmental archive Faulenseemoos is increasingly under pressure or even being destroyed, and its protection is currently not guaranteed.
In 2012 Brigitta Ammann, Martin Grosjean, Andy Lotter, Willy Tinner suggested measures to protect the site, including a fencing of the mire and raising the water table. These protective measures have, however, not been realized, on the contrary the situation got worse during the past years. Therefore a letter to the community of Spiez, where Faulenseemoos is located, is being prepared. If you want to support this letter, and for more information, contact Sandra Brügger: sandra.bruegger@ips.unibe.ch

The mires of Switzerland: state, development and restoration" (only in German)
Küchler M. et al., 2018: Moore der Schweiz: Zustand, Entwicklung Regeneration. Zürich, Bristol-Stiftung; Bern, Haupt. 258 p.

The Swiss Federal Institute for Forest, Snow and Landscape Research WSL published in August 2018 an overview about the bogs and fens of Switzerland, describing their past and present state and the efforts made to improve their quality. Since 1987, the area of the Swiss mires is protected by law but the question of the quality of the remaining bogs and fens still goes on. Based on the huge vegetation dataset of the project "Monitoring the conservation of the Swiss mires", an expert team of the WSL reports the recent trends in mires regarding ecology and biodiversity. The book highlights particular processes like the effects of mire environment on the distribution of characteristic species inside the mire itself. The impact on the vegetation of disturbance factors like grazing, military activities or distance to roads and ways are analysed. To illustrate the effectiveness of restoration measures in bogs, several case studies from the Alps and the Swiss Plateau are described. Finally, a particular case study reports the vegetation succession in a bog after a landslide. The last chapter gives recommendations and requirements for an effective protection of the mires in Switzerland.



United Kingdom

CCC: Farming needs a 'revolution' for UK to meet climate goals

Greenhouse gas emissions from the land-use and agriculture sector are set to increase unless the UK's "unsustainable" approach changes, warns the Committee on Climate Change (CCC) in a report published on 15.11.2018. "Fundamental reform" is needed to ensure the UK stores more carbon in land, says the government's official climate advisory body.

Greenhouse gas emissions from the agricultural and land sector sat at 53 million tonnes of CO_2 equivalent ($MtCO_2e$) in 2016, 11% of the UK total. The main sources are nitrous oxide (N_2O) and methane (CH_4) from soils and livestock, followed by peatland emissions. While agriculture emissions are currently far lower than for transport and energy supply, the sector is currently likely to be one of the largest emitters by 2050, the CCC says. Land is also an essential resource for tackling climate change, the CCC says, through its ability to sequester and store carbon. For example, the $18MtCO_2$ per year currently emitted by peatlands could be reduced to 7-$14MtCO_2e$ by increasing the area being restored to 55-70%, up from 25% today, it says. But past and current policies have rewarded food production over other services provided by land, the CCC adds. Agricultural emissions have barely changed over the last decade. The CCC highlights the importance to climate goals of freeing up land for afforestation and peatland restoration, as well as biomass production (with the caveat that environmental risks are managed).

- https://www.carbonbrief.org/ccc-farming-needs-revolution-for-uk-meet-climate-goals
- https://www.dailymail.co.uk/sciencetech/article-6391515/Britain-needs-plant-trees-eat-meat-help-stop-planet-overheating.html

The Peatbog Trows - Drama on the Bog

Sue White, Peatland Restoration Project Officer at Shetland Amenity Trust, writes: Most of Shetland's hills are cloaked in blanket bog; in fact about half of Shetland is covered in peat. In general, though, local folk who drive by the hills every day have been unaware of the importance of the habitat. Shetland does, however, have a rich cultural tradition and the peaty hills, music inspired by the landscape, and tales of mysterious beings that co-habit the islands are all part of that. As peatland ecologists, we are all aware of the range of ecosytems services that peatlands provide, but what about their value as a resource for inspiring the imagination and telling stories?

In my role as a Peatlands Project Officer (funded by SNH Peatland Action) I have held guided walks for adults, training courses, activities for children, and attended agricultural shows in order to promote our peatbogs and peatland restoration. The events are well received but I was keen to try a new approach, a different way of engaging a wider audience and tap into the Shetlandic storytelling tradition. Rather than a standard lecture approach I thought it might be more interesting and fun to create a piece of theatre, and so the "Drama on the Bog" idea was born.

We wanted to get folk, especially children, out onto a peat bog so the "theatre" was to be up on the hill on one of our first peatland restoration sites in Shetland, 10 miles south of Lerwick at Cunningsburgh. Hannah Uttley (a qualified teacher and youth theatre practitioner) put together a resource pack for schools to help teachers and pupils develop ideas and experiences from the visit. My role in the project was to give the artistic team a crash course in peatland ecology, the importance of bogs for ecosystems services and how we go about restoring peatlands. Then the team took over and the dramatic devising process took about a week.

Everyone in Shetland knows about "Trows", they are a like Nordic Trolls but a bit less menacing and a lot more mischievous, and they figure a lot in Shetland stories and folklore. "Bog Trows" though, as our audience would learn, have only recently been discovered and are much shyer, distant cousins of other Trows and Trolls. The elusive Peatbog Trows have been forced out of their homes due to human activity, the bogs where they live have been drying out and the Trows have been forced into a horrible "Trow Refugee Camp". The Peatland Restoration Team (project managed by "The Professor") working on the restoration of the peatbog and the Trows who still live there become aware of each other, and are now working together to restore the bog to its former glory with good outcomes for all involved.

Over the course of the week we did 14 performances to approx. 550 schoolchildren, teachers, classroom assistants, parent helpers, Radio Shetland and other members of the press, finishing off with two public performances.

The impact of actually seeing the contrast between the barren “Trow refugee camp”, the miserable hopeless characters who lived there, and the restored peatland, where the joy of their existence in harmony with nature was palpable in the tunes of the fiddle player, was extraordinary. The experience of seeing and hearing the sights and sounds all around with skylark, golden plover and curlew all providing background music and the backdrop of hills and ocean will be memorable. It was a powerful combination of science, local folklore and theatre arts.

The Drama on the Bog Team would love to bring the performance to your bog, tweaking it to local conditions and folklore. The Teachers’ Pack can also be made available to share. Please get in touch with me if you are interested: sue.white@shetlandamenity.org

- http://www.iucn-uk-peatlandprogramme.org/news-and-events/news/peatbog-trows-drama-bog

Peatland restoration as part of Heathrow's new roadmap for net-zero expansion

After launching a roadmap outlining how it will ensure its expansion is carbon-neutral ahead of the opening of its third runway in 2026, Heathrow Airport is exploring ways in which it can sell ecosystem restoration services as well as flights. Heathrow's expansion will enable an additional 52 million passengers to travel annually and accomodate an additional 267,000 flights each year. Launched on 3 December, Heathrow's new plan sets out four key areas in which the airport will take action to reduce both its direct and indirect emissions, before offsetting the remainder accounted for by its upcoming expansion, under its Heathrow 2.0 sustainability strategy. The roadmap includes a pledge for the company to "develop and promote" new ways of offsetting carbon – a move which comes shortly after the company partnered with Lancashire Wildlife Trust and Defra on its first peatland restoration project. Speaking at the launch of the roadmap, Heathrow's director of sustainability Matt Gorman said the company would use such peatland projects to develop a "market" for ecosystem restoration services, selling such services to other companies in a bid to fund some of its decarbonisation activities. "We think that UK peatland projects have the potential to be a very cost-effective way of offsetting carbon, and one which also delivers other benefits including increased biodiversity, flood risk reduction and improving downstream water quality," Gorman said. "If we could stack the benefits and market them to a developer who wants biodiversity investment of some sort, or water companies which are interested in water quality, you could lower the cost of such a project to any one individual." Gorman estimates that if all peatland nationwide were restored, it would sequester 16 million tonnes of carbon annually – the equivalent to emissions generated by all of Heathrow's departing flights each year. While Heathrow will also purchase carbon credits accounting for renewable energy and reforestation projects across the globe, the company's head of emissions Andrew Chen explained that UK-based projects had the benefits of being more easily verifiable and "visible" to stakeholders.

Another key discussion point was whether Heathrow will explore whether it can align its entire operations with a 1.5C trajectory, after the recent Intergovernmental Panel on Climate Change (IPCC) report laid bare the benefits of reducing warming to 1.5C rather than 2C, as originally specified under the Paris Agreement. Gorman explained that the roadmap would "absolutely have to be kept under review", with Heathrow prepared to set even more ambitious targets if Ministers ratify a UK-wide net-zero emissions target for 2050. "The scientific advice is saying that the world economy needs to reach net-zero by around the middle of the century, which is a fundamental challenge for any sector," Gorman said. "We recognise that the debate in this area is moving quickly – the Paris Agreement was a very significant foundation and the recent IPCC report has underlined both the huge benefits of limiting warming to 1.5C and the urgency needed to achieve that." In order to update its strategy as quickly as possible, Heathrow's sustainability team are lobbying for the UK Government to announce a 2050 decarbonisation target for the aviation sector "as soon as it is feasible," Chen added.

- http://www.newslocker.com/en-uk/news/environment/peatland-restoration-and-electric-planes-inside-heathrows-new-roadmap-for-net-zero-expansion/view/
- https://www.edie.net/news/6/Peatland-restoration-and-electric-planes--Inside-Heathrow-s-new-roadmap-for-net-zero-expansion/

Third runway: Heathrow unveils plan for 'carbon neutral' growth

The decision to green light expansion ushered in a raft of legal challenges from green campaigners, who broadly argue increased aviation capacity is incompatible with statutory climate targets. Five challenges have been granted Judicial Review hearings at the High Court and are scheduled to take place in March 2019.

But with the £14bn runway earmarked for completion in 2026, Heathrow said on 3 December 2018 it would seek to tackle related carbon emissions by encouraging cleaner aircraft technology, improving airspace and ground operations to boost efficiency, advancing sustainable aviation fuels, and investing in carbon offsetting methods.

Aviation is currently responsible for around two per cent of global carbon dioxide emissions, with demand for flights expected to grow significantly in the coming decades. An international deal - known as CORSIA - aimed at offsetting CO2 from the global industry was struck in 2016, but critics have said it does not go far or fast enough to cut emissions, while concerns remain over the long-term future of the deal.

However, Heathrow said it wanted to be an international leader on climate action in the aviation industry,and that its new plan laid out how it would use its position to capitalise on the opportunities that will come with airport expansion to ensure the growth in flights is managed "in a responsible and sustainable way".

To offset additional emissions from the airport's operations and flights in a bid to move towards 'carbon neutral' growth, Heathrow said it would continue to invest in UK peatland restoration, which it claims "has the

potential to be amongst the highest-quality, most cost-effective carbon offsetting methods". It said a pilot peatland restoration project was already underway in Lancashire.

- https://www.businessgreen.com/bg/news/3067362/heathrow-unveils-plan-for-carbon-neutral-growth-once-third-runway-is-built

Lancashire nature reserve becomes part of Heathrow's carbon offsetting drive

Heathrow has announced its investment in a unique project in UK aviation: the restoration of UK peatlands to offset carbon emissions. Working with the Lancashire Wildlife Trust and DEFRA, Heathrow's first restoration priority will be Little Woolden Moss, part of Chat Moss which is a larger area of peat bog land, west of Manchester, it has been subject to commercial peat extraction for over 15 years. The restoration of the UK's peatland bogs, forms part of Heathrow's plans to be a carbon neutral airport by 2020. By supporting research into the climate benefits of peatland restoration, Heathrow hopes to show that projects like this will make a good option for airlines' CORSIA commitments – an international agreement to deliver carbon neutral growth in aviation from 2020. This pilot project will also help explore opportunities for peatland to deliver cost effective carbon offsetting alongside a range of other benefits including biodiversity, water quality, and flood protection.

Heathrow has invested more than £94,000 in Little Woolden Moss to restore 70 hectares of peatland that has up until now been used for extraction. According to DEFRA indicators, the restoration of this project area could lead to savings of 22,427 tonnes of CO_2 over 30 years – equivalent to nearly 64,000 passenger journeys from Heathrow to New York. Following this initial pilot project, Heathrow plans to invest in more peatland restoration projects over the next two years, and the airport is already exploring other locations. The restoration of Little Woolden Moss will take place over three years, and the restored site will continue to be publicly accessible for cycling, walks, and community events. The restoration will involve pumping water to the site, planting native plant species, and eventually allowing the area to fully restore its rich habitat and wildlife – including species like the common lizard, Black Darter Dragonfly, Brown Hare and the rare Bog Bush Cricket. Heathrow Chief Executive John Holland-Kaye said: "We are very excited to announce our partnership with the Lancashire Wildlife Trust and explore how UK peatlands can be used as a carbon offsetting tool. Climate change is the greatest challenge our generation is facing and while this is just the first of many projects, we hope it will be a model for the aviation industry to follow."

- https://www.adsadvance.co.uk/lancashire-nature-reserve-becomes-part-of-heathrow-s-carbon-offsetting-drive.html
- https://www.businessgreen.com/bg/news/3063334/heathrow-launches-pioneering-peatland-offset-programme
- https://www.edie.net/news/9/Heathrow-Airport-launches-peatland-restoration-project-to-offset-emissions/

No moor burning on upland peat bogs in Cumbria

The RSPB is calling on the Government to honour its commitment to end the damaging practice of setting fire to England's upland peat bogs, especially on grouse moors. Monday 1 October marked the start of the new burning season, which permits land managers to set fire to areas of moorland in Cumbria (a practice known as rotational burning), including peat bogs, to encourage new heather growth and provide favourable conditions for red grouse. Cumbria's upland peat bogs (especially blanket bog) provide a valuable array of public benefits including providing a home for wildlife, countering climate change by locking up carbon, reducing flood risk, purifying drinking water and slowing the spread of wildfire. However, the majority of upland peat bogs are in a poor state, with only an estimated 4% of them in England in a healthy condition. They have been affected by a range of damaging activities for many years including burning.

Following pressure from the European Commission to end burning on blanket bogs, Natural England – the agency entrusted with protecting the countryside in England – is attempting to negotiate the end of rotational burning on blanket bog across over 100 grouse moors. While some shooting estates have already agreed to stop rotational burning on bogs, a number of these have then been given permission by Natural England to continue to use fire to remove heather as part of a wider programme of work to supposedly restore damaged peat bogs. This so called 'restoration burning' is a misnomer: Natural England's own evidence shows that burning actually damages peat bogs by drying them out, thereby robbing the public of their numerous benefits. Bogs need water not fire.

- https://www.cumbriacrack.com/2018/09/28/no-moor-burning-on-upland-peat-bogs-in-cumbria/

Helicopter airlifts bags of cut heather onto moor to restore peatland

As part of a €16million project to restore bare patches of peatland across the South Pennines, 390 giant bags of cut heather have been airlifted onto the moor above Deanhead reservoir, near Scammonden. The conservation work, carried out as part of the multi-million euro MoorLIFE 2020 project by the Moors for the Future Partnership – which Yorkshire Water is a partner of - aims to restore areas of peatland to active blanket bog.

Moor restoration work is essential due to decades of issues including industrial pollution in the form of acid rain and wildfires.

On Deanhead, this will be achieved by spreading the cut heather on to two hectares of bare peat, and applying lime, seed and fertiliser to encourage grass to grow. The brash and grasses together stabilise the eroding peat and provide the right conditions for native blanket bog species – including sphagnum moss, crowberry, cotton grass and heather - to recolonise. This complements other work to re-wet the moor by blocking erosion gullies and planting sphagnum mosses.

Cut heather spread over degraded blanket bog. Photo: Hans Joosten.

By protecting this blanket bog, the project will also reduce soil erosion and mean that drinking water collected by Yorkshire Water in the reservoir has less sediment in it before it is treated.

MoorLIFE 2020 is funded by the EU LIFE programme and co-financed by Severn Trent Water, Yorkshire Water and United Utilities. With advice and regulation from Natural England and the Environment Agency, and local advice from landowners. Over the next few years Yorkshire Water will help conserve and enhance over 10,000 ha of Yorkshire's peat moorland – much of which is designated as a Site of Special Scientific Interest (SSSi).

- https://www.yorkshirewater.com/about-us/newsroom-media/peatland-restoration-moorlife-2020

North-America

Canada

A first regulation for activities having adverse effects on wetlands and bodies of water

Line Rochefort (Line.Rochefort@fsaa.ulaval.ca)

In the last few years, the government of the province of Québec has been reviewing its Environment Quality Act which was adopted last year on 16 June 2017. A much greater attention is now given to wetlands and their degradation. This law gave the minister the power to elaborate programmes to favor the restoration and

creation of wetlands along with obligations to monitor the health status of wetlands with keeping the objective of No Net Loss of wetlands. It works on the principle to first Avoid, at least Minimize and if absolutely necessary Compensate. The regulation about how to apply the law and how to calculate compensation was published on September 5th, 2018 (http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=1&file=103689.pdf). As a reminder, in Québec-Canada close to 90% of our wetlands are peatlands, so essentially this regulation was designed with having the peatland ecosystem in mind but also including the riparian zone of the province numerous water bodies.

In general anybody having an impact in wetlands will be charged a compensation fee fixed at 20 $ CAD/m^2. These "amends" will constitute a green wetland fund to finance restoration projects. The Québec peat extraction horticultural industry is submitted to the same calculation but when receiving its financial contribution from the Minister, they will be allowed in lieu of payment to present a detailed restoration plan, as they have shown, through the investment in 28 years of research, that they master a robust method to restore Sphagnum-dominated peatlands. The cranberry and blueberry industry are for now exempted to pay the compensation fees but have an obligation to invest in research to develop their own restoration methodology adapted to their field conditions. The regulation will be revised in 2 years and adjusted with the development of scientific knowledgeable in ecological restoration.

To start researching methods to restore cranberry fields, the PERG group from Laval University along with representants from the Québec cranberry producers went to visit last August a cranberry field restored back to peatland nearby Plymouth, Massachusetts, USA. About 9-10 years ago, I had helped a consulting firm with the design of their restoration plan suggesting to do some *Sphagnum* transfer. I was pleased to see that the project had been implemented 8 years ago and the site is developing back a nice carpet of *Sphagnum*.

The President of the Quebec Association of Cranberry Producers (APCQ) visiting a post cranberry production restored peatland. Photo: Line Rochefort.

Québec RE^3 Conference 2020

This event will bring together the Canadian Land Reclamation Association (CLRA), the Society for Ecological Restoration (SER) and the Society of Wetland Scientists (SWS) from June 7 to 11, 2020, at the Quebec City Convention Center (Quebec, Canada), chaired by Line Rochefort (Université Laval) and Jacques Brisson

(Université de Montréal). The theme for the conference is "From Reclaiming to Restoring and Rewilding". http://www.re3-quebec2020.org/

USA

Coastal peatlands in a changing world

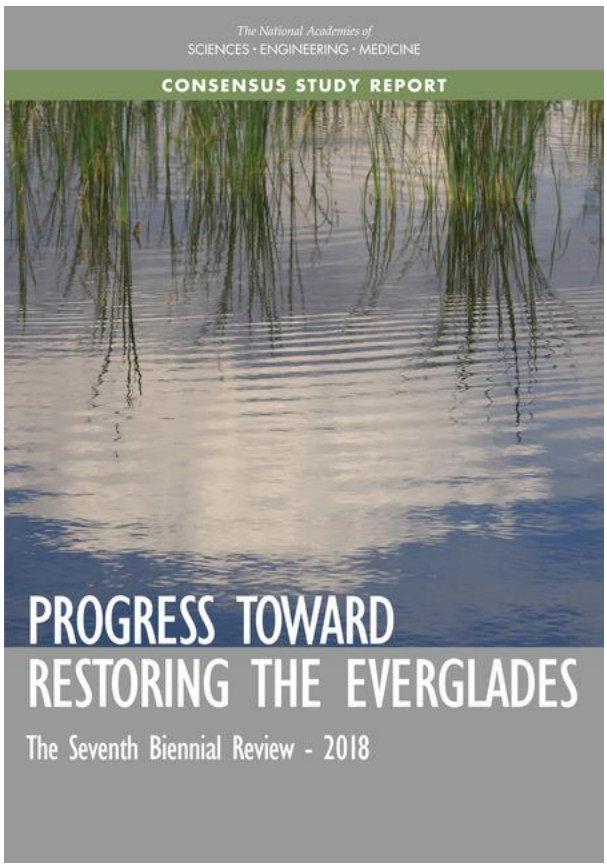
Julie Talbot (j.talbot@umontreal.ca)

Dr Curtis Richardson and myself have put in a proposal for a symposium on coastal peatlands for the 2019 SWS Annual Meeting in Baltimore (May 28 – May 31, 2019, https://www.swsannualmeeting.org/) (see below). If any of you intend to attend the meeting and would have interest in submitting an abstract to the symposium, please contact me so I can add you name to the list of potential speakers.

The structure and function of peatlands are affected by multiple disturbances, including drainage, agricultural activities, peat harvesting, road construction, and climate change. Coastal peatlands such as Pocosins, the Everglades, and bogs and swamp forests around the globe are especially vulnerable as they are increasingly exposed to climate change pressures specific to coastal areas such as sea level rise and salt water intrusions or are typically drained for agriculture, forestry, or urbanization. This greatly affects their role as ecosystem service providers on the landscape, especially their ability to function as carbon storage systems. Moreover, drainage, fertilization and salt-water intrusion alter their GHG flux contributions.

This symposium will bring together experts interested in low-gradient coastal peatlands. We welcome contributions on coastal peatlands functions or services, highlighting their past, current, or future responses to disturbances, and on the restoration of these systems. We also encourage contributions from people working in coastal mineral based wetlands as a means to compare and contrast the challenges faced by coastal systems.

Everglades restoration should considering climate change and sea-level rise – New report



As new evidence about climate change and sea-level rise in South Florida continues to emerge, agencies responsible for the restoration of the Everglades should conduct a mid course assessment that rigorously analyzes scenarios of future change to the region's ecosystem in its planning, says a new congressionally mandated report by the National Academies of Sciences, Engineering, and Medicine. This is the seventh biennial report on the progress of the Comprehensive Everglades Restoration Plan (CERP), a multibillion dollar effort designed by the state and the federal government and launched in 2000 to reverse the decline of the Everglades. A large and treasured ecosystem, Everglades has been dramatically altered by drainage and water management infrastructure that was intended to improve flood control, urban water supply, and agricultural production. The original CERP was created on a pre-drainage vision of the historical Everglades and the assumption that specific rainfall and temperatures observed during the 1965-1999 period of record captured the full range of changes expected throughout the 21st century.

.

However, there is now significant evidence that the South Florida climate is changing and that sea-level rise is accelerating. These changes will have profound impacts on the region's ecosystem and the ability of the water management infrastructure to provide flood protection and meet future water demands, the report warns.

Although the South Florida Water Management District (SFWMD) has begun to conduct forward-looking analyses for flood management projects outside of the restoration, CERP agencies do not adequately take these changes into account in project planning and have not systematically analyzed these threats in the context of the CERP, the report says. The information obtained through these analyses can potentially inform robust decisions about planning, funding, sequencing, and adaptive management.

"The restoration efforts are likely to have noteworthy benefits that increase the resilience of the ecosystem in the face of climate change, but these benefits have not yet been adequately studied or quantified," said Bill Boggess, professor of applied economics at Oregon State University and chair of the committee that authored the report. "With seven large projects to be constructed and three more nearing the end of their planning process, this is the opportune time for a mid course assessment." A more rigorous analysis of potential effects of climate change and sea-level rise on restoration outcomes is necessary in planning for all projects, so that investments are designed for the system to be more resilient to future conditions, the report says.

- http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=25198&_ga=2.134161933.268200797.1540352194-1965886153.1540352194

South-America

Chile

Delay of the regulation for *Sphagnum magellanicum* harvest in Chile

Marvin Gabriel (marvin.gabriel@miresofchile.cl)

The Chilean government has delayed the entry into force of the Decreto N°25 (2017), regulating the harvest of the moss *Sphagnum magellanicum*, that was due for August 2018 (for technical details please see IMCG Bulletin December 2017/January 2018). The official entry into force is now August 2019. Reasons for that delay are massive pressure by the *Sphagnum* harvest companies and at the same time an unprepared governmental institution, who is supposed to watch over the adherence of the regulations.

Sadly, the consequence is a run on the peat moss, which can now be harvested without any regulation for another year. Inconsiderate exploitation was observed in many places

Peatland conservation relevant papers Aug. - Nov. 2018

Collected by Hans Joosten: joosten@uni-greifswald.de

1. Ecological prerequisites for successful reforestation of degraded tropical peatlands: https://helda.helsinki.fi/handle/10138/260558
2. Sub-marine continuation of peat deposits from a coastal peatland in the southern Baltic Sea and its Holocene development: https://www.frontiersin.org/articles/10.3389/feart.2018.00103/full
3. Phytolith-inferred transfer function for paleohydrological reconstruction of Dajiuhu peatland, central China: https://journals.sagepub.com/doi/abs/10.1177/0959683618782590
4. Hydrogeomorphology, floristics, classification and conservation values of the little-known montane mires of the upper Cudgegong River catchment, Central Tablelands, New South Wales: https://www.rbgsyd.nsw.gov.au/getattachment/Science/Scientific-publications/Cunninghamia/Cunninghamia18-BAIRD-BENSON-Cudgegong-mires.pdf.aspx?lang=en-AU
5. Carbon footprint of oil palm planted on peat in Malaysia: https://link.springer.com/article/10.1007/s11367-017-1367-y
6. Predicting the occurrence of an endangered reptile based on habitat attributes. http://www.publish.csiro.au/paper/PC17027
7. Carbon footprint of oil palm planted on peat in Malaysia: https://link.springer.com/article/10.1007/s11367-017-1367-y
8. Acute peat smoke inhalation sensitizes rats to the postprandial cardiometabolic effects of a high fat oral load: https://www.sciencedirect.com/science/article/pii/S004896971832165X
9. Land-use trade-offs in the Kapuas peat forest, Central Kalimantan, Indonesia: https://www.sciencedirect.com/science/article/pii/S0264837717301187
10. Ecosystem-scale methane flux in tropical peat swamp forest in Indonesia: https://onlinelibrary.wiley.com/doi/10.1111/gcb.14410

11. Development of a method for protonema proliferation of peat moss (Sphagnum squarrosum) through regeneration analysis: https://nph.onlinelibrary.wiley.com/doi/10.1111/nph.15394
12. Runoff, flood peaks and proportional response in a combined nested and paired forest plantation/peat grassland catchment: https://www.sciencedirect.com/science/article/pii/S0022169418305444
13. Zero to moderate methane emissions in a densely rooted, pristine Patagonian bog - biogeochemical controls as revealed from isotopic evidence: https://www.biogeosciences-discuss.net/bg-2018-301/
14. Carbon balance of a restored and cutover raised bog: Comparison to global trends: https://www.biogeosciences-discuss.net/bg-2018-350/
15. Modeling the effect of moss cover on soil temperature and carbon fluxes at a tundra site in northeastern Siberia: https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2018JG004491
16. Tropical peatland carbon storage linked to global latitudinal trends in peat recalcitrance: https://www.nature.com/articles/s41467-018-06050-2
17. Plant rhizosphere oxidation reduces methane production and emission in rewetted peatlands: https://www.sciencedirect.com/science/article/pii/S0038071718302347
18. Latitudinal limits to the predicted increase of the peatland carbon sink with warming: https://www.nature.com/articles/s41558-018-0271-1
19. Holocene development of two calcareous spring fens at the Carpathian-Pannonian interface controlled by climate and human impact: https://link.springer.com/article/10.1007/s12224-018-9324-5
20. Hydrologic conditions and simulation of groundwater and surface water in the Great Dismal Swamp of Virginia and North Carolina: https://pubs.er.usgs.gov/publication/sir20185056
21. Use of remote sensing to analyse peatland changes after drainage for peat extraction: https://onlinelibrary.wiley.com/doi/abs/10.1002/ldr.3122
22. Iron-organic matter complexes accelerate microbial iron cycling in an iron-rich fen: https://www.sciencedirect.com/science/article/pii/S0048969718327529
23. Persistent carbon sink at a boreal drained bog forest: https://www.biogeosciences.net/15/3603/2018/
24. Assessment of methane and carbon dioxide emissions in two sub-basins of a small acidic bog lake artificially divided 30 years ago: https://onlinelibrary.wiley.com/doi/10.1111/fwb.13182
25. Ice wedge degradation and stabilization impact water budgets and nutrient cycling in Arctic trough ponds: https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2018JG004528
26. Oxygen-deficiency and allelochemicals affect Sphagnum spore persistence in peatlands: https://link.springer.com/article/10.1007%2Fs11104-018-3809-0
27. Brief review on climate change and tropical peatlands: https://www.sciencedirect.com/science/article/pii/S1674987118300343
28. Vascular plant-mediated controls on atmospheric carbon assimilation and peat carbon decomposition under climate change: https://onlinelibrary.wiley.com/doi/10.1111/gcb.14140
29. Carbon stocks, sequestration, and emissions of wetlands in south eastern Australia: https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.14319
30. Holocene development of subarctic permafrost peatlands in Finnmark, northern Norway: https://journals.sagepub.com/doi/abs/10.1177/0959683618798126
31. Oil palm and biodiversity : a situation analysis by the IUCN Oil Palm Task Force: https://portals.iucn.org/library/node/47753
32. Ecology of peatland testate amoebae in the Alaskan continuous permafrost zone: https://www.sciencedirect.com/science/article/pii/S1470160X18306502
33. Extent, regional distribution and changes in area of different classes of wetland: http://www.publish.csiro.au/mf/MF17377
34. Multiproxy analysis of inception and development of the Lac-à-la-Tortue peatland complex, St Lawrence Lowlands, eastern Canada: https://onlinelibrary.wiley.com/doi/10.1111/bor.12337
35. Guest post: A plan to solve the mysteries of Congo's vast tropical peatland: https://www.carbonbrief.org/guest-post-a-plan-to-solve-mysteries-of-congos-vast-tropical-peatland
36. "Peatland" issue of Leaf Litter: https://www.biohabitats.com/newsletter/peatlands/in-this-issue/
37. Holocene vegetation dynamics and hydrological variability in forested peatlands of the Clay Belt, eastern Canada, reconstructed using a palaeoecological approach: https://onlinelibrary.wiley.com/doi/10.1111/bor.12345
38. Multi-year net ecosystem carbon balance of a restored peatland reveals a return to carbon sink: https://onlinelibrary.wiley.com/doi/10.1111/gcb.14449
39. Spatial distribution and geochemistry of major and trace elements from Mohoș peatland, Harghita Mountains, Romania: http://journals.sagepub.com/doi/abs/10.1177/0959683618798174

40. Latitudinal limits to the predicted increase of the peatland carbon sink with warming: https://www.nature.com/articles/s41558-018-0271-1
41. Sheetflow effects on sediment transport in a degraded ridge-and-slough wetland: insights using molecular markers. https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2018JG004648
42. The stoichiometry of carbon, hydrogen and oxygen in peat: https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2018JG004574
43. Deep convolutional neural networks for automated characterization of Arctic ice-wedge polygons in very high spatial resolution aerial imagery: https://www.mdpi.com/2072-4292/10/9/1487
44. Phytolith-inferred transfer function for paleohydrological reconstruction of Dajiuhu peatland, central China: http://journals.sagepub.com/doi/abs/10.1177/0959683618782590
45. Pathways to policy impact: a new approach for planning and evidencing research impact: http://www.ingentaconnect.com/content/tpp/ep/2018/00000014/00000003/art00004;jsessionid=3aoq5m64s9ui0.x-ic-live-03
46. Wildfire as a major driver of recent permafrost thaw in boreal peatlands: https://www.nature.com/articles/s41467-018-05457-1
47. Archive value: measuring the palaeo-information content of peatlands in a conservation and compensation perspective: https://www.tandfonline.com/doi/full/10.1080/21513732.2018.1523229
48. High riverine CO_2 emissions at the permafrost boundary of Western Siberia: https://www.nature.com/articles/s41561-018-0218-1
49. Long-term peatland condition assessment via surface motion monitoring using the ISBAS DInSAR technique over the Flow Country, Scotland: https://www.mdpi.com/2072-4292/10/7/1103
50. Human-caused avulsion in the Rhine-Meuse delta before historic embankment (The Netherlands): https://pubs.geoscienceworld.org/gsa/geology/article/548577/human-caused-avulsion-in-the-rhine-meuse-delta
51. The Global Wetland Outlook – State of the world's wetlands and their services to people 2018: https://www.global-wetland-outlook.ramsar.org/outlook
52. Hydrological control of dissolved organic carbon dynamics in a rehabilitated Sphagnum-dominated peatland: a water-table based modelling approach: https://www.hydrol-earth-syst-sci.net/22/4907/2018/hess-22-4907-2018.html
53. Determining subarctic peatland vegetation using an unmanned aerial system (UAS): https://www.mdpi.com/2072-4292/10/9/1498
54. *Typha latifolia* paludiculture effectively improves water quality and reduces greenhouse gas emissions in rewetted peatlands: https://www.sciencedirect.com/science/article/pii/S092585741830346X
55. Natural Capital trade-offs in afforested peatlands: Evidence synthesis and needs for the future of peatland forestry and forest-to-bog restoration: http://valuing-nature.net/sites/default/files/documents/Synthesis_reports/VNP10_FullReport_TradeOffsAfforestedPeats.pdf
56. Characterizing the transport of hydrocarbon contaminants in peat soils and peatlands: https://uwspace.uwaterloo.ca/bitstream/handle/10012/13703/Gharedaghloo_Behrad.pdf
57. Wetland Management Guidelines: Building capacity and supporting effective management of wetlands within South African municipalities: https://cbc.iclei.org/wp-content/uploads/2018/10/WEB_ICLEI-WMG.pdf
58. Influence of graminoid species identity on carbon exchange in a restored peatland in central Alberta, Canada: www.gret-perg.ulaval.ca/uploads/tx_centrerecherche/Touchette_MSc_2017_01.pdf
59. First data on application of GEST approach in the Baltic region: Vegetation mapping of pilot peatlands: https://www.researchgate.net/profile/Tom_Kirschey/publication/328064471_FIRST_DATA_ON_APPLICATION_OF_GEST_APPROACH_IN_THE_BALTIC_REGION_VEGETATION_MAPPING_OF_PILOT_PEATLANDS.pdf
60. Impacts of drainage, restoration and warming on boreal wetland greenhouse gas fluxes: https://www.sciencedirect.com/science/article/pii/S0048969718328857
61. Fluvial organic carbon fluxes from oil palm plantations on tropical peatland: https://www.biogeosciences.net/15/7435/2018/
62. Changes in vegetation, climate and snowfall regime since the late Pleistocene in a snowy mountainous region of central Japan: http://journals.sagepub.com/doi/abs/10.1177/0959683618804644
63. Indian summer monsoon variability and vegetation changes in the core monsoon zone, India, during the Holocene: A multiproxy study: http://journals.sagepub.com/doi/abs/10.1177/0959683618804641
64. The response of boreal peatland community composition and NDVI to hydrologic change, warming and elevated carbon dioxide: https://onlinelibrary.wiley.com/doi/10.1111/gcb.14465
65. Wetland recreational agriculture: Balancing wetland conservation and agro-development: https://www.sciencedirect.com/science/article/pii/S1462901118300650
66. The role of climate: 71 ka of atmospheric mercury deposition in the Southern Hemisphere recorded by Rano Aroi mire, Easter Island (Chile): https://www.mdpi.com/2076-3263/8/10/374

67. The ecosystem approach in ecological impact assessment: Lessons learned from windfarm developments on peatlands in Scotland: https://www.sciencedirect.com/science/article/abs/pii/S0195925517303815
68. Tundra landscape heterogeneity, not interannual variability, controls the decadal regional carbon balance in the Western Russian Arctic: https://onlinelibrary.wiley.com/doi/10.1111/gcb.14421
69. Progress toward restoring the Everglades: The seventh Biennial Review – 2018: https://nap.us4.list-manage.com/track/click?u=eaea39b6442dc4e0d08e6aa4a&id=0206fd16d2&e=e3ee07bd36
70. Translocation of meadow, heath and fen to the Habitat Garden: the first insights after four years of experiment: https://onlinelibrary.wiley.com/doi/10.1111/avsc.12405
71. Biogeochemical characteristics of the last floating coastal bog remnant in Europe, the Sehestedt Bog: https://link.springer.com/article/10.1007/s13157-018-1089-3
72. The role of environmental driving factors in historical and projected carbon dynamics of wetland ecosystems in Alaska: https://esajournals.onlinelibrary.wiley.com/doi/10.1002/eap.1755
73. Range change evolution of peatmosses (*Sphagnum*) within and between climate zones: https://onlinelibrary.wiley.com/doi/10.1111/gcb.14485
74. Conservation of alkaline fens (7230) in Poland: http://alkfens.kp.org.pl/en/zakonczenie-projektu-ochrony-torfowisk-alkalicznych-w-polnocnej-polsce/
75. Respiration of aged soil carbon during fall in permafrost peatlands enhanced by active layer deepening following wildfire but limited following thermokarst: http://iopscience.iop.org/article/10.1088/1748-9326/aad5f0
76. Assessment of suitability of tree species for bioenergy production on burned and degraded peatlands in Central Kalimantan, Indonesia: https://www.mdpi.com/2073-445X/7/4/115
77. Land cover changes reduce net primary production in tropical coastal peatlands of West Kalimantan, Indonesia: https://link.springer.com/article/10.1007/s11027-018-9811-2
78. Peatland ditch blocking has no effect on dissolved organic matter (DOM) quality: https://onlinelibrary.wiley.com/doi/full/10.1002/hyp.13297
79. Hydraulic properties of peat soils along a bulk density gradient– A meta study: https://onlinelibrary.wiley.com/doi/abs/10.1002/hyp.13314?af=R
80. Utilisation of XRF core scanning on peat and other highly organic sediments: https://www.sciencedirect.com/science/article/pii/S1040618218300053
81. Economic evaluation of wetland restoration: A systematic review of the literature: https://onlinelibrary.wiley.com/doi/10.1111/rec.12889
82. Salinity pulses interact with seasonal dry-down to increase ecosystem carbon loss in marshes of the Florida Everglades: https://esajournals.onlinelibrary.wiley.com/doi/10.1002/eap.1798
83. E.M. van Zinderen Bakker (1907–2002) and the study of African Quaternary palaeoenvironments: https://www.sciencedirect.com/science/article/pii/S1040618217314271
84. Orangutan populations are certainly not increasing in the wild: https://www.cell.com/current-biology/fulltext/S0960-9822(18)31277-6 :
85. Guidelines for inventories of tropical peatlands to facilitate their designation as Ramsar Sites: https://www.ramsar.org/sites/default/files/documents/library/bn9_peatland_inventory_e.pdf
86. Guidelines for inventories of tropical peatlands to facilitate their designation as Ramsar Sites: Background notes: https://www.ramsar.org/sites/default/files/documents/library/bn9_peatland_inventory_background_notes_e.pdf
87. Predominance of methanogens over methanotrophs in rewetted fens characterized by high methane emissions: https://www.biogeosciences.net/15/6519/2018/
88. Plastic and genetic responses of a common sedge to warming have contrasting effects on carbon cycle processes: https://onlinelibrary.wiley.com/doi/10.1111/ele.13178
89. Plant uptake of organic nitrogen in two peatlands: http://link-springer-com-443.webvpn.jxutcm.edu.cn/article/10.1007/s11104-018-3851-y
90. Water table fluctuations control CO_2 exchange in wet and dry bogs through different mechanisms: https://www.sciencedirect.com/science/article/pii/S0048969718345078
91. Potential shift from a carbon sink to a source in Amazonian peatlands under a changing climate: http://www.pnas.org/content/early/2018/11/13/1801317115
92. Extensive loss of past permafrost carbon but a net accumulation into present-day soils: https://www.nature.com/articles/s41586-018-0371-0
93. Spontaneous revegetation of a peatland in Manitoba after peat extraction: diversity of plant assemblages and restoration perspectives: http://www.nrcresearchpress.com/doi/abs/10.1139/cjb-2018-0109
94. Environmental and taxonomic controls of carbon and oxygen stable isotope composition in Sphagnum across broad climatic and geographic ranges: https://www.biogeosciences.net/15/5189/2018/

95. Short-term effects of fen peatland restoration through the moss layer transfer technique on the soil CO_2 and CH_4 efflux: https://www.sciencedirect.com/science/article/abs/pii/S0925857418303951?dgcid=rss_sd_all
96. Using the Tea Bag Index to characterize decomposition rates in restored peatlands: www.borenv.net/BER/pdfs/ber23/ber23-221-235.pdf
97. The IPBES regional assessment report on biodiversity and ecosystem services for Europe and Central Asia: https://www.ipbes.net/sites/default/files/2018_eca_full_report_book_v5_pages_0.pdf (28Mb) supporting material under https://www.ipbes.net/assessment-reports/eca
98. Salinity pulses interact with seasonal dry-down to increase ecosystem carbon loss in marshes of the Florida: https://esajournals.onlinelibrary.wiley.com/doi/10.1002/eap.1798
99. Vegetation dynamics in response to climate change from the wetlands of Western Himalaya, India: Holocene Indian summer monsoon variability: https://journals.sagepub.com/doi/abs/10.1177/0959683618810401
100. Sustainable palm oil may not be so sustainable: https://www.sciencedirect.com/science/article/pii/S0048969718341159?via%3Dihub
101. Long-term summer warming trend during the Holocene in central Asia indicated by alpine peat α-cellulose $\delta^{13}C$ record: https://www.sciencedirect.com/science/article/pii/S0277379118307893
102. Palynological record of Holocene vegetation and climate changes in a high-resolution peat profile from the Xinjiang Altai Mountains, northwestern China: https://www.sciencedirect.com/science/article/abs/pii/S0277379118304049
103. Towards a Holarctic synthesis of peatland testate amoeba ecology: Development of a new continental-scale palaeohydrological transfer function for North America and comparison to European data: https://www.sciencedirect.com/science/article/pii/S0277379118304530
104. The roles of climate and human land-use in the late Holocene rainforest crisis of Central Africa: https://www.sciencedirect.com/science/article/pii/S0012821X18306125
105. Protected Area management: Fusion and confusion with the ecosystem services approach: https://www.sciencedirect.com/science/article/pii/S0048969718339068
106. Paleoecological assessment of cladoceran community dynamics in two subarctic peatlands: https://link.springer.com/article/10.1007/s13157-018-1118-2
107. Power from peat—more polluting than coal—is on its way out in Ireland: https://www.sciencemag.org/news/2018/12/power-peat-more-polluting-coal-its-way-out-ireland
108. Microtopography alters hydrology, phenol oxidase activity and nutrient availability in organic soils of a coastal freshwater forested wetland: https://link.springer.com/article/10.1007/s13157-018-1107-5
109. Procedure for organic matter removal from peat samples for XRD mineral analysis: https://link.springer.com/article/10.1007/s13157-018-1093-7
110. Recovery succession of native plant communities at Big Meadow Bog after disturbance and eutrophication from Herring Gulls: https://link.springer.com/article/10.1007/s13157-018-1099-1
111. WWF Living Planet Report 2018: https://wwf.panda.org/knowledge_hub/all_publications/living_planet_report_2018/
112. Holocene vegetation dynamics and hydrological variability in forested peatlands of the Clay Belt, eastern Canada, reconstructed using a palaeoecological approach: https://onlinelibrary.wiley.com/doi/10.1111/bor.12345
113. Rise and fall of forest loss and industrial plantations in Borneo (2000–2017): https://onlinelibrary.wiley.com/doi/epdf/10.1111/conl.12622
114. Emergent wetland vegetation data recording: does an optimal period exist?: https://onlinelibrary.wiley.com/doi/10.1111/avsc.12419
115. Using a new database of plant macrofossils of the Czech and Slovak Republics to compare past and present distribution of hypothetically relict fen mosses: www.preslia.cz/P184Hajkova.pdf
116. Greenhouse gas and energy fluxes in a boreal peatland forest after clearcutting: https://www.biogeosciences-discuss.net/bg-2018-473/
117. Light variability and mixotrophy: Responses of testate amoeba communities and shell $\delta^{13}C$ values to a peatland shading experiment: https://www.sciencedirect.com/science/article/pii/S0932473918300683
118. Towards a Holarctic synthesis of peatland testate amoeba ecology: Development of a new continental-scale palaeohydrological transfer function for North America and comparison to European data: https://www.sciencedirect.com/science/article/pii/S0277379118304530
119. Testate amoebae as a hydrological proxy for reconstructing water-table depth in the mires of south-eastern Australia: https://www.sciencedirect.com/science/article/pii/S1470160X18306976
120. Hydrological functions of a peatland in a Boreal Plains catchment: https://onlinelibrary.wiley.com/doi/abs/10.1002/hyp.13343?af=R
121. The diversity of geomorphological features of peatland basins in Central Poland and its paleoecological significance – a review: http://www.geologinenseura.fi/bulletin/Volume90/Bulletin_vol90_2_175-184_2018_Forysiak.pdf

122. The potential for modelling peatland habitat condition in Scotland using long-term MODIS data: https://www.sciencedirect.com/science/article/pii/S0048969718352124
123. Tree ring-based reconstruction of the long-term influence of wildfires on permafrost active layer dynamics in Central Siberia: https://www.sciencedirect.com/science/article/pii/S0048969718340051
124. Controls on fluvial carbon efflux from eroding peatland catchments: https://onlinelibrary.wiley.com/doi/full/10.1002/hyp.13329
125. The physics and ecology of mining carbon dioxide from the atmosphere by ecosystems: https://onlinelibrary.wiley.com/doi/10.1111/gcb.14559
126. Relative sea-level change regulates organic carbon accumulation in coastal habitats: https://onlinelibrary.wiley.com/doi/10.1111/gcb.14558
127. Conservation of disappearing cultural landscape's biodiversity: are people in Belarus willing to pay for wet grassland restoration?: https://link.springer.com/article/10.1007/s11273-018-9622-y
128. Hydrological functions of a peatland in a Boreal Plains catchment: https://onlinelibrary.wiley.com/doi/pdf/10.1002/hyp.13343
129. The Invisible Carbon Footprint as a hidden impact of peatland degradation inducing marine carbonate dissolution in Sumatra, Indonesia: https://www.nature.com/articles/s41598-018-35769-7
130. Experimental evidence for sustained carbon sequestration in fire-managed, peat moorlands: https://www.nature.com/articles/s41561-018-0266-6
131. The physical environment in Northern Greece at the advent of the Neolithic: https://www.sciencedirect.com/science/article/pii/S104061821630492X
132. Development of a southern hemisphere subtropical wetland (Welsby Lagoon, south-east Queensland, Australia) through the last glacial cycle: https://www.sciencedirect.com/science/article/abs/pii/S0277379118302154
133. Carbon budgets for 1.5 and 2 °C targets lowered by natural wetland and permafrost feedbacks: https://www.nature.com/articles/s41561-018-0174-9
134. Successional change of testate amoeba assemblages along a space-for-time sequence of peatland development: https://www.sciencedirect.com/science/article/pii/S0932473918300592
135. Distribution and cycling of terrigenous dissolved organic carbon in peatland-draining rivers and coastal waters of Sarawak, Borneo: https://www.biogeosciences.net/15/6847/2018/bg-15-6847-2018-discussion.html
136. Are secondary forests second-rate? Comparing peatland greenhouse gas emissions, chemical and microbial community properties between primary and secondary forests in Peninsular Malaysia: https://www.sciencedirect.com/science/article/pii/S0048969718343936
137. Screening potential bioenergy production of tree species in degraded and marginal land in the Tropics: https://www.mdpi.com/1999-4907/9/10/594
138. Access roads impact enzyme activities in boreal forested peatlands: https://www.sciencedirect.com/science/article/pii/S0048969718337306