IMCG Bulletin: March 2017

INTERNATIONAL MIRE CONSERVATION GROUP

www.imcg.net

Word from the Secretary-General

Dear mire friends

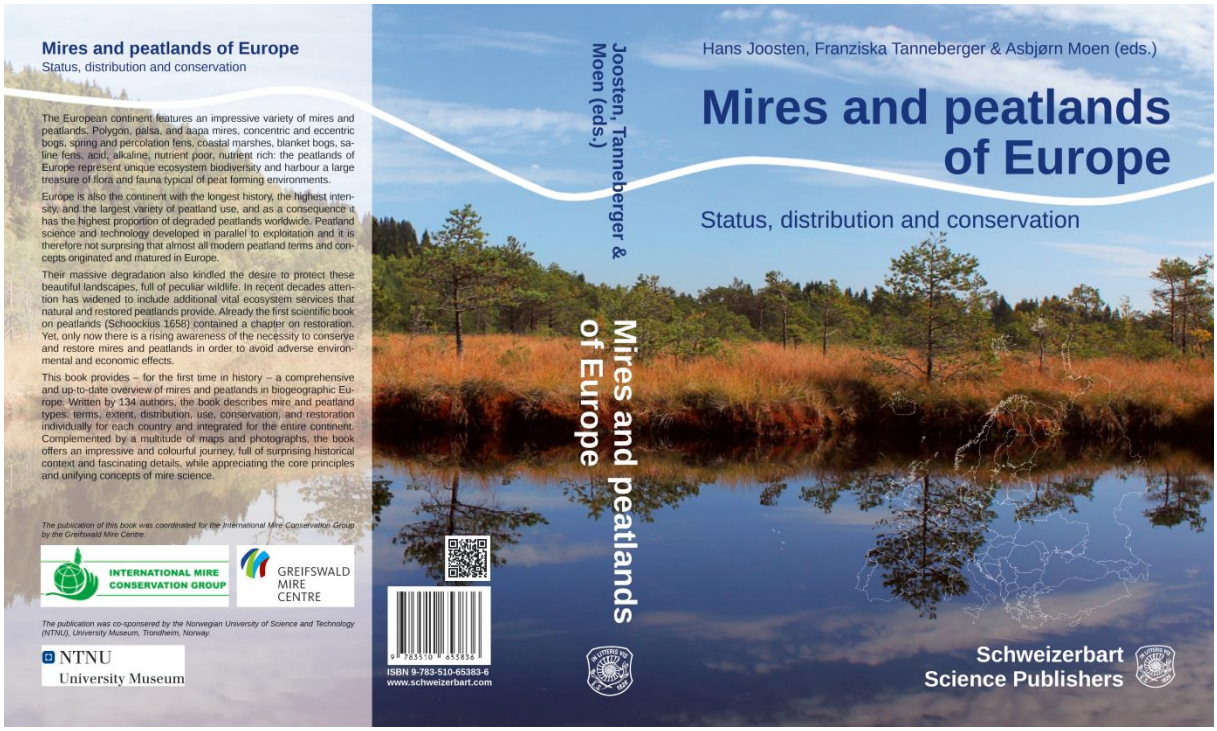
A new IMCG Bulletin full of new developments, discoveries, and threats to peatlands worldwide. From the restoration frontline in Indonesia to the development frontier in Amazonia. Major upcoming events in May are the launch of the European Mires book (see below) and The Global Landscapes Forum: Peatlands Matter event in Jakarta, which you can follow online, by livestreaming from Jakarta on 18 May 2017.

Keep on sharing your ideas and experiences with your fellow-IMCGers by sending news and discussion items, relevant photographs and other contributions for the next Bulletin by April, 30, 2017 to Hans Joosten at joosten@uni-greifswald.de.

IMCG News

Launch IMCG European Mires Book on May 9, 2017 in Bonn!

The launch of the IMCG European Mires Book will take place during the side event of the Global Peatlands Initiative at the UNFCCC SBSTA meeting in Bonn, Tuesday, 09 May 2017; 18:30-20:00 h in the Bonn Convention Centre Room: Berlin (112). We hope to hand over the first copy of the book to Thorbjørn Jagland, secretary-general of the Council of Europe, who is also scheduled to give a presentation on 'Connections, communalities, and unifying principles with respect to peatland policies in/for Europe'.



Mires and Peat

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

In March 2017 Mires and Peat has published the following articles:

- Using 'snapshot' measurements of CH_4 fluxes from an ombrotrophic peatland to estimate annual budgets: interpolation versus modelling. [S.M. Green & A.J. Baird] Volume Peat 19: Article 09.
- Drivers of peat accumulation rate in a raised bog: impact of drainage, climate, and local vegetation composition. [N. Stivrins, I. Ozola, M. Gałka, E. Kuske, T. Alliksaar, T.J. Andersen, M. Lamentowicz, S. Wulf & T. Reitalu] Volume 19: Article 08.
- Holocene elemental, lead isotope and charcoal record from peat in southern Poland. [K. Tudyka, A. Pazdur, F. De Vleeschouwer, M. Lityńska-Zając, L. Chróst & N. Fagel] Volume 19: Article 07.

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

News from the regions

Global

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

The symposium specifically targeted increased action in three areas: 1. Measuring, mapping, monitoring and reporting changes in soil organic carbon; 2. Fostering soil organic carbon sequestration for climate change adaptation and mitigation and land degradation neutrality; 3. Maintaining / restoring soil organic carbon stocks in vulnerable hotspots. The symposium concluded in its key messages: "Of particular concern are hotspots such as peatlands, permafrost and grasslands, which contain the highest amount of soil organic carbon. (…)"

Presentations from the symposium with respect to Sub-theme 3.1: 'Managing soils with high SOC - peatlands, permafrost, and black soils' can be found under http://www.fao.org/about/meetings/soil-organic-carbon-symposium/presentations/en/

Global Landscapes Forum: Peatlands Matter 18 May 2017 Jakarta

Peatlands are the world's largest carbon sinks, but often these landscapes are situated in areas where competing interests of conservation and development must be carefully negotiated. The Global Landscapes Forum: Peatlands Matter event will bring together local and global policymakers, stakeholders, and private sector interests in order to identify landscape-level solutions and accelerate measurable action on the ground in negotiating conflicting land use demands in these vital biomes. http://www.landscapes.org/peatlands/

GLF Photo Competition: Peatlands Matter

In conjunction with the GLF: Peatlands Matter event, GLF hosts a peatland-themed photo competition. Amateurs and professionals alike are welcome to submit images, to be shared on our global platform. http://www.landscapes.org/peatlands/glf-photo-competition-peatlands-matter/#participate

IPCC agrees outlines of new reports

The Intergovernmental Panel on Climate Change (IPCC) has agreed the outlines of two new reports that will help governments understand the impact climate change is having on human activities and nature on land and sea and how human activity in these areas is affecting climate change. The Panel approved the outlines of the Special Report on Oceans and Cryosphere in a Changing Climate, and Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems, both to be finalized in September 2019. IPCC has launched the call for nominations for authors for both reports in early April. Please register for nomination as Coordinating Lead Authors, Lead authors, and Review Editors for these Special Reports at your national IPCC focal point so that the interests of peatlands worldwide are adequately represented.

The agreed outlines, subject to final edits, are available on the IPCC website. The decisions were taken at the 45th Session of the IPCC, held in Guadalajara, Mexico, on 28-31 March 2017. The full agenda and documents can be found under: http://ipcc.ch/scripts/_session_template.php?page=_45ipcc.htm

Ramsar Convention Briefing Note: 30 Good Reasons to Safeguard Peatlands!

The results of the International Workshop 'Peatland Conservation and Wise Use in the Context of Climate Change: A Contribution to the Implementation of the Ramsar Convention' held at the International Academy for Nature Conservation, Island of Vilm (Germany), 11th – 14th September 2016 have now been published as a Briefing Note: http://www.ramsar.org/sites/default/files/documents/library/briefing_note_peatlands_vilm_workshop_sept_2016.pdf

Africa

Rwanda

First peat-fired power plant in Africa

Rwanda has opened its first peat-fired power plant at Gishoma in the far west of the country, a $39.2M project. It is the first of its kind in Africa. Another larger peat plant, costing $350M is under development in Gisagara to the east. The plan is for Gishoma to start feeding 15MW of electricity into the national grid imminently, and Gisagara 80MW by 2019. The Rwandan government is hoping to achieve its goal of connecting 70% of the country's 11.7 million people to the national grid by 2018. This is a near three-fold increase on the number connected at present. The peat-to-power plant at Gishoma will contribute to this goal, and further increase the installed capacity of the nation. This will reduce Rwanda's reliance on expensive imports of diesel oil for power generation. At the moment, only 25% of households have access to the 190MW of power generated in country. But over the next two years the capacity is projected to reach 563MW in line with national development goals. This increase will be made possible in part through the harnessing of power from peat.

Rwanda's first peat-fired power plant at Gishoma (photo: Rwanda Energy Group/Twitter)

Despite covering just 3% of the world's ice-free land surface, peatlands store up to 30% of its total soil carbon stock. This makes them the most efficient carbon storage facility we have. But arguably, not a renewable one. Though each peatland varies, one centimetre depth of peat may take an average of 10 years to accumulate, and less than 10 minutes to burn.

The plans are enabled through financial support from the African Finance Corporation, the Development Bank of Rwanda and Finnfund, the Finnish Development Finance Company, among other lenders.
There may well be vast resources of peat in Rwanda that local residents have known about for years, or that the Finns have sniffed out recently. But whatever the scenario defining the nation's peaty asset and wherever it is exactly, it is unlikely to be there for much longer if peat-to-power generation continues to be Rwanda's cost competitive energy solution.

- http://theconversation.com/rwanda-adds-to-energy-mix-with-first-peat-fired-power-plant-in-africa-74380

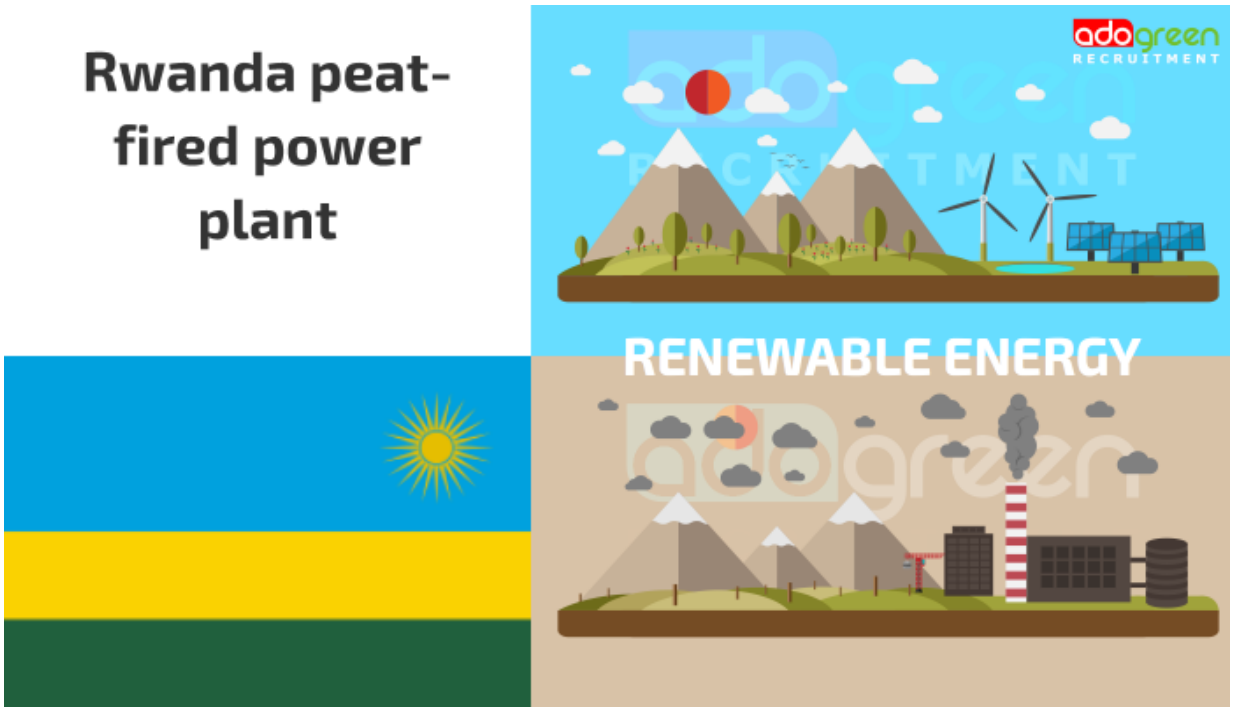


Photo credit: LinkedIn

Asia

Indonesia

Converting concessions and plantations into peatland conservation areas

The Indonesian government has started the process of converting peatland concessions and plantations into conservation areas in its effort to prevent peat fires. The conversion was targeted to cover 2.5 million hectares of land. The peat conversion plan has been laid out in four ministerial regulations issued as a follow-up of the revision of a government regulation on peatland protection and the government's peatland hydrological area (KHG) map. Recently completed by the Environment and Forestry Ministry's environmental pollution and damage control directorate general, the map divides Indonesia's peatland areas into two categories, namely conservation and production. According to the map, there should be 12.4 million ha of conservation areas and 12.2 million ha of production areas. Plantations in peatland that were converted into concessions will be converted back to their original functions, the ministry said. Signed by Environment and Forestry Minister Siti Nurbaya Bakar, the ministerial regulations stipulate that concession owners are prohibited from planting on areas designated as conservation areas. For companies already growing commodities on the conservation areas, the government has allowed them to harvest their commodities only once. "After that, they are not allowed to plant in the areas. They are also required to recover [the peat areas] and allow them to be used for conservation purposes," the ministry's sustainable forest management director-general, Ida Bagus Putera Parthama, said. The plan will affect at least 101 concession owners, but no further details were provided about the number of plantation owners that will be affected by the changes. (ebf)

- http://www.thejakartapost.com/news/2017/02/22/conversion-of-peatland-concessions-into-conservation-areas-commences.html
- http://gcoe.tus-fire.com/eng/ffsa/?p=21096

Academics: Peatland decree not pro-people, needs revision

Academics from several universities across Indonesia have recommended the government to revise Government Regulation (PP) No. 57/ 2016 on Peat Ecosystem Protection and Management Regulation, saying that the regulation is not pro-people and its implementation could damage plantation activities in Indonesia. Indonesia Land Science Association (HITI) chairman Budi Mulianto from the Bogor Institute of Agriculture (IPB) said many farmers and plantation companies cultivated oil palms on peatlands and that without revision of PP farmers and plantation companies operating on peatlands would have to stop their plantation activities

- http://www.thejakartapost.com/news/2017/03/17/peatland-decree-not-pro-people-needs-revision-academics.html
- http://www.ecodaily.org/featured/sapta-raharja-peatland-regulation-triggers-the-uncertainty-of-economy/

BRG allocates US$7.5 million to restore Riau`s peatlands

Indonesias Peatland Restoration Agency (BRG) has allocated Rp100 billion (US$7.5 million) to restore Riaus peatlands in 2017, BRG Chief Nazir Foead announced on March 8 in Pekanbaru, Riau. "In 2017, BRG has targeted the humidification of 700 thousand hectares of peatlands in Riau," Nazir stated. The agency has targeted to restore a total of 2.49 million hectares of peatlands across the country. Peatlands in Riau province covers almost half of the total area in the country. "For the first phase in 2017, BRG would focus on humidification and replanting of the damaged areas," he pointed out. "If we could keep it moist, the risk of forest fire could be reduced, and the land could be used to cultivate food crops such as sago."
http://www.antaranews.com/en/news/109834/agency-allocates-us75-million-to-restore-riaus-peatlands

APP affirms 'no deforestation' pledge amid scepticism

Asia Pulp and Paper (APP), Indonesia's largest pulp and paper company, with a land bank of 2.6 million ha, mainly in Sumatra, has since 2013 said it will not destroy natural forests. Today, it is holding fast to that position - in the face of growing criticism over its third and newly operational mill in South Sumatra, which environmental groups say will cause it to renege on its promise.

The US$2.6 billion largely Chinese-financed mill in the Ogan Komering Ilir (OKI) district of South Sumatra commenced operations last December. "The OKI pulp mill will be using 100 per cent plantation wood. We will not be cutting down natural forests... nor using wood from natural forests," stressed Mr Gadang Hartawan, head of external relations at APP's OKI Pulp and Paper Mills. Other than harvesting from Acacia trees in the plantations in OKI, Mr Hartawan said the mill will also receive wood from suppliers in other regions.

Asia Pulp and Paper acacia plantation on peat in Jambi, Sumatra (photo: Hans Joosten)

APP's two other mills are in the Jambi and Riau provinces of Sumatra. The mill in OKI is the largest and designed to produce up to 2.8 million tonnes of pulp every year. However, APP's environmental licence issued by Indonesia's Capital Investment Coordination Agency allows it to produce less, at two million tonnes of pulp annually. At that lower output, APP says the mill will consume 70,000ha of plantation timber a year. According to calculations of WWF-Indonesia the OKI mill will, however, need a minimum of 77,606ha of net planted area for annual harvest. A report put together by 12 NGOs last October had even bleaker estimates. If the mill was operating at its designed capacity of 2.8 million tonnes, it would need to harvest 108,648ha of plantations, under a scenario projecting high growth of the pulp-producing Acacia trees. In a low-growth scenario, this figure goes up to 172,026ha, or over a five-year rotation a gross plantation area of between 905,401ha and 1,443,551ha.

But APP insisted that the mill would never operate at its full capacity of 2.8 million tonnes per annum, due to factors such as maintenance work. It has also taken various measures to improve yield, the spokesman added without giving details. But Marcel Silvius of Wetlands International pointed out that APP's current supply base is insecure due to a number of factors. Draining peatlands to grow Acacia could result in soil subsidence and increase the risk of flooding, for example, and the fire risk could result in plantations being lost to fire, or the loss of the right to plant on burnt peat. "Long-term prospects look very weak or impossible, unless APP can develop non-drainage-based pulp production in time... using suitable peat swamp species on fully rewetted peat," said Mr Silvius.

A peat swamp forest prepared for planting with pulpwood, Jambi, Sumatra (photo: Hans Joosten)

APP is researching more than a dozen alternative species on peatland for conservation, production and community purposes. The spokesman said the research is expected to find species that, unlike Acacia, can thrive on near-natural conditions of peat, and, for pulpwood production species, have good pulping qualities. "Several trial sites have been established to find the best conditions required for cultivation," said the APP spokesman. Mr Silvius said it is encouraging that APP is doing such research. "The development of alternative pulp sources that grow well on rewetted peatlands is an absolute requirement to be able to address the major sustainability issues of the current drainage requiring Acacia pulp wood plantations on peat, such as huge greenhouse gas emissions, uncontrollable fire risks and soil subsidence," he said. "We see APP's efforts in this as a positive and essential step towards a more sustainable pulp sector."

http://www.straitstimes.com/asia/se-asia/app-affirms-no-deforestation-pledge-amid-scepticism

No haze from South Sumatra this year, Indonesian governor promises

Governor Alex Noerdin of South Sumatra has declared on April 6 that the province - responsible for most of the fires that caused the haze two years ago - has taken steps to address the issue. Canals have been blocked to dampen drained peatlands that can otherwise catch fire. Farmers have also been educated on ways to clear land without turning to slash-and-burn methods, he said. "This year, we are strengthening our efforts... No fire means no haze from South Sumatra province this year, and next year, and the year after," Mr Alex said on the on the sidelines of a conference on haze organised by the Singapore Institute for International Affairs. The Institute's chairman Simon Tay also said Indonesia has "done better". "It realises the costs for itself are incredibly high. Estimates have come up that Indonesia suffered US$17 billion in damage due to the fires and haze in 2015." Singapore experienced one day of haze last year, compared with the two months of bad air in 2015. But this was partly the result of more favourable weather conditions. The region experienced more rain last year than in 2015, an El Nino year when hotter and drier weather caused the fires to burn for longer. The People's Movement to Stop Haze is adopting a wait-and-see attitude. "Even though canal blocking efforts to re-wet drained peatlands are ongoing, the water levels may not be high enough to prevent them from catching fire, especially during the dry season," said its executive director Zhang Wen.

- http://www.tnp.sg/news/world/south-sumatra-governor-no-haze-year-next-year-and-year-after
- http://www.channelnewsasia.com/news/singapore/no-haze-from-south-sumatra-this-year-indonesian-governor/3656846.html

Major banks need to act and refuse funding to palm oil companies that destroy forests

A few weeks ago, HSBC bank (http://www.hsbc.com/about-hsbc) announced to cut its links with the destruction of Indonesia's forests by pledging to end funding for destructive palm oil companies. HSBC brought in a new policy after Greenpeace had shown how it had been involved in providing loans to some of the most destructive palm oil companies and hundreds of thousands of people around the world demanded tougher action. Other banks, however, are lagging way behind.

http://www.greenpeace.org.uk/blog/forests/who-still-banks-destroying-indonesias-forests-20170314

The year after the 2015 peatland fire in Jambi, Sumatra (photo: Hans Joosten)

Indonesian palm oil's stranded assets

6.1 million ha of forests and peatland are "stranded assets" on the balance sheet of Indonesian palm oil companies as they cannot viably be developed. This is one of the key findings of an extensive report produced by Chain Reaction Research. 29 percent of Indonesia's leased out landbank cannot be developed without

violating buyers' No Deforestation, No Peat, No Exploitation (NDPE) policies. 95 palm oil company groups – 35 of which are publicly traded – each holds at least 1,000 ha of stranded land within their concessions. Ten company groups have together over 1 million ha in stranded land. Most stranded lands are in Papua and Kalimantan, consisting of:

1. Accessible concessions with peat (1,532,364 ha). Peat development is prohibited by recent legislation.
2. Concessions with remaining forest cover, usually located further inland (3,505,012 ha). Deforestation in these concessions will likely trigger suspension by traders and refiners and downstream buyers.
3. Peat forest (1,086,881 ha).

Due to stranded assets, the Indonesian palm oil industry may face lower growth. Four developments are driving this transformation:

a) Undeveloped palm oil landbanks are no longer a viable proxy for financial valuation. Landbanks are traditionally used to determine a company's projected future net earnings and share price. However, under current market conditions, undeveloped forest and peatland cannot generate any future value without violation of NDPE policies.
b) 365 companies globally have adopted zero-deforestation or NDPE policies, including 25 of the largest palm oil traders and refiners. Some of these traders and refiners have already suspended or excluded growers from their supply chains because of unwillingness to stop deforestation and/or peatland development.
c) The government of Indonesia is directing the palm oil industry away from deforestation and peatland development. President Jokowi recently issued a revised regulation on the protection of peatland. This revision comes in addition to the twice-extended forest-clearing moratorium and a five-year ban on new oil palm concessions. As expressed by President Jokowi, the government of Indonesia wants to increase growth and yield at existing plantations as opposed to expand plantations via deforestation and peatland destruction.
d) "Eyes in the sky" provide immediate transparency and monitoring capabilities. Plantation development is now recorded by high-resolution satellite imagery that is easily available for monitoring and intervention. Imagery from Landsat 7 and 8 and Sentinel 1 and 2 satellites is now available on a weekly basis.

http://www.valuewalk.com/2017/03/indonesian-palm-oil/?all=1

Oil palm on peat in South-Sumatra (photo: Hans Joosten)

In war on haze, Indonesia has new ally: Tribespeople

The Peatlands Restoration Agency, set up by President Joko Widodo in 2016 to fight the peat fires, has struck a deal with indigenous groups in a bid to tap their traditional knowledge in managing lands and fires. "We realize indigenous groups are already practicing good peatland management, using their local wisdom," the agency's deputy head Myrna Safitri said. For instance, a long-held tradition by the Dayak tribe on Borneo island dictates they cannot leave a place that has been set on fire until the fire stops. Fires are often started in the dry season by farmers to clear their land quickly and cheaply to plant new harvests.

- http://www.voanews.com/a/war-on-haze-indonesia-tribespeople/3778270.html
- http://news.trust.org/item/20170322104956-a6oi8/
- http://jakartaglobe.id/news/brg-partners-indigenous-groups-restore-peatlands-combat-wildires/

UK donates $3.6m to prevent wildfires in Sumatra

The United Kingdom has donated 3 million pounds ($3.6 million) to prevent and mitigate wildfires in Sumatra and Kalimantan. The recipients of the aid are Jambi, Riau, South Sumatra, West Kalimantan and East Kalimantan. "The UK government deeply cares about Indonesia's efforts to prevent forest fire and haze. Therefore, UK has established partnerships with five provinces to prevent and mitigate these disasters. We also provided 3 million pounds in aid," British Ambassador Moazzam Malik said in Jambi on Monday 13 March.

The ambassador praised Jambi for issuing regulations on forest and peatland fire prevention. Jambi was the first among the five provinces to enact such laws. In 2015, the fires devoured more than 130,000 hectares of forests and peatland in the province, where 1,654 hotspots were detected and the losses reached Rp 12 trillion. http://jakartaglobe.id/news/uk-donates-3-6m-prevent-wildfires-sumatra/

Recently burned peatland in South-Sumatra (photo: Hans Joosten)

Malaysia

Yayasan Sime Darby (YSD) plants 18,500 trees in Raja Musa Forest Reserve, Malaysia

Sime Darby (YSD) has planted 18,500 tree saplings on 20ha of degraded peat swamp area in the Raja Musa Forest Reserve in an effort to reduce risks of forest fires that have occurred in the area almost annually since 1992, especially during the dry season. This effort aims to ultimately reduce greenhouse gas emissions, prevent peat land fire as well as haze. Furthermore, the planting of tree saplings will promote the natural regeneration of approximately an additional 30ha of degraded site, with the control and management of water levels in the

area. YSD's initiative, in collaboration with The Global Environment Centre (GEC), the Selangor Forestry Department (SFD) and Friends of North Selangor Peat Swamp Forest (FNSPSF) – involves a three-year commitment of RM1 million which began in January 2014. This rehabilitation initiative will serve as a link to the ASEAN Peatland Management Strategy, which was developed in 2003 to tackle transboundary haze pollution in the Southeast Asian region caused by fires in peat areas. It will also support the implementation of the Malaysian National Action Plan on Peatlands adopted by the Malaysian government in early 2011.

GEC Director Mr Faizal Parish said since 2014, GEC, together with YSD, SFD and FNSPSF, have implemented the project to enhance and strengthen efforts for peat water management and fire prevention in addition to the rehabilitation and conservation of an area in the Raja Musa Forest Reserve adjacent to Sime Darby Plantation Raja Musa Division. "In future, we will expand our work to support peatland management and rehabilitation in other parts of NSPSF in collaboration with YSD and Sime Darby Plantation," he said.

Thailand

Pru Kaching peat swamp reserve threatened by oil palm encroachment

Pru Kaching was declared a National Reserve Forest in 1965, under the control of Thailand's Royal Forest Department. In 1987, Pru Kaching was designated a "mangrove forest conservation area," thus falling under the responsibility of Thailand's Department of Marine and Coastal Resources (DMCR). It was later expanded in August 2000. But by then, according to Narong Pholla-iad, governor of Chumphon province, a third of the 4581-rai (approximately 1811-acre) area had been encroached upon by smallholders who cleared and converted the land to grow oil palm. In 2014, the Thai government launched a forest reclamation operation led by Pholla-iad to reclaim land in Pru Kaching. However, many worry it's too late for hundreds of acres of peat swamp that have already been planted with oil palm trees.

Satellite imagery show large swaths of cleared area in Pru Kaching, and data from the University of Maryland indicate the forest lost around 20 percent of its tree cover between 2001 and 2015. These numbers, which reflect both deforestation and plantation clearing, have ramped up over the past few years, with more tree cover lost in 2014 and 2015 than over the previous 13 years.

A middle-rank official with the department who wished to remain anonymous said that Thailand's peatlands have become a grey area in terms of which department is responsible for their protection. The law used to enforce the protection of peatlands is still implemented by the Royal Forest Department and the Department of National Parks, Wildlife and Plant Conservation, but Pru Kaching's conservation has been entrusted to the Department of Marine and Coastal Resources, which has no authority to enforce the law against encroachers, the official said. In the meantime, jurisdictional confusion has hampered efforts to protect the Pru Kaching peat swamp. The designation of peat swamps and mangroves is "definitely a lot more complex," said Maurizio Farhan Ferrari of the NGO Forest Peoples Program. According to Ferrari "there seems to be a lack of coordination between the different agencies when addressing issues related to landscapes that are composed of both terrestrial and coastal or marine ecosystems."

Estimates from the United Nations Development Program (UNDP) place Thailand's tropical peatlands at between 64,000 and 75,000 hectares, found mostly in the south. While the UNDP pegs Thailand as having one of Southeast Asia's strongest protected areas systems, just some-30 percent of Thailand's peat swamps had been included in protected areas by 2012.

Thailand's National Council for Peace and Order (NCPO – the junta that has ruled the country since a coup d'etat in May 2014) issued an order (no. 64/2557) on June 14, 2014, instructing government agencies to halt deforestation and encroachment on forest reserves nationwide. Following the order, Chumphon governor Narong Pholla-iad said some of the encroached land at Pru Kaching was reclaimed in an operation conducted September and October, 2014, by the Thai army and the Internal Security Operations Command (a Thai military unit dedicated to promoting "national security"). Pholla-iad told Mongabay that while much of land encroached by investors had been reclaimed by the government, some may still remain in oil palm production.

"Following the order by the NCPO, we will have to look at the landowners of the 1,300 rai (514 acres)," Pholla-iad said. "Are they poor? Do they pay taxes? If they are poor, we will find solutions. But we will reclaim the land, especially from the investors."

Unlike the world's two palm oil producing giants – Malaysia and Indonesia – where large industrial plantations make up the majority of the sector, Thailand's palm oil industry is dominated by smallholders, who manage

over 70 percent of the country's approximately 700,000 hectares of plantations (as of 2015). The growth in new plantation areas has been part of the Thai government's strategy to boost the industry and meet the nation's demand for alternative energy – in particular Thailand's biodiesel industry, which has seen its consumption of domestic crude palm oil grow from 32 percent in 2009 to 45 percent in 2015, according to OAE data analyzed by the Bank of Ayudhya.

The government's Alternative Energy Development Plan for 2015 – 2036 includes an Oil Palm and Palm Oil Industries Development Strategy 2015 – 2026, which aims to boost palm oil production by improving yields and expanding plantation areas by 50 percent over the next nine years. Ultimately, the strategy aims to increase cultivation of oil palm from 5 million rai (approximately 2 million acres) in 2017, to 7.5 million rai (approximately 3 million acres) in 2026. The 2015-2026 plan also promotes the ASEAN Sustainable Palm Oil (ASPO) standard, as well as the establishment of a permanent organization to drive research and development of the country's palm oil sector.

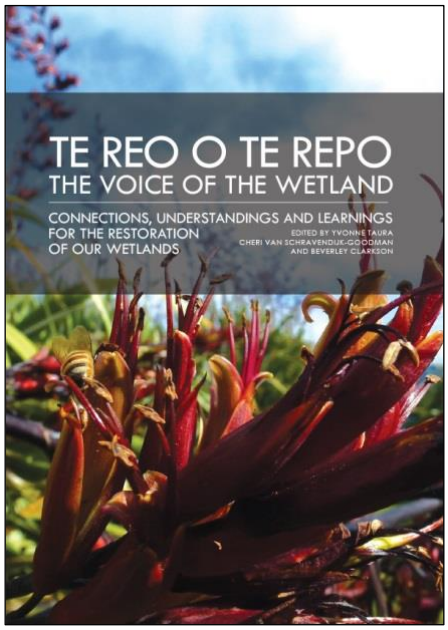
https://news.mongabay.com/2017/03/as-thailand-ramps-up-its-palm-oil-sector-peat-forests-feel-the-pressure/

Australasia

New Zealand

Cultural resource published

Bev Clarkson *Clarksonb@landcareresearch.co.nz*



Te Reo o te Repo: The voice of the wetland: Connections, understandings and learnings for the restoration of our wetlands.

Te Reo o te Repo – the voice of the wetland – is a new online handbook focused on the Māori cultural perspective of wetlands (including mires) in New Zealand. It highlights a range of projects undertaken by the indigenous people of New Zealand to increase the health and wellbeing of their wetlands. The material was written by Māori researchers as well as their non-Māori partners, and is the culmination of several years of research collaboration between the Waikato Raupatu River Trust and Landcare Research. The handbook aims to provide best practice techniques for the enhancement and protection of cultural wetland values to share with indigenous people throughout New Zealand. It will also assist local authorities, research providers, and community groups in their understanding of cultural priorities for wetland restoration. It is available online at cultural handbook.

Europe

Members of the European Parliament vote to ban the use of palm oil in biofuels

MEPs have voted overwhelmingly (640 votes in favour, 18 against, 28 abstentions) to ban biofuels made from vegetable oils including palm oil by 2020, to prevent the EU's renewable transport targets from contributing to deforestation. The motion has resulted in seven major palm oil producing countries– including Indonesia, Malaysia, Costa Rica and Ecuador – warning of a trade dispute if the ban is acted upon. While the report is not binding, EU lawmakers are now drawing up amendments to EU legislation which would be legally enforceable if approved by the European commission and council. Emmanuel Desplechin, the secretary-general of the European renewable ethanol association, said: "We call on the European parliament to translate its position

into binding requirements and limit the contribution of transport fuels from palm oil and its derivatives to the share of renewables in transport in the renewable energy directive until peatland drainage is halted."

IMCG Board member Faizal Parish, ankle-deep in pulverized peat in an oil palm plantation in Selangor, Malaysia (photo: Hans Joosten)

Studies have found (pdf) that overseas demand for palm oil, soy, beef, wood and other agricultural products are key drivers of illegal forest clearances in Indonesia, Malaysia and other countries. But trade associations say that robust action could threaten the livelihoods of smallholders – 40% of palm oil producers – just as palm oil-producing-countries have begun taking steps to limit the damage done by unsustainable practices. "Instead of cutting back, the EU should instead go further in its support," said Anita Neville, a sustainability VP at Golden Agri-Resources, Indonesia's largest grower of oil palm. "The EU can achieve much more by acting as a powerful incentive for sustainable development than by limiting ties." "A ban is not constructive," agreed Jelmen Haaze, the co-chair of the European sustainable palm oil advocacy group. "It is an illusion to think we can take one commodity out of the economy and solve all our problems." Europe's lobby of biofuels producers is one of the most powerful in Brussels, spending €14m a year and employing 400 lobbyists in total – more than the commission's entire energy directorate, according to Oxfam.

- https://www.theguardian.com/sustainable-business/2017/apr/04/palm-oil-biofuels-meps-eu-transport-deforestation-zsl-greenpeace-golden-agri-resources-oxfam?CMP=Share_AndroidApp_Tweet
- http://www.foodnavigator.com/Policy/European-Parliament-votes-in-favour-of-strict-new-palm-oil-measures

Ireland

Transdisciplinary Conversations on Peat and Peatlands: 8th July 2017, University College Cork

This day-long symposium will bring together scholars from the humanities, arts, and sciences, as well as community activists, to build new collaborations and develop frameworks to address issues around the value and 'wise use' of natural resources in the context of threats, including anthropogenic climate change. The focus will be on peatlands, endangered environments across the world, which provide a range of ecosystem services ranging from cultural heritage to carbon sequestration. We invite papers and short presentations (15 minutes) from across the disciplines and from all interested groups and individuals. Possible topics and themes may include (but are not limited to):

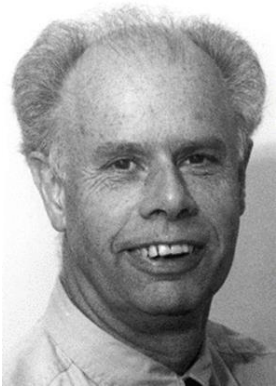
- The significance and impact of cultural representations of 'the bog', 'turf', and associated activities, such as cutting and burning;
- Peatlands as artistic and literary inspiration and influence;
- Historic attitudes/policies regarding the use of peatlands and/or their eradication;
- The significance of the Anthropocene in assessing the role of peatlands worldwide;
- Peatland conservation, restoration, activism and intervention;
- The non-human inhabitants of peatlands;
- Peatlands as archives of past landscapes and people, archaeology and heritage;
- EU environmental policies and the future of peatland ecosystems;
- New perspectives and approaches for understanding the science of peatland systems;

- Communicating value and addressing popular perceptions of and attitudes to peatlands in Ireland and beyond.

Please submit a 300-word abstract by 2 June 2017 to the organisers at peatlands@ucc.ie

Scotland

Hugh A.P. Ingram: R.I.P.



With great sadness, I have to inform the peatland community that our long-time friend and colleague Hugh Ingram died suddenly at his home in Scotland on Saturday 18th March. Hugh was in his 80th year. Almost four decades ago, he brought to us fundamental concepts for understanding how bogs work, along with the terms 'acrotelm', 'catotelm' and 'groundwater mound'. Many IMCG members will have met him in Dundee, during the *Peatland Ecosystems and Man* conference (1989) and the *Darwin Initiative Peatland Biodiversity Programme* ten years later – that is, if they did not know him already. Hugh was buried yesterday on a small green hill overlooking a wetland in the former Pictish Kingdom of Fife. The sky was almost full of clouds but the sun peeped round them from time to time, the birds sang loudly, and the reading was about Adam being made keeper of the Garden of Eden. The packed celebration of Hugh's life afterwards brought together three generations of his family, former students and colleagues from Dundee University, and many other friends including those from his long and active associations with the Scottish Wildlife Trust and Dundee Botanic Garden – which continued right up to the eve of his death. He leaves an indelible legacy that deserves more words (which may come later), but we will miss him. *Olivia Bragg, 31 March 2017*

IPS Convention Aberdeen

The International Peatland Society (IPS) will be holding its 2017 Convention in Aberdeen, Scotland from 28-31 May 2017 in the Marriott Hotel, Dyce, Aberdeen. This will be a major international event with participants from many countries. The main focus of the programme is 'Responsible Management of Peatlands', especially peatlands drained for agriculture, forestry, industry and other non-forestry uses. There will also be a major workshop on peatland restoration and a special session on Restoration of Tropical Peatland at which members of the Indonesian Peatland Restoration Agency will present. The Convention website is www.peatlands2017.net

Scottish Government sets peatlands on route to recovery

On March 15, the Scottish Government announced £8 million over the next year to support peatland restoration under the Peatland Action scheme. This follows proposals in Scotland's draft Climate Change Plan for 250,000 hectares of peatlands to be restored by 2032. IUCN UK Peatland Programme Director, Clifton Bain: "The announcement of new funding for Peatland Action is fantastic news. The Scottish Government has led a master class in providing the leadership, direction and tools for tackling one of our most urgent environmental challenges." Emma Goodyer, Programme Manager, added: "The IUCN UK Peatland Programme has brought together the evidence highlighting just how important peatlands are to all our lives and it is really encouraging to see this now being acted upon by the Scottish Government." It is estimated there are 1.7 million hectares of peatland in Scotland, much of which is eroding. A significant increase in peatland restoration forms part of Scotland's draft Climate Plan, which is currently going through parliament. It aims to increase annual targets to 20,000 hectares, with 250,000 expected to be restored by 2032.

- http://www.iucn-uk-peatlandprogramme.org/news-and-events/news/scottish-government-sets-peatlands-route-recovery
- https://www.holyrood.com/articles/news/roseanna-cunningham-opens-%C2%A38m-fund-peatland-restoration-projects
- http://www.bbc.com/news/uk-scotland-39276964
- https://www.energylivenews.com/2017/03/17/new-8m-peatland-restoration-plan-to-cut-emissions/
- http://www.thescottishfarmer.co.uk/news/15164881

Peat extraction given green light at Midlothian site

Conservationists have criticised the Midlothian Council for giving the green light to remove millions of cubic metres of peat for compost from Auchencorth Moss, near Penicuik, over the next two decades. Dr Maggie

Keegan, Scottish Wildlife Trust's head of policy, said: "It's incredibly disappointing that the destruction of peat bogs continues to be permitted while millions of pounds are being spent on their restoration elsewhere as part of Scotland's commitment to reducing carbon emissions. While we accept the moss has suffered damage in the past we believe it is possible to restore it to become an active bog that is rich in wildlife and acts as a carbon sink, helping Scotland meet its obligations to fight climate change. Auchencorth Moss accounts for one-fifth of Scotland's total carbon emissions from peat extraction so refusing this application would have gone a long way to reducing the environmental impact coming from this sector," she added. "Approving this application also goes against national and local policies that are aimed at phasing out the extraction of peat for use in horticulture. "Peat-free composts have been available for many years so there is absolutely no need for this archaic practice to continue."

A Midlothian spokesman said: "Peat extraction at Auchencorth Moss in Midlothian was granted planning permission in 1986. This planning permission expires in February 2042. The recent application was to review the conditions attached to the original planning consent. However this review process places restrictions on the local planning authority and as a consequence it cannot restrict working rights such as to prejudice adversely to an unacceptable degree either the economic viability of the operation of the site or the asset value of the site. If it did so the council would be liable to pay compensation for loss of income. Midlothian Council has managed to secure the restoration of the site to a raised bog rather than to agricultural land as stated in the original planning permission. "Furthermore, the applicant is also required to provide financial provision to secure the decommissioning, restoration and aftercare of the site."

- http://www.bbc.com/news/uk-scotland-edinburgh-east-fife-39443491
- http://www.midlothianadvertiser.co.uk/news/environment/anger-at-penicuik-peat-extraction-approval-1-4408992
- http://www.heraldscotland.com/news/15193872.Bog_off__Call_to_close_legal_loophole_which_allows_peat_to_be_extracted_from_Scots_estate/

United Kingdom

Wilder Visions - Peatlands for Birds

This conference, 6 - 8 September 2017 in Sheffield, will address key issues of how Britain's peatlands could or should be managed and restored to provide future resilient, sustainable habitats at landscape levels. The event is organised with the Peatlands Special Interest Group (SIG) by SYBRG and Sheffield Hallam University. Bringing together landowners, managers, practitioners and key academics, this major national conference will examine ecology and conservation for restoring upland and lowland peatlands specifically, for birds. More information:
http://www.britishecologicalsociety.org/event/peatlands-birds-fens-mires-bogs-re-constructing-peat-landscapes-uplands-lowlands/

South America

Chile

Historic pledge to create 11 million acres of new national parks in Chile

On March 15, Chilean President Michelle Bachelet and Kristine McDivitt Tompkins, leader of Tompkins Conservation, signed a pledge to dramatically expand national parkland in Chile by approximately 11 million acres (4.5 million ha). The proposal includes the largest land donation in history from a private entity to a country; the total area to be protected, via this private land donation plus government land, is three times the size of Yosemite and Yellowstone National Parks combined. When fully executed, the agreement will create five new national parks — including two crown jewels of Tompkins Conservation's park creation work, Pumalín Park and Patagonia Park, and the 1 million acres and world-class infrastructure they contain — and expand three others.
http://www.tompkinsconservation.org/news/

Peru

Newly discovered peatlands must be protected to prevent climate change

Recently discovered peatlands in Amazonia and Africa must be protected from commercial agriculture to prevent environmental disaster, say researchers at the University of St Andrews. Extensive deforestation,

drainage, burning and conversion of peat swamp forests to rice and palm oil plantations in Indonesia and Malaysia over recent decades have caused huge carbon releases, severe air pollution, and the loss of habitat for iconic species such as the orangutan.

A series of recent discoveries has shown that peatlands also cover large parts of Amazonia and Africa. These currently remain largely intact, beyond the present-day frontier of agriculture. The international research team, led by St Andrews, identified a series of threats to these intact tropical peatlands, and highlighted conservation methods particularly relevant to this type of ecosystem. This work focuses on the largest known intact tropical peatland in Amazonia, the Pastaza-Marañón Basin in north-east Peru, as a case study.

Lead author Dr Katy Roucoux of the School of Geography and Sustainable Development at St Andrews said: "The key to preserving these peatlands, which are a type of wetland, is maintaining their water balance; you need to keep the water table high. In our study area the main threat to peatland health is the expansion of commercial agriculture linked to the development of new transport infrastructure which makes it easier for companies to access remote areas." Although some of the peatlands in the Pastaza-Marañón Basin were found to fall within existing legally protected areas such as national parks, the team found that this protection is patchy, weak and not focused on protecting the most carbon-rich areas.

The team identified several key pathways for conservation. New carbon-based conservation funding, for example under UN-backed schemes such as the Green Climate Fund to which the UK contributes, could help local communities to protect their environment while also achieving sustainable economic development. Harvesting sustainable peatland products such as palm fruits, which can be collected without substantially degrading the ecosystem, could provide an alternative to monoculture plantations.

Giving local communities legal ownership of the lands they occupy could also help communities to have a greater say in how peatlands are managed, while national parks and forest reserves could be expanded to provide a legal barrier to environmentally damaging development.

Dr Roucoux added: "We argue that conservation should be focused in the first instance on the most carbon-rich peatlands, not just in Amazonia but across the tropics."

- http://www.ecodaily.org/featured/scientists-warn-amazon-peatland-could-face-environmental-disaster-due-to-palm-oil-threat/
- https://phys.org/news/2017-03-newly-peatlands-climate.html
- http://www.theecologist.org/News/news_round_up/2988795/scientists_protect_vast_amazon_peatland_to_avoid_palm_oil_environmental_disaster.html
- http://www.sciencetimes.com/articles/10724/20170321/peatlands-protected-helps-combat-climate-change-more-effort-conservation-applied.htm
- http://www.thenational.scot/news/15169538.St_Andrews_University_researchers_warn_eco_disaster_could_result_if_farmers_encroach_on_tropical_peatlands/

Threats to intact tropical peatlands and opportunities for their conservation

Katherine Roucoux (khr@st-andrews.ac.uk)

Our essay (Roucoux et al. 2017) published this month makes the first assessment of the vulnerability of the recently-described carbon-dense peatlands of the Pastaza-Marañón basin in Loreto, north-east Peru. We also explore some of the most promising avenues for protecting intact tropical peatland ecosystems, and their carbon stocks, from future land-use change and degradation.

The existence of extensive peatlands in the Pastaza-Marañón basin only came to light due to pioneering fieldwork campaigns within the last few years (Freitas et al. 2006, Lähteenoja et al. 2009). We now think that peat underlies some 35,000 km^2 of forest, on floodplains and low-lying interfluves (Draper et al. 2014). These newly-revealed peatlands, fascinating ecosystems in their own right, are nationally and internationally important if only because, like peatlands everywhere, they provide a substantial long-term below-ground carbon store, which we estimated at 3.14 Gt C (Draper et al. 2014). Additionally, these peatlands provide numerous non-timber forest resources for local communities and regional markets. Despite this usage, they appear to remain hydrologically intact; the extensive drainage and clearance that have occurred in parts of SE Asia have not (yet) taken place.

Our team, including scientists from Peru, UK, Finland, and USA, collaborated to identify and map the threats to intact peatlands across the Pastaza-Marañón basin, the largest known intact tropical peatland in Amazonia. We also mapped the location of existing protected areas, including national reserves, Ramsar sites and areas of titled land. Our analysis indicates that large areas of peatland have little formal environmental protection, and

are vulnerable to the effects of future economic development in the region. The main threat to peatland health in our study area is the expansion of commercial agriculture linked to the development of new transport infrastructure which makes it easier for companies to access remote areas. Roads, river transport improvements, and an electric transmission line are in various stages of planning, aiming to improve connections between the main regional city of Iquitos and wider networks. In some cases the proposed routes pass through presently remote regions, including some of the peatlands north of the Rio Marañón.

Coring peat in the Pastaza-Marañón basin, Peru (photo: Katy Roucoux).

Fortunately, the discovery of peat deposits in the Pastaza-Marañón basin comes early enough for there to be hope that unwitting destruction can be avoided. In our paper, we identify several promising pathways for conservation. New carbon-based conservation funding, for example under UN-backed schemes such as the Green Climate Fund, offers a great opportunity for local communities to protect their environment while also attracting investment that will encourage sustainable economic development. One Green Climate Fund project is already underway in The Datem del Marañón (http://www.greenclimate.fund), which includes areas of peatland. The scale of the peatlands is important: Peru has been very successful in attracting foreign investment to help protect the c. 7 Gt C stored above-ground in its forests; the c. 3 Gt C stored in peats should be seen as an asset.

There are other opportunities, too. Developing markets for sustainable peatland products such as *Mauritia* palm fruits, which can be harvested without substantially degrading the ecosystem, may provide an alternative to monoculture plantations. Giving local communities legal ownership of the lands they occupy may help these communities to have a greater say in how peatlands are managed. Finally, traditional protected areas such as national parks and forest reserves should be expanded to provide a strong legal barrier to environmentally damaging development, particularly in areas which, at present, are uncontested. In the paper, we argue that these approaches should be focused in the first instance on the most carbon-rich peatlands which currently lie entirely outside of the legally protected areas.

Much of our analysis could apply to other relatively intact peatlands elsewhere in the tropics, for example, the newly-mapped peatlands of the central Congo Basin (Dargie et al. 2017), which contain an order of magnitude more carbon than those in the Pastaza-Marañón basin. There is likely to be a lot more peat to be found in other

parts of the Amazon Basin, too. We hope that our paper makes a useful contribution to stimulating discussion about how to protect intact tropical peatland carbon stocks, to the benefit of ecosystems, local communities, and the global fight against climate change.

The paper's authors are based in the School of Geography and Sustainable Development at the University of St Andrews (Roucoux, Lawson), the University of Leeds (Baker), University of Edinburgh (Mitchard), University of Reading (Kelly), Instituto de Investigacion de la Amazonía Peruana (del Castillo Torres, Honorio Coronado), Carnegie Institution for Science, Washington DC (Draper), Arizona State University (Lahteenoja), George Mason University (Gilmore), and the Field Museum, Chicago (Vriesendorp).

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Dargie GC, Lewis SL, Lawson IT, et al. 2017. Age, extent and carbon storage of the central Congo Basin peatland complex. Nature 542, 86–90.

Draper FC, Roucoux KH, Lawson IT, et al. 2014. The distribution and amount of carbon in the largest peatland complex in Amazonia. Environmental Research Letters 9:124017

Freitas L, Otárola E, Del Castillo D, et al. 2006. Servicios ambientales de almacenamiento y secuestro de carbono del ecosistema aguajal en la Reserva Nacional Pacaya Samiria, Loreto-Peru. Documento Tecnico 29, IIAP, Peru. 62 pp.

http://www.greenclimate.fund/-/building-the-resilience-of-wetlands-in-the-province-of-datem-del-maranon-peru. Accessed 2nd April 2017.

Lähteenoja O, Ruokolainen K, Schulman L, Oinonen M. 2009. Amazonian peatlands: an ignored C sink and potential source. Global Change Biology 15:2311–2320.

Page SE, Hooijer A. 2016. In the line of fire: the peatlands of Southeast Asia. Phil. Trans. R. Soc. B 371(1696):20150176.

Roucoux KH, Lawson IT, Baker TR, et al. 2017. Threats to intact tropical peatlands and opportunities for their conservation. Conservation Biology. http://onlinelibrary.wiley.com/doi/10.1111/cobi.12925/full

Palm oil - the relentless advance

Palm oil is already expanding rapidly in Latin America and according to the Roundtable on Sustainable Palm Oil (RSPO) in 2015 6% of the world's palm oil comes from the region. Commercial agriculture is yet to expand into the Pastaza-Marañón Foreland Basin peatlands, but rice paddies and plantations have begun encroaching on wetlands in other parts of the country. Palm oil plantations have also been developed in the country.

Just south of the Pastaza-Marañón Foreland Basin in the Ucayali Region in east Peru, more than 9,400 hectares (ha) of forest has been cleared for oil palm plantation since 2011, according to the conservation group Monitoring of the Andean Amazon Project (MAAP). The most immediate threat to the peatland comes from infrastructure projects, like road building, as Ian Lawson, a lecturer in geography and sustainable development St Andrews University explained. "The development of commercial agriculture and transport infrastructure are conspiring to make remote areas in Peru more accessible to world markets. "There's been lots of discussions about infrastructure projects. All these things could make it easier for commercial agriculture to come in. In the next 15 years, if those transport projects take off you could imagine that this area could experience significant deforestation." Tim Baker, an associate professor of geography, at Leeds University, who has spent years studying the Peruvian rainforest, agreed: "One of the threats is the interest in connecting this region with the rest of Peru, through transport links. The government has long looked at plans to build road links from Iquitos to western Peru. Once you have any type of transport link, that will make deforesting and introducing other land uses more possible."

- https://phys.org/news/2017-03-newly-peatlands-climate.html#jCp
- http://www.theecologist.org/News/news_round_up/2988795/scientists_protect_vast_amazon_peatland_to_avoid_palm_oil_environmental_disaster.html

Peatland conservation relevant papers March 2017

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

1. 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

2. Controls on the storage of organic carbon in permafrost soil in northern Siberia: http://onlinelibrary.wiley.com/doi/10.1111/ejss.12357/abstract
3. The contribution of an overlooked transport process to a wetland's methane emissions: http://onlinelibrary.wiley.com/doi/10.1002/2016GL068782/abstract
4. Why do reed beds decline and fail to re-establish? A case study of Dutch peat lakes: http://onlinelibrary.wiley.com/doi/10.1111/fwb.12801/abstract
5. The *Sphagnum* microbiome: new insights from an ancient plant lineage: http://onlinelibrary.wiley.com/doi/10.1111/nph.13993/abstract
6. 8000 years of vegetation history in the northern Iberian Peninsula inferred from the palaeoenvironmental study of the Zalama ombrotrophic bog (Basque-Cantabrian Mountains, Spain): http://onlinelibrary.wiley.com/doi/10.1111/bor.12182/abstract
7. Climate and peat type in relation to spatial variation of the peatland carbon mass in the Hudson Bay Lowlands, Canada: http://onlinelibrary.wiley.com/doi/10.1002/2015JG002938/abstract
8. Estimating methane gas production in peat soils of the Florida Everglades using hydrogeophysical methods: http://onlinelibrary.wiley.com/doi/10.1002/2015JG003246/abstract
9. Multi-year greenhouse gas balances at a rewetted temperate peatland: http://onlinelibrary.wiley.com/doi/10.1111/gcb.13325/abstract
10. The role of the seed bank in recovery of temperate heath and blanket bog following wildfires: http://onlinelibrary.wiley.com/doi/10.1111/avsc.12242/abstract
11. Persistent high temperature and low precipitation reduce peat carbon accumulation: http://onlinelibrary.wiley.com/doi/10.1111/gcb.13319/abstract
12. Vascular plants promote ancient peatland carbon loss with climate warming: http://onlinelibrary.wiley.com/doi/10.1111/gcb.13213/abstract
13. Upland habitat loss as a threat to Pantanal wetlands: http://onlinelibrary.wiley.com/doi/10.1111/cobi.12713/abstract
14. Terrestrial ecosystem model performance in simulating productivity and its vulnerability to climate change in the northern permafrost region: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003384/abstract
15. Remediation of contaminated lands in the Niger Delta, Nigeria: Prospects and challenges: http://www.sciencedirect.com/science/article/pii/S0048969717303169
16. Threats to intact tropical peatlands and opportunities for their conservation: http://onlinelibrary.wiley.com/doi/10.1111/cobi.12925/abstract
17. An expert system model for mapping tropical wetlands and peatlands reveals South America as the largest contributor: http://onlinelibrary.wiley.com/doi/10.1111/gcb.13689/abstract?campaign=wolacceptedarticle
18. Evaluation on the decomposability of tropical forest peat soils after conversion to an oil palm plantation: http://www.sciencedirect.com/science/article/pii/S004896971730414X
19. Detecting peatland drains with Object Based Image Analysis and Geoeye-1 imagery: http://download.springer.com/static/pdf/313
20. Climate, pollution and grazing drive long-term change in moorland habitats: http://onlinelibrary.wiley.com/doi/10.1111/avsc.12260/abstract
21. The ecological legacy of 20th century acidification carried on by ecosystem engineers: http://onlinelibrary.wiley.com/doi/10.1111/avsc.12259/abstract
22. 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
23. Taxonomic and functional vegetation changes after shifting management from traditional herding to fenced grazing in temperate grassland communities: http://onlinelibrary.wiley.com/doi/10.1111/avsc.12287/abstract
24. Ascertaining the nature and timing of mire degradation: using palaeoecology to assist future conservation management in Northern England: http://www.aimspress.com/article/10.3934/environsci.2017.1.54
25. Hydrology of a wetland-dominated headwater basin in the Boreal Plain, Alberta, Canada: http://www.sciencedirect.com/science/article/pii/S002216941730063X
26. Importance of lateral flux and its percolation depth on organic carbon export in Arctic tundra soil: implications from a soil leaching experiment: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003754/abstract
27. CH_4 and CO_2 production below two contrasting peatland micro-relief forms: An inhibitor and $\delta^{13}C$ study: http://www.sciencedirect.com/science/article/pii/S0048969717302085
28. A 4000-yr multi-proxy record of Holocene hydrology and vegetation from a peatland in the Sanjiang Plain, Northeast China: http://www.sciencedirect.com/science/article/pii/S1040618216312642
29. Application of palaeoecology for peatland conservation at Mossdale Moor, UK: http://www.sciencedirect.com/science/article/pii/S104061821500004X

30. A late Holocene record of vegetation and fire from the Amur Basin, far-eastern Russia: http://www.sciencedirect.com/science/article/pii/S1040618214005461
31. Tropical Montane Cloud Forests in the Orinoco river basin: The role of soil organic layers in water storage and release: http://www.sciencedirect.com/science/article/pii/S0016706116306875
32. Limits on carbon sequestration in arid blue carbon ecosystems: http://onlinelibrary.wiley.com/doi/10.1002/eap.1489/abstract
33. Low-level addition of dissolved organic carbon increases basal ecosystem function in a boreal headwater stream: http://onlinelibrary.wiley.com/doi/10.1002/ecs2.1739/abstract
34. Vegetation succession, carbon accumulation and hydrological change in subarctic peatlands, Abisko, Northern Sweden: http://onlinelibrary.wiley.com/doi/10.1002/ppp.1945/abstract
35. On the flora of the Ypäyssuo Hydrological (Mire) Nature Reserve, Karelia (Russia): http://transactions.krc.karelia.ru/publ.php?plang=e&id=15181
36. Diversity and phytosociological role of mosses in mires of southwestern Arkhangelsk region and adjacent territories: http://transactions.krc.karelia.ru/publ.php plang=e&id=15185?
37. Can we find the World's remaining peatlands in time to save them?: http://e360.yale.edu/features/can-we-discover-worlds-remaining-peatlands-in-time-to-save-them
38. Soil physical and environmental conditions controlling patterned-ground variability at a continuous permafrost site, Svalbard: http://onlinelibrary.wiley.com/doi/10.1002/ppp.1924/abstract
39. 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
40. Disentangling the pollen signal from fen systems: Modern and Holocene studies from southern and eastern England: http://www.sciencedirect.com/science/article/pii/S0034666716301294
41. Postglacial environments in the southern coast of Lago Fagnano, central Tierra del Fuego, Argentina, based on pollen and fungal microfossils analyses: http://www.sciencedirect.com/science/article/pii/S0034666716302317
42. 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
43. Quantitative reconstruction of peatland hydrological regime with fossil testate amoebae communities: http://eprints.whiterose.ac.uk/113201/
44. Restoration of endangered fen communities: the ambiguity of iron-phosphorus binding and phosphorus limitation: http://onlinelibrary.wiley.com/doi/10.1111/1365-2664.12915/abstract
45. Light-absorbing brown carbon aerosol constituents from combustion of Indonesian peat and biomass: http://pubs.acs.org/doi/abs/10.1021/acs.est.7b00397
46. Spatial dependence of reduced sulfur in Everglades dissolved organic matter controlled by sulfate enrichment: http://pubs.acs.org/doi/abs/10.1021/acs.est.6b04142
47. Alteration of the copper-binding capacity of iron-rich humic colloids during transport from peatland to marine waters: http://pubs.acs.org/doi/abs/10.1021/acs.est.6b05303
48. Nonlinear and threshold-dominated runoff generation controls DOC export in a small peat catchment: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003621/abstract
49. Lateral expansion and carbon exchange of a boreal peatland in Finland resulting in 7000 years of positive radiative forcing: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003749/abstract
50. Correlations between substrate availability, dissolved CH_4, and CH_4 emissions in an arctic wetland subject to warming and plant removal: http://onlinelibrary.wiley.com/doi/10.1002/2016JG003511/abstract
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