IMCG Bulletin: December 2016

INTERNATIONAL MIRE CONSERVATION GROUP

www.imcg.net

Word from the Secretary-General

Dear mire friends

The new year 2017 has already started. I wish you and your family and friends all health and prosperity. *And* the drive and opportunity to contribute to conservation of mires and peatlands all over the world!
2016 has been characterized by the continuing destruction of peatlands in Southeast Asia, which several of you have witnessed during the impressive IMCG Field Symposium in Malaysia and Brunei (GEC: thanks again for the organisation!). The catastrophic 2015 peatland fires finally got the necessary reaction in 2016 when Indonesia started to make serious effort in peatland conservation and rewetting. But challenges are immense, solutions difficult, and implementation hesitant and imperfect. Meanwhile in neighbouring Malaysia, where fires are less of an issue, local "science" and policy continue denying the problems associated with drained peatland use, i.e. emissions and subsidence. This attitude culminated in 2016 in reckless pro-drainage propaganda and press action at and upon the IPC Congress in Kuching. This was immediately counteracted by a paper submitted by some 140 tropical peatland scientists, who warned for the devastating effects of such "strategy of denial". The paper (and translations in various relevant languages) has been downloaded thousands of times since and has just officially appeared: http://onlinelibrary.wiley.com/doi/10.1111/gcb.13516/full (open access).
A major IMCG achievement in 2016 was also the finalization of the manuscripts of the European Mires Book, a project to which almost 200 IMCG members and supporters have contributed over the years. We have meanwhile received the second version of the print proofs and are vigorously working on the last corrections and the indexes. Soon the publisher will start the printing of the huge book, and until then you – as an IMCG member – have the one-off opportunity to order your copy of the book for the special IMCG member discount! **SEE BELOW, DON'T FORGET!**
Please continue your efforts for mire conservation and wise use: it is necessary more than ever! And share your ideas and experiences with your fellow-IMCGers, by sending news and discussion items, relevant photographs and other January contributions (incl. your new papers to be included in the list) by 31 January 2017 to Hans Joosten at joosten@uni-greifswald.de.

IMCG News

European Mires Book. In press! With temporary discount for IMCG members!

Mires and peatlands of Europe. Status, distribution and conservation. Edited by Hans Joosten, Franziska Tanneberger & Asbjørn Moen. With contributions of 132 authors. c. 800 pages, 205 figures, 218 tables, 112 colour photos, 21x28cm, c. 2.5 kg, bound, English. Price: €94.00. See summary table of Contents in November Bulletin and a country map from the print proofs on the next page.
All authors will receive a free copy. IMCG members can until January 31, 2017 order specially discounted copies for the price of €69.00 + shipping charges (Germany €6.50, other EU-countries €12.20, other countries €14.40). Order your copies directly at the publisher: mail@schweizerbart.de and mention your IMCG membership! Use this one-off opportunity to acquire this IMCG masterpiece at a discounted price!

Fig. ITA-1: Spatial distribution of Italian mires with a surface area >1 ha (Natura 2000 habitat types 7110, 7140, 7150, 7230, and 91D0, EIONET 2015), (former) peat extraction sites (Martinelli et al. 2015), peaty/organic soils (Mancini 1966b), and locations of peatland areas of international importance (1–6). 1=Torbiere d'Iseo, 2=Pian di Gembro, 3=Biotopo Wiesermoos, 4=Torbiere alta Val Rendena, 5=Lago e Palude di Massaciuccoli, 6=Torbiere di Danta di Cadore.

Mires and Peat

Find the journal online at http://mires-and-peat.net/.

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

- Holocene fire history: can evidence of peat burning be found in the palaeo-archive? (S.L. New, C.M. Belcher, V.A. Hudspith and A.V. Gallego-Sala) Volume 18: Article 26.
- Surface peat and its dynamics following drainage - do they facilitate estimation of carbon losses with the C/ash method? (R. Laiho and M. Pearson) Volume 17: Article 08.

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 'Mires of the Northern Part of European Russia' (22 July – 4 August 2017)

Tatiana Minajewa (tania.minajewa@gmail.com)

Don't forget registering preliminarily with Tatiana in case you consider participating!

News from the regions

Global

World Wetlands Day

On 2 February 2017 the World Wetlands Day will focus on Wetlands for Disaster Risk Reduction to raise awareness and to highlight the vital roles of healthy wetlands in reducing the impacts of extreme events such as floods, droughts and cyclones on communities, and in helping to build resilience.

Global Symposium on Soil Organic Carbon, 21 - 23 March 2017 in Rome.

In the presence of climate change and biodiversity loss, soils have become one of the most vulnerable resources in the world. Soils host the largest terrestrial carbon pool and play a crucial role in the global carbon balance. Soil organic carbon (SOC) stocks amount to an estimated 1,500 ±230 GtC in the first meter of soil, and until now soils have been a global net source of GHGs. These losses are strongly affected by land use, land use change, vegetation cover and soil management. SOC stocks in the upper soil layers (first 40 cm) are especially sensitive and responsive to such changes in land use and management, which provides an opportunity to influence the amount of CO_2 in the atmosphere. This can be achieved by maintaining existing soil carbon stocks (of particular importance in soils with high SOC content), or by soil carbon sequestration.

During the 5th Working Session of the Intergovernmental Technical Panel on Soils (ITPS) of the Global Soil Partnership (GSP), ITPS and the Acting Secretary of the IPCC agreed that it would be desirable to incorporate the topic of SOC in the IPCC Assessment Report (ARs), from AR6 onwards. As a result, the ITPS and IPCC, supported by FAO, are jointly organizing the Global Symposium on Soil Organic Carbon (GSOC17) to discuss and elaborate the latest information on the role of soil and SOC in the climate change agenda. The UNCCD and its Science-Policy Interface (SPI) and the World Meteorological Organization (WMO) agreed to co-sponsor GSOC17 in light of the important contribution that maintaining and enhancing SOC can make to meeting the objectives of land degradation neutrality, reducing GHG emissions, and enhancing climate change adaptation.

The Symposium will be a scientific meeting, held over three days at FAO Headquarters in Rome, Italy from 21-23 March 2017 with 300-500 participants representing all regions of the world. The three main themes will be:

1. Measuring, mapping, monitoring and reporting Soil Organic Carbon (SOC)
2. Maintaining and/or increasing SOC stocks (fostering SOC sequestration) for climate change mitigation and adaptation, and Land Degradation Neutrality
3. Special focus: Managing SOC in soils with high SOC: peatlands, permafrost, and black soils (Mollisols, Chernozems/ Kastanozems/ Phaeozems)

Online registration under http://www.fao.org/about/meetings/soil-organic-carbon-symposium/en/

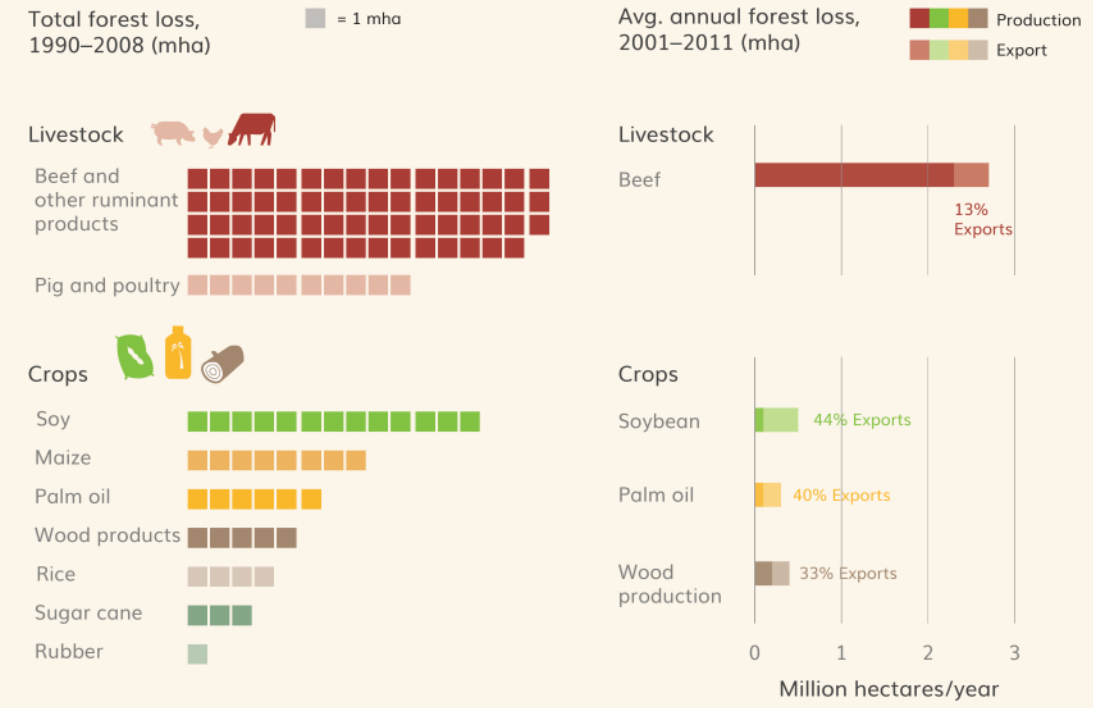
UN Biodiversity Conference (COP13) in Cancún, Mexico, 2 - 17 December 2016

The UN Biodiversity Conference (COP13) in Cancún, 2 - 17 December 2016 resulted in significant commitments for action on biodiversity, with special focus on actions to integrate biodiversity in forestry, fisheries, agriculture, and tourism sectors and to achieve the 2030 Agenda on Sustainable Development. Governments of 167 countries agreed on actions that will accelerate implementation of global biodiversity targets, and enhance the linkage of the biodiversity agenda with other global agendas - including the Sustainable Development Goals, the Paris Climate Agreement and others. Decisions of the COP can be found under: https://www.cbd.int/decisions/cop/?m=cop-13. Reference to peatlands in Decision XIII/4: Biodiversity and climate change: https://www.cbd.int/doc/decisions/cop-13/cop-13-dec-04-en.pdf

Coastal wetland/peatland in Cancun, Mexico. Photo: Hans Joosten

Report identifies drivers of deforestation, NGO apologizes for wrong focus, oil palm lobby take pleasure

A new report of Climate Focus (2016) 'Progress on the New York Declaration on Forests: Eliminating Deforestation from the Production of Agricultural Commodities' (http://www.climatefocus.com/sites/default/files/2016-NYDF-Goal-2-Assessment-Report.pdf) concludes that agriculture is the biggest driver of global forest loss. The report focuses on four key commodities: palm oil, soy, cattle, and wood products. Large shares of production and trade of these commodities can be traced to a handful of countries—Indonesia, Brazil, Malaysia, and Paraguay in particular—where the majority of tropical deforestation is concentrated. Targeted action in these countries is particularly important to reduce agro-commodity-driven deforestation. A summary of the results is presented in the following figure.



Source: (left) Climate Focus calculations based on European Commission, 2013; (right) Henders et al., 2015

Figure 1. Figure illustrates two data sources, one for total forest loss between 1990 and 2008 and another for average annual forest loss in 2001-11. [8; 4]

The data are clear: by far the biggest driver of deforestation is beef. Soy is second, but far behind in terms of importance. Palm oil and wood products are even smaller drivers, causing only about a tenth as much deforestation as beef. Many international corporations have meanwhile committed to eliminate deforestation from their practice. The pledges do, however, not reflect the relative importance of these four drivers, but rather the opposite: The more important a commodity is, the less likely that a company has pledged to eliminate the deforestation that it's causing. Here are the percentages of active companies that have made pledges according to each of these four drivers:

Palm Oil – 59%
Wood Products – 53%
Soy – 21%
Beef – 12%

In reaction, Doug Boucher, scientific adviser Climate and Energy of the USA based Union of Concerned Scientists has more or less apologized for the NGO community ("and that definitely includes me") having had their priorities wrong by focusing deforestation action on palm oil and wood (http://blog.ucsusa.org/doug-boucher/ending-tropical-deforestation-have-we-got-our-priorities-backwards). Companies in these branches have committed most to "no deforestation", mainly because NGOs have pushed hardest on those commodities. The palm oil lobby has eagerly reacted on this "apology" (http://theoilpalm.org/apology-oil-palm-growers-need-hear/) and has keenly remarked that this "wrong" focus has been driven by grants: "The Climate and Land Use Alliance, a coalition of US-based foundations, has funded a wealth of activity aimed at palm oil. … [T]hey have spent more than USD 13 million campaigning on palm oil across 38 funded projects – including USD 3 million for Greenpeace. Compare this with their spending in the same list on soybean: five projects, totalling USD 2.5 million. And compare this with spending on beef and cattle: USD 759,000. … It's no wonder the campaigning against palm oil and the subsequent commitments have been skewed: there was simply more money thrown at it."

Boucher justifies the focus "Sure, we had good strategic reasons to focus on palm oil. Some of these were based on data—palm oil was growing rapidly in terms of global consumption, and was linked to the tropical

peat clearance that releases large amounts of global warming pollution. Other reasons were more emotional—we could see that orangutans, which are threatened by the expansion of oil palm plantations, are incredibly cute and charismatic. But the end result was that we concentrated on getting corporate zero-deforestation commitments relating to crops that weren't the main causes of deforestation."

But Boucher et al. have not been wrong as far as peatlands are concerned. Beef and soy may indeed be responsible for most global deforestation; however, for tropical peatlands oil palm and pulp wood remain the most important drivers for degradation.

Young oil palm on peatland in Sabah (Malaysia). Photo: Hans Joosten.

Africa

Democratic Republic of Congo/ Republic of Congo

World's largest tropical peatland complex mapped in Congo basin

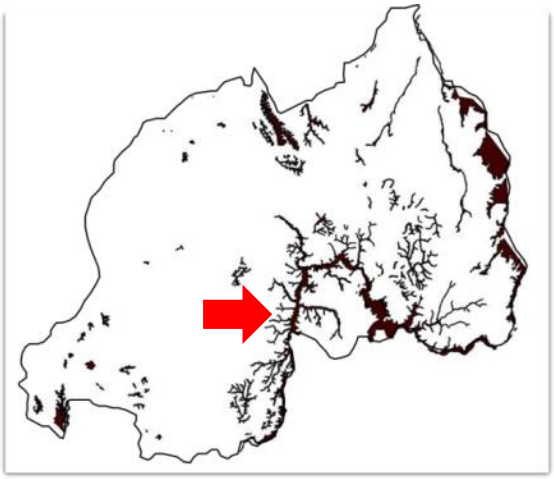
A UK-Congolese research team, co-led by Prof Simon Lewis and Dr Greta Dargie, from the University of Leeds and University College London have mapped the Cuvette Centrale peatlands in the central Congo basin and found they cover 145,500 km^2 – an area larger than England. The swamps could lock in 30 gigatonnes of carbon, i.e. the equivalent of three year's worth of the world's total fossil fuel emissions, making the region one of the most carbon-rich ecosystems on Earth (http://www.nature.com/nature/journal/vaop/ncurrent/abs/nature21048.html). Lewis said: "The peat covers only 4% of the whole Congo basin, but stores the same amount of carbon below ground as that stored above ground in the trees covering the other 96%. Peatlands are only a resource in the fight against climate change when are left intact, and so maintaining large stores of carbon in undisturbed peatlands should be a priority." Because of their remote location, the peatlands in the Congo basin are relatively undisturbed, but they are also not yet protected and could face threats from drainage for agricultural plantations, particularly for palm oil, as is happening in Indonesia. The study places the Democratic Republic of Congo (DRC) and the Republic of Congo (RoC) as the second and third most important countries in the world for tropical peat carbon stocks. In first place is Indonesia with its peatlands on Borneo, Sumatra and New Guinea. However, Indonesia has suffered damage or loss to about 94,000 km^2 of peatland over recent decades, due to drainage and deforestation. The study's co-author Dr Ifo Suspense, from the Université Marien Ngouabi in the RoC capital Brazzaville, said: "The discovery of the Cuvette Centrale peatlands could have a large impact

on the climate and conservation policies of the Congo. The maintenance and protection of this peatland complex, alongside protecting our forests, could be central Africa's great contribution to the global climate change problem". Dr Emma Stokes, director of the central Africa program of the Wildlife Conservation Society said: "This research highlights the immense significance of these swamp forests for the stability of our climate. However, these forests, in the geographical heart of Africa, are also a vital refuge for many thousands of great apes, elephants and other large forest mammals that are threatened by developments in the surrounding landscape. The RoC government is considering the expansion of Lac Télé community reserve, a move that could safeguard an additional 50,000 km^2 of swamp forest – much of it overlying peat – from future disturbance. We strongly support this move and commend the RoC government for this initiative. We urge both countries to continue efforts to protect these habitats from industrial transformation."
https://www.theguardian.com/environment/2017/jan/11/worlds-largest-peatland-vast-carbon-storage-capacity-found-congo

Interfluvial domed peat swamp forest (showing different zones) in the Cuvette Centrale between the Likouala aux Herbes (left) and the Ubangui River (right). The interfluve (space between the rivers) is 30 km wide. (© 2012 DigitalGlobe). From Joosten et al. 2012: http://www.fao.org/3/a-an762e.pdf

Rwanda government signs deal on peat-to-power project

On November 23, Rwanda signed a 350-million-U.S.-dollar contract with local and international financial institutions to fund construction of its peat-to-power project as part of its drive to increase energy access. The deal, which is expected to add 80 megawatts (MW) to the national grid, will help address the country's constant power shortages, according to the ministry of infrastructure. The power plant will be the second in the country when it starts production by the target date of 2019. The first peat plant is expected to be completed this year with 15-MW capacity. Yumn Ltd, a Turkey-based investment company, signed an agreement to construct the peat fired energy plant in Akanyaru peatland, Gisagara district, Eastern Province. According to the power purchase agreement, the Turkish firm will operate the plant for 26 years upon completion, and then transfer it to the government of Rwanda. A consortium of financial companies that will inject funds towards the construction include Preferential Trade Association-PTA bank, Africa Finance Corporation, Finnfund-Finland's development finance company, Development Bank of Rwanda, African Export-Import Bank (Afreximbank) and Export-Import Bank of India (EXIM Bank).



Peatlands in Rwanda (Global Peatland Database)
Red arrow: Akanyaru peatland

Speaking to reporters after the signing of the agreement, James Musoni, Rwanda minister of infrastructure, said that the power plant will boost energy access across the country and facilitate enhancement of power generation for industrial development.

"The peat project comes as another commendable step towards achieving our economic goals as replicated in our development strategies. Our country has made a commitment to this investment plan because we recognize that energy is the engine of our growth," he added.

Rwanda has set an ambitious target to increase installed electricity generation capacity to 563 MW within the next two years, which requires investments of 3 billion dollars in the energy sector. Currently, the country's energy production capacity is about 161 MW, up from 50 MW seen in 2008. In May 2016, Rwanda unveiled a mega methane gas power plant—the Kivu-Watt Gas Power project, which is expected to produce 100 MW of electricity from Lake Kivu, the world's only methane-rich water body. The country is also set to import 30 MW from Kenya on a five-year arrangement and to import 400 MW of power from Ethiopia by 2018.

In February 2015, the small central African nation unveiled 23.7 million dollars solar power plant, the first of its kind in the region and the third in Africa after those in South Africa and Mauritius. The utility power located in Rwamagana district, eastern province, which was developed by the Netherlands-based company Gigawatt Global, adds 8.5 MW to the national grid.

- http://www.thecitizen.co.tz/News/africa/Rwanda-signs-deal-on-peat-to-power-project/3302426-3463426-15pfp2yz/index.html
- http://www.newtimes.co.rw/section/article/2016-11-25/205663/

Asia

Indonesia

See for a recent analysis of Indonesia's peatland policies: http://www.economist.com/news/asia/21710844-weather-helping-little-despite-tough-talk-indonesias-government-struggling-stem

Indonesia strengthens peatlands moratorium

On Dec. 5, 2016, President Joko Widodo has announced a moratorium on all activities that could damage the nation's peatlands. The decision will prohibit the draining and clearing of not only new peatland, but also concession land previously licensed to plantation companies. The ban, which expands on an older moratorium, takes effect immediately. The action represents "the kind of leadership that the world needs right now," Erik Solheim, executive director of the United Nations Environment Program, said in a statement. The regulation formalizes into law President Joko Widodo's November 2015 peatland moratorium. The revised regulation announced includes:

- A moratorium on any new land clearing in peatlands.
- The establishment of protection and utilization zones in peatland ecosystem areas for the planting of certain peat-friendly plants (paludiculture).
- A prohibition on the building of any new canals.
- Making it illegal to burn peatlands.
- A scientifically rigorous approach to water level compliance to define peatland ecosystem damage.

Minister Siti Nurbaya said: "Since early November last year, based on my circular letter, Joko Widodo's administration has requested that all pulpwood and plantation companies refrain from carrying out new land clearing in peatlands. Now this prohibition has been enshrined in a level government regulation." She

explained that the revised government regulation is ultimately aiming at a permanent moratorium on the exploitation of peatlands, except in designated utilization zones with peatland plants, instead of plants that require drainage.

However, the regulation is not as good as it seems. The regulation only concerns the peak of the domes, i.e. areas where the peat is deeper than 3 meters, and fails to recognize that the dome centre can hydrologically only be maintained when also the margins of the dome remain undrained. Draining the margins lowers the water table across the entire landscape, resulting in the inevitable collapse of peat domes (with the associated subsidence and carbon loss) over the longer term. Marcel Silvius, program head of climate-smart land use at Wetlands International, said the goal of conserving 30 percent of peat and leaving 70 percent open to drainage was "like allowing smoking in the left side of a plane and forbidding it on the right side. Indonesia will have to come to grips with the fact that the current predominant land-use types on peat, which all use drainage, cannot be continued and need to be phased out. The government needs to commit to end further drainage-based development and to identify priority peatlands for protection and restoration, including phase-out or retirement of existing plantations in these areas," said Silvius.

Also the peatland ecosystem damage criterion in utilization zones, which stipulates that the groundwater level should not be deeper than 0.4 meters below the peat surface, is not a sustainable solution. With a water table 0.4 m below surface, Indonesian peatlands still emit 40 tonnes of CO_2 per ha per yr and subside 3-4 cm annually (Couwenberg et al. 2010). When you are heading for the abyss (i.e. the loss of millions of hectares of productive land and continuing giant emissions), it is not sufficient to reduce your speed: you have to stop and turn around!

- https://www.washingtonpost.com/news/energy-environment/wp/2016/12/06/indonesia-just-made-a-huge-move-to-protect-the-climate/?utm_term=.82a7f5bbe0b9#comments
- http://www.unep.org/NewsCentre/default.aspx?DocumentID=27090&ArticleID=36323
- http://m.foresthints.news/minister-highlights-key-points-of-revised-peat-regulation
- http://www.wri.org/news/2016/12/statement-indonesia-expands-protection-carbon-rich-peatlands-update-government
- https://chainreactionresearch.com/2016/12/07/the-chain-indonesia-strengthens-peatlands-moratorium-ing-places-e80-million-in-debt-for-socfins-palm-oil-and-rubber-expansion/
- http://e360.yale.edu/digest/indonesia_bans_burning_peatland_co2_emissions/4857/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+YaleEnvironment360+(Yale+Environment+360)
- https://news.mongabay.com/2016/12/green-groups-raise-red-flags-over-jokowis-widely-acclaimed-haze-law/
- http://news.trust.org/item/20161206152404-pw7ut
- http://www.thejakartapost.com/news/2016/12/09/total-ban-issued-peatland-clearance.html
- http://www.straitstimes.com/asia/indonesia-expands-protection-for-peatland

WWF and Greenpeace break with pulp giant April after peatland drainage on Pedang Island

The construction of a 3 km canal has led Greenpeace and WWF to suspend its partnership with one of Indonesia's biggest pulp and paper companies. Riau Andalan Pulp and Paper (RAPP), a subsidiary of Asia Pacific Resources International Limited (APRIL), dug the canal through thick peat forest on the island of Pedang, just off the east coast of Sumatra. In doing so, APRIL not only broke its own sustainability standards but went against government regulations and a letter of instruction issued by the Ministry of Environment and Forestry last year asking companies to block existing canals. APRIL insists the construction of the canal was due to a misunderstanding of government regulations. Tony Wehas, the president and director of RAPP, said the new canal was built as a fire break and not for drying out the peatland. In response to the construction of the canal and deforestation in the region, the government gave APRIL a verbal censure but has not taken any further action. The incident – and rising mistrust – has led Greenpeace and WWF to suspend their work on APRIL's Stakeholder Advisory Committee. Both groups say they can no longer work with a company they feel is not being forthright. Greenpeace has been concerned for some time about APRIL's limited follow up on key parts of its sustainability policy. After years of targeted campaigns, the company had strengthened its sustainability policy enough to bring on board longstanding critics Greenpeace and WWF. The new policy included no new clearing of forests on peatlands and an investment of $100m over 10 years for peatland restoration and conversation. But, within months, the company fell foul of environmental groups after it was caught clearing the forest on Pedang, the same concession where it would be caught with a giant canal several months later.

- https://www.theguardian.com/sustainable-business/2016/dec/16/wwf-greenpeace-april-indonesia-peat-forest-canal-pulp-paper-industry
- http://www.thejakartapost.com/news/2016/12/14/green-groups-cut-ties-with-april.html

Burned and flooded peatland in Kalimantan, Indonesia. Photo: Hans Joosten.

Europe

Improving water quality in the Neman catchment area

Wendelin Wichtmann (wendelin.wichtmann@succow-stiftung.de)

On 12-14 December the Michael Succow foundation and the Clean Baltic Network organized a workshop 'Improving water quality in the Neman catchment area through rewetting, wise wetland and river basin management' aimed at networking and first preparation of activities for the improvement of the Neman river water quality by implementing peatland rewetting and paludiculture as well as constructed wetlands within the whole Neman river catchment area. The Neman catchment comprises areas in Belarus, Lithuania and Kaliningrad Oblast, but also some small areas in northeastern Poland. About 60 participants from these four countries, and also from Sweden, Denmark, Germany and Netherlands attended, representing NGO´s, municipalities, responsible governments, and science. The situation of the Neman river basin was analysed and first project ideas were developed. Also options to integrate peatland rewetting and water management in the river basin in new concepts for transboundary protected areas (Biosphere Reserves) were discussed. The workshop was followed by an excursion into the southern delta of the Neman river, about 120 km northeast of Kaliningrad, with its large floodplains and degraded peatland areas. We visited the 'Haus im Moosbruch' run by the NGO antropos, a decrepit pumping station, and had a walk in the near-natural bog 'Großes Moosbruch/Bolschoje Mochowoje Boloto'.

Austria

Peatlands and paludiculture in Austria

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

In October 2016, the University of Vienna started the first project examining the potential for establishing paludiculture in Austria. The aim is to conduct an analysis of potential pilot areas, to work out site-specific paludiculture options with the affected stakeholders and to recognise traditional land-use that qualifies as paludiculture. Austria has more than 1,550 mires and peatlands – with varying (protection) status. While some mires are declared as natural park, landscape conservation area or Natura2000 habitat (EU nature protection

areas) and are in a quite undisturbed status, most peatlands are degraded due to intensive agricultural or forestry use for decades or even centuries. Underlying that with numbers: On the one hand, 15 % (12,556 km²) of Austria's land area is protected as Natura2000, but on the other hand, at least 63 % of the peatland area (with a minimum peat depth of 30 cm) is degraded, above all due to agricultural use.
In order to minimise that number and area of degraded peatlands, we want to establish wet land use options and try to regain their original functions as much as possible. A wet peatland can store carbon and serve as an agricultural or forestry site at the same time – which is only little explored in Austria so far. We chose five regions where we want to analyse the potential of paludiculture. These regions include two rather positive ideals, litter meadows in the eastern and western parts of Austria as well as severely drained peatlands, even in nature conservation areas. These areas are either intensively cultivated as grassland or forested, surrounded by drainage systems, or peat is still being extracted, although small-area. First contacts with regional stakeholders seem quite promising, after Christmas we will have continuative meetings – likely that we soon can tell more.

Austria's last peat extraction site in Admont, Steiermark. Photo: Jasmin Karer.

Belarus

Fen restoration project in Biełaviežskaja Pušča

On the border of Poland and Belarus lies the impressive Białowieża Forest, one of Europe's last primeval forests and one of the few remnants of the vast woods that once covered most of the continent. This exceptional habitat is a Natura 2000 site, an Important Bird and Biodiversity Area (IBA) and a UNESCO World Heritage Site, inhabited by a total of 250 bird species including Great Snipe *Gallinago media*, Greater Spotted Eagle *Clanga clanga* and the Aquatic Warbler *Acrocephalus paludicola*.
Sixty years ago, a large open fen covering an area of over 7000 ha at the eastern edge of Białowieża Forest (known as *Biełaviežskaja Pušča* in Belarusian) was drained as a result of a large scale wetland reclamation campaign in the Soviet Union. A new conservation project started early December to seek to restore an area of 1163 hectares of National Park. One of the largest fen rehabilitation projects in Europe, the project aims to construct 112 natural dams by the end of December.

While the peatland restoration project is taking part in the central part of the Białowieża Forest, its positive impact will even cross borders. The so-called Dziki Nikar mire is the source of the Narevka River, one of the main water arteries feeding the Polish part of Białowieża Forest. The dams will make the water level rise to the surface for the benefit of wildlife in both countries.

Over the last decade, up to 50,000 hectares of degraded peatlands have been rewetted in Belarus. Most of them are depleted through peat extraction, which makes restoration of the original mire a complicated and lengthy process. But this project is unique: after Dziki Nikar was drained for agriculture it was used for a relatively short time, thereby enhancing prospects for successful restoration of the original vegetation.

“Water is a key element for all ecosystems of Belarus. Most of our rare species are associated with water and have become rare due to water shortages. If we restore the peatland, we will bring back these species. We will wait for the return of the Great Snipe, Greater Spotted Eagle and the Aquatic Warbler”, said Alexander Vintchevski, Director of APB BirdLife Belarus.

- http://www.birdlife.org/europe-and-central-asia/news/belarus-restore-over-1000-hectares-peatland
- http://www.surfbirds.com/community-blogs/blog/2016/12/10/belarus-to-restore-over-1000-hectares-of-peatland/

France

Metal palisades to rehabilitate peatlands

Geneviève Magnon (g.magnon@smmahd.fr)
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Thanks to the European programme "Life tourbières du Jura", around sixty sites in the Jura massif will undergo functional rehabilitation actions by 2020. Among the measures implemented, the neutralisation of drains and the re-watering of peat extraction’s pits involve techniques that have been experimented for several years by local managers: creation of peat mounds, wood panels or wood timbers dams, total filling of drains with peat and/or sawdust. The large number of sites studied during preliminary studies (geomorphology, hydrology, topography, etc.) highlights a multitude of particular cases. They require managers supported by experts, to adapt to these local contexts and develop new techniques to enable optimal ecosystem rehabilitation. Thus, metal dams have recently completed the variety of materials used.

In order to ensure the sealing of the dams, their anchoring must take place in the underlying mineral substrate (clay, marl, moraine). The dams must not disrupt too much this sealing layer, in order not to pierce it and generate underlying leaks. When this layer is very thin, the use of steel planks allows the work to be carried out more precisely than with wood planks. Steel planks also have the advantage of "slicing" the layers of peat and of not becoming distorted in front of coarse components (wood), guaranteeing the waterproofness of the dam and reducing the risk of disturbance in the anchoring substrate. The installation of metal dams may also be preferred on sectors where the height of water retained and thus the hydraulic head must be heavy[2]. They offer the possibility of a better anchoring in the mineral substrate and a better cohesion between planks. As for wooden palisades, these dams are then covered with peat to prevent the metal from being in direct contact with air and water, to improve its sealing by the fine particles of the peat and to facilitate plants colonization of the work, thus optimizing their landscape integration.

However, several points should be taken into account when using this technique. Although the amount of time required to set up metal dams is less than the time required for wooden dams (sinking into peat is easier), the weight of the steel planks makes it more difficult to bring them on site. The potential damages linked to the introduction of an unnatural material into the peat must also be taken into consideration. In conclusion, the choice of metal dams for the functional rehabilitation of peatlands is therefore appropriate in specific cases where the use of other techniques would present risks regarding the efficiency of the palisades and therefore of the works.

- Peatland of the “Creux au Lard” in Frasne (Doubs county, France): construction of a 90 m metal dam aiming to neutralize the topographic subsidence of the peat due to drainage. Commissioned by: SMMAHD ; Preliminary studies: Lin'Eco and Scop Sagne. Works in images: http://www.life-tourbieres-jura.fr/images-travaux-page.html
- Peatland of Douillons in Nanchez (Jura county, France): construction of 3 metal dams (60 linear m in total) to re-watering peat extraction’s pits. Commissioned by: Pnr du Haut-Jura; Preliminary studies: Lin'Eco. Works in images: http://www.life-tourbieres-jura.fr/images-travaux-page.html

Palissade dam in the Tourbière des Douillons, Chaux-des-Prés (Jura). Photo: Pierre Durlet.

A new programme for the peatlands of Massif Central

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Massif Central is the name of the highlands in the centre of France (85,000 km^2, maximal altitude 1885m a.s.l.) where mires are rather common, some of them having developed in the crater of former volcanoes, the last of which were in eruption about 7000 years before present.

Pôle-relais tourbières (PRT), the French mire resource centre, was solicited to manage the coordination of several actions led by different NGOs, Conservancies and Regional Natural Parks of this area. The project it submitted was recently accepted by the European Regional Development Fund (ERDF) und as well as by the Water agencies (Agences de l'eau) of the three major catchments of the Massif. Its actions will begin 2017and intend to help the local bodies in their field management and restoration programmes for mires. They focus on the usefulness, for these bodies, to work together, exchange and communicate about their practices.

2017 World Wetlands Day and Ramsar Convention in France

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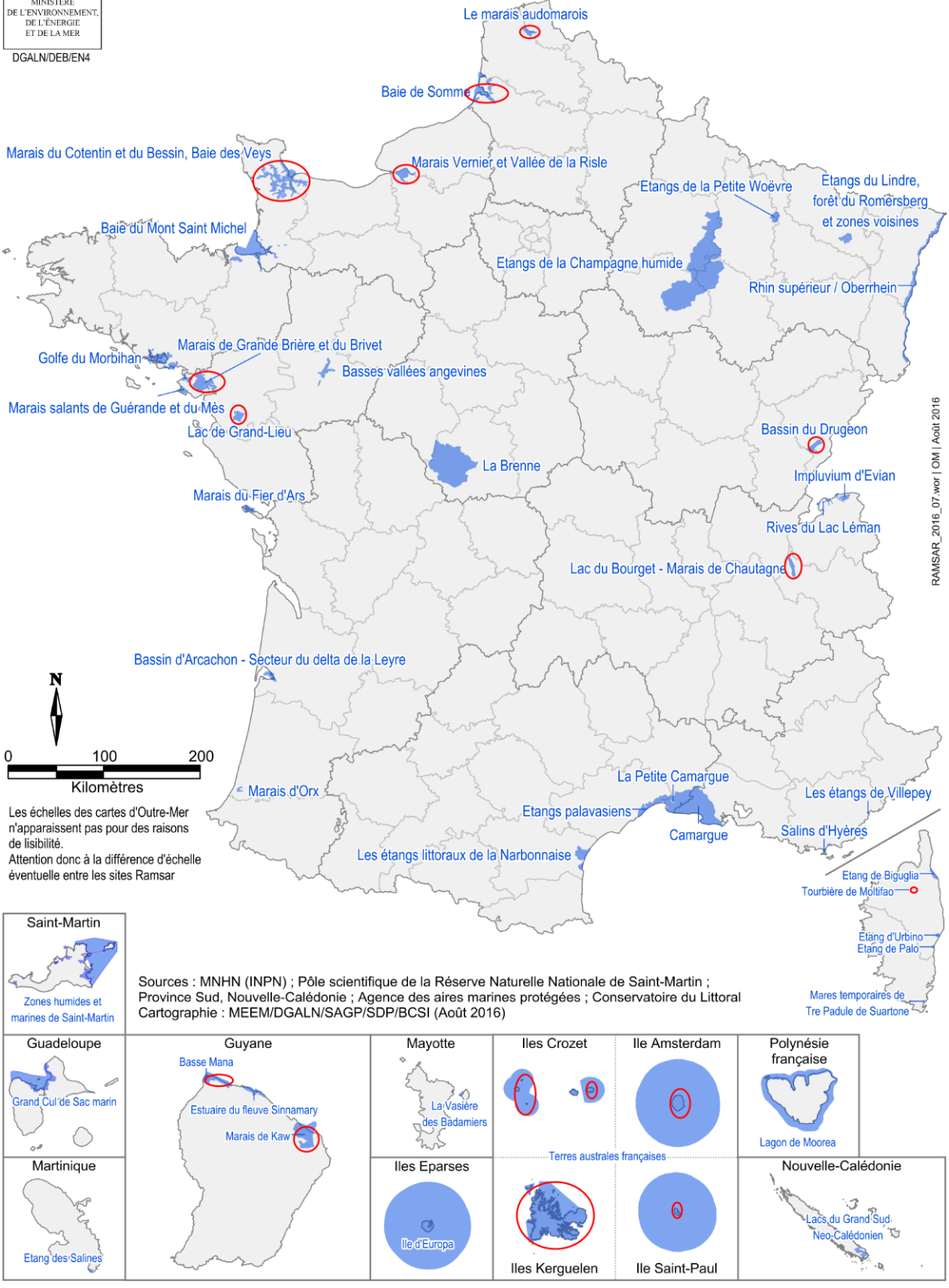
Last year, World Wetlands Day was a great success in France with 626 events organized all around the country. February 2017 may see at least as many events, a part of them concerning peatlands, and a special attention is given this year to the co-operation with the French-speaking countries of the Organisation Internationale de la Francophonie. We hope we can boost relations between countries and people from the Northern as well as from the Southern hemisphere, giving them some tools and trying to promote partnerships between sites. The five Wetlands Resource Centres of our country, including the one for mires, Pôle-relais tourbières, will contribute to this action.

The "Ramsar France" association will hold its yearly meeting in the Drugeon valley, a peatland site of the Jura plateau, in October 2017: an occasion to see how we can reinforce and extend the network of mires that have been declared as Ramsar sites in France. Several projects exist, in Massif Central and elsewhere. 44 Ramsar sites (bleu) now exist in France, at least 12 including mires (encircled, see map on next page).

Les zones humides d'importance internationale en France désignées au titre de la Convention de Ramsar



Europarc meeting in Switzerland

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Pôle-relais tourbières was invited to organize a workshop about the restoration of mires and other wetlands during the annual meeting of Europarc in Le Sentier, Vaud, Switzerland, where National and Regional Parks from all the continent gathered last October. The examples of Jura and Massif Central were presented (see above) for France, and the project of a national strategy for Austrian mires was developed by Stephan Glatzel (University of Vienna). This was a good introduction for debates between the 15 participants of this workshop, coming from 10 countries, concerning the differences and similarities in our approaches in management, restoration or public awareness. Mires were the type of wetlands that was the most evocative during our discussions!

The participants to the Wetland management workshop in Le Sentier, Switzerland. Photo: Francis Muller.

Germany

Testing UAV application for paludiculture and peatland science

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The Peene River Valley is one of Germany's largest fen areas and the cradle of aviation, as Otto & Gustav Lilienthal (Anklam 1848/49) started their attempts and experiments to fly, as well as the study of bird flight at the border of that peatland. That peatlands and aviation are a winning combination, is also illustrated by unmanned aerial vehicles (UAVs). UAV based mapping may provide new perspectives for peatland research and paludiculture.

UAVs allow to create ultra-high resolution ortho-photos (visible spectrum and near infrared (NIR)) and ultra-high resolution digital elevation models (DEMs) through aerial triangulation/structure for motion. They can also be used for mapping with light thermal, radar and LIDAR sensors (Whitehead & Hugenholtz 2015). The usefulness of aerial images with UAVs has been demonstrated (e.g. Knoth 2013, Hodgson et al. 2016, Cruzan et al. 2016, Simpson et al. 2016). Problems and challenges concerning UAV based imagery are numerous and reviewed by Whitehead & Hugenholtz (2015) and Whitehead et al. (2015).

Aerial images collected by UAVs have many interesting fields of application. The mere availability of an up-to-date high resolution picture adds a new perspective when single point data are upscaled to areas by simple image interpretation. Remote sensing methods such as object based classification can lead to robust image interpretation.

Possible applications in peatland research are: analysing vegetation structure and cover, vegetation classification, analysing fine scale patterns, wild life monitoring, … With respect to paludiculture, UAVs assist in

the monitoring of vegetation health (e.g. in Sphagnum farming, s. Fig.) and vegetation productivity, in the development of high resolution digital elevation models for water management, in vegetation classification for fuel management or biomass quality, in assessing biomass productivity, in measuring the harvestable and harvested area, in pre harvest reconnaissance of harmful objects and obstacles, etc.

The use of UAVs as well as almost any other data collection activity has an impact on wildlife but in case of UAVs it can be relatively low when adequately applied (Hodgson & Koh 2016, Vas et al. 2015).

Modern microelectronics and open source hardware and software allow building UAVs that perform a fully autonomous mapping mission from take-off to landing for less than 400 €. Thus UAV image acquisition is possible with very low effort. Comparable cheap multispectral sensors, cheap high precision L1 RTK GPS systems and free or at a discount available structure for motion software offer new opportunities and low investment costs.

However, in many countries there are legal restrictions. In Germany an insurance (300 €/yr) and a special licence (100€/yr) are necessary, but for scientific applications, a take-off weight under 5 kg and a flight height below 100m above ground level, the license can easily be obtained. But times are strange and even though excessive regulations are already in place and problems are mainly caused by people anyhow ignoring these regulations, even stricter regulations may apply in the near future. In the US very restrictive regulations are already in place. Therefore, other technologies such as kite aerial photography or pole photography may in particular cases be more suitable. They are, however, less comfortable to handle than UAVs with automated mission execution. Methods to process aerial images to derive DEMs have been successful applied to ground captured images (Mercer & Westbrook 2016).

UAVs exist in various types: fixed wing aircrafts offer longer range operation, whereas rotary-wing aircrafts like multi-copters need less space for take-off and landing and are easier to deploy. Combinations of both, vertical take-off and landing (VTOLs), called quadplanes combine these advantages.

In 2016 DUENE e.V., a partner in the Greifswald Mire Centre, has started to explore the possibilities of UAV based mapping. The table below shortly characterizes the UAVs tested until now, whereas on the next page some examples of images taken with the 2nd UAV are depicted.

	1ST UAV	2ND UAV	3RD UAV
	cheap consumer UAV	custom build UAV	custom build UAV
PLATTFORM	quadcopter	quadcopter	hexacopter
SENSOR	point and shoot camera	point and shoot camera, DIY NIR conversion	APS-C camera NIR conversion
CAMERA STABILISATION	None	2D gimbal	3D gimbal
GEO TAGGING	flight track and interval	flight track and interval	RTK GPS (sub decimetre precise geo tagging)
FLIGHT TIME	12 min	30 min	> 30 min
INVESTMENT COSTS	250 €	400 €	2.500 - 4.000 €

References

Cruzan et al. (2016): Small unmanned aerial vehicles (micro-UAVs, drones) in plant ecology. Applications in Plant Sciences

Hodgson et al. (2016): Precision wildlife monitoring using unmanned aerial vehicles. Scientific Reports

Hodgson & Koh (2016) Best practice for minimising unmanned aerial vehicle disturbance to wildlife in biological field research. Current Biology

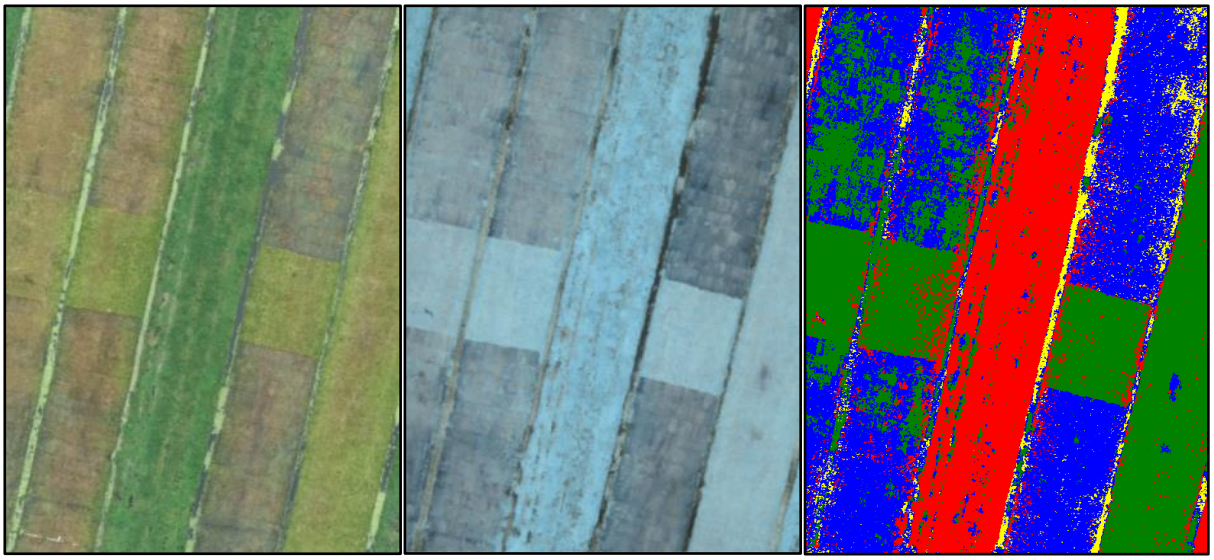
Knoth et al. (2013) Unmanned aerial vehicles as innovative remote sensing platforms for high-resolution infrared imagery to support restoration monitoring in cut-over bogs. Applied Vegetation Science.

Mercer & Westbrook (2016) Ultrahigh resolution mapping of peatland microform using ground-based structure from motion with multi-view stereo. American Geophysical Union.

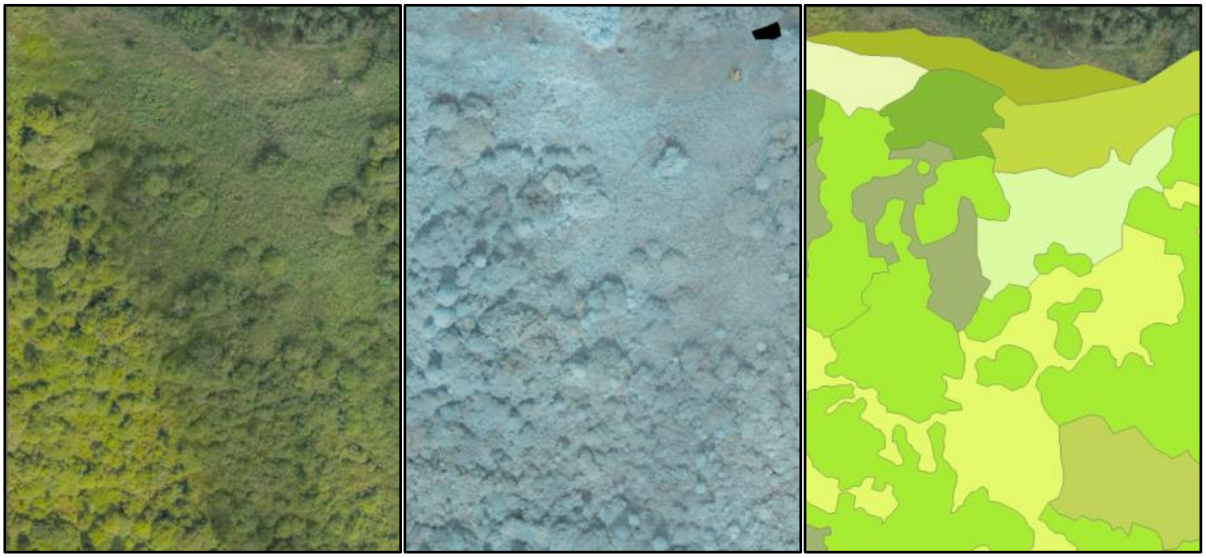
Simpson et al. (2016) Tropical peatland burn depth and combustion heterogeneity assessed using UAV photogrammetry and airborne LiDAR. Remote Sensing.

Vas et al. (2015): Approaching birds with drones: first experiments and ethical guidelines. Biology Letters

Left: first flight of our custom build mapping hexacopter, right: Cinderella project site in Kamp, Mecklenburg-Vorpommern after Typha harvesting



Sphagnum farming site in Hankhausen, harvested and non harvested parts. RGB- and IR-image acquired with a point and shoot (IR with replaced hot mirror filter, blue channel = ir) and rough classification with ENVI (right).



Part of an overgrown peatland next to Warin, Mecklenburg-Vorpommern. RBG- and IR picture and vegetation classification based on image interpretation and ground based mapping (Barnik 2016 unpublished).

United Kingdom

A Secure Peatland Future: A vision and strategy for the protection, restoration and sustainable management of UK peatlands

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Across the UK peatland community, there is a broad agreement that in the current political climate it is crucial to have the peatland story clearly set out in a strategic format to support developing strategy and policy, and to provide ongoing momentum, synergy and co-operation across the four UK countries. To that end, the IUCN UK Peatland Programme has been working with British Government, NGOs and academia to develop a UK Peatland Strategy. Now in draft form, this strategy has been split into two parts: a) background, which summarises the current situation, and b) the strategy, which provides a collective vision for UK peatlands, the actions required and milestones to reaching that vision. This draft document is now available for comment, and we would welcome suggestions from across the international peatland community as to structure, content and future use of this document. For more information and to read the strategy document and leave feedback, please visit the IUCN UK Peatland Programme website: www.iucn-uk-peatlandprogramme.org/uk-peatland-strategy.

Conference Peatlands for Birds

This conference is one of the Wilder Visions series of events which will be taking place over the next 2-3 years. The conference 'Peatlands for Birds: Issues & Opportunities in Re-constructing Peat Landscapes in Uplands and Lowlands' (Wednesday 6th to Friday 8th September 2017, Sheffield) will address key issues of how Britain's peatlands could or should be managed and restored so that they provide a future resilient and sustainable habitat at landscape level. This will be a major national conference with relevance to wider international issues as well that will bring together landowners, managers, practitioners and key academics to examine the ecological and conservation issues for the restoration of upland and lowland peatlands specifically, for birds. Offers of ideas for papers can be emailed to info@hallamec.plus.com by 31st March 2017. Supported by the British Ecological Society, RSPB, South Yorkshire Biodiversity Research Group, Landscape Conservation Forum, ESEH, IPS, UKECONET, BaLHRI, & Sheffield Hallam University, Thorne & Hatfield Moors Conservation Forum.

Restoring blanket bog in the Flow Counry (Scotland). Photo: Hans Joosten

Natural environment at risk unless Government creates new legislation before leaving EU

A new report *The Future of the Natural Environment after the EU Referendum*, issued on 04 Jan 2017, has highlighted that wildlife should not be negatively affected by the UK leaving the European Union. The IUCN UK Peatland Programme (IUCN UK PP) welcomes the recommendation that the Government commits to new legislation to fulfil the role currently served by European law that will no longer apply to the UK, including the Birds and Habitats Directives. These EU Directives have helped safeguard important peatlands in the UK as Natura 2000 sites since their conception. The IUCN UK PP also advocates that leaving the European Union provides the UK with an opportunity to review future land management payments. Currently payments under the EU Common Agricultural Policy (CAP) are the largest and most widely applied funding source for peatland management in the UK, but the overall funding available and limitations in the scheme have restricted uptake. A review into how future payments from the Government are paid to land managers could address the market failure to reward them for delivering healthy peatlands, which provide society with public goods. Dr Rob Stoneman, Vice Chair of the IUCN UK PP said: "With as many as 80% of our UK peatlands in some way damaged, it is crucial that we act quickly to save them. We have the skills and knowledge to restore them now before the problem is further exacerbated, helping to avoid a much greater cost to future generations in lost public benefits. In line with the Government's manifesto pledge to "be the first generation to leave the environment in a better state than it found it in", the negotiations and actions following Article 50 provide an excellent opportunity to make good on this promise."

The IUCN UK Peatland Programme presented written evidence during its inquiry into the future of the natural environment post-referendum, see www.iucn-uk-peatlandprogramme.org/briefings/eu-referendum/natural-environment.

Peatland conservation relevant papers December 2016

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

1. Vegetation, recent pollen deposition, and distribution of some non-pollen palynomorphs in a degrading ice-wedge polygon mire complex near Pokhodsk (NE Siberia), including size-frequency analyses of pollen attributable to Betula: http://www.sciencedirect.com/science/article/pii/S0034666716301749
2. Regulating effects of climate, net primary productivity, and nitrogen on carbon sequestration rates in temperate wetlands, Northeast China: http://www.sciencedirect.com/science/article/pii/S1470160X16302898
3. The Global Methane Budget 2016: http://www.globalcarbonproject.org/methanebudget/index.htm
4. Soil greenhouse gas emissions reduce the contribution of mangrove plants to the atmospheric cooling effect: http://iopscience.iop.org/article/10.1088/1748-9326/11/12/124019/pdf
5. Remote sensing of landscape change in permafrost regions: http://onlinelibrary.wiley.com/doi/10.1002/ppp.1914/abstract
6. Progress in understanding the dynamics, internal structure and palaeoenvironmental potential of ice wedges and sand wedges: http://onlinelibrary.wiley.com/doi/10.1002/ppp.1920/abstract
7. Peatland development and climate changes in the Dajiuhu basin, central China, over the last 14,100 years: http://www.sciencedirect.com/science/article/pii/S1040618216303068
8. Palsa uplift identified by stable isotope depth profiles and relation of $\delta^{15}N$ to C/N ratio: http://onlinelibrary.wiley.com/doi/10.1002/ppp.1936/abstract
9. Carbon accumulation rates recorded in the last 150 years in tropical high mountain peatlands of the Atlantic Rainforest, SE – Brazil: http://www.sciencedirect.com/science/article/pii/S0048969716325165
10. Spatial and temporal dynamics of groundwater flow across a wet meadow, polar bear pass, Bathurst island, Nunavut: http://onlinelibrary.wiley.com/doi/10.1002/ppp.1931/abstract
11. Impacts of conversion of tropical peat swamp forest to oil palm plantation on peat organic chemistry, physical properties and carbon stocks: http://www.sciencedirect.com/science/article/pii/S0016706116308187
12. Algal richness and life-history strategies are influenced by hydrology and phosphorus in two major subtropical wetlands: http://onlinelibrary.wiley.com/doi/10.1111/fwb.12866/abstract
13. Evaluation of a hierarchy of models reveals importance of substrate limitation for predicting carbon dioxide and methane exchange in restored wetlands: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003438/abstract
14. Predicting outcomes of restored Everglades high flow: a model system for scientifically managed floodplains: http://onlinelibrary.wiley.com/doi/10.1111/rec.12479/abstract

15. Convergence and impoverishment of fen communities in a eutrophicated agricultural landscape of the Czech Republic: http://onlinelibrary.wiley.com/doi/10.1111/avsc.12298/abstract
16. How does elevated ozone reduce methane emissions from peatlands?: http://www.sciencedirect.com/science/article/pii/S0048969716323762
17. Transport and transformation of soil-derived CO2, CH4 and DOC sustain CO2 supersaturation in small boreal streams: http://www.sciencedirect.com/science/article/pii/S0048969716323750
18. Unveiling exceptional Baltic bog ecohydrology, autogenic succession and climate change during the last 2000 years in CE Europe using replicate cores, multi-proxy data and functional traits of testate amoebae: http://www.sciencedirect.com/science/article/pii/S0277379116306072
19. Processus d'évaluation du cadre économique d'une tourbière dans un contexte de projets de développement: http://www.ihqeds.ulaval.ca/fileadmin/fichiers/fichiersIHQEDS/Publications/CahiersInstitutEDS/CA16-12_Tourbieres.pdf
20. The role of summer precipitation and summer temperature in establishment and growth of dwarf shrub *Betula nana* in northeast Siberian tundra: http://link.springer.com/article/10.1007/s00300-015-1847-0
21. Peatland plant communities under global change: negative feedback loops counteract shifts in species composition: http://onlinelibrary.wiley.com/doi/10.1002/ecy.1627/abstract?campaign=woletoc
22. Top-down control of methane emission and nitrogen cycling by waterfowl: http://onlinelibrary.wiley.com/doi/10.1002/ecy.1640/abstract
23. A comparative analysis reveals little evidence for niche conservatism in aquatic macrophytes among four areas on two continents: http://onlinelibrary.wiley.com/doi/10.1111/oik.03154/abstract?campaign=woletoc
24. Stability of peatland carbon to rising temperatures: http://www.nature.com/articles/ncomms13723
25. Book of Abstracts 11th International Conference on Permafrost (ICOP 2016): http://ipa.arcticportal.org/publications/conference-proceedings
26. A simple calculation algorithm to separate high-resolution CH_4 flux measurements into ebullition- and diffusion-derived components: http://www.atmos-meas-tech.net/10/109/2017/
27. Wetlands and climate change. Managing wetlands as a nature-based solution to climate change: http://us3.campaign-archive1.com/?u=ca1c49cda13b17ff4ff665dc0&id=cdb1464a32&e=90301c2d1a
28. New fossil record of *Cladium* (Cyperaceae) from the Middle Miocene of Zhenyuan, SW China, and the palaeobiogeographical history of the genus: http://www.sciencedirect.com/science/article/pii/S0034666716301099
29. A decade of boreal rich fen greenhouse gas fluxes in response to natural and experimental water table variability: http://onlinelibrary.wiley.com/doi/10.1111/gcb.13612/abstract
30. Algal richness and life-history strategies are influenced by hydrology and phosphorus in two major subtropical wetlands: http://onlinelibrary.wiley.com/doi/10.1111/fwb.12866/abstract
31. Age, extent and carbon storage of the central Congo Basin peatland complex: http://www.nature.com/nature/journal/vaop/ncurrent/abs/nature21048.html
32. Tropical peatland burn depth and combustion heterogeneity assessed using UAV photogrammetry and airborne LiDAR: http://www.mdpi.com/2072-4292/8/12/1000
33. Towards a trait-based ecology of wetland vegetation: http://onlinelibrary.wiley.com/doi/10.1111/1365-2745.12734/abstract
34. Multi-decadal changes in water table levels alter peatland carbon cycling: http://link.springer.com/article/10.1007/s10021-016-0092-x
35. Local knowledge and environmentality in legitimacy discourses on Irish peatlands regulation: http://www.sciencedirect.com/science/article/pii/S0264837716302460
36. Evaporation fractionation in a peatland drainage network affects stream water isotope composition: http://onlinelibrary.wiley.com/doi/10.1002/2016WR019258/pdf
37. Wetland invasion by *Typha × glauca* increases soil methane emissions: http://www.sciencedirect.com/science/article/pii/S0304377016302169
38. 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
39. Molecular mechanisms of water table lowering and nitrogen deposition in affecting greenhouse gas emissions from a Tibetan alpine wetland: http://onlinelibrary.wiley.com/doi/10.1111/gcb.13467/abstract
40. Growth dynamics of black spruce (*Picea mariana*) in a rapidly thawing discontinuous permafrost peatland: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003528/abstract