


IMCG Bulletin: August 2016

INTERNATIONAL MIRE CONSERVATION GROUP

www.imcg.net

Word from the Secretary-General

Dear mire friends

Inevitably this month's Bulletin is characterised by the peatland events in Borneo and Malaysia in August 2016. We had a very successful IMCG Field Symposium, on which you will find impressions, a scientific Conference, which illustrated the wide geographical experience and scientific expertise of IMCG members, and the IMCG General Assembly, where Nikolay Bambalov and Olivia Bragg were granted the status of IMCG Honorary Member "by reason of their exceptional merits to the objects of the Society". More about all this also in the next Bulletin.

Impressive was also the 15th International Peat Congress in Kuching, Sarawak, organised by the International Peatland Society (IPS), in which many IMCG members participated. Impressive, because it was the largest such Congress ever and the first one organised outside Europe or North-America. Impressive also by the way the local organisers managed to abuse the international arena for crude, primitive, but locally effective propaganda (see further in this Bulletin). This culminated in a newspaper report in the Jakarta Post of August 18, 2016 (http://www.thejakartapost.com/news/2016/08/18/congress-may-change-views-on-cultivation-of-peatland-ips.html) that "many results of new research … may change the perception of environmentalists about the negative impact of cultivation on peatland areas". The newspaper quoted IPS executive board member Moritz Böcking that "much of the new research showed that the agricultural development of peatland areas, such as by oil palm plantations, did not necessarily have a negative impact on the environment". This statement caused uproar in the scientific community, which had provided ample evidence of the opposite, also during the Congress, and also in the ever increasing sensible part of business and politics in Southeast Asia, which acknowledges the immense environmental and economic burden of drainage-based peatland exploitation and is taking first steps to limit the damage.

Only on August 23, IPS sent out a statement that "the article incorrectly attributes views to the International Peatland Society (IPS) on the cultivation of peatland areas" and "that the views attributed to it in this article are not accurate". But the harm was done, the propaganda message widely spread, also by other newspapers, the Jakarta Post still does not pose the relevant "comment" under the article, and I cannot find the IPS statement on neither the IPS website, nor somewhere else on the web…

As someone involved in the elaboration of the IPS/IMCG Wise use principles, to which the IPS statement refers, I am somewhat fascinated by the statement that IPS did acknowledge as being reflected correctly: "We hope that more scientists from this region will be more active in conducting research on this issue. We will have a roundtable with NGOs. The IPS will arrange it."

Fundamental in the Wise use principles is that a clear distinction is made between facts and choices. Science deals with facts, NGOs (meant is interest groups) with choices. If "scientists" present "facts" that have long been falsified, you must treat them as charlatans, if NGOs hide behind wrong "science" you have to expose them as liars. May I propose that IPS invites the Southeast Asian peat-problem-deniers to the roundtable to discuss their hiding – under the flag of IPS - behind quacks?

Read about all this and react!

Send your September contributions (incl. your new papers to be included in the list) by 30 September 2016 to Hans Joosten at joosten@uni-greifswald.de.

IMCG News

Honorary IMCG member Seppo Eurola passed away

Honorary IMCG member emeritus professor Seppo Eurola slept away 27/28 August 2016 in the hospital. Cancer won. He was active until his last moments, also on mire issues.

Tapio Lindholm: tapio.lindholm@ymparisto.fi

Seppo Eurola on Uchebnoe Mire in Karelia, 01 September 2005. Photo: Asbjørn Moen.

Dr Olivia Bragg – an Appreciation

Richard Lindsay (R.Lindsay@uel.ac.uk)

Olivia Bragg, who has done so much for peatland ecology and conservation over the years, always desires clarity of purpose and a clear framework for action. This desire has enabled her to help bring order, logic and organisation to a number of areas which have proved increasingly important to the IMCG over the past 20-30 years.

Olivia began her real training to be a scientist at Cambridge, studying Natural Sciences for her first degree, and this gave her an unusually broad base of scientific understanding and technical skills which would help to underpin much of what she would subsequently become involved with. For her PhD she moved to the University of Dundee to work under the guidance of Professor Hugh Ingram. This was at a time when Hugh was developing his now famous model of the Ground Water Mound Theory for raised bogs, and much of Olivia's PhD work was concerned with obtaining hard data with which to test, validate and underpin the Ground Water Mound concept. She spent many long hours on Dun Moss, close to Dundee, measuring the behaviour of the water table in relation to the acrotelm concept, and having successfully obtained her doctorate she then continued to work with Hugh Ingram to develop and enlarge on the practical implications of this theory, for several years through funding from the UK's Nature Conservancy Council.

The critical feature of the Ground Water Mound Theory was that it provided, for the first time, an integrated and coherent picture describing the overall effects of draining or otherwise hydrologically damaging a raised bog system, describing the way in which the bog as a whole responded to such impacts. Prior to this, the impacts of drainage were largely seen as localised surface effects, but the work of Hugh Ingram, Olivia Bragg and Jim Brown provided a theoretical mechanism, supported by much of Olivia's site-based data, which described the bog as an integrated system with feedback and resilience responses which involved the entire peatland system. This utterly transformed the basis of peat bog conservation, providing a strong theoretical basis for whole-system conservation rather than protection only for the supposedly natural parts of a bog, and this principle of whole-system conservation is now widely used throughout the world. The Ground Water Mound Theory has been subject to some critical evaluations and modifications have been proposed for certain parts of it, but it has still not, in its essentials, been replaced by a radically different model and has thus stood the test of time as a clear framework for peat bog conservation, and Olivia has continued to work with

conservation bodies, most notably in Scotland and Austria, in applying the practical lessons of the Ground Water Mound Theory to practical conservation action.

Olivia has also played an important part in the earliest stages of the IMCG field symposia, becoming involved as one of the 'native English writers' to whom various ideas, requests, scribbled notes, long screeds, half-written Word documents or soggy note-book pages were passed with the request that the proffered object be turned into 'good English' in the form of an IMCG Resolution. This generally involved re-working the text long into the night; meanwhile the original authors of these scraps of paper were drinking, carousing, sleeping, or even discussing other possible scraps of paper with fellow IMCG members. Subsequent days often also involved sometimes-complex discussions with the originators about the need to change a phrase or meaning, or even to re-work the thing entirely, but the results of Olivia's efforts, and those of the other native English speakers, can be seen in the array of Resolutions which have emerged from IMCG Field Symposia, some of which have then had major impacts on the recipient country's peatland conservation activities.

Olivia Bragg (l) and Julia Lo in the Lawas swamp (Sarawak), 23 August 2016. Photo: Hans Joosten

Olivia has also made several major contributions to a number of other peatland conservation issues ranging from individual site assessments to strategic recommendations for whole trans-boundary regions. She has made several critical assessments of windfarm developments, she has looked at the hydrological condition of several sites both in the UK and abroad – most notably Malaysia and Australia – but has also made a major contribution to identification of management requirements for water catchments across Scotland (and thus

largely for peatland systems which dominate these catchments). She was also co-editor of the large-scale strategy and action plan for peatlands which lie between the Baltic and the Black Sea, helping to pull together peatland information from eight nations and setting out a coordinated approach to peatland conservation across these eight nations.

Olivia was also the main focal point for organising two key international peatland events. Firstly in 1992 the University of Dundee played host to an international conference – 'Peatland ecosystems and man – an impact assessment' – sponsored by the British Ecological Society's Mires Research Group. The main burden of organising this conference fell to Olivia, and the success of this conference, both in terms of bringing peatland ecologists and conservationists together from around the world can be measured in the fact that this conference is still spoken of as a key moment in both peatland research and in the IMCG's development. Subsequently, Olivia was also responsible for running a programme funded through the UK's Darwin Initiative, which enabled a wide range of peatland researchers, conservation scientists and policy makers from former Soviet countries to visit the UK, and then play host, in order to share peatland knowledge and scientific understanding. This, too, led to an important widening of the IMCG network.

In recent years, however, Olivia's ability to bring focus to a topic and establish a solid framework for action has been demonstrated in the way that she has taken the journal 'Mires and Peat' and has developed it from a rather hesitant yet hopeful start into a journal which now attracts contributions from some of the leading researchers in the field – not only from active peatland conservationists but also from some of the leading academics in the field of peatland research. In some cases, such contributors are one and the same, but in the past some of the more 'traditional' journals have tended to baulk at taking papers containing real practical conservation results and guidance and thus have not fairly reflected the large amount of work being undertaken, and associated information being gathered, by conservation bodies. Olivia has ensured that 'Mires and Peat' embraces all aspects of peatland research and conservation, and has made it the 'go-to' journal for an increasing number of those active in peatland issues, whether as a practitioner or an academic researcher.

To achieve this balance is not easy because it requires the assembly of an editorial and reviewer team which is somewhat eclectic in its composition and range of expertise. The business of selecting appropriate reviewers, chasing those reviewers (who often do need chasing, busy lives being what they are), then assembling comments and integrating the final version into a journal volume, together represent something which needs a keen eye for detail, a close watch on the clock and the skills to marshall the editorial team towards production of the next volume. The fact that 'Mires and Peat' continues to go from strength to strength is testimony to Olivia's dedication to the journal and her ability to keep the whole thing on track. It represents an increasingly strong and powerful voice for peatland ecology, peatland wise use and sustainable management of the global peatland resource, and thus represents one of the IMCG's most important legacies into the future.

It is fitting, therefore, that the IMCG should choose to bestow Honorary Life Membership on Dr Olivia Bragg.

Nikolay Nikolayevich Bambalov honorary IMCG member

Merten Minke, Vyacheslav Rakovich & Nina Tanovitskaya (mertenchristian@gmx.de)

Prof. Nikolay Nikolayevich Bambalov, since 1976 the head of the Laboratory of Landscape Biogeochemistry of the Institute for Nature Management of the National Academy of Sciences of Belarus, is the sun of the Belarusian peatlands, as he was called in 2004 by a Russian journalist because of his immeasurable contributions to peatland ecology and conservation. He is a great scientist with a wide research area, major directions of which are:

- mineralization and humification of organic matter in peatlands
- metal-humic interactions and development of biological active microelements
- methods of biosphere compatible peatland management.

Nikolay Bambalov graduated in 1961 from the faculty of Soil Sciences and Agrochemistry of the Agricultural Academy in Minsk and in 1968 he received at the former Peat Institute (today Institute for Nature Management) his candidate (cf. PhD) of chemical sciences in the field "Chemical technology of fuel and gas". His superviser was Vladimir E. Rakovskij, the pioneer of peat chemistry in Belarus. In his thesis Nikolay

Bambalov analysed the changes of the physical-chemical characteristics of humic acids during peat humification. The process of humification and the special features of humic acids remained a central point of the theoretic and practical works of Nikolay Bambalov up to today. With his laboratory he analysed metal-humic interactions, developed technologies to extract biological active microelements, and on this basis organized the production of the fertilizer “Elegum” that substantially increases the fertility of agricultural soils. For Nikolay Bambalov peat is a unique resource that should be carefully used to make valuable medical, cosmetical, cleaning, painting and other products.

Nikolay Nikolayevich Bambalov (18 Nov. 2015) Photo: Hans Joosten

In 1984 Nikolay Bambalov published the monograph “Balance of organic matter in peat soils and methods of its study”, largely based on his thesis on the mineralization of organic matter in drained agricultural used fens for which he received in 1985 the doctorate (cf. habilitation) of agricultural sciences. This work was a milestone on the way to a more rational peatland management and is still one of the most comprehensive analysis of the process of mineralization in cultivated peatlands and of measures to regulate the balance of organic matter. Evaluating a wide range of experiments, reviewing all relevant literature and based on a thorough understanding of the involved biogeochemical processes Nikolay Bambalov analysed the impact of a wide range of factors, including drainage depth, botanical peat characteristics, time since drainage, crop, tillage, fertilizers, and mixing or covering the peat with mineral soils. This was in a time, when most large peatlands in Belarus had already been subject to complex melioration and the question of how to reduce the loss of organic matter to sustain the fertility of this land became increasingly important. Next to laboratory experiments and the litter bag approach, Nikolay Bambalov also monitored since 1971 changes of the organic matter stock of the peat layer on experimental plots in Polessie. He found annual losses of organic matter from perennial grassland between 1.7 and 4.3 tons per hectare and from arable crops between 10.3 to 12.6 tons. Nikolay Bambalov identified perennial grassland with high water level as the most rational though still peat consuming way to use a peatland. He also showed that from the energy point of view the utilization of peat as energy source was the most ineffective way to exploit peatlands. In the conclusions of this work he outlined the high importance to protect the remaining pristine mires and to develop peat conserving management practices for drained peatlands.

Realizing that all forms of conventional peatland management are destructive, he published in 1991 his concept of a biosphere compatible peatland management that he called болотоводство (bolotovodstvo). According to this concept peatlands should remain wet or should be rewetted to preserve the organic matter, sustain peat accumulation and allow for real sustainable peatland management. The concept is broader than paludiculture and has four directions:

- ecological: directed on peatland conservation and restoration to sustain their ecological functions in the environment;
- cultural-recreational: peatland conservation and restoration for education and tourism;
- agro: wet management for the production of medical plants, honey, berries, fodder, and
- energy-technological: wet management for plant material as a raw material and energy source.

In his monograph "The role of peatlands in the biosphere", published in 2005 together with Vyacheslav Rakovich, Nikolay Bambalov prognoses that болотоводство will be very successful or even become the only way to manage peatlands in the 21st century. The first part of his prognosis has already become true, large areas of degraded peatlands have been rewetted and paludiculture is increasingly developing in many countries, and Belarus is, with strong support of Nikolay Bambalov and his team, among the first. Since 2006 about 50,000 ha of degraded peatlands have been rewetted, the main part of them identified and scientifically justified by him and his laboratory. Their expertise is highly valued also beyond the borders of Belarus.

Nikolay Bambalov has published more than 400 scientific works including 12 books and 26 patents in field of peatland use, soil science and the agricultural use of peat and lake sediments. In 1989 he was elected corresponding member of the Academy of Sciences of the Belarussian Socialist Soviet Republic, in 1994 academician of the National Academy of Sciences of the Republic Belarus.

Nikolay Bambalov and his team always studied the peatlands in Belarus directed on a more sustainable peatland management. They analysed strategies, worked out methods and action plans against peatland degradation, and developed many normative documents. He prepared sections of the National Strategy of the Republic of Belarus for the implementation of the UN Convention to Combat Desertification and Land Degradation, and parts of the National Action Plan to combat land degradation in the Republic of Belarus. Also the new "Strategy on conservation and rational (sustainable) management of peatlands" til 2030, adopted by the Council of Ministers of the Republic of Belarus end of 2015, was prepared by Nikolay Bambalov and his laboratory. The strategy is a balance between the national ecological and economical interests; it aims to increase the area of restored and protected peatlands, as well as the area of perennial grassland on meliorated peatlands, but also to sustain the supply of the population with peat as fuel, to use a larger part of the harvested peat for deep processing and a stable development of the peat industry. It is the strength of Nikolay Bambalov to find compromises between contrary positions and to take different points of view. For example, he does not blame the melioration engineers for the negative consequences of peatland drainage but also sees the positive aspects of their activities for the people, especially in the Polessie, where villages, hospitals and roads were built and bad diseases like malaria disappeared. Probably this attitude is a reason for his success; he does not only see the peatlands, but also the people.

Nikolay Bambalov is furthermore a very attentive, caring and responsible teacher for his students. Under his leadership eight candidate theses have been produced. He has an extensive experience and erudition in various fields: physics and chemistry of peat, the structure of humic substances, peatland sciences, agricultural sciences and others. At the same time, Nikolay Bambalov is very modest and polite in communication.For all these merits it is appropriate to grant IMCG honorary membership to Nikolay Bambalov.

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

IMCG field Symposium in Malaysia and Brunei: report of the organizers

Noor Azura binti Ahmad (azura@gec.org.my)

At Maludam National Park HQ.

For the Global Environment Centre (GEC) team, comprising Director Faizal Parish and Peatland team members Serena Lew, Julia Lo, Mohd Faiz and Azura Ahmad; organising a 10 day trip for a group of world class peatland experts was an unforgettable experience. There were so many things to consider – venues, transport, accommodations, visas, permits, etc. We are glad that the trip went well despite some hiccups along the way. It helped that everyone was so positive and upbeat; taking things in stride, even when it got a little hairy.

The trip started in Kuching on 19th August, where everyone congregated at the Pullman Hotel lobby. Then came a gruelling 5 hour drive to Maludam Village, which included two river crossings by ferry. While waiting, we took the opportunity to check out local plants and wildlife including mangrove plants, mudskippers, birds and even a humpback dolphin. We spent the night in the village with our local homestay hosts. The next morning we took a boat ride up the Maludam River. The peat forest was unspoilt with pandanus plants all along the river and wildlife like proboscis monkeys, the Kuhl's Gliding Gecko and a rare, IUCN red listed dragonfly (*Brachygonia oculata*) found in the forest. At the quick stop at the Control Post of the National Park, some people were stung by bees, but fortunately no one was allergic and gamely continued trekking. We returned to Kuching in the evening.

	
*Kuhl's Gliding Gecko (*Ptychozoon kuhli*).*	Brachygonia oculata*. Photos: GEC/ Azura Ahmad*

On 21st August morning we flew to Miri and took a bus to the District Office of Kuala Belait, Brunei Darussalam for a briefing and lunch. The briefing was done by Chief Executive Officer of the Heart of Borneo Centre of Brunei, Mr. Mahmud Hj Yussof. After lunch we proceeded to Belait River for a river cruise. The cruise lasted longer and proved more adventurous than intended, but thankfully, everyone survived intact. The only encounters with wildlife were with fireflies, hornbills, proboscis monkeys and barn swallows. Some participants managed to witness large buttress of indigenous tree species in the intact peat swamp forest too.

Drone pic- Badas FR

The following day, we visited magnificent Alan Batu (*Shorea albida*) trees in Badas Forest Reserve before continuing our journey to Lawas in Sarawak. The trees formed remarkably pure stands that usually have greater height at the edge of the dome and are shorter towards the centre of the dome which is a unique feature of the peat swamp forest. That travel to Lawas itself took half a day due to the many border crossings we had to go through. Where else could we get 6 stamps on our passport in just one afternoon?

On 23rd August, we visited the stands of *Dacrydium* and *Casuarina* sp. trees at Kayangeran Forest Reserve in Lawas, Sarawak. We also found a patch of mangroves, several *Nepenthes* sp. and red palms in the peat swamps. Next we proceeded to Klias Peat Swamp Field Centre in Sabah for lunch and to walk around the area. We enjoyed the 2.7km boardwalk in the Forest Reserve and went up on fire watch tower to have a greater view of the surrounding area of the reserve. On the way to Crocker Range Biosphere Reserve where we stayed the night, participants had the opportunity to test the infamous Asian specialty – *Durio zibethinus* a.k.a the durian. Located high in the mountains, the hostel was a cool retreat where moths and other wildlife abounded. In the morning, participants took a walk along the Crocker Trail and were rewarded with, among other things, a beautiful Rafflesia flower in full bloom. After lunch, we proceeded to Kota Kinabalu, Sabah's state capital for dinner and rest before flying to Kuala Lumpur in the morning.

	
Rafflesia arnoldii.*Photo: GEC/ Azura Ahmad*	*Break for durian on the way to Crocker Range*

From KL International Airport, we went straight to North Selangor PSF Centre of Excellence to learn about the conservation and rehabilitation efforts in the area. Participants planted trees before going to Sungai Sireh Homestay for the night. On 26th August, they visited the Sungai Karang Forest Reserve before heading to Cameron Highlands.

Peat profile in Gunung Brinchang

27th August – a Seminar on Tropical Peatlands in a Global Context was held in Nova Hotel, where 20 participants presented their peatland conservation work. The next morning, we visited the Mossy Forest on Gunung Brinchang which had substantial amounts of montane peat. It was also rich with mosses, herbs, orchids, and pitcher plants among the large trees.

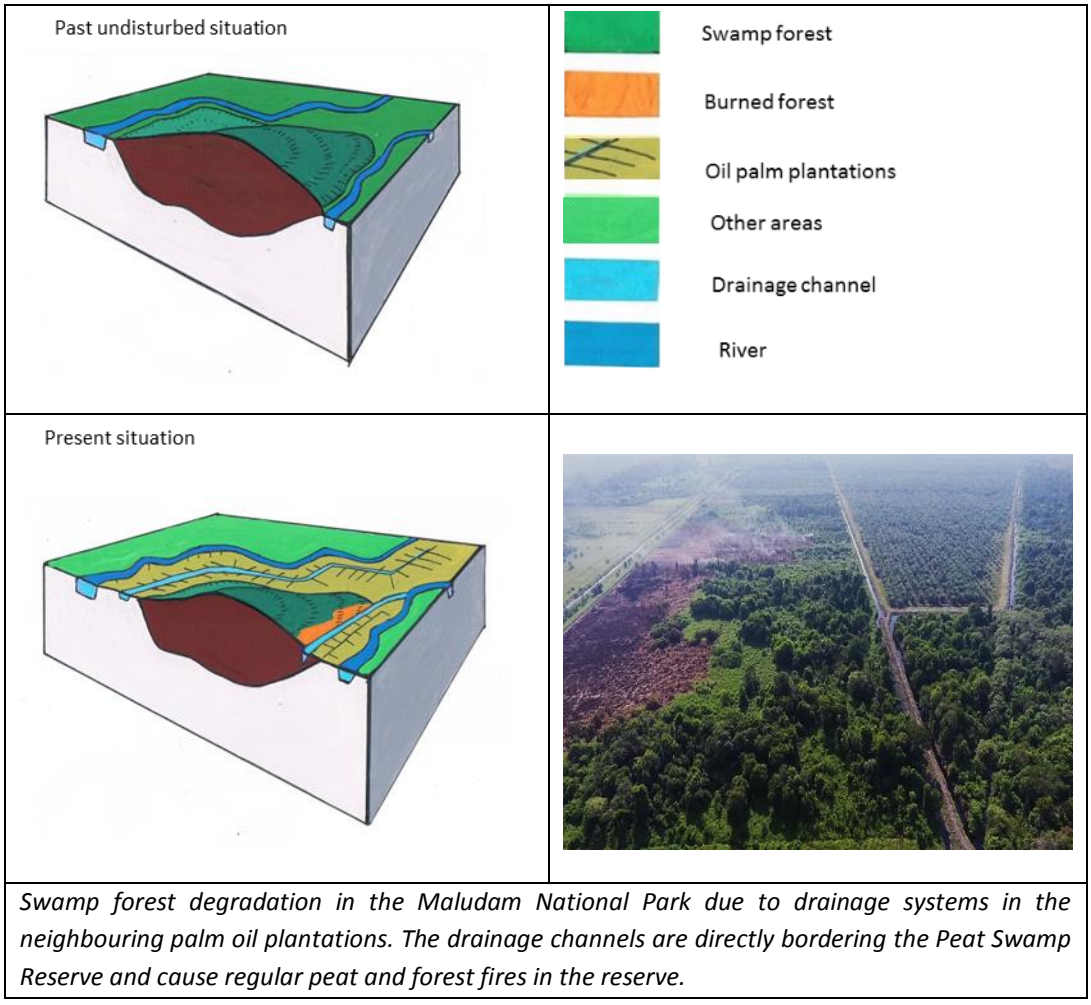
That afternoon, we visited the BOH tea plantation where we learned about their operations, visited the factory and had tea at the BOH café. What better way to end our wonderful journey than with a hot cup of tea, sandwiches and cakes, with a beautiful view of tea terraces on a rainy afternoon? Thank you BOH for gracefully hosting our party.

We bid adieu the next day upon arrival in KLIA after a long journey down the mountains. To all who came, thank you for coming to sunny Malaysia, and do come again!

IMCG field Symposium in Malaysia and Brunei: impressions of participants

Ab Grootjans (a.p.grootjans@rug.nl)

The IMCG Field Symposium was both exiting and shocking. It was exciting to see that large areas of peat swamp forest have been given a protection status as Totally Protected Area, Forest Reserve or National Park. However it was shocking to see that these areas are not really protected against drainage and illegal logging. Drainage directly along the borders of the reserve trigger forest and peat fires, which over time threatens large sections of the protected areas. The situation in Maludam National Park was particularly distressing. This 43,000 ha large swamp forest has a small staff and practically no financial budget (ca. 20,000 USD per year). The staff was not able to carry out their duties. The only boat to be used to patrol the rivers had no engine anymore (stolen). Almost no tourists are visiting the National Park, because the services are insufficient. Even local villagers are complaining that tourism in their 'home stays' was declining due to lack of tourist services. The staff has no possibilities to establish good relationships with the local villagers and in this way stop the illegal logging.

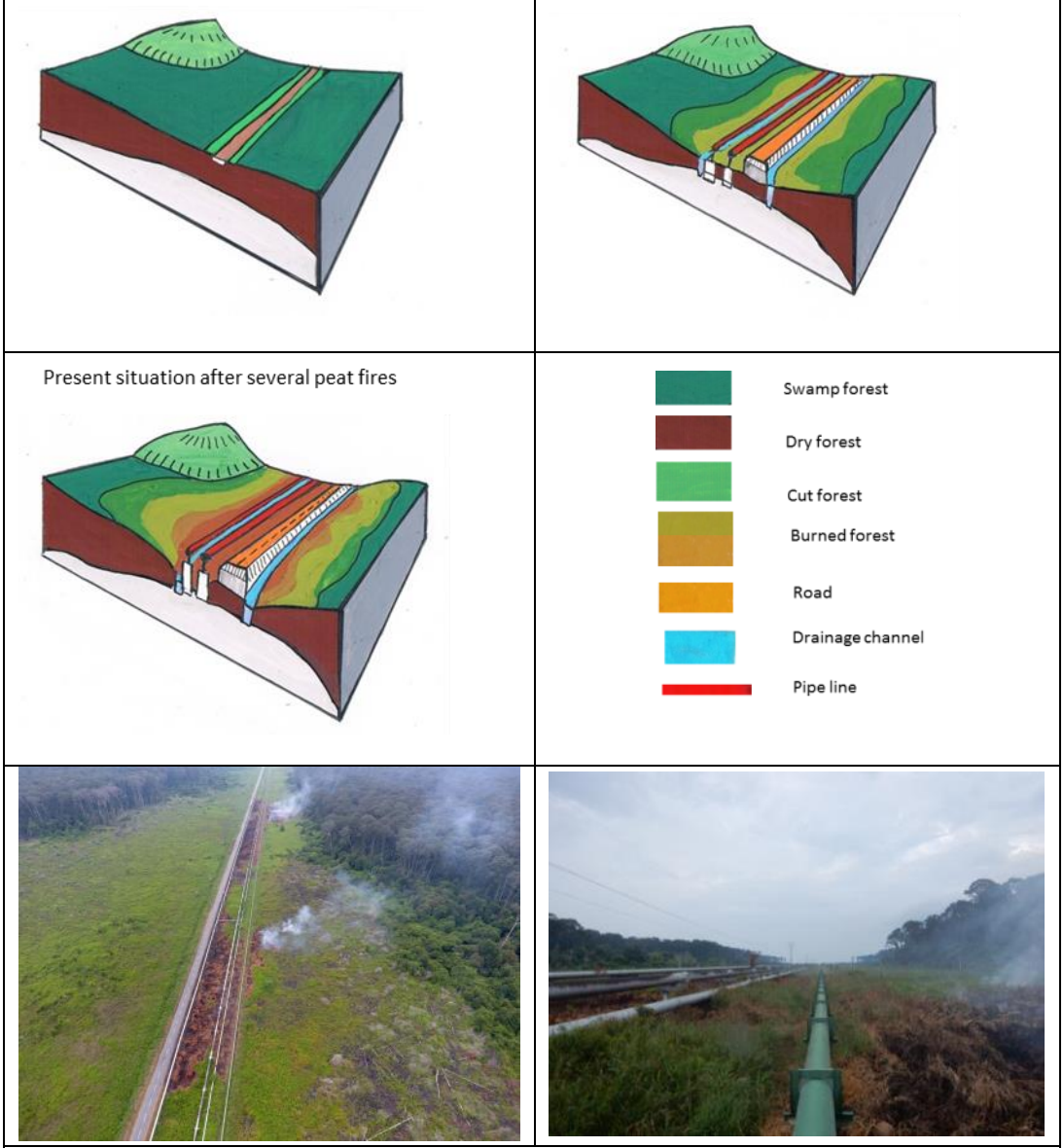


Swamp forest degradation in the Maludam National Park due to drainage systems in the neighbouring palm oil plantations. The drainage channels are directly bordering the Peat Swamp Reserve and cause regular peat and forest fires in the reserve.

Deep drainage channels are bordering the swamp forest reserve on almost all sides, without any hydrological buffer zones in place. Hydrological buffer zones have to be at least 500-1000 meter wide areas where high water levels are maintained in order to prevent drainage of the reserve, thus preventing forest and peat fires in the reserve. We have seen good examples of hydrological buffer zones in Selangor Peat Swamp reserve in Peninsular Malaysia.

In Brunei we observed an ongoing peat fire around a pipeline transporting water from a river to the Shell refinery in that country. The fire burned along the pipe lines and along the road. The asphalt road, pipe lines and drainage ditches along the road had been constructed directly through a peat dome and peat swamp reserve without any precaution taken to prevent drainage in the adjoining peat swamp. The forest had burned repeatedly in the past and the damaged areas spread out hundreds of meter at either side of the pipelines. We were told that the Department of Public Works had repeatedly been asked to put dams in the ditches in order to stop the peat fires, but up to now without results.

We find it hard to understand that a well-developed country like Brunei and a large company like Shell have, up to now, been unable or unwilling to solve the problems of forest and peat fires in this area. No one benefits from this situation, which can be solved easily.



Several stages of peat swamp degradation by the construction of a pipeline transporting water from a river to the Shell refinery in Brunei. Bottom photos represent burning peat along the road and the pipeline due to the drainage channels along the road. Photos were taken during the IMCG trip 2016 in Brunei.

Karin Keßler (Kessler@Hydro-Consult.de):

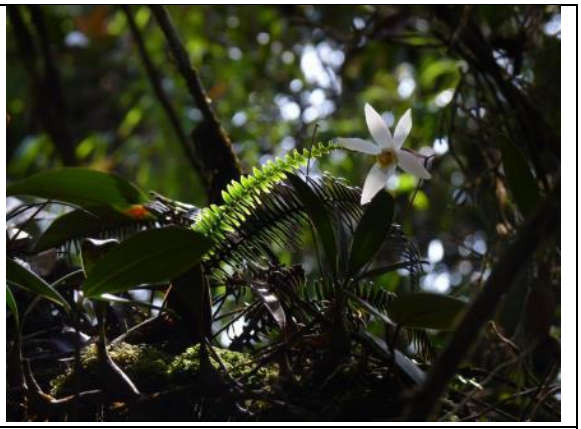
As a hydrologist I was especially interested in the structure and roughness of the mire surface and, as far as possible, in the structure of the peat. I had calculated the water flow for a pristine peat dome in Brunei shortly before the trip and, according to these calculations, there should be some small, valley-like depressions at the fringe of the peat domes with preferential water flow during the rain season.

In the Badas peat swamp forest in Brunei we visited a more or less pristine forest with huge *Shorea albida* trees. The surface was really rough with little mounds up to 2 m around the buttress roots of different tree species. Even though the mounds where formed by very lose material, mainly old leaves, these structures slow down water movement at the surface and enable ponding. From the ground, I could not see, whether the sinks between the trees were arranged in special patterns suitable for drainage in the rain season. However, with the drone we could see a small stripe of different tree species in the otherwise homogeneous canopy of *Shorea*

albida, indicating a different forest type. This could indicate such small, valley like depressions, which Rob already had found in earlier surveys in this kind of peat domes. These structures are important for the hydrology of the peat domes and should be further investigated.
Besides this hydrological point of view, it was impressive for me to see some of the last pristine swamp forests, although even these were slightly influenced by illegal logging. Oil palm plantations, burned peatlands and even some peat fires were common views along the road, especially in Sarawak. So, I was eased to see there were at least some efforts made for reforestation as in the Raja Musa Forest Reserve. It was a great pleasure for me to plant a tree by myself in the rainforest.

Planting trees in the Raja Musa Forest Reserve. Photo: Karin Keßler.

Tima Orlov (tim.orlov@gmail.com):
The deepest impression of the IMCG trip was when we met sunset at the river in the jungle. It was about 20 km from the nearest city, we were rowing on the river and the sun became lower and lower. At this time the jungles is full of life. A lot of monkeys tried to go to sleep, but noise from us disturbed them and they started to jump from tree to tree and to cry. Big fishes jumped from the water while hunting. Birds flew along the river and from one bank to the other. We had no engine working so we could hear all these noises clearly. Only one thought was annoying us - it was too dark to make good photos. When the night fell completely, trees were lighted by the fireflies like Christmas trees. That was amazing!

	
Dark skies over black waters. Photo: Tima Orlov	*Treasure orchid in the green jungle. Photo: Reni Barthelmes*

Reni Barthelmes (karen-d.barthelmes@web.de):
What impressed me most was the variety of Peat Swamp Forests I saw on the IMCG Field Trip 2016 in Peninsular Malaysia, Sarawak, Brunei and Sabah. Every individual forest was an original and incomparable, the mossy forest at Gunung Brinchang was the most expressive for me. You walk on the mountain ridge. First you walk on a wooden path and then on the peat itself, between the roots of old, mossy trees. Gnarled branches, roots and tree trunks form the path, so that you can enjoy for a moment that feeling of being outside civilization, pursuing your way alone and undisturbed through the forest. Each individual tree forms an intrinsically living cosmos. At each level, and on each branch is a variety of plants to discover and this already on just one square meter. A jungle of different shades of green and everywhere you look, you can see something new. Incomparable.

Shane Grundy (shane@bushdoctor.com.au):
First of all I would like to thank all the participants of the symposium. A very intelligent, sharing and social group of people. I personally had a fantastic time and look forward to future field trips. The knowledge and personal commitment displayed on the trip by individuals is inspiring. I would like to thank, in particular, the organisers who had a very challenging job, which conducted graciously. On the professional side of the trip I will return home richer in knowledge and understanding of peat communities and their functions. The peatlands we have visited have been so diverse in vegetation assemblages. My favourite was Maludam National Park. This included the home stay, the National Park headquarters, the boat trip and the peat forests. The visit to parks HQ highlighted the lack of funding and government support to provide the protection the peatlands required. Considered the best remaining area of peatland forest in Malaysia, the current active logging, drainage and encroachment is a symptom of the inability of Parks officers in any enforcement and protection role. This is gravely inadequate. The most unusual for me was the *Dacrydium* and *Casuarina* peat swamp forest, one again in real threat of becoming severely degraded or extinct. The active logging, drainage and burning of this forest is disappointing. I will return to the Blue Mountains in Australia and share the knowledge and highlight the problems of peatland degradation in the ASEAN region. Thank you again.

Left: Klias Peat Swamp Forest in Klias Forest Reserve (Sabah), right: newly established oil palm plantation. Photo: Shane Grundy

Vera Luthardt (Vera.Luthardt@hnee.de):

It was great to get a real impression of the tropical peat swamp forest which I had only read about before.
The Malaysian colleagues organized everything perfectly - thank you so much.
On the first look all you can see is green jungle. But if you look closer, an overwhelming diversity opens up to you as we could see in various examples. On the other side, we heard about the expectations and necessities of the locals. To have more profit from the wild wetlands they clear and drain the area although they know it leads to fires and soil degradation.
When I came back to Germany I found that our well-prepared rewetting project of an agriculturally used drained peatland was cancelled by the ministry... So we have bad prerequisites to advice and convince Malaysian people and politicians to save their peatlands.
Nevertheless the excursion was an excellent addition to my horizon.

Excursion participants in front of a Shorea albida *tree in Belait peat swamp forest (Brunei)*

Tropical Peatlands In A Global Context: IMCG Conference 27 August 2016

09:00	Welcoming Remarks by IMCG Deputy-Chairman Prof. Dr. Ab Grootjans
	Block I: Chair: Ab Grootjans
09:05	Opening Remarks by YB Dato' Sri Azizan bin Ahmad, Secretary General of Ministry of Natural Resources and Environment of Malaysia
09.20	Presentation of findings from peatland site visits in Malaysia and Brunei Darussalam and discussion/feedback from all participants
09:55	Keynote: Faizal Parish: Sustainable management of peatland ecosystems in Southeast Asia
10:15	Rob Stoneman: Latest developments in UK peatland conservation
10:30	Alexandra Barthelmes: The contribution of drained organic soils to global greenhouse gas emissions
10:45	Beverley Clarkson: Mire restoration down under – Australian and New Zealand approaches
11.00	Anke Nordt: Bringing paludiculture into practice
11.15	Plenary discussion after the presentations
11:30	**Refreshment**
	Block II: Chair: Tim Orlov
11:45	Franziska Tanneberger et al. (presented by Asbjørn Moen): The IMCG European Mires Book
12:00	Ab Grootjans et al.: Quick scan ecohydrological analysis of an inter-dune mire in Slitere National Park, Latvia
12:15	Jaanus Paal: Recent developments with respect to Estonian mire conservation
12:30	Wiktor Kotowski: Plant functional traits as indicators of climatic resilience in rich fens
12:45	Plenary discussion after the presentations
13:00	**Lunch**
	Block III: Chair: Rob Stoneman
14:00	Tim Orlov: Stochastic approach to patterned peatland modelling based on several types of Russian peatlands
14:15	Ain Kull et al.: Width of drainage affected zone in Estonian bogs as reflected by landscape ecological indicators
14:30	Olivia Bragg: Smart sensing at the Moine Mhor (Scotland)
14:45	Norway: Asbjørn Moen et al.: Mire and Climate (MIRACLE): Management and restoration of boreal hay fens
15:00	Susanne Abel: DPPP – a worldwide search for paludiculture plants and their potential to stop peat degradation
15:15	Bikila Workineh Dullo: Mountain mires of Ethiopia: the least explored peatlands
15:30	Karen Jenderedjian: Current state of peatlands conservation and wise use in Armenia
15:45	Izolda Matchutadze: Protected areas in Kolkheti (Georgia) - new approaches for conservation and wise use
16:00	Tatiana Blyakharchuk: Mountain mires of Southern Siberia as unique natural objects for mire conservation
16:15	Shane Grundy: Peatland restoration in the Blue Mountains (Sydney, Australia)
16:30	Samantha Grover: Soil research for Indonesian peatland restoration
16:45	Marte Fandrem: Bird-parasite dynamics in a Bornean rainforest and the effects of logging
17:00	Plenary discussion after the presentations

News from the regions

Global

Correspondence on the International Peat Congress

Here we reproduce some correspondence about the commotion following the International Peat Congress in Kuching, starting with the letter that Marcel Silvius (Wetlands International) send to IPS as a reaction on the one-sided coverage of the event in the latest Peat News (the news bulletin of the International Peatland Society). This is followed by the response of the new IPS chair Gerald Schmilewski and again the reply of Marcel.

Marcel Silvius (Marcel.Silvius@wetlands.org), August, 30, 2016:
This Peat News 8/2016 is not providing an adequate description of the IPC in Sarawak: It was not organized in a way to reflect the different key perspectives and was presented in the press, through press releases by the organisers, as having reached a consensus (!) that oil palm plantation development on peat is sustainable. This is far from the truth.
The conference could have provided a useful platform for exchange of different views and perspectives – and in its concurrent sessions it did. Sadly the Opening Session in the morning, which set the scene for the rest of the conference and for the press, lacked representation of some of the key stakeholder groups that promote responsible peatland management. Some of the keynotes were the worst I have ever heard in my entire career, going as far as implying that NGOs such as Wetlands International have a genocidal agenda.
The Roundtable for Sustainable Palm Oil (RSPO), which covers about 60% of the entire palm oil sector with over 2500 members from all parts of the palm oil trade chain, apparently was not invited to present a key note. The RSPO has adopted a no-peat policy (no further development of peat) and it would have been extremely valuable for all participants to hear how and why RSPO has come to this policy.
The conference also lacked a key-note presentation from an Indonesian government representative, i.e. the Badan Restorasi Gambut (BRG: national Peatland Restoration Agency, which reports directly to the Indonesian President) despite the fact that they requested such a speaking slot. They have the ambitious target of restoring 2 million ha of peatlands in Indonesia by 2020. As most IPS members are aware, the negative economic and social impacts of peatland degradation - often linked to plantation developments - have been significant in the region, with last year's peat fires coming at a cost of 35 billion US$ to the Indonesian economy (i.e. excluding the economic damage to Malaysia, Singapore, Thailand and Philippines) and having disastrous impacts on public health. It would have been most useful to hear the perspective of the BRG in a key note presentation.
Another perspective that was not given sufficient space during the conference is of the Sarawak Dayak Iban Association. In a press release Nicholas Mujah, the head of the Sarawak Dayak Iban Association SADIA mentioned: "The Peat Congress should be opened up for local people, considering the fact that their land rights are often neglected when peatlands are converted in oil palm plantations.The high admission costs exclude local people from joining the conference."
The local Sarawak chapter of IPS ran away with the conference, stating in the press that "a consensus (!!) was reached that palm oil development on peat is sustainable", blatantly misusing IPS's credentials to promote its own one-sided perspective. This was exacerbated by later statements in the press (mis)quoting a certain IPS EB member.
I hope that the IPS EB will do its utmost to rectify this single-sided perspective, using its full potential for outreach to press and public, including its own newsletter and website.

Gerald Schmilewski (ips@peatlands.org), September, 5, 2016:
Dear Marcel,
Thank you for your message and for expressing your views so frankly.
It has been the tradition in the IPS that the organisation of Congresses, including the choice of keynotes, is delegated to the local National Committee. In the past this has, for the most part, worked well. We accept that the IPS Executive Board has ultimate responsibility for the conduct of Congresses, and to this end tries to excercise some oversight.
The Kuching Congress was very well organised and had the largest attendance of any Congress to date. The article in Peat News sought to reflect this organisational success.
However, the IPS Executive Board shares your concerns about the keynote speeches on the first morning. We are not privy to why some speakers were chosen and others not. In this regard our oversight did not succeed. We accept final responsibility for the Congress, and will put in place stricter governance rules for future Congresses. The views of the IPS on all activities on peatlands are reflected in the Wise Use book and the Strategy for Responsible Management. These are our basic texts, and anything contrary to these is not acceptable to us.
We note what you say about the Sarawak Dayak Iban Association and access for local people. We hope to address this issue in future Congresses.
As far as press coverage is concerned, Mr Moritz Böcking correctly stated IPS Executive Board policy, and was grossly mis-reported. We issued a statement to the Jakarta Post voicing our concerns. We are now considering how we can better and more positively communicate our policies.
Once again, thank you for writing to us.

Marcel Silvius (Marcel.Silvius@wetlands.org), September 5, 2016:
Dear Gerald,
Please note that not only Mr Böcking was (mis)quoted, but the IPS Sarawak chapter had a very active outreach to the press (not just the Jakarta Post, but many local newspapers and on the internet), involving grossly misleading statements that the IPS had reached a consensus on the sustainability of oil palm plantations on peat.
This was observed with much concern and dismay by the many and major stakeholder groups that have a very different view but who and whose perspectives were for various reasons not present or underrepresented at the IPC in the morning of the opening day of the conference and in the overall IPC communications. I believe that IPS EB must have and take overall responsibility for press and communication. It is of the utmost importance for the credibility of IPS but also for a fair discussion and reflection of the various perspectives, that the IPS distances itself publicly and clearly from these misleading statements.

Is a scientific congress a place for debate?

Tatiana Minajewa (tania.minajewa@gmail.com)

Playing with the queen of hearts,
knowing it ain't really smart
The joker ain't the only fool
who'll do anything for you
H. Devito for Juice Newton

Some time has passed but I am still under deep impression of the 15th Peat Congress. My problem with this congress is very personal.
Having grown up in the Soviet Union in a family of foreign citizens with parents being scientists, I totally understood from childhood on, what is meant with violating human rights, suppressing freedom of speech, absence of parliament and debate on decisions, and of course absence of different opinions in science. The scientific theory in the Soviet Union had first to be politically approved and all research should prove already approved theory. In the 1980s when I started my scientific career in the former Soviet Union, a researcher

could choose between a good equipped and famous lab working in line with official theories, or working as a lonely researcher without resources. Still a very “vegetarian” situation compared to the 1930s, when the famous scientist Vavilov was killed in prison and the entire science of genetics in the Soviet Union was stopped by the lamarckist Lysenko who was accepted by Stalin. For many of us the “western” values and culture of democracy was the desired future which Soviet Republics should reach one day. Western science for many of us was the example of freedom and openness.

All dreams…, merely dreams… One more proof of the prosaic side of the World.

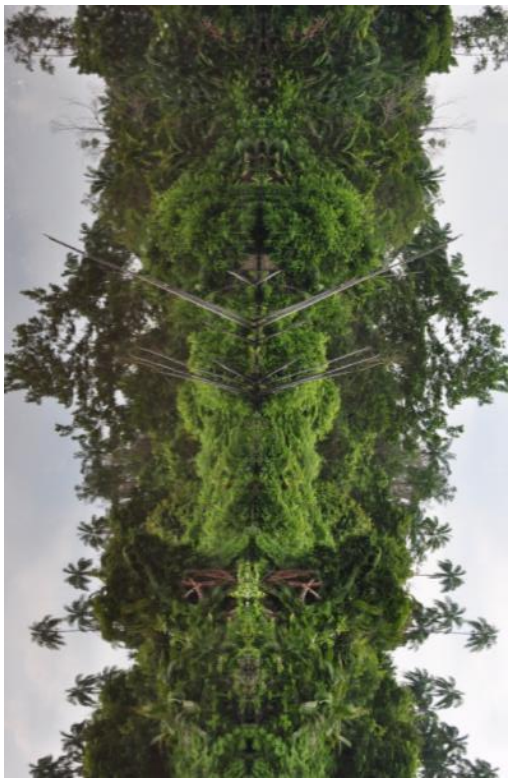
I had no illusions about the situation in Sarawak. Very close to modern Russia. The difference to the former Soviet Union is that the strong power is not based on pure ideology but very prosaically on making money for a few families. Of course, this is presented as that the money is for all people, for the children of the future and for other things… But simple calculations tell us otherwise.

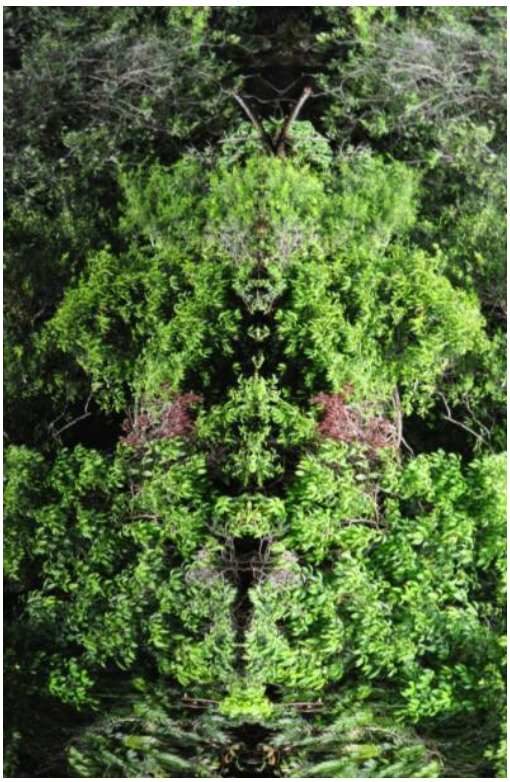
And it is clear that well-paid science in such situation is serving business and will prove whatever business wants to be proven. And will accuse anybody who has another opinion. This was predictable.

Not predictable was the reaction of the more than 500 Europeans including the leadership of the International Peatland Society. We were very polite and tolerant. We have been applauding the total misuse of science and facts, and even of children. We altogether accepted Goebbels-like propaganda and called it “excellent organisation of the congress”. A congress which was everything – except a platform for open debate and discussion. We followed the advice of the IPS chair and had fun and enjoyed. In the corners, we were sharing our negative impressions and −as maximum “coming out” − put our comments to the evaluation forms… which have been flashed down immediately.

What is worrying me more and more is that we have not heard any other opinion, any critical contribution from scientists from Sarawak or Malaysia. Do we know where they are? I hope still in their labs. And if they are not? That would be the personal responsibility of each of us. Our parents and grandparents in Europe also told that they were like blind in the 1930s and 1940s. Why we are blind? Tolerance? The burden of colonial scents? Europeans should not allow to be blackmailed on the basis of their history.

Our best literature teaches us to stay in balance with good and bad for the sake of the GOOD. Why we still cannot? I am afraid that unless everyone of us kills the Jabberwocky inside him/herself we will more and more often hear as a scientific argument “Off with his/her/its head!”





Black water: the perfect mirror. Photos: Hans Joosten

My boggie is all in erosion

My boggie is all in erosion
My boggie is drained to the sea
My boggie is all in erosion
Oh bring back my boggie to me

Bring back, bring back
Oh bring back my boggie to me, to me
Bring back, oh bring back
Oh bring back my boggie to me.

Last night as I lay on my pillow
Last night as I lay on my bed
I dreamt that my bog was subsiding
and that all my peat swamp was dead.

Bring back, bring back…

There's oil palm all over my boggie
There's nothing else that I can see
There's oil palm all over my boggie
Oh bring back my boggie to me.

Bring back, bring back
Oh bring back my boggie to me, to me
Bring back, oh bring back
Oh bring back my boggie to me.

Sung at the IPC Peat BBQ at the Tropical Peat Research Laboratory, Kota Samarahan, Sarawak, August, 18th, 2016 by Marcel Silvius and Hans Joosten. Earlier version available under https://www.youtube.com/watch?v=EykuZbNtWfw.Text inspired by and melody taken from a traditional Scottish folk song. Photo: Oi palm plantation bordering (in the background) Klias Peat Swamp Forest (Sabah). Photo: Hans Joosten.

New Global Peatland Initiative started – Initial partner meeting in Rome

Jan Peters (jan.peters@succow-stiftung.de)

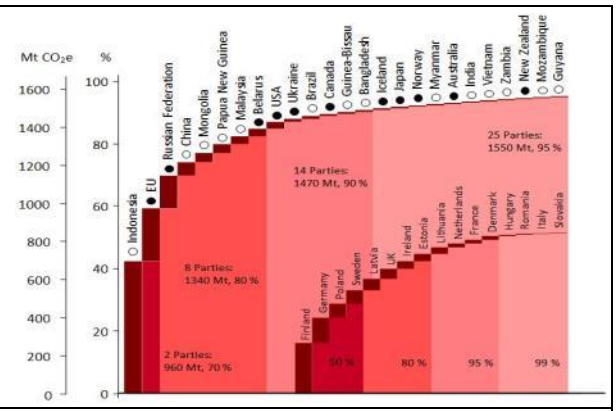
The Global Peatland Initiative (GPI) under the auspices of UNEP and supported by FAO was started with high enthusiasm by initial partners in a first meeting on 1st & 2nd September 2016 in Rome. The objectives of the meeting were to discuss strategic scope, partnership structure and technical challenges of the GPI. Among the founding partners are the Ramsar Convention secretary, Wetlands International, World Resource Institute (WRI), Joint Research Centre (JRC) of the European Union, Grid Ardenal and the Greifswald Mire Centre (GMC). Martin Frick, director of the climate change division in FAO, and Tim Christophersen, initiator of GPI from UNEP, stressed in their opening words that peatlands finally get the attention by governments and the international conventions they deserve. Protecting peatlands and initiate sustainable management serves the strengthened cooperation and joint action of various UN conventions and institutions like UNEP, FAO, UNFCCC, Ramsar and others in an exemplary manner to reach global policy targets.

Major first action of the group will be the preparation of a global assessment on peatlands and organic soils in order to guide decision makers on fostering peatland conservation and restoration for climate change mitigation and biodiversity protection. Beside general information on location and spatial extent, special emphasis will be put on degradation and peat fires in the tropics. The existing IMCG Global Peatland Database, coordinated by GMC, will play an essential role in providing background data to the assessment and identifying existing knowledge gaps.

In parallel to the global assessment, the initiative enforces the exchange on more sustainable peatland management strategies worldwide. Major steps have to be taken to stop drainage and incentivise new approaches to local people to keep peatlands wet or make organic soils wet again e.g. for paludiculture. To keep the momentum of the initiative rolling and bring ideas into practice, Indonesia, Peru, and the Republic of Congo were chosen as first circumtropic pilot counties to the initiative. These countries all share extended areas of peatlands and a political will for improved management within their borders, by divergence in conservation and degradation status, threats and existing scientific knowledge. Therefore, south-south cooperation between these countries will be encouraged, complemented to an exchange triangle by bringing in northern hemisphere expertise and responsibility as well. In a later phase, more and more countries will be convinced to join the global initiative, focussing on the 25 key countries which have been identified as being responsible for 95 % of the global greenhouse gas emissions from organic soils (Wetland International 2015).

The initiative plans to set up a comprehensive internal communication platform and to hold follow-up meetings in person every 6 to 12 month in changing locations, Membership to the initiative will be granted by promotion and no-objection basis of existing partners.

The Global Peatland Initiative in its first meeting in Rome, September, 1-2, 2016. Photo: Jan Peters



Emissions from peatlands per country (in Mt CO_2e) (without peat fires). IMCG Global Peatland Database

Peatlands on the agenda at IUCN World Conservation Congress

The IUCN UK Peatland Programme will be actively promoting peatlands at the upcoming congress, which is to be held in Hawaii from 1st September. In partnership with Scottish Environment LINK, IUCN Commission on Ecosystem Management, Wetland International and others, the IUCN UK PP has submitted an interactive poster on the Peatland Code and a motion: Securing a future for global peatlands. It is hoped that the IUCN will adopt the motion and prepare draft legislation for nations to use as guidelines to preserve and restore peatlands. Find out more

On Friday, 2 September 2016, the second day of the IUCN WCC, participants focused on exploring solutions to some of the planet's most pressing conservation and sustainability challenges. In the session 'Changing climate: championing nature-based solutions', Ramsar Convention Secretary General Martha Rojas-Urrego underscored the huge carbon storage potential of peatlands conservation.

Africa

Of Rhinos, *Sphagnum*, amoebae and Nelson Mandela

Edward Mitchell (edward.mitchell@unine.ch)

Although the title reads very much like an exquisite corpse, this is a true story! An international story of friendship, passion, beauty and molecules.

- International it is indeed, as the people involved are a perfect illustration of the global village in which we live: South-Africa, Switzerland, Scotland, Armenia, Brazil, Greece, Spain, France, Germany.
- Passion certainly, first for peatlands, second for *Sphagnum* mosses and more specifically *Sphagnum* mosses considered as an ecosystem.
- Beauty because these mosses are home to many beautiful and still very poorly documented organisms.
- And molecules and more specifically DNA and all the molecules involved in the long and complex process of DNA sequencing.

An exquisite corpse is an inventions of surrealists where several people in turn draw an image and each person only sees the last bit of the image drawn by the previous person. The composite image typically makes no sense, is usually rather intriguing and often quite funny.

Our story started in a private game reserve just north of Marakele National Park in South Africa. Piet-Louis Grundling was guiding me with two rangers of the part to sample *Sphagnum* mosses in a valley wetland in the Highveld savanna. To get to the mire we had to leave the car, walk around a group of very peaceful white rhinos, keep our eyes open for lions and other potentially dangerous animals while walking towards a low spot in the valley (Figure 1). There, in the middle of tall, dry grasses we found very happy *Sphagnum* mosses, nice patches that we were able to sample (Figure 2). The mosses were kept preciously in plastic bags, regularly opened to let the mosses – and multitude of microorganisms – alive until the samples could be processed in my lab back in Switzerland.

Fig. 1: A group of white rhinos we had to walk by to get to the low spot in the valley where the Sphagnum *mosses were growing.*

Fig. 2: A healthy patch of Sphagnum*, full of happy amoebae!*

When we took the mosses out of the bags, not only were the *Sphagnum* still alive, but we also found many happy amoebae. Among these, were the testate amoebae I have been studying for over 20 years. These amoebae are useful indicators of environmental conditions and their tests, or shells are preserved in the peat and thus can be used to trace back past environmental changes. These amoebae are typically small, ca. 50-200 µm, so roughly 1/10 of millimeter. A microscope is therefore needed to see them. But squeeze a drop of water from any *Sphagnum* moss and observe it under the microscope and you will see some amoebae.

At the time when I brought back these samples to the lab my then PhD student from Armenia, Anush Kosakyan was doing a DNA barcoding project on a group of testate amoebae that produce their shells from self-secreted transparent square siliceous plates. The genus is quite logically named *Quadrulella*. We had sequenced several

individuals from Europe but we had no material from Africa. We were therefore curious to see if African amoebae were genetically and morphologically different from their European cousins.

The results were actually quite surprising. We found three different *Quadrulella* species in our South African samples. And when we built a phylogenetic tree with these sequences and other sequences from this genus and relate genera we realized that the genus *Quadrulella* was not monophyletic. This means that the amoebae with square scales did not all fit in the same part of the tree. These new sequences and several others from other related taxa further allowed Anush with other colleagues involved in various aspects of the study to propose an in-depth taxonomic revision of the whole family.

We described five new genera and two new species. One of the new species (Figure 3) was name *Quadrulella madibai*, in honor of Nelson Mandela. Madiba is the name of Nelson Mandela's clan and this was also how his friends called him. We felt it was a nice way to honour the memory of this man and we also hoped that this beautiful new species could possibly be a flagship species that could be used to raise awareness to the value of wetlands in South Africa.

Fig. 3: Piet-Louis happily sampling the Sphagnum for the amoeba hunt!

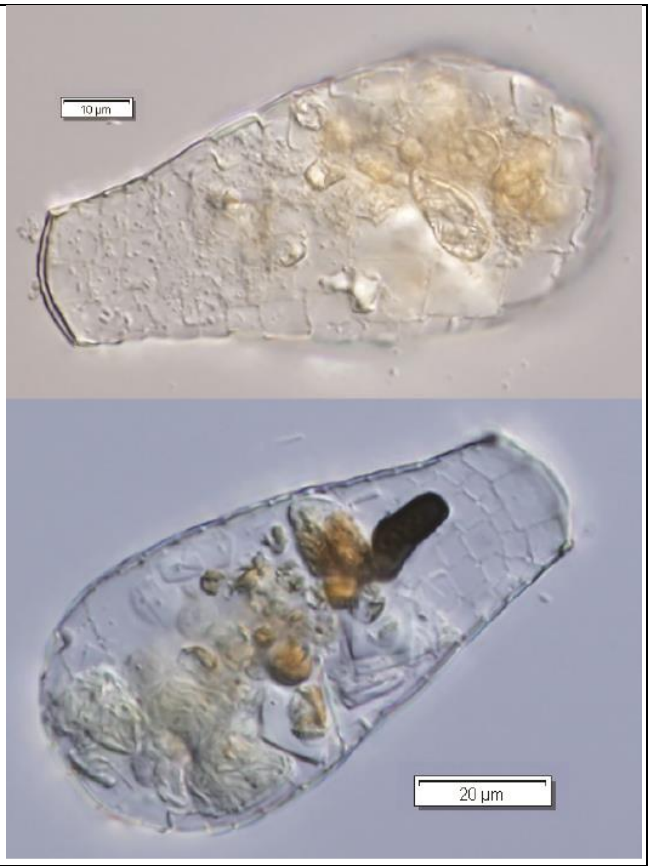


Figure 4: Quadrulella madibai*, a new species of shelled (testate) amoeba discovered in South Africa and name after Nelson Mandela.*

Reference: Kosakyan A, Lahr DJG, Mulot M, Meisterfeld R, Mitchell EAD, Lara E. 2016. Phylogenetic reconstruction based on COI reshuffles the taxonomy of hyalosphenid shelled testate amoebae and reveals the convoluted evolution of shell plate shapes. Cladistics published online: Doi: 10.1111/cla.12167 xxx

Asia

Brunei

National action plan created to protect Brunei's peatland

Government stakeholders are currently working to create a national action plan on peatlands that will outline the environmental challenges as well as tourism and research opportunities identified within Brunei's peat swamp forests. Chief Executive Officer of Heart of Borneo (HoB) Centre in Brunei Mahmud Hj Mohd Yusof said the plan has been drafted with the input of the Department of Environment, Parks and Recreation (JASTRe), Land Department and Ministry of Primary Resources and Tourism. "The draft is currently pending review and approval," Mahmud said on the sidelines of an introductory briefing at the Belait District Office for a visiting delegation of the International Mire Conservation Group.

Peatland experts from the International Mire Conservation Group during a visit to the peat swamp forest of Kuala Balai on Sunday. Picture: BT/Aaron Wong

Brunei's peatlands are mostly peat swamp forests, which are found primarily in the Belait district. Southeast Asia is estimated by experts to cover 60 per cent of the world's tropical peatlands. However, recurring forest fires in the region, particularly severe in Indonesia, have ravaged the peatlands, threatening their long-term survival by outstripping their natural ability to regenerate. "Brunei's peatland is not exempt (from this threat). We have seen forest fires recurring annually here as well," said Mahmud. "However a good portion of our peatlands and forests remain intact and in pristine conditions, so we must do our utmost to maintain them." Problems of overlogging and conversion to agricultural land have further compounded the problem in the region, with experts propositioning Brunei's peat swamp forests be preserved "at all costs".

Mahmud said part of the action plan would be raising awareness of the benefits of tropical peatlands, and exploring the eco-tourism potential and research and development opportunities.

"As one of the last intact peat swamp forests we have an interest to protect, understand and promote it," he said. "On the research side, we have a few facilitated by HoB who are studying different aspects, but on the

eco-tourism side, we are still engaging with the response from the private sector." He added that the rarity of the peat swamp forests could be their selling point, to be used by private companies as leverage to attract tourists. "The government will do its part to identify what the suitable sites are for these visits, but the private sector will have to play its role in marketing it," he said. More than half of Brunei's forests are protected under the HoB initiative, including much of the country's peat swamp forests.

http://www.bt.com.bn/news-national/2016/08/23/national-action-plan-created-protect-brunei%E2%80%99s-peatland

China

Tiger land: Refuge for the world's largest cat in newly planned Chinese national park

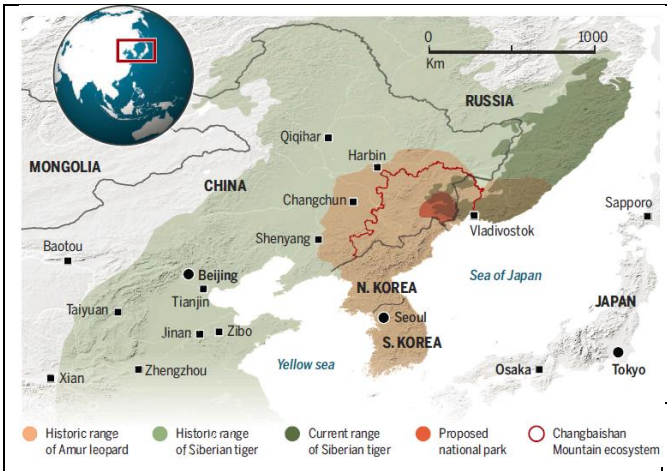
Both the Siberian tiger—the world's largest cat, with males weighing up to 300 kilograms—and the Amur leopard face dire threats from poaching, logging, and development. A substantial population of both species is found along the forest- and peatland-rich borders of China, a fact which has helped convince the central government of China to create a 15,000 km^2 national park—60% larger than Yellowstone—that could save the cats from extinction.

The big cat park—still unnamed and not yet formally announced—signals a change in China's attitude toward conservation. With little fanfare, China is creating its first system of national parks, a major step up in management and funding from the current mishmash of national reserves, semiprotected forests, and provincial parks. About two dozen national parks are planned, and the first four mentioned by state media aim to protect charismatic mammals: Asian elephants, giant pandas, Tibetan antelopes, and, here in the northeast, tigers and leopards.

Creating parks faces much the same obstacles in China as elsewhere. The central government has to convince local authorities that the parks will not undermine their economies, and locals who made their living by logging or poaching will need help to find other livelihoods. But Rose Niu, chief conservation officer at the Paulson Institute, a Chicago, Illinois–based think tank that is helping design the park system, hopes the Chinese public will embrace the idea. The parks, she hopes, will offer "spiritual healing" to Chinese who have had to endure worsening environmental degradation in recent years.

China's wild tigers and leopards have long been suffering from hunting and habitat loss. Scientists believe that 20 years ago, both populations were nearing a genetic bottleneck. Numbers have ticked up recently with expanded habitat protection and antipoaching efforts in Russia and China.

Siberia has been a lifeline for the big cats. Surveys indicate that Russia's wild tiger population has increased from 40 in the 1940s to 540 today. That number is stable, but has just about maxed out the available habitat in Russia. "If they're going to save this population, it's really going to be the Chinese, not the Russians. All the potential land for expansion is on the China side," says David Smith, a tiger expert at the University of Minnesota.



Peatland reconnaissance in north-eastern Jilin (China). Photos: Hans Joosten.

China's central government has moved aggressively to help. Since the Communist Party signaled its intention to create a national park system in a 2013 planning document, the government has banned logging in Jilin and Heilongjiang provinces, canceled a highway project that would have bisected big cat habitat, and rerouted a high-speed railway connecting China to Vladivostok. In the next few years, the government will consolidate and expand protection across 15,000 square km^2 of prime cat habitat and conservation areas, including many peatlands. At the big cat park alone, planners hope to turn 30,000 former forest workers—loggers, hunters, and even poachers—into park rangers and conservation workers.

http://science.sciencemag.org/content/353/6301/744.full

Indonesia

Japanese Institutions grant US$3mn for peatland restoration

Three Japanese institutions (University of Kyoto, Hokkaido University, and the Research Institute for Human and Nature) have given Indonesia US$3 million worth of monitoring systems, monitoring devices as well as agricultural and peatland researches. These tools will be used for restoring peatlands that have been damaged by fires, as well as to detect and prevent fires.

Indonesia's Peat Restoration Agency chief Nazir Foead said 40 devices have been installed to monitor the humidity and water temperature in peatlands as a pilot project. "The devices show how dry or wet peatlands are. So it is useful to monitor restoration activities," he said.

http://en.tempo.co/read/news/2016/08/11/056795127/Japanese-Institutions-Grant-US3mn-for-Peat-Restoration

Indonesian fires sent huge smoke plume halfway around the globe

The fires that raged through Indonesia last year were the world's worst since 1997. They generated a smoke plume so large that it wrapped itself halfway around the equator – fallout on a scale usually associated only with volcanic eruptions. Fire and smoke billowing from the peat fires, triggered by oil palm plantation owners and other farmers who clear surplus vegetation by setting it alight also generated 1.5 billion tonnes of carbon dioxide – more than the total 2013 emissions of Japan. The massive equatorial plume was identifiable by satellites designed to detect carbon monoxide, another major pollutant generated by the fires, which lasted from July to November. The plume stretched from East Africa to the western Pacific Ocean and persisted for two months. More: https://www.newscientist.com/article/2099496-indonesian-fires-sent-huge-smoke-plume-halfway-around-the-globe/

Fires emergency alert raised in five provinces

Five provinces in Sumatra and Kalimantan are bracing up to face peatland and forest fires as the dry season comes close to its peak in September. The governors of Riau, Jambi, South Sumatra, West Kalimantan and Central Kalimantan have already raised forest fire emergency alert for their provinces.

"The national disaster management agency (BNPB) will provide assistance to their regional counterparts to handle the forest fires," said BNPB spokesman Sutopo Purwo Nugroho in a statement on August 12. In areas where emergency has been declared, the armed forces, the police, local and national disaster mitigation agencies, the Manggala Agni Forest Fire Brigade and volunteer firefighters will be deployed. The BNPB will also have on standby 16 water-bombing and patrol helicopters, two water-bombing aircraft and eight cloud-seeding aircraft.

Last year's seasonal fires affected millions of hectares of peatland, afflicted more than half a million people with respiratory problems and resulted in billions of dollars in economic losses. The same tragedy may happen again this year if there is no coordination between palm oil companies, local governments, security officers and government agencies to work out a way to minimize the fires.

http://jakartaglobe.beritasatu.com/news/peat-land-forest-fires-emergency-alert-raised-five-provinces-sumatra-kalimantan/

President Jokowi calls for law enforcement against forest and peatland burners

Indonesian President Joko Widodo wants a strict law enforcement against forest and peatland burners. The statement was made by Jokowi at a meeting discussing prevention and mitigation measures of forest and peat land fires at the Presidential Office on Friday August 12. "This move is expected to provide legal certainty and meet the justice of the people," Jokowi said. At the meeting, Jokowi stressed four steps to prevent and overcome forest and peatland fires: extinction of hot spots, fire prevention, law enforcement, as well as restoration of peatland ecosystems.

http://en.tempo.co/read/news/2016/08/13/206795638/Jokowi-Calls-for-Law-Enforcement-Against-ForestPeat-Land-Burners

Destructive palm oil company IOI let off the hook too easily by RSPO

IOI, one of the biggest palm oil suppliers in the world, was suspended by the Roundtable on Sustainable Palm Oil (RSPO) in April 2016 for clearing peatland areas and developing land without obtaining required permits. As a result, many of its big-name customers walked away such as Unilever, Cargill, Mars, and General Mills.

RSPO has now announced to lift the suspension because IOI has a plan to deal with the specific details of the complaint raised against it. However, these are minor corrections affecting only a small part of IOI's operations, while the company continues to create problems elsewhere.

Over the years, IOI has left a trail of devastation across Indonesia. Back in 2008, Greenpeace revealed how the company had destroyed peatland forests as well as areas of orangutan habitat. More recently, it was clearing areas which its own assessment surveys identified as being of particular value for conservation and carbon storage, contravening its own policies. And just this year, Greenpeace investigations showed IOI had planted oil palm saplings in areas burnt during last year's catastrophic fires, despite government instructions to the contrary.

The policy IOI published early August in response to the most recent RSPO complaint continues this tradition - it makes no attempt to address the most serious problems. There's also the question of how IOI will repair the damage done to the peatlands it has drained - the Indonesian government has instructed plantation companies to immediately re-wet peatland areas in an effort to reduce fire outbreaks.

Letting IOI back into the fold so soon is a big mistake. The RSPO is supposed to be preventing its members from destroying forests, but this alarming decision sends the message that even the worst offenders will be let off with little more than a slap on the wrist.

It also highlights just how weak the RSPO's standards are - many of its members have palm oil policies much stronger than its own, undermining the RSPO's claims to be pushing the industry towards true sustainability. It also suggests the RSPO is more concerned about giving the all-clear for IOI's old customers to start buying its palm oil again, rather than forcing it to make any kind of serious reforms. However, many of IOI's ex-customers have said they will only start buying again once it has shown it can radically improve its approach to protecting forests and peatlands.

http://www.greenpeace.org.uk/blog/forests/destructive-palm-oil-company-ioi-let-hook-too-easily-rspo-20160810

http://www.foodbusinessnews.net/articles/news_home/Regulatory_News/2016/08/Palm_oil_group_lifts_IOI_suspe.aspx?ID=%7B61AC183F-60BE-4BE9-B818-ACF8916B5D2C%7D&cck=1

Vice President to promote peatland restoration investment at UN General Assembly

The Indonesian government plans to promote investment in peatlands at the sidelines of the 71st United Nations General Assembly in New York in mid-September. Vice President Jusuf Kalla will meet several investors to discuss investment opportunities in Indonesia's peatlands. "Peatland restoration has to be promoted from the investment side; the business," the vice president's secretary M. Oemar said in Jakarta on Thursday 25 August. Oemar added that the peatland investments have to be supported by simplified regulations, which the Peatland Restoration Agency (BRG) is currently discussing with various ministries. "Our goal is to improve the forests and restore the land without the use of state budget," Oemar said. Nazir Foead, head of the BRG, said

on Wednesday August 24 that the participation is badly needed as the government is only capable of improving 1 million hectares out of the over 6 million hectares of peatlands which have to restored.

http://jakartaglobe.beritasatu.com/news/vp-promote-peatland-investment-un-general-assembly/

http://news.xinhuanet.com/english/2016-08/24/c_135630589.htm

New paludiculture book in Bahasa

Tata, H.L., & Susmianto, A. (2016). Prospek paludikultur ekosistem gambut Indonesia. Bogor, Indonesia: Forda Press, 96 p.

The first and second chapters contain a review of the background and purpose of the book as well as the approach used. Chapter three, four and five discuss the history and development of paludiculture in Indonesia, the types of plants, and case studies. The last three chapters explore market opportunities and policies related to paludiculture products, paludiculture development strategies in Indonesia, and present recommendations and a road map for the further development of paludiculture.

Malaysia

SADIA and BMF criticize the destruction of peatland for oil palm plantations

Whilst the International Peat Congress 2016 was being held in Kuching, Sarawak, NGOs were highlighting environmental damage caused by the drainage of peat fields. This week, the International Peat Congress (IPC) is taking place in Kuching, Sarawak, Malaysia, and thus for the first time outside Europe and North America. Unfortunately, the congress missed the opportunity to include civil society voices and land rights issues. The conference was designed for researchers, academics and practitioners. “The high admission costs exclude local people from joining the conference,” criticizes land rights activist Nicholas Mujah, the head of the Sarawak Dayak Iban Association SADIA. “The Peat Congress should be opened up for local people, considering the fact that their land rights are often neglected when peatlands are converted in oil palm plantations.”

Scientific studies have shown that local livelihoods of people depend on peat swamp forests and that indigenous peoples possess traditional knowledge in preservation as well as sustainable use of peatlands. Given that Sarawak holds a substantial amount of Southeast Asia’s peatland, it is no coincidence that the International Peat Congress (IPC) is being held in the largest Malaysian state. However, Sarawak’s peatlands are under serious threat. According to Wetlands International, Sarawak has the highest oil palm development on peatland in Southeast Asia.

“It is well known that peatlands serve as one of the most valuable storages for carbon. The drainage of peatlands is an environmental disaster and a source of massive fires”, says Lukas Straumann, director of the Bruno Manser Fund. Currently, peatfields opened for oil palm plantations are burning in Sumatra, Indonesia, causing haze in Southeast Asia. BMF and SADIA call for an immediate halt to the conversion of peatlands to plantations and call on Sarawak Chief Minister Adenan Satem to keep his promise that “no more palm oil is needed”!

Sarawak Dayak Iban Association/ MALAYSIA; Bruno Manser Fund/ SWITZERLAND 18 August 2016

Singapore

Smoke from Indonesian fires hits 'unhealthy' level in Singapore

Air pollution in Singapore rose to the "unhealthy" level on Friday August 26, as acrid smoke drifted over the island from fires on Indonesia's Sumatra island, the National Environment Agency (NEA) said. The 24-hour Pollution Standards Index (PSI), which Singapore's NEA uses as a benchmark, rose as high as 105 in the afternoon. A level above 100 is considered "unhealthy". Indonesia has been criticized by its northern neighbors for failing to end the annual fires, which were estimated to cost Southeast Asia's largest economy $16 billion in 2015, and left more than half a million Indonesians suffering from respiratory ailments.

http://in.reuters.com/article/us-indonesia-haze-idINKCN1110K2

Australia/Oceania

Australia

Kosciuszko National Park Wild Horse Management Plan

Feral horses are threatening peatlands and other ecosystems in Kosciuszko National Park (NSW). A Draft Wild Horse Management Plan has in August been available for review. The plan and associated documents can be downloaded from: http://www.environment.nsw.gov.au/protectsnowies/

Sphagnum cristatum *and* Empodisma minus *in Thredbo river valley, Kosciuszko National Park (NSW Australia). Photo: D. Isaacson/OEH*

Europe

Finland

Finland launches Ramsar Wetlands Action Plan 2016-2020

The new National Ramsar Wetlands Action Plan 2016-2020 includes a review of the current state of wetlands and presents an analysis of the strengths, weaknesses, threats and opportunities in the protection and sustainable use of wetlands. Based on these, a total of 55 measures aimed to improve the state of wetlands have been established, including an estimate of the economic and environmental impacts of the plan. The documents were updated to correspond to the goals specified in the Convention on Biological Diversity (78/1994), and the EU biodiversity strategy. Finland has a total of 49 Ramsar sites, covering approximately 785,000 ha. Half of the Ramsar sites in Finland are mires. More info:

www.ramsar.org/news/finland%E2%80%99s-ramsar-wetlands-action-plan-2016-2020-improving-the-condition-of-wetlands-benefiting

Slovakia

Korbeľka tunnel is the best highway variant for people and nature

Nature conservationists have been reiterating for years that the best route for the highway connecting Turany with Hubová in northern Slovakia is that with the Korbeľka tunnel. Now also highway builders have joined this opinion. A study evaluating impacts of construction and operation of this highway stretch picks the variant with the Korbeľka tunnel as the least harmful for people and nature. The Turany-Hubová stretch of the D1

Bratislava-Košice highway connecting the Turiec and Liptov regions is very demanding from the viewpoint of protection of nature (including Rojko peatland/Rojkovské rašelinisko), geology as well as financing. So far the state has pushed for a cheaper surface variant with more harmful impacts on the nature reserves of the Lower and Higher Tatras mountains. But after a landslide during construction of the surface highway near Šútovo in 2013 it began reconsidering the final route, and the oldest variant with the six-kilometre Korbeľka tunnel was again under consideration. Now also the study, which the Dopravoprojekt company elaborated for the National Highway Company (NDS) and which was revealed in early August, recommends the variant with the Korbeľka tunnel and ecoducts.

United Kingdom

Factsheets on peatland restoration made available

A series of factsheets are being created to explain in detail the type of work that will be undertaken as part of MoorLIFE 2020. The first eight cover: bare peat restoration; heather cutting; grip and gully blocking; heather bale dams; timber dams; plastic dams; peat dams and stone dams. Download here

Academics feel blight of Brexit – from cancer research to peat projects

A month on from the EU referendum result, academics across the country are finding they already are having to cope with the fallout from the decision to leave the EU. 'Instead of restoring peatland, we're taking a step back', said Mark Reed, professor of social innovation at Newcastle University. "Before the referendum I felt full of hope. We were applying for €10m of funding from the European commission's Life programme – a pot set up to protect the environment and tackle climate change through EU policy and legislation. The money was for an ambitious 10-year project to restore at least a million hectares of peatland in the UK.

Peatlands are this country's biggest source of carbon and their restoration is a vital part of our efforts to tackle climate change, water management and biodiversity conservation. The British government has already invested millions of pounds in generating evidence to underpin a draft strategy for restoring the UK's peatlands and this grant would have been enough to implement it.

For me, it was personal – the culmination of 12 years' work. Others in the project team had invested similar time and effort. But the probability of us continuing to get access to funds like Life now is low. Why would the EU continue to give up funds designed to implement EU environmental legislation to a country withdrawing from the EU that wants to reduce regulation?

https://www.theguardian.com/education/2016/aug/02/academics-brexit-research-peat-fears-eu-funds

RSPB calls for grouse shooting to be licensed

The start of the grouse shooting season has reignited the debate over the sport's role in protecting the countryside. As the industry marks the "Glorious 12th", the beginning of the red grouse season, moorland owners said they had restored peatland equivalent to the combined areas of Liverpool and Nottingham and wild birds are thriving on well-managed moors. But with numbers of hen harriers, which come into conflict with gamekeepers because they prey on red grouse chicks, falling to just three breeding pairs in England this year, the RSPB is warning the industry must change its ways.

England's uplands could support more than 200 breeding pairs of hen harriers, but the bird of prey's numbers are being kept down by illegal persecution, a report by government conservation agency Natural England concluded. The RSPB recently pulled out of the Government's hen harrier action plan because it felt the plan was not delivering the "urgent action and change in behaviour" needed to bring the bird of prey back from the brink of extinction in England. The wildlife charity also raised concerns about the "environmental damage" caused by practices used by grouse moor managers, such as draining and burning habitat and killing mountain hares to reduce disease in grouse. It has called for the licensing of the industry, which it argues would drive up standards and ensure grouse moors complied with the law or risk losing their right to hold shoots.

The Moorland Association, whose members own and manage 860,000 acres of heather moorland in England and Wales for red grouse, said there could be pockets of poor grouse numbers on some moors and shoot days

being cancelled. But chairman Robert Benson said that there were still "positive outcomes" on land managed for grouse shooting, with 18,000 acres of peatland habitat restored across northern England. According to the association the shooting industry delivers £52.5 million annually on conservation work, and £15 million for local businesses.

Mr Benson added: "Short-term licensing of driven grouse shooting, advocated by the RSPB, could also foreshorten the generation to generation planning and investment that is inherent in managing moorland, leading to less successful conservation management." But Jeff Knott, the RSPB's head of nature policy, said: "It is in the interests of those good, law-abiding estates to stand up and embrace licensing as a means for driving up standards, building public trust and removing the bad apples."

http://home.bt.com/news/uk-news/rspb-calls-for-grouse-shooting-to-be-licensed-at-start-of-glorious-12th-11364079046632

Peatland restoration in grouse land in Caithness, Scotland (Photo: Hans Joosten)

The Peatland Code webinar: A practical solution to a global problem

The recording of a webinar on the Peatland Code in July 2016, which explains the mechanism to attract private funding for peatland restoration is found on 2016-07-26 12.32 The Peatland Code A practical solution to a global problem. The webinar was hosted by Nick Blyth from IEMA, with Clifton Bain (Director, IUCN UK Peatland Programme) and Rob Stoneman (Vice Chair, IUCN UK Peatland Programme) providing the presentations.

Raptors, uplands & peatlands – Conservation, land management and issues

On 9 - 10 September 2016, the British Ecological Society Peatlands Special Interest Group will bring together academics and practitioners to examine the ecological and conservation issues of raptors on uplands generally, and peatlands specifically. We will be addressing the hugely controversial issues of why Britain has lost its upland hen harriers, and much more besides. It is the first of two major events, the second being a 3-day national conference in 2017, on issues for the conservation of birds of uplands & peatlands.

For more information: http://www.ukeconet.org/raptors.html

North-America

Extensive contribution in New York Times on peatland fires:
http://www.nytimes.com/2016/08/09/science/climate-change-carbon-bogs-peat.html?_r=0

Peatland conservation relevant papers August 2016

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

1. Soil paludification and Sphagnum bog initiation: the influence of indurated podzolic soil and fire: http://onlinelibrary.wiley.com/doi/10.1111/bor.12200/abstract?campaign=wolearlyview
2. Numerical modelling of ice-wedge polygon geomorphic transition: http://onlinelibrary.wiley.com/doi/10.1002/ppp.1909/abstract?campaign=wolearlyview
3. The Okavango companion: All-in-one guide to common animals and plants: http://www.nhbs.com/title/210353/the-okavango-companion
4. The total phosphorus budget of a peat-covered catchment: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003375/abstract?campaign=woletoc
5. Twelve year interannual and seasonal variability of stream carbon export from a boreal peatland catchment: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003357/abstract?campaign=woletoc
6. Effect of plant functional type on methane dynamics in a restored minerotrophic peatland: http://link.springer.com/article/10.1007/s11104-016-2999-6
7. Quantifying peat carbon accumulation in Alaska using a process-based biogeochemistry model: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003452/abstract?campaign=wolacceptedarticle
8. Multi-proxy evidence of Holocene climate variability in Volhynia Upland (SE Poland) recorded in spring-fed fen deposits from the Komarów site: http://hol.sagepub.com/content/26/9/1406?etoc
9. The ecological legacy of 20th century acidification carried on by ecosystem engineers: http://onlinelibrary.wiley.com/doi/10.1111/avsc.12259/abstract?campaign=wolearlyview
10. Ecoregionalization classification of wetlands based on a cluster analysis of environmental data: http://onlinelibrary.wiley.com/doi/10.1111/avsc.12248/abstract?campaign=wolearlyview
11. Assessing the opportunity costs associated with peatland restoration: http://iucn-uk-peatlandprogramme.us3.list-manage.com/track/click?u=f1bc6fee95849ff37dcbae3b4&id=88345f8f8f&e=5413830ff2
12. Contrasting transit times of water from peatlands and eucalypt forests in the Australian Alps determined by tritium: implications for vulnerability and the source of water in upland catchments: http://www.hydrol-earth-syst-sci-discuss.net/hess-2016-361
13. Comparison of site preparation and revegetation strategies within a Sphagnum-dominated peatland following removal of an oil well pad: https://muse.jhu.edu/article/628165
14. An overview of the progress and challenges of peatland restoration in Western Europe: http://onlinelibrary.wiley.com/doi/10.1111/rec.12415/abstract?campaign=wolearlyview
15. Utilising non-timber forest products to conserve Indonesia's peat swamp forests and reduce carbon emissions: http://jinh.net/wp-content/uploads/2016/05/Volume-3-2-December-2015.pdf
16. Stratigraphy and soil properties of fens: Geophysical case studies from northeastern Germany: http://www.sciencedirect.com/science/article/pii/S0341816216300716
17. Land use increases the recalcitrance of tropical peat: http://link.springer.com/article/10.1007/s11273-016-9498-7
18. Management driven changes in carbon mineralization dynamics of tropical peat: http://link.springer.com/article/10.1007/s10533-016-0222-8
19. Keep wetlands wet: The myth of sustainable development of tropical peatlands - Implications for policies and management: http://onlinelibrary.wiley.com/doi/10.1111/gcb.13422/abstract
20. Relationships between vegetation succession, pore water chemistry and CH_4 and CO_2 production in a transitional mire of Western Siberia (Tyumen Oblast): http://link.springer.com/article/10.1007/s13157-016-0798-8
21. Assessment of water quality in the vicinity of peat extraction sites: The case of Pien-Saimaa, Finland: http://onlinelibrary.wiley.com/doi/10.1111/wej.12168/abstract?campaign=woletoc

22. More frequent burning increases vulnerability of Alaskan boreal black spruce forests: http://iopscience.iop.org/article/10.1088/1748-9326/11/9/095001/meta;jsessionid=483FFBD1BB222FA3BE1A667EE3E6BFC4.c2.iopscience.cld.iop.org
23. Can intensification reduce emission intensity of biofuel through optimized fertilizer use? Theory and the case of oil palm in Indonesia: http://onlinelibrary.wiley.com/doi/10.1111/gcbb.12398/full
24. Substantial overnight reaeration by convective cooling discovered in pond ecosystems: http://onlinelibrary.wiley.com/doi/10.1002/2016GL070206/abstract?campaign=woletoc
25. A review of the ecosystem functions in oil palm plantations, using forests as a reference system: http://onlinelibrary.wiley.com/doi/10.1111/brv.12295/abstract
26. Modeling hydrological controls on variations in peat water content, water table depth, and surface energy exchange of a boreal western Canadian fen peatland: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003501/abstract?campaign=wolacceptedarticle
27. Continuous dissolved oxygen measurements and modelling metabolism in peatland streams: http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0161363
28. Persistent high temperature and low precipitation reduce peat carbon accumulation: http://onlinelibrary.wiley.com/doi/10.1111/gcb.13433/abstract?campaign=woletoc
29. Isotopic insights into methane production, oxidation, and emissions in Arctic polygon tundra: http://onlinelibrary.wiley.com/doi/10.1111/gcb.13281/abstract?campaign=woletoc
30. How hunters' actions in wetlands contribute to the Ramsar Convention and the water Framework Directive: http://www.face.eu/sites/default/files/documents/english/how_hunters_actions_in_wetlands_contribute_to_the_ramsar_convention_and_the_water_framework_directive2.pdf
31. CH_4 exchanges of the natural ecosystems in China during the past three decades: the role of wetland extent and its dynamics: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003418/abstract?campaign=wolacceptedarticle
32. Atmospheric CH_4 and CO_2 enhancements and biomass burning emission ratios derived from satellite observations of the 2015 Indonesian fire plumes: http://www.atmos-chem-phys.net/16/10111/2016/acp-16-10111-2016.pdf
33. Long-range transport of NH_3,CO,HCN,andC_2H_6 from the 2014 Canadian wildfires: http://onlinelibrary.wiley.com/doi/10.1002/2016GL070114/abstract?campaign=woletoc
34. Development of rich fen on the SE Baltic coast, Latvia, during the last 7500 years, using paleoecological proxies: Implications for plant community development and paleoclimatic research: http://link.springer.com/article/10.1007/s13157-016-0779-y
35. Icelandic inland wetlands: Characteristics and extent of draining: http://link.springer.com/article/10.1007/s13157-016-0784-1