


IMCG Bulletin: September 2016

INTERNATIONAL MIRE CONSERVATION GROUP

www.imcg.net

Word from the Secretary-General

Dear mire friends

Like the August Bulletin, this month's Bulletin is full of the spin-off of the peatland events in Borneo and Malaysia in August 2016. Meanwhile 139 peatland scientists from all over the world, including many from Southeast Asia, have published a letter in Global Change Biology. In this letter they object to the reported conclusion of the 16th International Peat Congress (IPC) in Kuching (Sarawak), that current agricultural practices in peatland areas, such as oil palm plantations, do not have a negative impact on the environment (see IMCG Bulletin August 2016). More about the IMCG Malaysia meetings in the coming October Bulletin.
The October Bulletin will also include more information on the next IMCG Field Symposium in NE European Russia (Komi Republic, Nenets Autonomous Okrug) to be held 22 July - August 4, 2017. So **save the date!**
And again that Bulletin will be as extensive as YOU allow it to be. The world of peatlands is full of interesting things to share. Please send your news messages, discussion items, relevant photographs and other October contributions (incl. your new papers to be included in the list) by 31 October 2016 to Hans Joosten at joosten@uni-greifswald.de.

IMCG News

Seppo Eurola in memoriam

Tapio Lindholm (tapio.lindholm@ymparisto.fi)

One of most important mire specialists in his generation in Finland has slept away. Honorary IMCG member and emeritus professor Seppo Eurola left us on the 27th of August, 2016.
Seppo was born on the 29th of March 1930 in the parish of Suojärvi in eastern Finland, an area, which is now in the Russian part of Karelia. He immigrated to western Finland on the first day of the Finnish-Soviet Winter War (1939–40), which Seppo often reminded to the younger generation. Seppo Eurola was already as a school boy an active student of nature. He started in 1950 to study systematic geobotany at the University of Helsinki, and graduated in 1954. After graduation he was some years a high school teacher.
In 1954 professor of Botany Aarno Kalela started at the University of Helsinki with a project on the regionality of Finnish mires. The project was funded by the State funding system of natural sciences. The idea was to continue and further develop the works of A. K. Cajander. Professor Kalela (the son of A.K. Cajander) gathered a group of young students and masters for this project. Master of Science Seppo Eurola got the task to study the character and regionality of the Karelian mire complex concept. Other later famous mire scientists of the group were student of biology Pekka Isoviita who would study the raised bogs of South-Western Finland, master of science Paavo Havas to study the mires in the middle part of Finland, student of biology Yrjö Vasari to study the mires of Kuusamo and Boundary Karelia, and student of biology Rauno Ruuhijärvi to study the aapa mires in middle Lapland.
Everyone of this group made his dissertation and a good career as a mire scientist, all by their own way. As often happens the studies resulted in something else than they were started. So the dissertation of Seppo Eurola from 1962 was titled: 'Über die regionale Einteilung der südfinnischen Moore'. This classical work was thus not on the Karelian mire complex, but on the internal regionality of bog complexes/ massif systems in southern Finland.
In 1974 Seppo Eurola became associate professor of botany in the young University of Oulu. There he continued to study plant ecology, working for example on flood meadows and cryologic seasonality in mires, on

other questions of northern mires and also on fell (alpine) vegetation. Before that he had spent in 1973 - 1974 one and a year as a professor at the University of Tromsø in northern Norway, where he made research excursions to destinations like Spitsbergen and Greenland. Later he focused on Kilpisjärvi in the north-western corner of Finland where he studied the phytogeography of mires, seed germination, snow algae, ecological effects of snow, soil biology, ecology of mountain birch, and patterns in oroarctic vegetation. Assisted by younger co-workers, Seppo created a mire classification system in which the old Cajanderian site types were arranged along meaningful ecological gradients.

In September 1983, the 25th anniversary year of the University of Oulu, Seppo arranged an international Field Symposium on Classification of Mire Vegetation. The 24 delegates met in Oulu before travelling north eastwards across Finland to Oulanka, where the idea of IMCG was conceived. IMCG owes special gratitude to Seppo not only for bringing the group together, but also because all subsequent biennial IMCG field symposia have followed the format of this original meeting.

Seppo Eurola on the 9th of September 2013 in Kainuu hill area, northern Finland, giving a field lecture on the peculiarities of hill mires to the group of assessment of threatened mire habitats in the Finnish environmental administration. Photo: Tapio Lindholm.

Many of Seppo´s former students are now themselves distinguished members of universities, research institutes and environmental institutions, where they have progressed Seppo Eurola's knowledge and admiration of mires, and his recognition of the urgent need of their protection.

Seppo belonged to several scientific associations, and has received a number of awards and honorary titles that acknowledge his wide-ranging achievements, e.g. in science, university teaching and nature conservation. At the IMCG General Assembly in Finland in 2006, Seppo Eurola was granted the status of honorary member of IMCG.

Seppo Eurola acted during his retirement years as an advisor of the Finnish Environment Institute, where his knowledge and opinions were important in the assessment of threatened habitats, especially mires and fell (alpine) habitats.

The last of the professor Aarno Kalela group, and still going strong, is emeritus professor and IMCG honorary member Rauno Ruuhijärvi. Emeritus professor Pekka Isoviita died earlier this year, emeritus professor Paavo Havas in 2011 and emeritus professor Yrjö Vasari in 2010.

Mires and Peat

Thomson Reuters has increased the Impact Factor of Mires and Peat to 1.095, so there is nothing anymore that should withhold you from submitting your next high-quality paper to your own scientific journal. Find the journal online at http://mires-and-peat.net/. Send your new manuscripts on any topic relating to mires, peatlands and peat to the Editor-in-Chief Olivia Bragg: o.m.bragg@dundee.ac.uk

In September 2016 Mires and Peat has published the following articles:

- Biology, ecology, use, conservation and cultivation of round-leaved sundew (*Drosera rotundifolia* L.): a review. (B. Baranyai & H. Joosten) Volume 18: Article 18
- The production of 7-methyljuglone, plumbagin and quercetin in wild and cultivated *Drosera rotundifolia* and *Drosera intermedia* (B. Baranyai, C. Bäcker, C. Reich & U. Lindequist) Volume 18: Article 19
- Ecosystem respiration, methane and nitrous oxide fluxes from ecotopes in a rewetted extracted peatland in Sweden (S. Jordan, M. Strömgren, J. Fiedler, L. Lundin, E. Lode & T. Nilsson) Volume 17: Article 07
- Combining short-term manipulative experiments with long-term palaeoecological investigations at high resolution to assess the response of *Sphagnum* peatlands to drought, fire and warming (M. Lamentowicz, S. Słowińska, M. Słowiński, V.E.J. Jassey, B.H. Chojnicki, M.K. Reczuga, M. Zielińska, K. Marcisz, Ł. Lamentowicz, J. Barabach, M. Samson, P. Kołaczek & A. Buttler) Volume 18: Article 20

IMCG field Symposium in Malaysia and Brunei: impressions of participants

Itinerary: 1. Maludam NP (Sarawak, MY), 2. Badas peat swamp forest (Brunei Darussalam), 3. Kayangeran Forest Reserve, Lawas (Sarawak, MY), 4. Klias Peat Swamp Forest (Sabah, MY), 5. Crocker Range Park (Sabah, MY), 6. North Selangor Peat Swamp Forest (Selangor, MY), 7. Gunung Berinchang, Cameron Highlands (Perak-Pahang, MY).

Maludam National Park: a dragonfly day

Marcel Silvius (Marcel.Silvius@wetlands.org)

On 20-8-2016, in Maludam National Park (Sarawak), I particularly focused on dragonflies. I saw about 19 species. Several species could not be photographed, including:

1. *Dysphaea* sp, one seen in Pandanus dominated river stretch
2. *Podolestes* sp, one male seen at the second pondok, likely *P. chrysopus*
3. *Heliaeschna idae* (Brauer, 1865), several seen flying at both pondoks in the forest
4. *Ictinogomphus acutus*, common on the river
5. *Chalybeothemis fluviatilis*, one seen from the boat along the river
6. *Orthetrum chrysis*, 1 male seen along river
7. *Rhyothemis obsolescense*, common along the river in areas with Bakung (*Hanguana malayana*)
8. *Nannophya pygmaea*, 1 male seen in Bakung vegetation

The other species are shown in this photographic journey report.

<table>
<tr><td>  </td><td>The entire Maludam NP area has been thoroughly messed up by logging, given the logging patterns that can be discerned on the above satellite picture. Fortunately logs were extracted by logging rail instead of by ditches, which is less destructive and provides hope for a recovery of the vegetation in the long term.</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Libellago hyalina, female</td><td>Libellago hyalina, male</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Libellago species, female</td><td>Pseudagrion microcephalum, ovipositioning</td></tr>
</table>

This is the normal *Ceriagrion cerinorubellum*

A probably new *Ceriagrion* species, with more red on the abdomen, mentioned by Rory Dow and only known from Maludam and two sites in Brunei.

Elattoneura aurantiaca, male

Ictinogomphus cf *decoratus melaenops*

Brachygonia oculata, adult male and young male

Brachygonia puella

Pornothemis serrata

Neurothemis fluctuans

Urothemis signata, male

Stork-billed Kingfisher (*Pelargopsis capensis*)

Kuhl's Parachute Gecko (*Ptychozoon kuhli*)

Asbjørn Moen (asbjorn.moen@ntnu.no) & Marte Fandrem (marte.fandrem@ntnu.no):

Conclusion: We are very thankful to the organizers and all helpers for a fantastic excursion. Never in our lives have we seen and learned so much on diversity in peatland ecosystems during two weeks. The protection of tropic mire ecosystems is crucial both to protect ecosystem diversity, and to contribute to solving the world's climate issues. The 14 days in Malaysia has given us energy to continue to work for protection of mires, in boreal as well as in tropical regions.

Ecosystem variation: The excursions in the tropical regions included regional variation (a number of lowland types; and montane forests ca 2000 m a.s.l.) as well as local variation (e.g. mangrove forests and swamps, dryland forests and peat swamp forests, including mossy forest). We visited peat swamp forest localities at six different stops: in Maludam national park in Sarawak, Badas forest reserve in Brunei Darussalam, Kayangeran forest reserve in Sarawak, Klias forest reserve in Sabah, North Selangor peat swamp forest in Selangor and then also in the mossy forest near Gunung Brinchang in the Cameron Highlands. In addition we visited the very interesting and species-rich Crocker range national park (montane rainforest) in Sabah. We also visited a large number of smaller localities along the road, and the large tea center BOH in Cameron highlands.

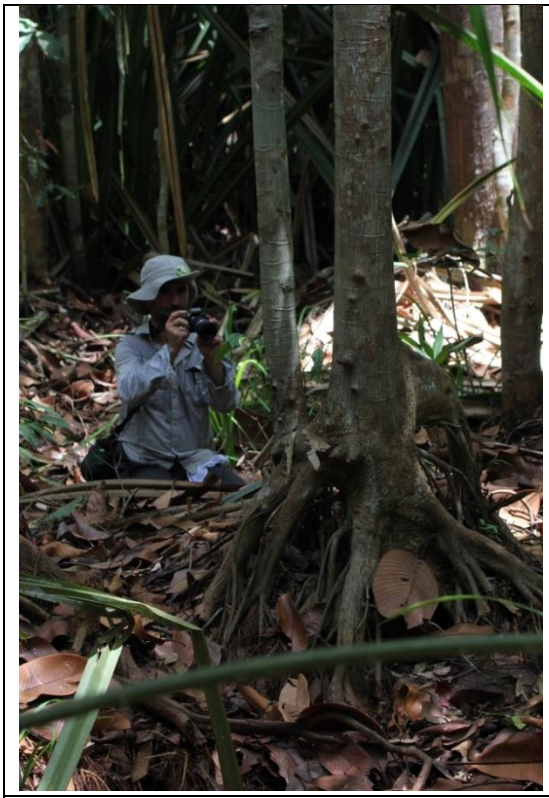
The large number of tree species is overwhelming, with c. 3000 in Borneo. The structure of the forests with 50-80 m high trees, a dense low tree/shrub layer (including climbers (lianas), palms, bamboos, epiphytes, parasites etc.), no moss layer (mosses only on wood) and a thick peat layer is typical in lowland peat forests. In Cameron Highlands *Sphagnum* spp. and other bryophytes occurred on peat. Cauliflory (flowers and fruits directly on the trunk of trees) is common.

Organizers and hospitality: The traveling during the excursion included two flights, four ferries, more than 10 pass controls, staying in more than 10 different hotels/homes, a large number of busses and boats etc. Everything was well organized (a bit after time schedule was a service for us to see as much as possible). We are thankful to Faizal, Julia Fuisan, Siew Yan, Noor Azura, Mohd Faiz, Serena and others of the team who helped and took care of us. We also thanks Rohani who has participated in earlier IMCG field excursions.

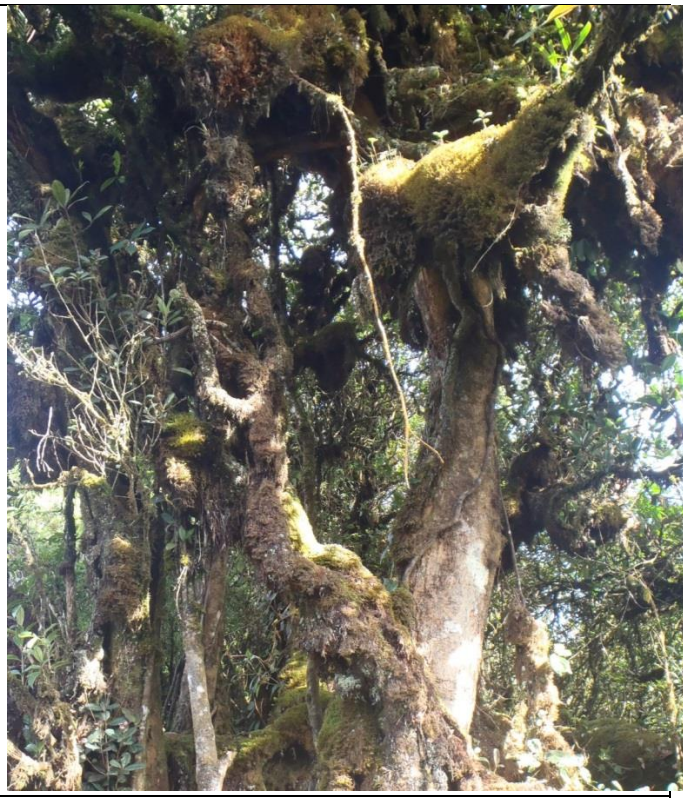
Knowledge and information. Faizal and his team of ecologists helped us with knowledge of the visited ecosystems and their history, species etc. The visits to forest/biological stations were interesting, and gave us important information. We were impressed by the size of protected areas, the number of staff and large ambitions to protect the rest of tropical mires in the country. On the other hand, it was depressing to see that some of the most valuable localities for protection (e.g. complete raised bog complexes) had been recently destroyed, that peatlands are still burning and destruction of peatlands still continues.
We all have to give priority to work on protection of mires!

IMCG in Badas peat swamp forest (Belait District, Brunei Darussalam). Photo: Marte Fandrem

Wiktor Kotowski (w.kotowski@uw.edu.pl):
I went to Malaysia to see and (try to) understand what I perceived as one of largest environmental catastrophes of our times. And I saw what I think is a very accelerated repetition of our - Central European - deterioration of mires. Oil palm plantations expand on Malaysian peatlands, despite the widespread knowledge on its devastating effects on climate and biodiversity. Their drainage systems closely resemble those on large drained fens in Poland. Prior to the IMCG trip I attended the IPS peat congress. I heard there a lot of hypocritical propaganda of peatland drainage and denialism of facts related to environmental impact of peatland farming. Also this sounds familiar to me. During the field symposium of IMCG, I was charmed by the splendour of tropical peatswamp forests. But I also realised how incomplete is our - general public - information on their destruction. Additionally to the area loss, they are also rubbed from the inside: selective logging, legal or illegal, led to elimination of large trees from most of forests, and the practice continues. Lack of hydrological buffer zones in protected areas also means that effectively protected area is much less than declared: swamp forests burn along with drained peatlands. The team of Global Environmental Centre does a great job trying to preserve Malaysian mires, change local awareness and establish good policies. Many thanks for that and for organising our trip. My other impressions in short: main astonishment - lack of mosquitoes in tropical peat swamp; main 'exotic excitement' - Malaysian food; main enchantment - local people, open, friendly and happy; the most surprising ecosystem service of tropical peat forests - offering a good environment for 'farming' swift nests, bought for 1000 $/kg by the local Chinese community to produce bird nest soup - an elixir of life.



Wiktor in the forest. Photo: Marte Fandrem



Mossy forest Gunung Brinchang, Cameron Highlands. Photo: Bev Clarkson

Cameron Highlands' mossy forest and some comparisons with New Zealand

Bev Clarkson (Clarksonb@landcareresearch.co.nz)

The last stop of the IMCG symposium was to the mossy, cloud or elfin forest, which occurs at 2000 m above sea level on Gunung (Mount) Brinchang, Cameron Highlands, Pahang, in Peninsular Malaysia. This is classified as upper montane rain forest and, with its stunted, even canopy, and gnarled, twisted trees festooned with mosses and liverworts, is highly distinctive. The main species are in the families Myrtaceae (e.g. *Syzygium*), Ericaceae (e.g. *Rhododendron*), and Coniferae. *Sphagnum* mosses grow on the forest floor and form a peat layer typically 1–3 m deep. This forest was particularly interesting to me as New Zealand has several mossy forest examples, and on my return I was interested in investigating whether peats were also present. Although not considered as true cloud forest (a term generally limited to the humid tropics), and here in the temperate climatic zone, rainfall is probably more important than cloud, there are many physiognomic similarities. One of the most widely known mossy forests in New Zealand is on Mount Taranaki, which is dominated by Cunoniaceae (*Weinmannia*) and Coniferae (*Podocarpus*).

Abundant mosses, liverworts, lichens, and filmy ferns are present; however *Sphagnum* is absent, and peat is not yet present because of regular volcanic disturbance. The most recent eruptions of 1655 and 1755 have deposited up to 40 cm of ash and lapilli, on which only shallow soils have developed. In contrast, mossy forests on older mountains elsewhere in New Zealand have accumulated extensive peats. For example, Table Mountain in the Coromandel Peninsula has peat deposits at least 1.5 m deep, but probably radicel rather than *Sphagnum* peat. The overall IMCG field symposium was invaluable to better understand forest peatlands, determine what is similar and what is different compared with the ecosystems we each work in, and why and how to generate new lines of enquiry

News from the regions

Global

Denial of long-term issues with agriculture on tropical peatlands will have devastating consequences

Following the 16th International Peat Congress (IPC) in Kuching (Sarawak), Malaysia, widely read media reported that the congress supported the view that current agricultural practices in peatland areas, such as oil palm plantations, do not have a negative impact on the environment (see IMCG Bulletin August 2016). However, this view is not shared by many of the participants, and does not reflect the broad message conveyed by the research presented at the congress.

In an effort to correct these statements, a number of the world's leading researchers researchers and practitioners from around the world have come together to publish a letter in Global Change Biology, one of the world's leading environmental science journals: http://onlinelibrary.wiley.com/doi/10.1111/gcb.13516/abstract. The 139 authors represent 115 government, academic, industry and non-governmental organizations from 20 countries. Forty of these organizations are based in Malaysia, Indonesia and Singapore; the countries most directly impacted by the adverse consequences of unsustainable management of tropical peatlands.

The consensus achieved in this paper is unprecedented. The letter confirms that the weight evidence presented at the congress, backed by many decades of scientific research, is unequivocal: business-as-usual management is not sustainable for tropical peatland agriculture and can no longer be justified.

While truly sustainable peatland agriculture methods do not yet exist, the scientific community and industry are already collaborating in the search for solutions, including interim measures to mitigate ongoing rates of peat loss under existing plantations. Not only is this of global importance in the fight against climate change, it is also key to ensure future economic wealth in tropical peatland rich regions. Indeed, failing to recognize the devastating far-reaching consequences of the way in which peatlands are being managed and failing to work together to address them could mean that the next generations will in fact have to deal with an irreversibly altered, dysfunctional landscape.

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Read also:
https://news.mongabay.com/2016/10/139-scientists-shoot-down-misleading-reports-from-malaysia-peat-congress/
http://www.straitstimes.com/singapore/environment/can-peatland-turn-into-oil-palm-fields-and-not-cause-haze
https://news.mongabay.com/2016/09/the-good-the-bad-and-the-ugly-in-palm-oil/

Congress may change views on cultivation of peatland: IPS

Bambang Nurbianto
The Jakarta Post

Kuching, Sarawak, Malaysia | Thu, August 18 2016 | 06:43 pm

"The International Peat Society (IPS) has said that the 15th International Peat Congress in Kuching, Sarawak, Malaysia at which many results of new research were presented, may change the perception of environmentalists about the negative impact of cultivation on peatland areas."

One of the newspaper articles (see http://www.thejakartapost.com/news/2016/08/18/congress-may-change-views-on-cultivation-of-peatland-ips.html) that triggered the publication of the Global Change Biology paper. See also: http://www.peatsociety.org/news/ips-statement-congress-may-change-views-cultivation-peatland-jakarta-post

Climate Change Agreement to enter into force

Over 55 Parties covering more than 55% of global greenhouse gas emissions have ratified the Paris Climate Change Agreement. "This is a truly historic moment for people everywhere. The two key thresholds needed for the Paris Climate Change Agreement to become legal reality have now been met," said Patricia Espinosa, Executive Secretary of the UN Framework Convention on Climate Change (UNFCCC). "The speed at which countries have made the Paris's Agreement's entry into force possible is unprecedented in recent experience of international agreements and is a powerful confirmation of the importance nations attach to combating climate change and realizing the multitude of opportunities inherent in the Paris Agreement," she said.

The Paris Agreement was adopted in Paris, France at the UN climate conference in December 2015. In order to enter into force, at least 55 Parties accounting for at least 55 per cent of global greenhouse gas emissions were required, with the Agreement then entering into force 30 days later.

On October 5, the UNFCCC secretariat tracker showed that the number of Parties that have ratified, accepted, or approved the Agreement covered over 55% per cent of global greenhouse gas emissions. This includes the biggest and smallest emitters, the richest and the most vulnerable nations.

Entry into force triggers a variety of important consequences, including launch of the Agreement's governing body, known as the CMA (= the **C**onference of the Parties to the Convention serving as the **m**eeting of the Parties to the Paris **A**greement.

Given that the count-down to entry into force has now been formally triggered, the first CMA will take place at the upcoming annual UN climate conference, known as COP22, in Marrakesh, Morocco from November 7-18. Precise dates will be announced in the coming days.

Moreover, the Intended Nationally Determined Contributions (INDCs) – national climate action plans - of Parties which have joined or subsequently join the Agreement transform into Nationally Determined Contributions (NDCs). A key feature of the Agreement is that these plans can be strengthened at any time but not weakened.

Governments will also be obligated to take action to achieve the temperature goals enshrined in the Agreement – keeping the average global temperature rise from pre-industrial times below 2 degrees C and pursuing efforts to limit it to 1.5 degrees.

The fact that around one degree of this rise has already happened and global greenhouse gas emissions have not yet peaked underlines the urgency of implementing the Paris Agreement in full.

Countries are also not starting from scratch. The many models and mechanisms for international climate cooperation set up under the UNFCCC over the past two decades have built up a deep level of experience and knowledge on how this can be done effectively. This includes, for example, the accountable action on peatland rewetting under the Kyoto Protocol.

Another key issue is to ensure that the $100 billion, pledged by developed countries to developing ones, is truly building in the run up to 2020 and that even larger sums are being leveraged from investors, banks and the private sector that can build towards the $5 to $7 trillion needed to support a world-wide transformation.

"The entry into force of the Paris Agreement is more than a step on the road. It is an extraordinary political achievement which has opened the door to a fundamental shift in the way the world sees, prepares for and acts on climate change through stronger action at all levels of government, business, investment and civil society," said Ms Espinosa.

For more information: http://unfccc.int/paris_agreement/items/9444.php

IUCN World Conservation Congress: Global call for action on peatlands to avoid catastrophic loss

At the IUCN World Conservation Congress in Hawaii, September 2016, delegates have passed a motion calling for better protection and restoration of the world's peatlands. The motion highlighted the potential for catastrophic loss of carbon, biodiversity and harm to water systems unless urgent action was taken to protect, restore and sustainably manage peatlands, which are present in more than 175 countries.

The currently known extent of peatlands occupies 3% of the Earth's land surface area, yet more carbon is stored in this area than all the world's vegetation, including forests. Damaged peatlands release two gigatonnes of carbon to the atmosphere each year, equivalent to the carbon emissions of all air travel. A large proportion of which is coming from drained peatlands in South East Asia, where emissions are increasing at an alarming rate.

Clifton Bain, Director of the IUCN UK Peatland Programme said: "The IUCN motion acknowledges the important role of the UK as a major peatland nation helping lead the way in tackling climate change by rewetting

peatlands – a nature-based solution in the tool kit to address this global problem. "We now need to build on this early momentum and ensure the UK and its devolved administrations have a lasting strategy to repair and look after our peatlands and support the farmers, crofters and other land managers in maintaining the vital peatland benefits for all of society."

Jonathan Hughes, Global Councillor for the IUCN and Chair of the IUCN UK Peatland Programme said: "The IUCN is the largest global voice for nature conservation, with representation from Government and civil society. Having this hugely influential group agree that peatlands are a priority for action is great news. The world's leaders have been given a clear steer that we cannot continue with the damage and destruction of our peatlands and that better protection is needed under national and international laws dealing with climate change, water and biodiversity."

Stuart Brooks, Chair of the IUCN UK National Committee said: "As a UK representative at this important event it was inspiring to see the overwhelming support for peatlands among so many delegates. Peatlands occur on every continent of the world with countries sharing many of the same peatland issues. It is clear from discussion among delegates that we can all benefit from each other's experiences and help build a strong global response to secure our peatlands."

Notable engagement in how global action on peatlands might be secured to address climate change was seen from Indonesia and Hawaii during a workshop hosted by the IUCN UK Peatland Programme and supported by IUCN Climate Change lead, Dr Sandeep Sengupta, at the IUCN World Congress.

The UK, which is amongst the top twelve nations for peatland area, has been challenged by the IUCN UK Peatland Programme to restore 1 million hectares of peatlands by 2020.

For full details of the motion: https://portals.iucn.org/congress/motion/046 .

http://www.iucn-uk-peatlandprogramme.org/news-and-events/news/global-call-action-peatlands-avoid-catastrophic-loss?destination=node%2F278%3Fpage%3D1&utm_source=IUCN+UK+Peatland+Programme+Master+List&utm_campaign=219aa74d6b-September_newsletter9_20_2016&utm_medium=email&utm_term=0_7872ad6518-219aa74d6b-179010653&ct=t(September_newsletter9_20_2016)

IUCN resolution 046 - Securing the future for global peatlands

NOTING that peatlands occur in every continent of the world;

RECOGNISING that peatlands occupy 3% of the Earth's land surface area yet store more carbon than all the world's vegetation, including all forests, and that damaged peatlands release two gigatonnes of carbon to the atmosphere each year, equivalent to the carbon emissions of all air travel;

RECOGNISING that peatlands are among the most valuable ecosystems on Earth (also providing clean water and playing a key role in flood management), and support a wide range of rare, specialist and threatened biodiversity, and are valuable as a palaeontological archive;

RECOGNISING that peatlands are areas of geological interest on our planet and that they are of great scientific interest in recording climate evolution, the composition of the atmosphere, geological processes and agents, as well as biodiversity during the Quaternary Period;

WELCOMING the recognition by international environmental agreements and initiatives, including the Convention on Biological Diversity (CBD) and the Ramsar Convention, of the importance of peatlands for climate change, biodiversity conservation, and a wide range of ecosystem services, and RECALLING that the restoration and sustainable use of peatlands has long been recognised as a priority under such activities but that implementation of these has been largely ineffective;

RECOGNISING that a workshop held during the IUCN World Conservation Congress at its session in Jeju, Republic of Korea (2012) called for IUCN to provide a focus for peatland action, for work with the business and private sector to secure funding, and for support to international efforts to share good practice and science relating to peatlands;

ACKNOWLEDGING the commitment to action for peatlands in the draft IUCN Programme 2017-2020, the work of National Committees, such as the IUCN National Committee for the United Kingdom Peatland Programme, and the work of Members such as Wetlands International;

GRATEFUL that the IUCN National Committee for the United Kingdom has pioneered procedures to re-wet peat, to restore biodiversity, reduce emissions and sequester greenhouse gases;

TROUBLED that peat is being lost rapidly through peat forest fires, conversion of peatlands for agricultural uses, mining for fuel, mining to sell in horticulture, and to enable construction;

ALARMED at the potential for catastrophic loss of carbon, biodiversity and harm to water systems if action is not taken to halt the loss of peatlands and to restore damaged peatlands;

ALSO ALARMED that in Borneo and Sumatra and the Malay Peninsula peat forests are being increasingly drained, sometimes unlawfully burned, and converted to oil palm plantations, causing severe fires, harm to water systems, and catastrophic loss of carbon and biodiversity, and that this peat destruction has released such vast amounts of CO_2 that this region now contributes greenhouse gas emissions comparable to those of

China or the USA, a sign it is time for action to be taken to halt the loss of peatlands and to restore damaged peatlands; and
CONCERNED that globally, there exists no legal provision for the stewardship of peat and peatlands, unless coincidentally peatland is located in a designated protected area or is subject to wetland preservation laws;

The World Conservation Congress, at its session in Hawai'i, United States of America, 1-10 September 2016:
1. RECOMMENDS that the Commission on Ecosystem Management should develop or endorse an existing scientific definition of peatland to be applied by the United Nations Food and Agricultural Organization (FAO) in its Soils Charter, by the Ramsar Convention in its classification of wetland type, and by IUCN;
2. REQUESTS the World Commission on Environmental Law to prepare draft legislation for nations to use as a guideline recommending how to preserve and restore peatlands and how to include them alongside forests in all relevant intergovernmental agreements relating to climate change, geodiversity and biodiversity;
3. CALLS ON National Committees to cooperate with the Secretariat, Commissions and Members in developing or contributing to country-focused programmes to protect, restore and sustainably manage peatlands taking cognisance of the strategic actions of the FAO 'guidance for climate change mitigation by conservation, rehabilitation and sustainable use of peatlands' and the ongoing work of the Ramsar Convention particularly under Ramsar Resolution XII.11 on peatlands, climate change and wise use (2015);
4. URGES states to place a moratorium on peat exploitation until their legislation is strengthened to ensure peatlands are protected or managed through wise use principles; and
5. RECOMMENDS states to give appropriate consideration to the importance of the preservation of peatlands when implementing activities to reduce deforestation and forest degradation.
https://portals.iucn.org/congress/motion/046

Big decline in Earth's wilderness

Unspoiled lands are disappearing from the face of the Earth at an alarming pace, with about 10 percent of wilderness regions - an area double the size of Alaska - lost in the past two decades. South America lost 30 percent of its wilderness during that period, and Africa lost 14 percent. The main driver of the global losses was destruction of wilderness for agriculture, logging and mining.

Researchers mapped the world's wilderness areas, excluding Antarctica, and compared the results with a 1993 map that used the same methods. They found that 30.1 million km^2 remain worldwide as wilderness, defined as biologically and ecologically intact regions without notable human disturbance. Since the 1993 estimation, 3.3 million km^2 of wilderness disappeared. About a quarter of the planet's land surface remains wilderness, particularly in central Africa, the Amazon region, northern Australia, the United States, Canada and Russia.
https://www.yahoo.com/news/paradise-lost-study-documents-big-decline-earths-wilderness-173743205.html

Extensive wilderness areas with peatlands still prevail in the Northeast Siberian Arctic. Photo: Hans Joosten

Asia

Indonesia

The worst air quality in the world?

Last year El Niño brought drought to south-east Asia, creating the conditions for enormous wildfires in forests and peatlands. To understand the fires' effect on atmospheric greenhouse gas concentrations and air quality, Bruce Main and Martin Wooster from King's College London, together with scientists from the Indonesia-based Centre for International Forestry (CIFOR), journeyed to the city of Palangkaraya, the capital of Central Kalimantan and home to around 220,000 people.

“By the time we got to Palangkaraya our noses told us the air was full of smoke, but it was past midnight and the darkness made it hard to tell how bad things were. Just before going to sleep though, I turned on one of our gas measuring instruments to download that day's data for safekeeping and was surprised when I saw a carbon monoxide concentration of 30 parts per million (ppm) in the hotel - enough to set off some European smoke alarms - even though we were many miles from the fires themselves. We wondered if sleeping in such polluted conditions was entirely safe.” “The next day the view from the hotel's sixth floor showed the buildings of Palangkaraya peeking out from a fog-like layer of smoke, with visibility of just a few hundred meters. This smoke, locally called 'haze', was being caused by the huge peat fires all around the city. Unfortunately for local people, most of the particles in the 'haze' are very small - being classed as PM10, with a diameter of 10 micrometres or less. In fact PM2·5 and smaller usually dominate in smoke from burning biomass, and these particles are small enough to penetrate into the deepest part of the lungs, and so cause the most serious health problems.

Particulate measurements are typically reported in microgrammes of PM10 particles per cubic meter of air (µg/m3). In the UK, daily mean PM10 values of 101µg/m3 or above are considered 'very high' - the most severe level usually seen here - and the US Environmental Protection Agency (EPA) views 300µg/m3 or more as hazardous, advising everyone to consider avoiding physical activity outdoors under such conditions.

Palangkaraya's local air quality monitoring station turned out to be frequently reporting PM10 concentrations around 2,000µg/m3, and sometimes closer to 4,000µg/m3. This was probably the worst outdoor air quality of any city on Earth at the time, and hospital admissions soared. Beijing for example has notoriously poor air, but even on its worst days it doesn't come close to these levels.” http://www.nerc.ac.uk/planetearth/stories/1834/

Peat fire in Central Kalimantan Photo: Hans Joosten

Haze from the 2015 Indonesian fires may have killed more than 100,000 people

A smog outbreak in Southeast Asia last year may have caused over 100,000 premature deaths, according to a new study released in September (http://iopscience.iop.org/article/10.1088/1748-9326/11/9/094023). Researchers from Harvard and Columbia universities estimated there were more than 90,000 early deaths in Indonesia, and several thousand more in neighbouring Singapore and Malaysia. The new estimate, reached using a complex analytical model, is far higher than the previous official death toll given by authorities of just 19 deaths in Indonesia.

The haze is an annual problem caused by fires set in forest and peatland in Indonesia to quickly and cheaply clear land for palm oil and pulpwood plantations. The blazes occur mainly on Indonesia's western Sumatra island and the Indonesian part of Borneo, with monsoon winds typically blowing the haze over Singapore and Malaysia. Last year's haze outbreak was the worst since 1997 due to a strong El Nino weather system, which created tinder-dry conditions in Indonesia and made peatland and forests more vulnerable to going up in flames.

Indonesian, Malaysian and Singaporean authorities have dismissed the study. In Indonesia, a spokesman for the country's disaster mitigation agency said the research "could be baseless or they have the wrong information." Indonesia officially counted 24 deaths from the haze including people killed fighting the fires. Singapore's Ministry of Health said short-term exposure to haze will generally not cause serious health problems. The study was "not reflective of the actual situation," it said, and the overall death rate hadn't changed last year. In Malaysia, Health Minister Subramaniam Sathasivam said officials are still studying the research, which is "computer generated, not based on hard data." "People have died but to what extent the haze contributed to it, it's hard to say," he said. "If an 80-year-old fellow with high blood pressure, diabetes, heart problem and exposure to haze died, what did he die of? This is hell of a difficult question to answer."

https://www.theguardian.com/world/2016/sep/19/haze-indonesia-forest-fires-killed-100000-people-harvard-study
http://www.thejakartapost.com/news/2016/09/20/haze-caused-thousands-deaths-ri-2015-study.html
http://www.ksby.com/story/33145095/nothing-to-see-here-southeast-asia-flummoxed-by-haze-study
http://www.aseanpeat.net/newsmaster.cfm?&menuid=11&action=view&retrieveid=3562

Indonesia environment haze investigating team threatened with death

Dozens of Indonesian men, suspected of being hired by an oil palm plantation company, threatened to kill environmental investigators checking on fires on Sumatra island, the environment ministry of Indonesia said in the beginning of September. The incident illustrates the difficulties Indonesia faces tackling the illegal burning of vegetation to clear land for palm oil and pulp and paper plantations that causes clouds of smoke every dry season, which at times blanket the region, raising fears for public health and air travel.

The ministry said a group of up to 100 men detained seven investigators for about 12 hours on the weekend and threatened to burn them alive and dump their bodies in a river at an oil palm plantation in Rokan Hulu, Riau province. The team was following up on satellite images showing "hot spots", or suspected fires, in a concession of PT Andika Permata Sawit Lestari (APSL) oil palm plantation company.

There were "strong indications" the mob was deployed by the company, the ministry said in a statement.

http://www.reuters.com/article/us-indonesia-haze-idUSKCN11B0JF

Government prepares economic package for peat restoration

The Indonesian government is preparing a special economic policy containing investment packages specially aimed at supporting peatland restoration. "We would invite the ministry of finance, the Capital Investment Coordinating Board (BKPM) and the President for the discussion of the economic packages," head of Peat Restoration Agency (BRG), Nazir Foead, said when explaining the results of the meeting on Building Investment Partnership for Peatland Conservation, Restoration and Development at the Indonesia High Level Dialog New York at the BRG office here on Monday September 26.

Based on BRG calculation there are four million hectares of cultured peatland that have been damaged and so need different treatment and supervision to improve their hydrological resilience. "We will invite philanthropists to help restore the land," Nazir said. "Many parties have expressed interest to invest on peatland restoration although their main reason is carbon trading." "I believe some will also be interested in developing coconut or sago plantations or other plants that fit with peatland," he said.

It is hoped in the 22nd Conference of Parties in Marakesh, Morroco, early in November, the investment packages will have been able to be introduced.

http://www.antaranews.com/en/news/106914/government-prepares-economic-package-for-peat-restoration

Indonesia seeks foreign investors to help restore peatland

Indonesia will need the help of foreign investors to restore over two million hectares of peatland in Sumatra, Kalimantan and Papua. “Some foreign organisations have expressed interest in aiding us with peatland restoration. We will never meet our target if we only rely on (palm oil) corporations,” Peatland Restoration Agency chief Nazir Foead told CNN Indonesia end September. The World Bank had estimated the initial cost for rehabilitating the peatland at around 1.8 billion (milliard) euros. That figure includes the vital initial work, such as blocking drainage canals, but does not price-in the longer term costs associated with maintaining restored peatland.

About half the peatland earmarked for restoration is on palm oil companies’ concession land. These companies are responsible for the improvement work with guidance from the agency. According to Nazir, peatland restoration requires a close cooperation between the government, investors and farmers, as its sustainability relies on following existing programs on preservation, rehabilitation and land use.

Nazir said his agency has identified potential donors such as American philanthropist Tom Steyer, non-governmental organisations the Packard Foundation and the MacArthur Foundation, banking giant Goldman Sachs, climate change group Good Energies Foundation, and the Climate and Land Use Alliance.

The Packard Foundation and the Climate and Land Use Alliance have already declared they will donate $15 million.

http://www.todayonline.com/world/asia/indonesia-seeks-foreign-investors-help-restore-peatland
https://news.mongabay.com/2016/09/indonesia-seeks-foreign-funds-to-aid-peat-restoration-drive/
http://wp.news365.my/?p=1540803

ASEAN and EU unite in fighting haze

ASEAN (the Association of South East Asian Nations) and the European Union have agreed to cooperate in managing peatlands and combating cross-boundary haze pollution in order to prevent a recurrence of last year’s disastrous fires that ended up severely affecting the wider region. Franck Viault, the head of cooperation at the delegation of the EU to Indonesia, said on Wednesday September 14 that about €24 million in funds had been set aside to finance the Regional Peatlands program. The EU will provide €20 million while co-financier Germany will provide the rest of the money.

http://www.thejakartapost.com/news/2016/09/15/asean-eu-unite-fighting-haze.html

After the peatland fire (Central Kalimantan). Photo: Hans Joosten

Russia / Siberia

6th International Meeting on the Biology of *Sphagnum* in Russia

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The 6th International Meeting on the Biology of *Sphagnum* was held in Russia this year from the July 28 to August 11. Twenty five years ago the idea to bring *Sphagnum* enthusiasts from many different scientific fields together started with the 1st meeting in Exeter, Great Britain, organized by the British Bryological Society and the International Association of Bryologists. Meanwhile the meeting to share experiences and exchange knowledge on *Sphagnum* bryology has been organized in several regions including Northeastern USA/Canada, Norway/Sweden, Alaska and Latvia/Estonia.

Sphagnum wulfianum *in Chistoye Bog, West Siberia. Photo: Anja Prager*

Participants of Saint-Petersburg's part of excursions on Ozernoe bog. Photo: Anna-Helena Purre.

This year the meeting began with a two-day excursion in the surroundings of St. Petersburg, organized by Maria Noskova (Saint-Petersburg State University). The main goal for this part of the meeting was to look at species with an oceanic distribution tendency, which are difficult to find in continental Russia, and to give scientists who couldn't go to Siberia the possibility to participate in the *Sphagnum* meeting. The first destination on July 29th was Tarchovka Park situated within the city boundaries. As a result of influence of the Gulf of Finland its flora includes various suboceanic elements. The red-listed *Myrica gale* is a dominant vascular species in small fens along the Gulf's coast. The prevalent peatmosses there are *Sphagnum teres* and *S. fallax*. The suboceanic species *S. palustre*, which is also listed in the regional Red Data Book, was found in the nearby forest. The second destination on the same day was Ozernoye bog nature reserve, where *S. rubellum*, *S. cuspidatum* and *S. tenellum* are very common, as opposed to Western Siberia, where they are rare. Dominant species were also *S. fuscum*, *S. capillifolium*, *S. balticum* and *S. majus*. A puzzling finding was a peatmoss species growing at around 2-meter depth under water in a primary lake. The plants had swollen branches without differentiation into spreading and pendant ones, with large and broad concave branch leaves, and stem leaves looking similar to branch leaves. The first identification suggestions were *S. platyphyllum* or a peatmoss of the section *Sphagnum*. Further microscopic examination showed that apexes, margins and tissue of the branch leaves were more like those in *S. cuspidatum*.

July 30th was fully dedicated to excursions to mires along Europe's largest lake: Ladoga. During the first stop in Gontovoye mire and in the surrounding forest the participants observed rare peatmosses such as *S. quinquefarium*, *S. wulfianum*, *S. compactum* and *S. subnitens*. In Kokorevskoye, the last mire on the itinerary, *S. jensenii*, *S. auriculatum* and *S. obtusum* were encountered. In both mires *Sphagnum papillosum* and *S. subsecundum* were very common species.

In total, twelve participants from Estonia, Czech Republic, Lithuania, Netherlands, Germany, Belarus, and Russia took part in the Saint-Petersburg part of the *Sphagnum* meeting, and 30 peat moss species were found during the excursion: *Sphagnum angustifolium*, *S. auriculatum*, *S. balticum*, *S. capillifolium*, *S. centrale, S. compactum*, *S. cuspidatum*, *S. fallax*, *S. fimbriatum*, *S. flexuosum*, *S. fuscum*, *S. flexuosum*, *S. girgensohnii*, *S. inundatum*, *S. jensenii*, *S. magellanicum*, *S. majus*, *S. obtusum*, *S. palustre*, *S. papillosum*, *S. quinquefarium*, *S. riparium*, *S. rubellum*, *S. russowii*, *S. squarrosum*, *S. subsecundum*, *S. subnitens*, *S. tenellum*, *S. teres* and *S. wulfianum.* Four

species previously known from the visited mires were not found on these excursions: *S. contortum, S. platyphyllum*, *S. pulchrum* and *S. warnstorfii.*

Saint Petersburg excursion, Ozernoye bog. Photo: Lisa Op den Kamp.

Conference auditory during the 6th International meeting on the Biology of Sphagnum in Khanty-Mansiysk at Yugra State University. Photo: Greta Gaudig.

The Meeting continued with a conference from August 1 to August 3 in Khanty-Mansiysk, the administrative centre of the Khanty-Mansiysk Autonomous okrug (region) – Yugra in West Siberia. The meeting was hosted by Yugra State University and organized by Yulia Papanova and Prof. Dr. Elena Lapshina (Head of the Research Educational Centre "Environmental Dynamics and Global Climate Change" (UNESCO Chair) of Yugra State University). 45 participants from ten countries (Russia, Canada, Germany, Estonia, Finland, Ireland, Lithuania, The Netherlands, Sweden, and Czech Republic) exchanged their knowledge in 27 oral and seven poster presentations on topics like:

- *Sphagnum* taxonomy, floristic studies, rare *Sphagnum* species, mire regions
- *Sphagnum* growth: productivity, decomposition
- Element concentrations (N, P, K) in *Sphagnum* species
- Development of *Sphagnum* coverages in different succession stages
- Interrelations of moss species in peatland communities
- Utilisation of *Sphagnum* mosses and Sphagnum farming.

During the conference the first Russian field guide for *Sphagnum* identification was presented and successfully tested during the field excursions. The field excursions began during the conference, lasted until August 11 and covered four regions and around 5,000 km through the vast peatland areas of the West Siberian plain.

As Khanty-Mansiysk is situated between the rivers Ob and Irtysh the first excursion close to town led to Chistoye Bog and Moroshkovy Island bog situated at elevated terraces of the river floodplains. Dwarfshrub, sedge and birch-reed communities with species like *Chamaedaphne calyculata*, *Eriophorum vaginatum*, *E. russeolum*, *Carex vesicaria* and *C. globularis* were accompanied by peatmoss species like *Sphagnum fuscum*, *S. squarrosum*, *S. russowii*, *S. magellanicum*, *S. wulfianum*, *S. warnstorfii* and many others.

The excursion went more west and visited the Potanay mire area. At a poor minerotrophic aapa mire *Betula nana*, *Carex lasiocarpa* with *Sphagnum magellanicum*, *S. angustifolium* and *S. russowii* were observed at the strings while flarks were covered with *Scheuchzeria palustris* and *Rhynchospora alba* accompanied by *Sphagnum papillosum.* At the mire margins *S. aongstroemii* was growing. At one rich fen *Sphagnum teres* and *S. warnstorfii* were forming a dense carpet together with other bryophytes. A more nutrient poor, mesotrophic fen was dominated by *Carex canescens* and *Eriophorum gracile. Sphagnum obtusum* and *S. centrale* were observed.

The excursion continued westwards to the Kondinskiye Lakes nature park, east of the Konda river catchment with large areas of pine forests on sandy soils and 50 % of the area covered by mainly raised bogs and to lesser extent by poor fens. *Sphagnum riparium*, *S. obtusum*, *S. jensenii* and *S. balticum* occurred in an oligo-mesotrophic fen at the eastern bank of lake Rangetur. In shallow rounded depressions (alases) with *Sphagnum compactum*, *S. balticum* or *S. papillosum*, the influence of thermokarst on mire development was explained. *Sphagnum tenellum* was found in the raised bog Bazovoye bog. *Sphagnum platyphyllum* was growing close to the Enya river in *Carex aquatilis* communities. Once more the participants enjoyed the colourful peatmoss

lawns at Polosatoye aapa mire with *S. fuscum*, *S. magellanicum*, *S. papillosum* and *S. subfulvum*, which is rare in West Siberia. The overnight stay in the field station situated adjacent to beautiful bog with wonderful meals, vodka toasts to peatmoss science and the traditional Russian sauna ('banja') completed the unforgettable visit of the nature park.

Bazovoye bog in Kondinskiye Lakes nature park. Photo: Greta Gaudig.

Participants determining peatmosses in the bogs of Surgutskoye Polesye. Photo: Greta Gaudig.

The last excursion led us to Surgutskoye Polesye on the right bank of the Ob river close to the settlement of Lyantor. Surgutskoye Polesye is a plain in the taiga zone with only 3% forest and vast bog systems with numerous lakes developed by thermokarst. A mosaic of ombrotrophic ridges and minerotrophic flarks *Sphagnum* caused species of different habitats to grow closely together; on an area with a radius of 20 m *S. fuscum*, *S. angustifolium*, *S. capillifolium*, *S. balticum, S. obtusum*, *S. riparium*, *S. teres*, *S. fimbriatum*, *S. lindbergii*, *S. papillosum* and *S. compactum* were found.

As a result of the unforgettable field excursions and long lasting determinations of mosses via microscope combined with 'hot' debates until late night, we observed 29 of the 32 peatmoss species that were known from the areas. Moreover, we found several species like *S. subfulvum* in areas, where they had not yet been observed and we recorded *S. annulatum* for the first time for this region.

Beside that we became more familiar with the culture of the indigenous people: the tribes of the Khanty and the Mansi, and their shamanic life as reindeer herders. This contrasts with the 'modern world' of oil production in the area as large oil reserves were found in the Khanty-Mansiysk region in the 1960s.

Finally we have to conclude for all participants of the 6th International Meeting on the Biology of *Sphagnum*: incredible vast peatmoss mires, endless pine forests, and great hospitality.

Europe

European Union

Cost and benefits of Natura 2000

Effective management and restoration of sites in the Natura 2000 network requires significant investments. In 2004 the Commission provided a first cost estimate of 6.1 billion EUR per year for EU-25 Natura 2000 financing needs. An updated and more thorough assessment for EU-27, using common methodologies, broadly supports this earlier figure. Based on data received from 25 Member States it is estimated that a minimum of 5.8 billion EUR per year will be needed for EU-27 to manage and restore the sites in the network.

However, these costs are greatly outweighed by the benefits provided by the network. In addition to playing a crucial role in protecting Europe's biodiversity, Natura 2000 sites provide a wide range of other ecosystem benefits and services to society. The economic value of these multiple benefits has been considered to be very significant, but until recently few studies have been undertaken to evaluate this in detail. DG Environment has commissioned three contracts to help identify, evaluate and subsequently demonstrate the economic benefits provided by Natura 2000.

The first of the three studies provides a methodological framework for assessing the overall economic value of the Natura 200 benefits and offers a first broad assessment of what that value could be. It puts the figure in the region of 200-300 billion EUR per year for the whole network.

- The Economic benefits of the Natura 2000 Network (Synthesis report)
- The Economic benefits of the Natura 2000 Network (Factsheet)

The second study looks specifically at the economic value of benefits provided by tourism and recreation and employment in relation to Natura 2000, whilst the third study proposes a tool for estimating the total economic value of the changes to ecosystems services as a result of taking conservation measures in Natura 2000 sites. Detailed final reports of the three study contracts

- Estimating the overall economic value of the benefits provided by the Natura 2000 network & Annexes
- Estimating the economic value of the benefits provided by the tourism/recreation and employment supported by Natura 2000
- Recognizing Natura 2000 benefits and demonstrating the economic benefits of conservation measures

Specific case-studies have also been prepared on successful and innovative approaches to financing Natura 2000 needs.

- Successful and innovative approaches to financing Natura 2000 needs

Earlier studies for the Commission have also examined the benefits associated with individual Natura 2000 sites:

- Assessing Socio-Economic benefits of Natura 2000 sites - a toolkit

The tool is designed for wider use by land managers and has been verified on 5 case studies in different biogeographical conditions:

- The Azores: SPA Pico da Vara / Ribeira do Guilherme
- Maramures, Romania: Oaș-Gutâi Plateau and Igniș site
- Poland: Białowieża Forest
- Portugal: Natural Park of Vale do Guadiana
- UK Uplands: Sustainable catchment management programme

An initial review on the benefits brought by Natura 2000 as they are seen in the Member States has been elaborated Further information on both the costs and the benefits is available in the reports of the Commission's contractors:

- Costs and Socio-Economic Benefits associated with the Natura 2000 Network

Germany

Governmental advisory councils recommend to rewet agricultural soils and to stop peat use

The German governmental Advisory Councils for Agriculture and Forestry have recommended the federal and relevant state governments far going steps with respect to peatlands. Both councils in a joint report advise to develop peatland conservation strategies with mandatory time goals and implementation steps and a secure long-term financing concept. In these strategies all agriculturally used peat soils should get a basis protection, including the obligatory conversion of arable land to grassland and a limitation of fertilization. In areas with higher nature conservation perspectives, low intensity grassland use should be promoted by voluntary contractual climate protection measures. In areas with highest conservation perspectives full rewetting of peat soils should be pursued using tendering mechanisms. If tendering does not lead to sufficient result, legislative measures have to be taken in combination with compensatory payments.

The advisory councils furthermore recommend the federal and state governments, together with the environmental and industrial associations concerned, to develop a peat exit strategy, including the fast development of climate, environmental and user-friendly peat substitutes, the prohibition of the use of peat substrates in hobby gardening within the next two years, and the start of gradually restricting peat in commercial horticulture in about five years. The directives on public procurement should be amended so that in public contracts for landscape gardening, the use of peat substitutes can be prescribed. Further information: http://www.bmel.de/SharedDocs/Downloads/Ministerium/Beiraete/Agrarpolitik/Klimaschutzgutachten_2016.pdf?__blob=publicationFile

An exit strategy for peat use in Germany? Photo: Hans Joosten.

Tiny mosses – big style! First large scale harvest of cultivated peatmoss worldwide

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17/07/2016: It was a global premiere: the first mechanical harvest of cultivated peatmoss ever! At Hankhauser Moor (Lower Saxony), scientists of Greifswald University and staff of the peat company Moorkultur Ramsloh harvested the rare commodity from the joint pilot site. Being precious seed, the mosses were immediately reused and spread out, thus tripling the Sphagnum farming area. Expanding the site to a total 'business-scale' size of 13 ha also kicked off the MOOSWEIT-project (see for spectacular pictures the television movie http://www.ndr.de/nachrichten/niedersachsen/oldenburg_ostfriesland/Torfmoos-Anbau-Weltpremiere-in-der-Wesermarsch,torfmoos108.html).

Five years ago the project partners had installed the peatmoss culture on former bog grassland that had been a drained and intensively used meadow for over 50 years. Mosses had established successfully and showed remarkable growth over the years. Peatmosses may be used as substrate in horticulture and thus present an alternative to peat. However, peatmoss biomass is not yet available in sufficient quantities and seed is especially scarce. Therefore, MOOSWEIT investigates large scale cultivation, mechanical harvest and regeneration of the permanent crop. The project is financed by the State of Lower Saxony, the EU (ERDF), and the German Federal Ministry of Food and Agriculture.

Moreover, Sphagnum farming allows a sustainable utilisation of rewetted bogs (paludiculture). So far, most peatlands in Germany are being drained for agricultural use. This results in immense emissions of greenhouse gases. In contrast, wet peatlands hardly emit any CO_2, filter nutrient-rich water and offer habitats for rare species. For more information on the peatmoss cultivation at Hankhauser Moor see www.sphagnumfarming.com.

Harvest of cultivated peatmoss in Germany. Photo Philipp Schroeder, www.lensescape.org

Draft German climate protection plan not ambitious enough with respect to peat soils

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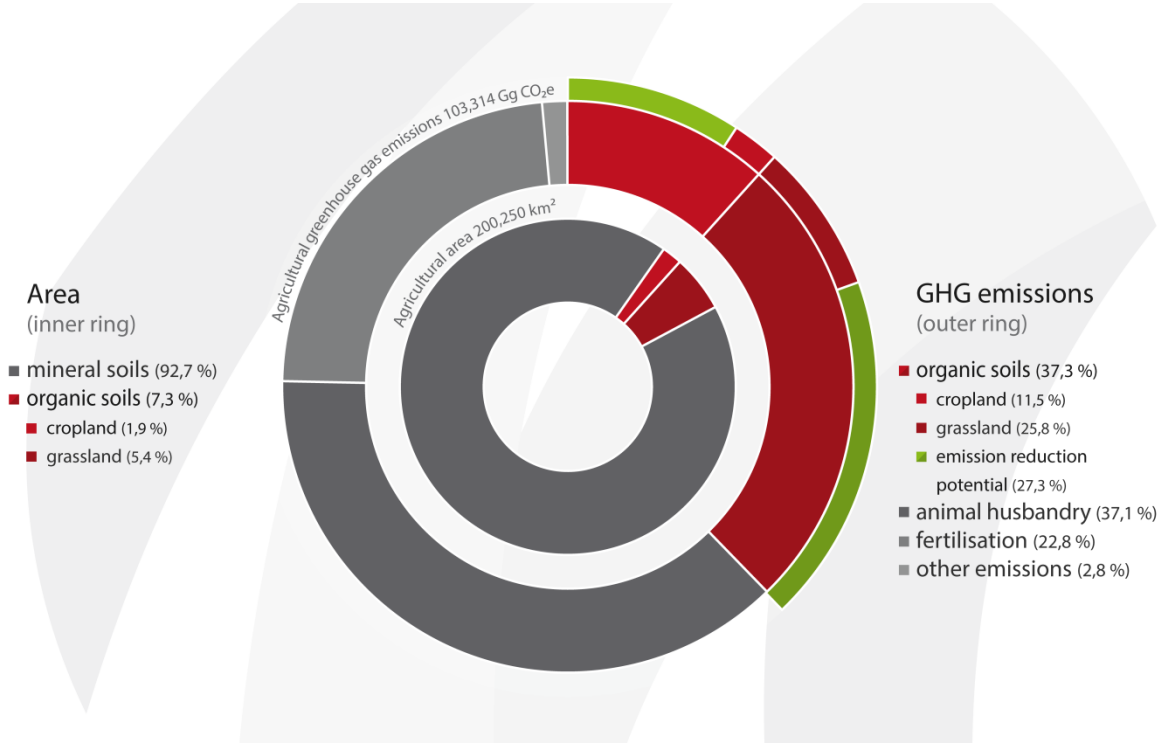

Of the organic soils in Germany, 3,800 km^2 are –according to official statistics - used as arable land and 11,000 km^2 as grassland. Constituting only 7.3% of the total agricultural land, these lands emit more than 45 million tonnes of CO_2e per year, i.e. more than one third of all emissions from agriculture (see above). To reduce emissions, the draft Climate Protection Plan 2050 of the German government has formulated the aim to rewet an additional 5-10% or organic soils by 2030. This goal, however, is far from ambitious, particularly when taking into account that agriculture is responsible for 15% of total German greenhouse gas emissions. The target is also not proportional to the necessary 90% reduction of total greenhouse gas emissions by 2050, as the Paris Agreement implies.

First one may challenge the choice of the draft Plan to reduce emissions from agriculture with only 50% until 2050, where the overall aim of all sectors together is 90%. With an overall goal of 90%, allowing one sector to reduce only 50% simply means that other sectors have to reduce more than 90%. And these last percents may be the most difficult ones to achieve… The choice of only 50% is motivated by the fact that emissions from agriculture 'mainly base on natural physiological processes, which can only be reduced in a limited way by technical measures'. In addition, there is reference to the hunger in the world and food security.

Whereas these are valid arguments, they cannot substantiate the low ambition. Much of German agriculture does not contribute to food security at all but produces energy crops, some of which (e.g. biogas from Maize grown on drained peatland) is totally counterproductive from a climate change mitigation point of view (see

http://www.imcg.net/modules/download_gallery/dlc.php?file=47). Furthermore technical measures, especially peatland rewetting, may actually well reduce emissions more substantially than implied.
With the low ambition of rewetting 10% of drained organic soils, emission reduction would amount to only 2.3 megaton CO_2e or 2% of the total emissions from agriculture. In contrast rewetting 50% would allow 11.4 megaton CO_2e to be avoided, or 10% of total agricultural emissions. With optimal water management emissions can further be reduced, so that emissions from agriculture can be reduced by about some 15% if 50% of the currently drained organic soils are rewetted. If fertilization and animal husbandry, the other major emission sources from agriculture (see figure), also halve their emissions, the total agricultural sector would reach a reduction of almost 50 %.
This said, it has to be taken into account that rewetting 50% of the organic soils in agricultural use only concerns 3.6 % of the total agricultural area, whereas a similar emission reduction in fertilization and animal husbandry will have a much larger effect on the total agricultural sector. The costs and impact of rewetting will thus be much lower than the other reduction options of agriculture.
Last but not least, rewetting of agricultural land does not have to imply discontinuation of agricultural use. Paludiculture, the productive use of wet peatlands (http://www.schweizerbart.com/9783510652839, http://mires-and-peat.net/pages/volumes/map13/map1300.php), provides ample opportunities for production while avoiding the enormous environmental burden of drainage based peatland agriculture.

Russia

September was very active time in Russia for peatland related events.

Sloping mire in the National Park "Ugydva" in the Polar Urals.

Symposium "Stationary investigations of forested and peatland ecosystems" in Syktyvkar

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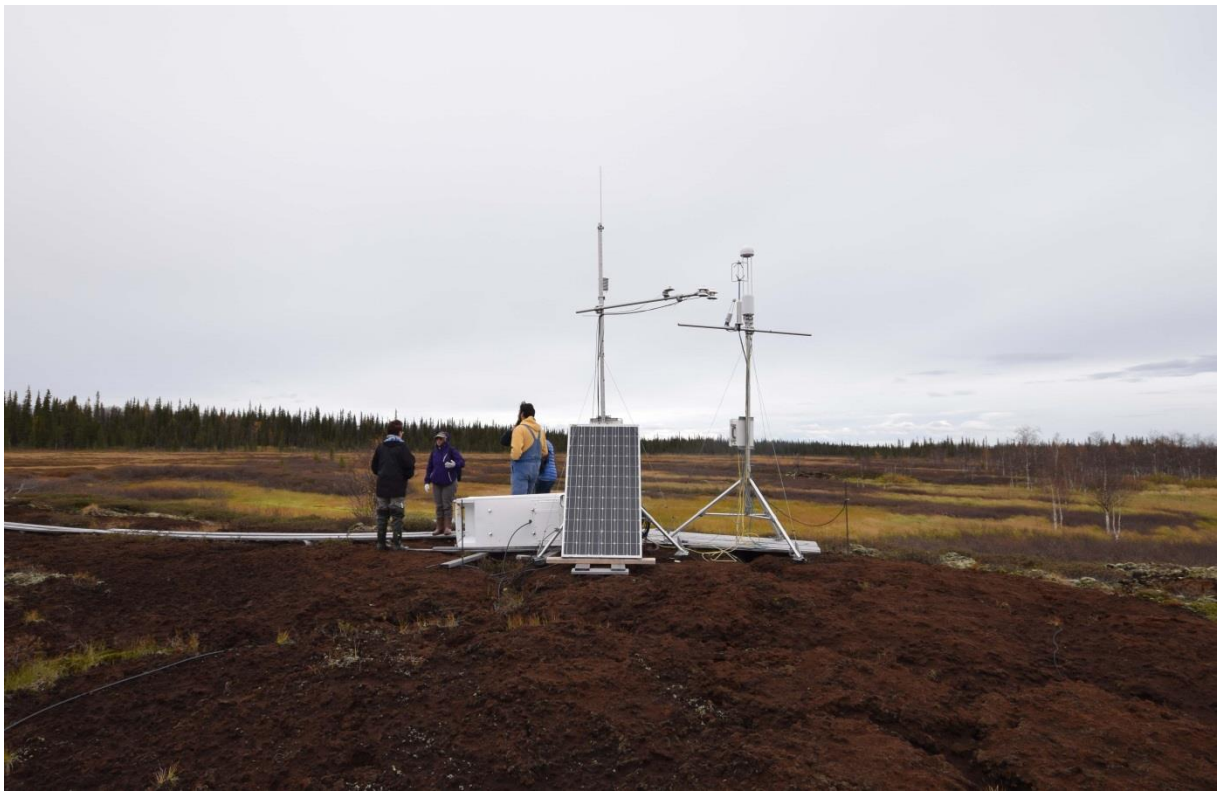
Productive discussions characterized the scientific symposium "Stationary investigations of forested and peatland ecosystems" in Syktyvkar, Komi Republic of Russia, on September 14-23. Furthermore an exciting excursion was held to the beautiful peatlands of the northern taiga and the Northern Ural highlands in Ugra National Park and the Medla-Pev-Nur and Lyalski research stations of the Institute of Biology, Komi Scientific Centre of the Ural Branch of the Russian Academy of Sciences.

During this excursion Svetlana Zagirova and Nadezhda Goncharova of Komi as well as the most experienced Russian mire scientist and IMCG Honorary Member Tatiana Yurkovskaya examined with us the sites to be visited during the 2017 IMCG excursion.



Greenhouse gas and carbon balance measurements on palsa mires near Inta town

International workshop 'Restoration of peatlands in Russia'

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An international workshop 'Restoration of peatlands in Russia: project outcomes and cooperation perspectives' was held on September 27-28 in the town of Vladimir and in Meschera National Park, Russia. This was the fourth large workshop in the Russian Federation on peatlands conservation and wise use during the last 20 years. Previous workshops were held in 2001, 2005 and 2010. As an outcome of the 2001 Workshop the 'Framework for Peatland Conservation and Wise Use in Russia' was developed. Workshops in 2005 and 2010 produced resolutions that actualized provisions of the Framework. The 2016 workshop was focused on the priority topic 'peatland restoration' and more time was assigned to working in groups and to practical field excursions.

The 100 participants came from 15 federal subjects of Russia and 6 foreign countries. They represented executive authorities of various level (31 participants), federal specially protected nature areas (11 people), scientific community and educational institutions (22 people), private sector (13 people), and non-governmental nonprofit organizations (8 people).

Workshop participants got an insight into peatland management, conservation, and restoration in Russia and worldwide. They were informed on the outcomes of the 2012–2016 Project 'Restoring peatlands in Russia for fire prevention and climate change mitigation', identified problems that had arisen in the course of project implementation, and then discussed follow-up priorities of peatland restoration, conservation, and wise use activities in Russia that could facilitate mitigation of and adaptation to climate change.


Goal of the workshop was to optimally involve experts in the discussions about peatland rewetting, restoration, and planning follow-up activities funded both within a second phase of the project and within governmental programs. Also issues of peatland protection and wise use were briefly discussed.

Monitoring activities and assessments of rewetting effectiveness in terms of fire prevention and climate change mitigation were carried out on >70,000 ha in Moscow Province. The Vladimir Province Administration, which hosted the workshop in association with the Project, identified 15,000 ha of cutover peatland deposits as priority sites for rewetting. Plans to implement these works have been included in the provincial environment conservation programme. More than 10,000 ha has been rewetted in Tver oblast. In total 100,000 ha of drained peatlands has been directly or indirectly been positively influenced by the project activities.

Peatland restoration aspects were at the workshop vigorously discussed in the form of interactive seminars, in particular addressing rewetting methodologies, socio-economic issues, legislation, scientific foundations of engineering works, monitoring of rewetting results, economic incentives, capacity building, education and awareness raising. A special seminar on 'Voluntary carbon markets: possibilities and perspectives for Russia' was held during the workshop. Speeches of international experts on restoration and wise use of peatlands, including paludiculture development and sustainable use of peatlands, with case studies from Germany, Belarus, The Netherlands, and other countries, raised great interest among the participants.

Special attention was given to the selection of technologies and other practical problems that were brought forward by experts during their excursion to rewetting sites in the Meschera National Park. Participants from other regions of Russia expressed their interest in the rewetting activities on disturbed peatlands. Possible cooperation with private sector investors was discussed. In the course of the workshop, technological guidelines and other materials were presented to the participants.

The Project has been developed in accordance with the Joint Statement on cooperation between the Ministry of Natural Resources and Ecology of the Russian Federation and the Federal Ministry of Environment, Nature Conservation, Building, and Nuclear Safety of the Federal Republic of Germany (June 2011) in the context of agreements on cooperation in peatland restoration and mitigation of climate change between the President of the RF and the Federal Chancellor of Germany that were concluded in August 2010.

The Project has been financed under the International Climate Initiative by the Federal Ministry of Environment, Nature Conservation, Building, and Nuclear Safety of the Federal Republic of Germany, managed by the Germany's KfW Development Bank (project 11 III 040 RUS K "Restoration of peatlands"), and implemented by Wetlands International in association with the Institute for Forest Science RAS, the Michael Succow Foundation, and the Institute of Botany and Landscape Ecology of Greifswald University with support of the Ministry of Natural Resources and Ecology of the Russian Federation

Visit of IMCG experts to Russian restoration sites

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Using the opportunity of having them in Russia we asked key experts to have a look at project restoration sites. Ab Grootjans, Olivia Bragg, Alexander Kozulin and Marcel Silvius looked at plans and designs and visited sites in Vladimir and Nizhny Novgorod provinces, even using drones to take a look at the sites.

Many valuable comments were received which will improve the designs and plans.

United Kingdom

Forsinard declared National Nature Reserve

Scottish Natural Heritage has now attributed the National Nature Reserve (NNR) accolade to the newly extended Forsinard Flows reserve. Forsinard Flows is situated in Caithness and Sutherland and has been extended by 3,963 hectares and now covers an area of 15,392 hectares. Flow country peatland restoration is one of the priority projects helping to deliver on the Scottish Government's 2020 Challenge for Scotland's Biodiversity.

https://www.pressandjournal.co.uk/fp/news/highlands/1043441/newly-extended-peatland-reserve-gains-accolade/

North-America

Peat extraction volumes 2016 lower than expected

The Canadian Sphagnum Peat Moss Association (CSPMA), whose members represent 95% of the North American peat extraction volume, has announced the results of its members' survey regarding level of extraction for the 2016 season. The survey was conducted on the status of their 2016 'Actual Harvest' (= volume achieved as of August 31, plus, what can reasonably be expected to be achieved for the last few weeks of the season considering 'normal' conditions) as a percentage of their 2016 'Expected Harvest' (= volume that equates to a) market needs, plus, b) anticipated buffer as at the end of the 2016 season, minus, c) what was left of the 2015 buffer) on August 31.

Overall the picture is that no peat extraction region is achieving the expected volumes. In New Brunswick, the industry is slightly below average in its expected harvest volumes (New Brunswick North, 93%, New Brunswick South, 76%). A wet cool summer restricted extraction. Extraction on Québec's South Shore (89%) is below expectations. In Québec's North Shore (75%) no company achieved its extraction harvest expectations, because of weather conditions.

The Prairie Provinces (MB, SK & AB) have experienced a lower (Manitoba, 83%, Saskatchewan, 70%, Alberta, 79%) extraction volume primarily due to adverse weather. Minnesota has experienced a similarly lower than expected volume with 84% achieved. Further adjustments may be made dependent on the ability to extract in the fall season. The industry had lower carryover inventory volumes from the previous extraction season.

http://www.greenhousegrower.com/production/crop-inputs/media/peat-moss-supplies-look-to-be-down-in-2016/
http://www.nurserymag.com/article/canadian-peat-moss-low-harvest-volumes-2016/

Peatland conservation relevant papers September 2016

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

1. Effect of plant functional type on methane dynamics in a restored minerotrophic peatland: http://link.springer.com/article/10.1007/s11104-016-2999-6
2. A multi-adaptive framework for the crop choice in paludicultural cropping systems: http://www.agronomy.it/index.php/agro/article/view/734
3. The challenges of integrating biodiversity and ecosystem services monitoring and evaluation at a landscape-scale wetland restoration project in the UK: http://www.ecologyandsociety.org/vol21/iss3/art10/
4. Overlapping land claims limit the use of satellites to monitor No-Deforestation commitments and No-Burning compliance: http://onlinelibrary.wiley.com/doi/10.1111/conl.12256/full
5. Greenhouse gas emissions from Brazil's Amazonian hydroelectric dams: http://iop.msgfocus.com/c/16e7hM3FIj4p4bejdOIRZ2CNf
6. Tree islands: the bellwether of Everglades ecosystem function and restoration success: http://onlinelibrary.wiley.com/doi/10.1111/rec.12428/abstract?campaign=wolearlyview
7. Integrating ecosystem functions into restoration ecology—recent advances and future directions: http://onlinelibrary.wiley.com/doi/10.1111/rec.12422/abstract?campaign=wolearlyview
8. Will Asia Pulp & Paper default on its "zero deforestation" commitment? An assessment of wood supply and plantation risk for PT OKI Pulp & Paper Mills' mega-scale project in South Sumatra, Indonesia: http://assets.worldwildlife.org/publications/871/files/original/OKI-Mill-Report.pdf?1461160101

9. Drought as a stress driver of ecological changes in peatland - A palaeoecological study of peatland development between 3500 BCE and 200 BCE in central Poland: http://www.sciencedirect.com/science/article/pii/S0031018216304114
10. Quantifying peat carbon accumulation in Alaska using a process-based biogeochemistry model: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003452/abstract?campaign=woletoc
11. Habitat mapping of coastal wetlands using expert knowledge and Earth observation data: http://onlinelibrary.wiley.com/doi/10.1111/1365-2664.12695/abstract?campaign=woletoc
12. Repeated fires trap Amazonian blackwater floodplains in an open vegetation state: http://onlinelibrary.wiley.com/doi/10.1111/1365-2664.12687/abstract?campaign=woletoc
13. Spatial variation in vegetation productivity trends, fire disturbance, and soil carbon across arctic-boreal permafrost ecosystems: http://iop.msgfocus.com/c/16gbBM1ibsICi5O4Cq1Ca9sj1
14. Carbon leaching from tropical peat soils and consequences for carbon balances: http://journal.frontiersin.org/article/10.3389/feart.2016.00074/full?utm_source=newsletter&utm_medium=email&utm_campaign=Earth_Science-w38-2016
15. Aboveground carbon storage in a freshwater swamp forest ecosystem in the Niger Delta: http://www.tandfonline.com/doi/full/10.1080/17583004.2016.1165355
16. Predicted Pleistocene–Holocene range shifts of the tiger (Panthera tigris): http://onlinelibrary.wiley.com/doi/10.1111/ddi.12484/abstract?campaign=wolearlyview
17. Rapid conversions and avoided deforestation: examining four decades of industrial plantation expansion in Borneo: http://www.nature.com/articles/srep32017
18. Peat bogs as hotspots for organoarsenical formation and persistence: http://pubs.acs.org/doi/full/10.1021/acs.est.5b06182
19. Current state of peatland soils as an effect of long-term drainage – preliminary results of peatland ecosystems investigation in the Grójecka Valley (central Poland): http://www.degruyter.com/view/j/ssa.2016.67.issue-1/ssa-2016-0001/ssa-2016-0001.xml
20. Biogeography of the cosmopolitan sedges (Cyperaceae) and the area-richness correlation in plants: http://onlinelibrary.wiley.com/doi/10.1111/jbi.12802/abstract?campaign=woletoc
21. A novel testate amoebae trait-based approach to infer environmental disturbance in Sphagnum peatlands: http://www.nature.com/articles/srep33907
22. Variability of fire carbon emissions in Equatorial Asia and its non-linear sensitivity to El Niño: http://onlinelibrary.wiley.com/doi/10.1002/2016GL070971/abstract?campaign=wolacceptedarticle
23. Vegetation change and conservation status of Coastal Upland Swamps: http://onlinelibrary.wiley.com/doi/10.1111/emr.12220/abstract?campaign=woletoc
24. Peat bogs in northern Alberta, Canada reveal decades of declining atmospheric Pb contamination: http://onlinelibrary.wiley.com/doi/10.1002/2016GL070952/full
25. Geochemical evidence for peat bog contribution to the streamflow generation process: case study of the Vltava River headwaters, Czech Republic: http://www.tandfonline.com/doi/full/10.1080/02626667.2016.1140173
26. Denial of long-term issues with agriculture on tropical peatlands will have devastating consequences: http://onlinelibrary.wiley.com/doi/10.1111/gcb.13516/abstract?campaign=wolacceptedarticle
27. Regional carbon fluxes from land use and land cover change in Asia, 1980–2009: http://iopscience.iop.org/article/10.1088/1748-9326/11/7/074011
28. Changes in flow and transport patterns in fen peat following soil degradation: http://onlinelibrary.wiley.com/doi/10.1111/ejss.12380/abstract?campaign=wolearlyview
29. Are global mangrove carbon stocks driven by rainfall?: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003510/abstract?campaign=wolacceptedarticle
30. Directed dispersal by an abiotic vector: Wetland plants disperse their seeds selectively to suitable sites along the hydrological gradient via water: http://onlinelibrary.wiley.com/doi/10.1111/1365-2435.12771/abstract?campaign=wolacceptedarticle
31. The influence of restoration efforts in the freshwater Everglades on the salinity regime of Florida Bay: http://onlinelibrary.wiley.com/doi/10.1111/rec.12454/abstract?campaign=wolearlyview
32. On the after-use and restoration of abandoned extracted peatlands in the Baltic countries: http://onlinelibrary.wiley.com/doi/10.1111/rec.12436/abstract?campaign=wolearlyview
33. An overview of peatland restoration in North America: where are we after 25 years?: http://onlinelibrary.wiley.com/doi/10.1111/rec.12434/abstract?campaign=wolearlyview
34. Peat fires doubled annual ammonia emissions in Indonesia during the 2015 El Niño: http://onlinelibrary.wiley.com/doi/10.1002/2016GL070620/abstract?campaign=wolacceptedarticle
35. 8000 years of vegetation history in the northern Iberian Peninsula inferred from the palaeoenvironmental study of the Zalama ombrotrophic bog (Basque-Cantabrian Mountains, Spain): http://onlinelibrary.wiley.com/doi/10.1111/bor.12182/abstract?campaign=woletoc

36. Species interactions and the effects of climate variability on a wetland amphibian metacommunity: http://onlinelibrary.wiley.com/doi/10.1002/eap.1442/abstract?campaign=wolacceptedarticle
37. Measurement of carbon dioxide flux from tropical peatland in Indonesia using the nocturnal temperature-inversion trap method: http://iopscience.iop.org/article/10.1088/1748-9326/11/9/095011
38. Public health impacts of the severe haze in Equatorial Asia in September–October 2015: demonstration of a new framework for informing fire management strategies to reduce downwind smoke exposure: http://iopscience.iop.org/article/10.1088/1748-9326/11/9/094023
39. Eutrophication triggers contrasting multilevel feedbacks on litter accumulation and decomposition in fens: http://onlinelibrary.wiley.com/doi/10.1002/ecy.1482/abstract?campaign=woletoc
40. What general practitioners, football coaches and rocket science have to do with conservation: http://forestconservationscience.blogspot.de/2007/12/what-general-practitioners-football.html
41. Opportunities to address climate change and support biodiversity through better management of ecosystems: https://www.cbd.int/climate/doc/brochure-climate-ecosystems-wcmc-en.pdf
42. The good, the bad, and the ugly in palm oil (commentary): https://news.mongabay.com/2016/09/the-good-the-bad-and-the-ugly-in-palm-oil/