

The International Mire Conservation Group (IMCG) is an international network of specialists having a particular interest in mire and peatland conservation. The network encompasses a wide spectrum of expertise and interests, from research scientists to consultants, government agency specialists to peatland site managers. It operates largely through e-mail and newsletters, and holds regular workshops and symposia. For more information: consult the IMCG Website: <http://www.imcg.net>

IMCG has a Main Board of currently 15 people from various parts of the world that has to take decisions between congresses. Of these 15 an elected 5 constitute the IMCG Executive Committee that handles day-to-day affairs. The Executive Committee consists of a Chairman (Jennie Whinam), a Secretary General (Hans Joosten), a Treasurer (Philippe Julve), and 2 additional members (Tatiana Minaeva, Piet-Louis Grundling).

Seppo Eurola, Richard Lindsay, Viktor Masing (†), Rauno Ruuhijärvi, Hugo Sjörs, Michael Steiner and Tatiana Yurkovskaya have been awarded honorary membership of IMCG.

Editorial

This Newsletter contains the first preparations for this year's IMCG General Assembly in Georgia. In the coming months we will organize the discussions on important decisions to be taken there. As we again want to discuss and vote per mail, to enable all IMCG members to participate, it is important to send in your contributions (including nominations for the Main Board) to the Secretariat before July 1st 2008. Furthermore this Newsletter gives additional information of the field excursion in the weeks before the Conference.

Have you already registered for the Conference? Mind the new schedule of the events: 31 August – 16 September!

This Newsletter again pays attention to an important aspect of peatlands and energy. After "peat as a fuel", "biofuel cultivation on peatlands" and "wind parks on peatlands", this issue is devoted to the interference of oil, gas, coals and hydro-electricity exploitation on peatlands. Of course we cannot treat this theme comprehensively, but we hope that the case studies from various parts of the world (including various contributions from South-Africa: thanks South-Africa!) may give an idea of the multiple impacts. Furthermore this Newsletter provides the first information on peatland in Cyprus.

The next Newsletter we will devote to discussions in preparation of the General Assembly (see agenda in this issue). We are eagerly awaiting your conference resolution proposals, your contributions on policy priorities, your view on our relation with IPS, or on whatever subject you think should be discussed. Deadline for the next Newsletter: 1 July 2008.

For information, address changes or other things, contact us at the IMCG Secretariat. In the meantime, keep an eye on the continuously refreshed and refreshing IMCG web-site: <http://www.imcg.net>

John Couwenberg & Hans Joosten, The IMCG Secretariat
Institute of Botany and Landscape Ecology, Grimmerstr. 88, D-17487 Greifswald (Germany)
fax: +49 3834 864114; e-mail: joosten@uni-greifswald.de

Contents:

Editorial	1
A note from the Chair	2
Certified unwise	3
The IMCG 2008 Meetings in Georgia and Armenia.....	4
The IMCG 2008 Field Symposium in Georgia and Armenia	5
General Assembly Georgia 2008	5
Kolkheti wetlands in 2008	6
Agreement on compensation for peatland losses at Kulevi (Georgia).....	8
On the impact of oil shale mining and processing on mires in Northeast Estonia	10
Major hydropower flooding in Iceland	11
Prudhoe Bay: oil exploitation in arctic mires.....	12
More oil exploitation in arctic mires.....	12
Niger Delta: Oil's dirty business.....	14
Coal mining in South Africa threatens peatlands.....	15
Impact of the Energy Crisis in South Africa - Newly discovered peatlands under threat.....	16
The Tevreden Pan peatland complex of the Mpumalanga Lake District (South Africa)	18
Small mire habitats in Troodos National Forest Park, Cyprus.....	22
Mires and Peat Volume 2: 30–50% extra and all for free!.....	23
The Global Peatland Fund: Emission trading to halt CO ₂ emissions from peatland destruction	25
Review of international policies.....	26
IMCG-IPS Terminology Working Group established	27
Regional News.....	28
New and recent Journals/Newsletters/Books/Reports/Websites	32
IMCG Main Board.....	35
UPCOMING EVENTS.....	36

A note from the Chair

Planning is now well underway for the upcoming IMCG Field Symposium and General Assembly in Georgia and Armenia (see details in this Newsletter) – I would encourage as many members as possible to come along to explore the wonderful peatlands of this lesser known region. However, if you cannot attend and have views and/or opinions on the agenda for the General Assembly or on future directions for IMCG, please feel free to contact either Hans Joosten or myself prior to the General Assembly.

One of the ironies of climate change is that in an attempt to respond to the issue, new threats have emerged. Previous Newsletters have already highlighted various energy related problems. This issue explores some additional threats including oil exploration, coal mining and hydro-electricity.

The proposal in 1967 to flood the 'jewel' of the heart of the south-west wilderness of Tasmania – the unique 9km² glacial lake, Lake Pedder – to build a hydro-electric power station, lifted the profile of conservation in Tasmania and led to an international environmental furor. The campaign resulted in the formation of the first greens party in the world – the United Tasmania Group. Unfortunately, the campaign was unsuccessful, despite many scientific and conservation arguments, and the production of magnificent paintings and photographs of the area under threat. In 1972, a large area of buttongrass moorland was flooded, with the pristine wilderness scarred with the infrastructure associated with hydro-

electricity – dams, roads, a construction town, powerlines, construction pits, etc.

At least the outrage from the loss of Lake Pedder led to the successful stopping of the flooding of the Franklin River for another hydro-electric scheme, in the remaining southwest wilderness in 1983, and the declaration of the Tasmanian Wilderness World Heritage Area. There are calls for the area to be drained and restored (<http://www.lakepedder.org/>, <http://www.abc.net.au/science/kelvin/files/s18.htm>)

This example – like that of biofuels – highlights the need to include an assessment of all the associated issues, rather than simply addressing an immediate energy need.

As you read this newsletter, I will be on subantarctic Macquarie Island where a combination of climate change and increased rabbit grazing has led to the complete modification of plant communities, the loss of habitat protection for endangered ground-nesting seabirds, as well as a significant decline in some plant species, including *Sphagnum falcatum*. The Australian and Tasmanian Governments have agreed to fund an ambitious multi-million dollar vertebrate pest eradication program (rabbits, rats and mice) over the next 5 years on this World Heritage listed island (<http://www.environment.gov.au/heritage/publications/pubs/macquarie-rabbit-eradication-plan.pdf>).

Enjoy this edition of the IMCG newsletter.

Jennie Whinam

Do not forget and register for the IMCG biennial meeting in Georgia/Armenia!

Registration form in the back of this Newsletter – MS Word file on www.imcg.net

REGISTER

Please fill out the IMCG membership registration form.

Surf to <http://www.imcg.net> or contact the secretariat.

Certified unwise

by John Couwenberg

So now the IPS Executive Board has decided that they want to develop an International Certification System for the Sustainable Management of Peatlands and Peat¹. The start was made at the IPS Board meeting held in Brussels in March and by the end of April the Secretariat (Jaakko Silpola) will have prepared a project plan to be presented to the Board, later followed up upon at the IPS International Peat Congress in Tullamore this year. The certification system is targeted to be ready by the end of the year 2009.

Reading this news doesn't fill me with joy and good hope, really.

Particularly since the Finnish took over the chair of their club, IPS has had a record of filling in the terms "sustainable" and "wise" with whatever fits best with the company agenda. Recently, climate has become the focus of the attempts by the peat extraction industry to bend and twist the term "sustainable" to fit their destructive practices.

Now, demolishing peatlands and burning peat is "climate-benign" or "sustainable from a climate point of view". Such linguistic monstrosities try to pour a self-concocted sweet climate sauce over the usual business of destroying a long term carbon store and substituting one fossil fuel with another one that has an even worse effect on the climate.

The facts and logic behind these latest efforts repeatedly have been debunked by IMCG as seriously lacking in the accuracy department. The IMCG has addressed IPS through a series of Newsletter articles as well as in person during last year's Sweden meeting of IPS and IMCG.

That meeting was a bit of a disappointment. IMCG had prepared well by analysing the IPS fabrications and bringing to the table well prepared written out critique supported by plenty background and references. Sadly none of the IPS board members present was capable of defending the science behind the hogwash they were all too willing to propagate.

As noted in the previous IMCG Newsletter, IPS Secretary Jaakko Silpola even managed to author a chapter in a book on World Energy Resources in which he again spouted the same old story and even managed to undersign it as representative of IPS². And so again, writing it down seems fine, but thinking about it and engaging in discussions is not part of the package.

What's even more disturbing is that IPS seems unable to have their specialists address the IMCG critique – those specialists in the know and so obviously not present during the Sweden meeting. Actually at that very Sweden meeting IPS promised to provide arguments to counter our stance in writing – by October 2007. A small working group of IPS and IMCG members then were to work out the factual basis of the argument and report back to both organisations in Tullamore.

It's IPS who has to play a card now and we have been waiting patiently. My fear is that in Tullamore Jaakko Silpola will give his report on what the Certification on sustainable management should look like and that it will be a copy of his recent presentation at a Tekes/Climbus meeting³, where he simply repeated the already refuted arguments. One may wonder whether this is strategic ingenuity that is rising miles above us all or whether the Secretary General of IPS is really too stupid to understand what's going on – as he pointed out himself during the Sweden meeting.

Anyhow, such a presentation will not bring the discussion forward in any substantial way; it may even undermine the cooperation between the two organisations. What's more, it would ridicule the Wise Use process the two organisations went through, in which it was agreed that such opposed positions as harboured by IMCG and the industry branch of IPS can only be resolved when parting from a basis of facts, all the facts and nothing but the facts.



IPS has failed to address the factual IMCG refutations of their arguments. Whether this is intentional or because of a lack of understanding, it fits the agenda: IPS continues slinging the same mud against the wall, seemingly hoping some of it will stick. The peat industry continues preaching the same lies for its financial profit where they claim to want to help the world.

That may not be evil, but it certainly is unwise.

IPS is very high on the shortlist to earn the IMCG certificate for sustained unwise approach to wise use.

¹ See March issue of Peat News: [/www.peatsociety.fi/user_files/files/PeatNews2-2008.pdf](http://www.peatsociety.fi/user_files/files/PeatNews2-2008.pdf)

² I know at least one long standing IPS member who vehemently disagrees with what was written in that chapter.

³ <http://tinyurl.com/5n7r5t>

The IMCG 2008 Meetings in Georgia and Armenia

The Biennial IMCG meetings will be held in Georgia and Armenia from 31 August – 16 September 2008.

The IMCG Field Symposium will be held from 31 August - 13 September. The theme will be 'Mires and peatlands of Kolkheti lowland and highlands in Georgia and peatlands in Armenia'. A preliminary schedule can be found in this Newsletter, a detailed programme under: www.imcg.net/2008/georgia.htm

The IMCG Scientific Congress will be held from 14-15 September 2008 with scientific presentations on peatland biodiversity, conservation and wise use, and climate change. Venue: Kobuleti, Ajara, Georgia.

Following the Congress, there will be the IMCG General Assembly on 16 September 2008, also held in Kobuleti, Ajara, Georgia.

Travel information

Arrival and departure

We will start the field symposium in Tbilisi (Georgia) on August 31 and end all meetings in Kobuleti (near Batumi, Georgia) around noon on September 16. Entrance to Georgia is possible by land, air and sea. There are international airports in Tbilisi and Batumi. Another convenient airport is Trabzon in Turkey with easy bus transport to and from Batumi (from where trains to Tbilisi can be taken).

An option is also to join us in Armenia in the early beginning of our trip (September) by flying to Yerevan.

If you have questions, don't hesitate to ask!

Please inform us about your arrival time and place, so that we can arrange you transportation to the venue.

Visa

Citizens of the following countries (with IMCG members) do NOT need a visa for **Georgia**: All countries of the European Union, Armenia, Belarus, Canada, Israel, Japan, Moldova, Norway, Switzerland, Turkey, Ukraine, and the United States of America.

Citizens of all other countries can obtain visas at Georgian embassies (consulates) or at every frontier-post, airport, and sea terminal. The costs (appr. 10-20 USD) depend on the duration of the stay.

For further information on visa matters please visit the website of the Ministry of Foreign Affairs of Georgia: http://www.mfa.gov.ge/?sec_id=467

Participants, who need an invitation, have to contact the Ministry of Environment and Natural Resources. The contact person is Rhezo Enukidze (e-mail: renukidze@yahoo.com) and cc to Izolda Matchutadze (email: tchaobi@yahoo.com)

ATTENTION

Take care, the validity of your passport should exceed the term of validity of the visa at least three months!

You need a two-entry visa for Georgia and a single entry one for Armenia.

Citizens of following countries (with IMCG Members) do NOT need a visa for **Armenia**: Belarus, Georgia, Moldova, Russian Federation, and Ukraine. Generally for most nations it is not difficult to obtain visa just on the border. Anyway, it is better to have visa in your passport already before, as this will save considerable time while crossing the border. Single entry visa costs 15,000 Armenian Drams or around 36 USD. For people arriving at Yerevan Airport also electronic visa application is possible: www.armeniaforeignministry.am/eVisa/

For further information on visa matters please visit www.armeniaforeignministry.com

That site also hosts a list of Armenian embassies and consulates abroad.

Currency

There are numerous banks and exchange offices in the region. In cities also bank automats functioning with common bank cards are available (maestro, Master, Visa), in bigger cities like Tbilisi and Yerevan also EC and American Express.



Excursion through Ispani 2 (left) and in an intermontane basin of the Javakheti Plateau (right) (photos HJ, Sept. 2007)

The IMCG 2008 Field Symposium in Georgia and Armenia

31 August – 13 September 2008

The preliminary schedule of the IMCG 2008 Field Symposium is as follows:

Sunday, 31 August: Arrival of participants in Tbilisi (Georgia), registration, main board meeting, welcome

Monday, 1 September: Meeting in the Ministry of Environment Protection and Natural Resources Tbilisi, travel to Sevan (Armenia).

Tuesday, 2 September: Museum of Sevan National Park, Hairivanq Monastery, Lichq-Argichi Reserve Zone, Lake Gilli.

Wednesday, 3 September: Yerevan: Meeting in the Ministry of Nature Protection; Museum of art, history and nature

Thursday, 4 September: Ardenis sedge peatland, Lake Arpi Ramsar site, Samtskhe-Javakheti Protected Area (Armenia, Georgia)

Friday, 5 September: Bakuriani, Ktsia-Tabatsku Managed Nature Reserve

Saturday, 6 September: Bagrati UNESCO World Heritage Site, Vani Archeological Museum

Sunday 7 September: Kolkheti: Anaklia mire Ramsar Site and Tsia River relict forest, Churia mire Ramsar Site, Kulevi Terminal.

Monday 8 September: Kolkheti National Park Office, Paliastomi Lake – Ramsar Site, Pichora River, Kolkheti relict forest (by boat), Grigoleti

Tuesday 9 September: Maltakva, Imnati mire

Wednesday 10 September: Travel up to Minor Caucasus Arsiani Hill

Thursday 11 September: high mountain mire landscape and subalpine vegetation

Friday 12 September: Batumi Botanical Garden, Mtirala National Park

Saturday 13 September: Ispani I and II mires, Fichvnari and Namchediri archaeological settlements.

Field conditions are generally good. Access roads are available to most of the sites to be visited. Rubber boots are needed for the excursions in the (sometimes very wet) peatlands. As the Kolkheti area has high precipitation, rain clothes are recommended. We will spend considerable time near the Black Sea coast. If you want to swim local custom demands you bring swimming clothes.

Sleeping bags and mats are necessary for the Chirukhi lodges in the Minor Caucasus high mountains.

General Assembly Georgia 2008

Nominations for the IMCG Main Board

On our General Assembly in Georgia we have to elect a new IMCG Main Board. In order to guarantee an effective democratic election process involving all members, nominations have to be submitted to the Secretariat before 1 July 2006, so that ballots can be sent out in time to allow email and postal voting. Please send your nomination (incl. a short description of your backgrounds, your activities in, and vision on mire conservation) to the Secretariat.

On the IMCG General Assembly on Tuesday 16 September 2008 in Kobuleti (Georgia) only a limited number of IMCG members can be present, and only limited time will be available. Therefore we will arrange the discussions and decisions largely by internet and (e)mail, like we have done with earlier General Assemblies.

This Newsletter contains the preliminary agenda for this Assembly (that will be available on our website as well) and in the beginning of July we will produce a Newsletter containing the full documents for the Assembly and all information on how the voting per email or snailmail will be done. We will furthermore open a special site on our website where all drafts of discussion papers will be made available.

Therefore: provide the IMCG secretariat with additional (minor) agenda points and submit your background papers, concrete proposals, contributions

for discussion, nominations for the IMCG Main Board etc. until 1 July 2008. Send the material in as soon as possible – the sooner the better – so that we can arrange the democratic procedures in a smooth way.

The *preliminary agenda* of the IMCG General Assembly is as follows:

1. Opening and Welcome
2. Minutes of the General Assembly of 22 July 2006 in Tammela, Finland (available in IMCG Newsletter 2006/3)
3. Biennial report on the state of affairs in the IMCG and on its policy
4. Balance sheet and the statement of profit and loss
5. IMCG Action Plan 2007 - 2010: progress and amendments
6. Working with(in) international conventions
7. Relation IMCG - IPS
8. Membership fee
9. Conference resolutions
10. Honorary membership
11. Election of the Main Board
12. Information on next biennial venue 2008 in Poland/Slovakia; Agreement on biennial venue 2010; information on other venues
13. Any Other Business

IMCG Resolutions

The IMCG General Assembly in Georgia 2008 will again discuss and adopt resolutions. To streamline the procedure, IMCG members are requested to submit their draft resolution timely, i.e. as soon as possible, to the IMCG secretariat. This will enable to circulate the draft resolutions among the Main Board, to publish the necessary background information in the IMCG Newsletter of July 2008, and to put the drafts on our website so that everybody can send reactions (to the IMCG Secretariat).

Draft resolutions should identify the apparatus and bodies to which the resolution has to be directed or sent. Examples (phrasing and content) of resolutions can be found on the IMCG website (www.imcg.net/imcgdocu.htm). Resolutions are not always taken at heart by the governments they are addressed to. Yet resolutions remain a strong tool to influence government policies, the more so with the increasing strength of IMCG on the global peatland front.

Kolkheti wetlands in 2008

by Matthias Krebs and Izolda Matchutadze

As pointed out in earlier IMCG newsletters (Joosten et al. 2003, Krebs & Joosten 2006) the unique peatlands of the Kolkheti lowlands of Georgia (Transcaucasia) are still under high pressure from infrastructure development, exploitation of natural resources and privatisation of state owned land. The transition to a market economy has increased poverty and has forced the local community into a state of subsistence economy. As a result the use of peatland areas is increasing. In this contribution we describe some recent developments.

Kolkheti National Park (KNP)

Kulevi Oil Terminal and access railway

The Kulevi Oil Terminal is situated at the Black Sea Coast directly adjacent to the peatlands, dunes and marine parts of the Kolkheti National Park (KNP). The 300 ha large area was formerly part of the Central Kolkheti Wetlands Ramsar site and belonged to the KNP (Krebs & Joosten 2006).

The terminal will transport three types of oil products, including raw oil, diesel fuel and mazut (black oil), that will be transported by railway from Azerbaijan and shipped in the terminal's harbour. The volume of the terminal reservoirs is 380,000 m³, while turnover is expected to be around 15-20 mio t yr⁻¹ (Manana Kochladze pers. comm.).

During the construction several violations of national legislation, World Bank agreements, and the Ramsar Convention occurred, including not ratifying changes with regard to Ramsar protected area borders and not preparing an Environmental Impact Assessment (EIA) prior to construction. The Ramsar Advisory mission in 2005 highlighted the impact of terminal construction and operation on the Ramsar site and stressed the necessity of a compensation plan (Salathé 2005). Compensation areas have, however, still not been installed.

Early 2007, the Azerbaijani State Oil Company (SOCAR) bought the Kulevi Oil Terminal from its former owners around the Georgian investor Badri Patarkashvili (www.today.az/news/business/34842.html). The Georgian president granted 301 ha of land to the Black Sea Industry for expanding the terminal and for constructing a railway access road. The new project

sponsor announced that the Georgian Government agrees on the construction of an oil refinery in Kulevi (Manana Kochladze pers. comm.). Terminal operation is expected to start in May this year.

The existence and the obscure and continuous expansion of the terminal are endangering one of the largest areas of extremely sensitive peatland in the Kolkheti National Park. Recently, however, in a covenant with the Ministry of Environment of Georgia, the Terminal agreed to implement reforestation projects and conservation projects for the Common Pheasant *Phasianus colchicus colchicus* and the Black Sea sturgeon *Acipenser guldenstadti colchicus*. These first attempts to cultivate a better image may arouse hope for more transparency in future.

Oil field in the KNP area

Another threat to the KNP and the protection of its peatlands is the existence of oil fields on its territory (see map under <http://pubs.usgs.gov/of/1997/ofr-97-470/OF97-470E/fsumap.pdf>). The oil found in the 1960s was never exploited for unknown reasons. Recently a Georgian company has requested permit for exploiting oil in the Kolkheti lowland (Protected Areas Agency, pers. comm.).

Buffer and multiple use zones

The buffer, multiple use and rehabilitation zones that are important for the Kolkheti National Park (KNP) and the Kobuleti Nature Reserve (KNR) have not yet been installed due to conflicts between the local stakeholders and the KNP and because a law adjustment has not yet been made. This issue is going to be addressed in World Bank financed case studies focusing on traditional use. People living close to the Protected Areas are for their subsistence strongly dependent on these zones. The rehabilitation of ancient traditional trades such as weaving, timbering, bee-keeping, metal casting, and tinware work will furthermore promote (eco-)tourism and nature conservation. The development of eco-tourism is of great importance to combine ecological and economic needs.



Kulevi terminal (photo Hans Joosten, September 2007)

Kobuleti Nature Reserve (KNR)

Privatisation of Nature Reserve Areas for Peat Extraction

Plans existed to privatize areas at the margin of the unique mire Ispani 2, the world's first described percolation bog (Kaffke et al. 2000), situated in the Kobuleti Nature Reserve. After drainage the area was to be sacrificed for peat extraction. Drainage of the margin of its dome would have destroyed the whole mire, however. The plan has meanwhile been stopped by the new Minister of Environment Zaza Gamtsemlidze.

Sewage in the channels adjacent to the KNR

A factory producing juice from the citrus fruits growing in the region was built at the margin of the settlement Kobuleti and adjacent to the Ispani 1 and 2 peatland complex (Joosten et al. 2003), separated only by the 'Smekalovka' channel. After construction the operation was initially forbidden because of insufficient assessment of Environmental Impacts. Last autumn the operation started and fruit remnants were simply dumped in the adjacent channel, polluting also the Protected Areas. Fish are dying and local inhabitants suffer as their cattle falls ill after drinking the water.

The administration of the Kobuleti Nature Reserve will address this unacceptable situation problem through the local newspaper.

In spite of the problem sketched above, the Protected Area of the Ispani 2 peatland is an example of effective protection work in Georgia. In the last years the condition of the peatland has substantially improved. Especially impressive is the regeneration of the marginal zones that until some years ago were severely damaged by cow grazing. These have regained a full *Sphagnum* cover and invasive species are being suppressed. Also the rest of the mire is in excellent condition and shows the full characteristics of a percolation bog. These improvements are clearly attributable to the management of the last years,

especially the exclusion of cow grazing. Beautiful and instructive information boards have been installed in the framework of the Integrated Coastal Zone Management project. A watchtower allows visitors a spectacular view over the mire. The forest at the margin that was cut is growing again and damaging effects of former cattle grazing have nearly disappeared.

Outlook

The protection of the Kolkheti Nature Reserves is better organised and thus working more efficiently. But the examples show that – in spite of their conservation status – unique peatlands all over the Kolkheti lowland are still in acute danger of economic interests. This is also illustrated by changing the responsibility for Natural resources (like peat!) from the Ministry of Environment to the Ministry of Finance and Economy.

To safeguard the unique Kolkheti peatlands for the future a strong governmental and non-governmental protection movement in Georgia is necessary. The IMCG biennial field symposium in Georgia this year will be one further step to show the international importance and highlight the values of protecting the Kolkheti peatlands.

References

- Joosten, H., Kaffke, A. & Matchutadze, I. (2003): The mires of the Kolkheti lowlands (Georgia), International Mire Conservation Group Newsletter 2003/3, S.19-23.
- Kaffke, A., Couwenberg, J., Joosten, H., Matchutadze, I. & Schulz, J. (2000): Ispani II: the world's first percolation bog, In: Québec 2000 Millenium Wetland Event, Program with Abstracts, p. 487.
- Krebs, M. & Joosten, H. (2006): The golden fleece in trouble - the endangering of the Kolkheti peatlands (Georgia). International Mire Conservation Group Newsletter 2006/1: 6-9.
- Salathé, T. (2005): Ramsar Advisory Missions: No. 54, Georgia, Central Kolkheti Wetlands. www.ramsar.org/ram/ram_rpt_54e.htm [06.04.2006].

Agreement on compensation for peatland losses at Kulevi (Georgia)

On March 12, 2008, the Ministry of Environment Protection and Nature Resources of Georgia and the Black Sea Terminal Ltd have signed an agreement in order to fulfil the compensation requirements of the Ramsar Convention. Next to other requirements and general legal obligations the agreement comprises that the Terminal will

- 1) implement a program of annual ecological monitoring
- 2) undertake the demarcation correction of the perimeter of the Kolkheti National Park
- 3) technically and financially contribute to the formation of the reserved areas of Tchorokhi (289 ha and 63 ha in the sea), Anaklia (389 ha on land and 124 ha in the sea), Maltakhva (646 ha), the Rioni River mouth (984 ha), and Narionali Lakes (342 ha)
- 4a) ensure the demarcation of the Etsera Dikhagudsuba territory (1282 ha) added to the Kolkheti National Park
- 4b) ensure the rehabilitation/restoration of a Kolkhetian forest habitat of high conservation value
- 5) ensure the construction of a fish channel parallel to the riverbed of the mouth of the River Khobistskali, along the southern edge, up to the River Tsivi
- 6) plan and implement measures for the rehabilitation of the populations of sturgeon and salmon species, and to set up an incubation plant for indigenous species of sturgeon with an annual production of 500 000 fry for introduction into the wild
- 7) ensure the design and implementation of rehabilitation works and the optimization of the hydrological regime in the Kobuleti reserve and protected area (= Ispani)
- 8a) ensure the afforestation of 90 ha area to create a Kolkhetian forest habitat of high conservation value, and take care of it for 10 years
- 8b) provide financial support for the establishment of a nursery for species characteristic to the Kolkhetian forest, i.e. species that are indigenous, endemic, relic, or listed in the Red Data Book of Georgia
- 9) ensure the establishment of a protecting belt/zone of 100 meters wide and 500 meters long along the right bank of the River Khobi, using indigenous species, and to take care of it for 10 years
- 10) ensure the establishment of a noise-control zone of 25 meters wide along the railway on the side of the Nabada swamp, using indigenous tree and bush species, and to take care of it for 10 years
- 11) ensure the setting up of shelters for bats along the railway
- 12) ensure the construction of tunnels for small mammals, amphibians, and reptiles under the railway

13) facilitate the restoration of the population of pheasant through setting up a pheasant nursery for the Kolkheti National Park

14) ensure the establishment of a permanent archaeological exhibition in the visitors' center of the Kolkheti National Park and the development and publication of a scientific monograph about Kolkheti, in which all archaeological excavations in the region will be reflected

15) provide the administration of the Kolkheti National Park with technical and financial assistance in the implementation of research, monitoring and protection activities

Points 2 and 4a have to be implemented within 6 months, points 5, 6, 8 - 14 within one year, points 4b and 7 within five years.

The Caucasus Environmental NGO Network (CENN) reacted critically on the agreement. It noted that efforts and willingness are visible, but that the agreement remains vague and almost impossible to implement. Major criticism includes that severe conflict of interest may be generated because the responsibility of defining and implementing mitigation measures is delegated to Black Sea Terminal Ltd (BST). Additionally, the agreement requests BST, a private company, to intervene on territories controlled by other entities such as the Kolkheti National Park administration, without defining the legal ways to follow. Other criticism includes:

- The agreement does not fix any technical conditions and is unclear on the timeframes.
- Some measures mentioned require additional studies or even Environmental Impact Assessment before any implementation but this is not mentioned.
- Some elements of the agreement are general legal obligations and should therefore not be part of a 'compensation package'.
- By not defining the conditions of the requirements, the Ministry of Environment limits its ability to evaluate (financially and environmentally) the real compensations implemented by BST and to monitor the implementation and impact of the measures.

Further reading:

Gachechiladze, M. & Staddon, C. 2007. Towards a Political Ecology of Oil in Post-communist Georgia: the conflict over the Kulevi Oil Port Development. Journal of Political Ecology 14: 58 – 75.

From the abstract: Since 1998 the growing importance of the Caspian Sea's oil reserves for the international markets has put a new pressure on Georgia's energy transit capacities. One of the new transit facilities – the Kulevi Oil Terminal located on the country's ecologically-sensitive central Black Sea

coast –has emerged as a controversial development evoking several cross-cutting environmental policy, economic and political conflicts at the international, national, and local levels. This paper explores and tracks the nature of this multi-level environmental conflict over land-use and reveals it to be a complex product of the interplay between social, political and economic power. From a political ecological perspective it is possible to interpret the controversy over Kulevi as a ‘regional’ conflict of interests between different land managers. This paper discloses the links between these conflicts and their triggers at different spatial scales with a view to

articulating an emerging political ecology of oil for Georgia and the Caucasus. The paper reflects on how the threat of economic loss has forced environmentally unfriendly decisions in the region, causing internal problems and a derogation of the reputation of Georgia at the international arena. Several suggestions for resolution are offered, but their success depends on the contribution of the main players in the conflicts and their commitment to fulfil their obligations.

PDF download from: http://jpe.library.arizona.edu/volume_14/Gachechiladze.pdf

Ramsar and Peatlands

From 14-18 January 2008 the Ramsar COP10 preparatory meeting for the Asian region was held in Bangkok, Thailand. Of the total of 29 Asian parties to the Ramsar convention 27 took part. IMCG was represented by Faizal Parish and Tatiana Minaeva and with assistance of Ramsar representative Tobias Salathé a peatland round table was organised. Tatiana shocked her public explaining what a peatland is and pointing out that each country has to fulfil its Ramsar obligation to protect them. She also presented an analysis of national reports from the 2002-05 triennium, showing poor attention paid to peatlands. Faizal presented the Assessment on Peatlands, Biodiversity and Climate Change as well as ASEAN peatland activities. Mr Sulistrianto of the Ministry of Forestry of Indonesia presented information on Peatland Management and Climate Change in

Indonesia.

During the round table feedback interesting activities were presented from the countries. From example, Pakistan has a high altitude peatland inventory ongoing and Bangladesh and Thailand are restoring peatlands released from military use. These and many more interesting facts will be generalised into the report to COP10.

The round table once more demonstrated the strength of Ramsar in influencing peatland related policy.

We plan to have the same round table in Sweden in the European Ramsar regional meeting in the afternoon of 4 May 2008.

Everybody willing and able, please join lonely Tatiana Minaeva: tminaeva@wwf.ru

More on policy in the next Newsletter

Meeting IPS/IMCG

The annual meeting between the International Peat Society (IPS) and the IMCG to discuss global peatland issues, joint projects (e.g. the Mires and Peat journal, Terminology working group, Peat and climate discussion group) and further joint initiatives will this year take place during the International Peat Congress in Tullamore.

On Monday 9 June 2008, 14.00-17.20h, a joint IPS/IMCG Meeting/Workshop will take place that might be devoted to reporting progress of the joint projects. The IPS/IMCG meeting will be continued on Tuesday 10 June, 14.00-15.30h.

IMCG members who are in Tullamore and interested to participate, please contact the IMCG secretariat: joosten@uni-greifswald.de

submit your

DRAFT RESOLUTIONS

**Help making the Biennial meeting smooth and effective.
Contact the secretariat.**

On the impact of oil shale mining and processing on mires in Northeast Estonia

by Edgar Karofeld¹ and Mati Ilomets²

¹ Institute of Ecology and Earth Sciences, University of Tartu (edgar.karofeld@ut.ee)

² Institute of Ecology at Tallinn University (ilomets@tlu.ee)

Oil shale is a widely distributed organic-rich sedimentary rock that belongs to the group of sapropel fuels. The oil shale in northeastern Estonia was formed in a shallow warm sea in the Middle Ordovician some 400-500 million years ago. Due to the kerogen it contains oil shale can be used in chemical industry for various products and can also be burnt directly as a low-grade fuel for power generation and heating purposes.

Industrial interest in oil shale in Estonia arose with rising oil and coal prices in the 1910s. In 1916 large scale oil shale exploration was started in NE Estonia along the St. Petersburg – Tallinn railroad. From an opencast mine as many as 22 wagons of oil shale were sent to the St. Petersburg Academy of Science for testing. Extraction was interrupted by World War I and the Estonian Independence War, but already in 1918 industrial exploitation of oil shale in NE Estonia started.

In the northern part of the Estonian deposit oil shale is mined in opencast pits up to 30 m deep, while in the southern part underground mines go up to 70 m deep. The total area of opencast pits is ca 120 km²; that of underground mines ca 220 km². The re-cultivated area of former open pits covers about 10,000 ha, mainly used for forestry but including 160 ha of farmland. In Estonia all together ~20 open pits and underground mines have been in use. At present 3 open pits and 2 underground mines are exploited.

Annual oil shale production reached its maximum of ca 30 million tonnes in the 1980s. Following the Estonian re-independence and reduced demand for oil shale products (including electricity) annual mining has varied between ca 12 and 14 million tonnes during recent years. In total about 1 billion tonnes of oil shale has been mined in Estonia since 1918. Currently about 80% of the mined oil shale is used in two big and several smaller electric power plants, about 19% in chemical industry and the remaining in building material industry in the city of Kunda.

The northeast is also one of the most paludified areas in Estonia with large raised bogs and mire systems covering about 40% of the area. Oil shale mining and processing affect these mires in various ways, with direct impacts from mining, flooding for cooling water reservoirs, waste deposits and air pollution.

Some mires have been destroyed directly by opening of oil shale pits. About 5000 ha of mires in the northern part of the Puhatu mire system have been destroyed by the Narva open cast mine and the entire Hiiesoo Mire (~300 ha) by the Aidu mine. Before reaching the oil shale layer in a depth of 15 – 30 m, the sand, gravel and peat should be removed. In average about 0.17 t of peat is wasted to mine 1 t of oil shale. In case of the Aidu mine this was not done and at the Narva pit the peat was only partly used and

later just made useless by piling removed soil on top. In addition, about 1500-2000 ha of mires are estimated to be buried under oil shale ash hills of up to 60 m high from the nearby 'Baltic' and 'Estonia' power plants.

In the southern part the Narva pit directly faces the Puhatu Nature Protected area and Ramsar site that was created to protect the biggest mire system of Estonia with its rich avifauna. The effect on animals and particularly on birds of the noise and small earthquakes caused by explosion works is unknown.

As oil shale deposits lie below the ground water level annually 200-240 million cubic metres of water are pumped from open pits and underground mines. Depending on mining depth, soil structure, etc. this affects ground water levels in an area of typically 0.5 – 6 km (sometimes even up to 20 km) distance from the mine. Lake water levels drop by 2 to 3 m and wells dry out. The impact on mires has not been studied, but is bound to be disastrous.

Also mires above underground mines are negatively influenced by a sinking ground water table but also by land subsidence creating shallow water bodies. In the latter case flooded peat may rise to the surface and form floating peat mats.

Flooding also occurred when the Narva river was dammed in 1956 to create a water reservoir for cooling water for the 'Baltic' (1959) and 'Estonian' (1969) power plants. The reservoir covers 191 km², including parts of Kõrgesoo bog. As peat was not removed from the basin it started to decompose and due to the increased methane content was partly lifted to the water surface forming floating islands, causing problems for navigation and sometimes also for the turbines of the power station.

An exceptional problem for the NE Estonian environment is the air pollution related to the use of oil shale in power plants and chemical and industrial materials industry. The atmospheric deposition of some chemical elements rose up to 2000 times compared to pre industrial times. In industrial areas the negative effect of air pollution on environment is usually related to high atmospheric SO₂ concentrations and increased nitrogen and sulphur deposition by acid rain. In NE Estonia the calcium rich fly ash emitted from power plants and the Kunda cement factory is extremely alkaline (pH of water solution ~12) and responsible for most of the changes in nearby bogs. Large changes have been observed by several researchers near the 'Ahtme', 'Baltic' and 'Estonian' electric power plants since the 1980s (but likely started earlier) as well as near the Kunda cement factory.

Bog water pH has risen to 6.7 compared to 3 – 4 in undisturbed Estonian bogs. In combination with high Ca content (up to 40 mg l⁻¹ as compared to ~2 mg l⁻¹)

this has caused the disappearance of *Sphagnum* mosses and has led to an increase in the number of other moss and vascular plant species. Whereas only 30 vascular plant species are found in natural Estonian bogs, in most polluted bogs (Liivjärve, Niinsaare, Mustaladva) they number up to 140. After the disappearance of *Sphagnum* mosses, the resulting atypical bog vegetation includes species common for calcium and nitrogen rich habitats like *Epipactis palustris*, *Festuca rubra*, *Lonicera baltica* etc.

The ash content of surviving *Sphagnum* mosses increased from natural *ca* 2 % up to 12%. Increased pH and nutrient content have caused changes in the ecophysiology of bog pines resulting in twice higher rates of radial increment.

The impact on peat accumulation and the carbon budget has not been studied. It is estimated that net peat accumulation has stopped and decomposition processes are accelerated by the pollution

There is hope that the above described changes are reversible. After an almost twenty fold reduction in emission of air pollutants from 'Ahtme' in the 1980s and from 'Baltic' and 'Estonian' in the second half of the 1990s, *Sphagnum* mosses have started to reappear on some bogs. At first patches of *Sphagnum* species common for eutrophic and mesotrophic mires appeared on pool banks and ridges, then the number and area of these patches increased and bog species reappeared. Reduced atmospheric deposition and

acidification by the *Sphagnum* mosses leads to lower pH and a reduced number of plant species. With bog water geochemistry more comparable to natural bogs typical bog plant communities may recover.

At present oil shale mining is moving south and south-west, which means that in future mines will lie under protected mires, including Sirts bog (Natura 2000 site), Muraka bog and Puhatu mire complex (Ramsar sites). The oil-shale layer is located 30-40m below the surface and is covered by limestone deposits of more than 20m thick. The topmost 2-10m consist of Pleistocene sediments (mostly till) followed by the Holocene peat. The limestone deposit has lot of cracks and the upper aquifers are not well isolated from the lower ones. During mining water levels need to be kept below the oil-shale layer. This will lead to a water level draw down also in the upper aquifers, which will affect the peatlands. Research has started to look into the possibility of lower hydraulic pressure in the upper aquifer leading to increased pore flux in the catotelm of raised bogs.

The mineral subsurface of the mires is highly heterogeneous and the thickness of the pleistocenic sediments varies a lot. Therefore it is difficult to draw straightforward conclusions on what will happen to the peatlands in the future mining areas.

See also the home page of Eesti Põlevkivi (Estonian Oil Shale): <http://www.ep.ee/?lang=en>

Major hydropower flooding in Iceland

Hydroelectricity is central to the existence of Iceland as an industrialised country. Over 80% of the energy in Iceland is generated in hydroelectric power stations run by the national power company Landsvirkjun. Iceland's potential to produce electricity is by far larger than what its population is able to consume. The government has been looking for ways to export excess energy in an effort to industrialise the country. A solution was provided by aluminium industry that currently has several large smelters on Iceland.

As a result large areas of Iceland's natural wilderness, including areas of mostly shallow peat, have been or are threatened to be flooded to provide hydroelectric power for aluminium smelting plants. For this purpose the Kárahnjúkavirkjun power station, the largest hydroelectric power station in Europe (690 MW), was put into operation near Kárahnjúkar north of the Vatnajökull glacier to power a new aluminium smelting plant built by Alcoa in the town of Reyðarfjörður.

The Kárahnjúkar hydropower project involved damming two rivers in eastern Iceland – the Jökulsá í Fljótssdal and the Jökulsá á Dal. Five large dams have been built, of which the largest is 193 m high and 730

m long. The largest reservoir, the Hálslón reservoir will be 57 km². Some rivers will dry up as a result of the damming. Also the Jökulsá á Dal will carry much less water most of the year resulting in lower sedimentation rates in the estuary. Shoreline erosion will prevail, impacting seal and geese populations living there.

The Jökulsá í Fljótssdal will carry all the excess water from the power station to the lowland Lagarfljót lake where rising water levels will cause darkening of the water resulting in a temperature drop of 0.5°C. This is likely to have major impact on the ecosystem, affecting protected bird species like Greylag and Pink Footed Geese (both Bern Convention Annex II).

The hitherto unspoiled nature harboured 35 rare moss and lichen species, two of which globally threatened, and important grazing grounds for reindeer and goose. Some 280 small animal species have been identified at Kárahnjúkar including three insect species never previously found in Iceland. Moreover, many unique geological features are affected by the hydropower project, including 60 waterfalls, various hot springs and canyons, including the Hafrahvammagljúfur canyon (Iceland's "Grand Canyon").

Taking into account all the wider impacts, the total area affected by the Kárahnjúkar hydropower project is estimated at 2900 km².

Beyond the immediate impacts there are concerns about the long term effect of the project. The level of the reservoir will fluctuate by up to 75 metres leading to exposition and drying out of large mud areas. Dust blown from these areas by the prevailing strong winds may damage vegetation and habitats in the wider surroundings.

The aluminium smelter will emit 3900 tonnes of sulphur dioxide into the atmosphere per year, or 12kg/ton, which is more than twice the limit of 5kg/ton set in the WHO guidelines for Europe. This is in addition to high levels of greenhouse gases like tetrafluoromethane (6500x stronger than CO₂) and hexafluoroethane (9200x stronger than CO₂), leading to greenhouse gas emissions of more than 1.5 tonnes CO₂-eq per tonne of aluminium produced.

The dam is built close to one of the most volcanically active and unstable areas of the Earth. The Vatnajökull glacier is melting as a result of climate change leading to an uplift of 1 – 2 cm per year. This can lead to instabilities in the crust causing fracturing beneath the dam with disastrous results.

The rationale behind Kárahnjúkavirkjun was to bring industry and jobs to the impoverished east coast of Iceland that suffers from a decline in traditional industries like fishing and farming. Most of the

construction work is being done by foreign workers, however. The number of jobs the project will create is estimated at 400 direct and an additional 500 indirect jobs. The total investment by the government in the hydropower scheme amounts to at least 1.1 billion Euro, or over 1 million Euro per job created. This corresponds to 3000 Euro of tax money per citizen of Iceland.

The electricity generated by the scheme has no domestic use. Alcoa, the company that will run the smelter has agreed to buy electricity for the next 40 years. Independent research suggests that if interest rates increase, the price of aluminium falls, and the króna remains strong (all of which are projected), the project will lose over 20 million Euro a year. In this case the country will be effectively subsidising Alcoa with a huge overseas debt.

The problem doesn't end with Kárahnjúkar. There are plans to dam all the major glacial rivers of Iceland to generate power for highly polluting heavy industry. Iceland is undergoing by far the largest industrial assault on wild nature in Western Europe.

National Geographic recently published an in depth article touching also on some socio-political aspects of the Kárahnjúkar hydropower project. You can read it online here: <http://ngm.nationalgeographic.com/2008/03/iceland/del-giudice-text>

JC

Oil exploitation in arctic mires

The Arctic holds the world's largest remaining untapped gas reserves and some of its largest undeveloped oil reserves. Hydrocarbon development and transport already pose serious threats in four of the twelve Arctic ecoregions:

- the Alaskan North Slope Coastal Plain ecoregion (Arctic National Wildlife Refuge and National Petroleum Reserve);
- the Barents/Kara Sea ecoregion;
- the Canadian Low Arctic Tundra and Canadian Boreal Forests ecoregions (the Mackenzie River Valley and Delta);
- and subarctic Sakhalin in the Russian Far East ecoregion.

Oil and gas development is also very likely to be a medium-term threat in the Taimyr Siberian Coastal Tundra ecoregion, the Fenno-Scandian Mountains ecoregion, the East Siberian Taiga ecoregion, the Chukota Coastal Tundra ecoregion and the Bering/Beaufort Seas ecoregion (including the Canadian Beaufort Sea).

The Arctic is a frontier region and oil and gas development will require the building of massive infrastructure through ecologically intact areas. Next

to direct impacts, the creation of new infrastructure will dramatically lower the barriers to entry for other kinds of resource exploitation.

Oil spills, whether from blowouts, pipeline leaks or shipping accidents, pose a tremendous risk to arctic ecosystems. These ecosystems are characterised by a short productive season, low temperatures, and limited sunlight. As a result, it can take many decades for them to recover.

In spite of all ecological risk, the Arctic will become more important for global energy production. The area borders the three most important energy markets of the world: Europe, North America, and Asia. 80 % of Arctic oil and 99 % of Arctic gas is currently produced by Russia.

Geopolitically Europe and North America want to reduce their dependency from the Gulf and the Caspian Sea regions. The Arctic promises more price stability and less reliance on politically risky partners.

Sources:

www.panda.org/about_wwf/where_we_work/europe/what_we_do/arctic/what_we_do/oil_gas/index.cfm

www.spiegel.de/wissenschaft/natur/0,1518,530224,00.html

Prudhoe Bay: oil exploitation in arctic mires

Prudhoe Bay is the largest oil field in North America, and the eighteenth largest oil field in the world. Covering 20 km² of Alaska's North Slope, Prudhoe Bay includes some 4,000 exploratory wells, 800 km of road, 1,800 km of pipeline, 5 docks, and 25 production, processing, sea water treatment and power plants.

The oil reserves in Prudhoe Bay were discovered in 1968, and production began in 1977. Peak production was in 1998 but since production has more than halved.

From Prudhoe Bay the 1,288 km long Trans-Alaskan Pipeline runs to the port of Valdez where the oil can be transported by oil tankers. The United States receives a substantial part (20 -25 %) of its domestic oil from the Alaskan North Slope, making Prudhoe Bay a vital contributor to the country's overall oil resources.

Prudhoe Bay is an excellent example of the consequences of constructing a large oil field in an arctic environment and much research has been done into that subject, that some years ago was compiled by Truett & Johnson (2000).

Oil industry disrupts tundra surfaces by removing, compacting, dusting, oiling, partially covering, or otherwise altering the vegetation cover and the peaty soil. Except where soil, organic matter, or debris are piled, disruption almost always results in thermokarst. Compaction or removal of soil and vegetation reduces surface insulation. Deposition of road dust on snow hastens snowmelt, and spillage of oil on tundra reduces albedo. All these processes promote thermokarst by enhancing heat absorption during summer. Subsequent to thermokarst water accumulates and 'ponds' on the surface. Ponding reduces surface thermal insulation and albedo even further, exacerbating subsidence.

Impoundments also form behind blockages of surface run-off. Such impoundments occur where roads or other infrastructure block drainage.



Oil field facilities in Prudhoe Bay polygon mires

Table: Potential environmental impacts from oil and gas exploration and development (after Truett & Johnson 2000)

Component	Potential impact
Air	Emission of gases from flaring, venting and purging gases, combustion, fire protection systems, road traffic, dust dispersal, fugitive gas losses
Water	Quality: waste streams from produced water, drilling and well treatment fluids, process, wash and drainage water, sewage and domestic water Quantity: alteration of drainage patterns due to road or facility construction; creation of wetter or drier habitats by changing topographical features or adding fill material; direct vegetation clearance
Soil	Soil disturbance due to compaction, erosion resulting from changes in slope angle, promotion of thermokarst
Vegetation	Vegetation losses due to construction of access roads, drilling and production sites, infrastructure, mine sites
Wildlife	Direct habitat loss, habitat disturbance, displacement, blockage of access to habitats.

Since 1977 impacts have been reduced through improved environmental management (elimination of surface waste disposal, reductions in air emissions and spills of oil and other chemicals) and through reducing the size of the oil industry operations. Reduction of the operational footprint has been especially achieved through consolidation of facilities, use of (temporary) ice road technology (instead of gravel roads), directional drilling (allowing to reach locations up to 5 km lateral from the drillsite), improved waste handling, re-injection of drilling by-products, and increased automation and remote-control operation.

A rupture of 30 year old corroded pipeline in March 2006 sent nearly 800 m³ of crude oil spilling out across the snow, directly affecting almost one hectare of ground. The leak – and the subsequent discovery that 10 km of pipeline was badly corroded – led to the shutdown of half of Prudhoe Bay oil production capacity and the loss of hundreds of millions of dollars. In October 2007, BP was fined \$20 million for the oil spills.

Sources:

Truett, J.C. & Johnson, S.R. (eds.) 2000. *The Natural History of an Arctic Oil Field. Development and the Biota*. Academic Press, San Diego, 422 p.
http://en.wikipedia.org/wiki/Prudhoe_Bay_oil_spill
http://www.columbia.edu/~sp2023/scienceandsociety/web-pages/Prudhoe_Bay.html

Niger Delta: Oil's dirty business

The dark side of global development: the Niger Delta (Nigeria), once a natural paradise, has been transformed into an inferno of rigs and refineries operated by Western oil companies that have destroyed the area's ecosystem and reaped enormous profits.

Nigeria has become Africa's biggest producer of petroleum. Some 2 million barrels a day are extracted in the Niger Delta. Since 1975, the region has accounted for more than 75% of Nigeria's export earnings. Much of the natural gas extracted in oil wells in the Delta is immediately burned, or flared, into the air at a rate of approximately 70 million m³ per day. This is equivalent to 40% of African natural gas consumption, and forms the single largest source of greenhouse gas emissions on the planet. Over 20 million people live and work in the Delta, where severe contamination of the flora and fauna has led to changes in the food chain.

In IMCG Newsletter 2004-3 Willem Smuts described how oil spills and fires from sabotaged pipelines in the Niger Delta have devastating effects. Entire villages and 1000s of hectares of surrounding swamp forest have been laid waste by such fires. Subsequent peat fires burn for many months unchecked until the next rainy season lifts water levels again.

The environmental devastation and the lack of distribution of oil wealth have been the source of numerous environmental movements and inter-ethnic conflicts in the region, including recent guerilla activity by the Movement for the Emancipation of the Niger Delta (MEND).

The film *Delta, Oil's Dirty Business*, by Greek director Yorgos Avgeropoulos, shows from an insider's perspective the life-threatening risks the members of MEND are willing to take to stop the devastation.

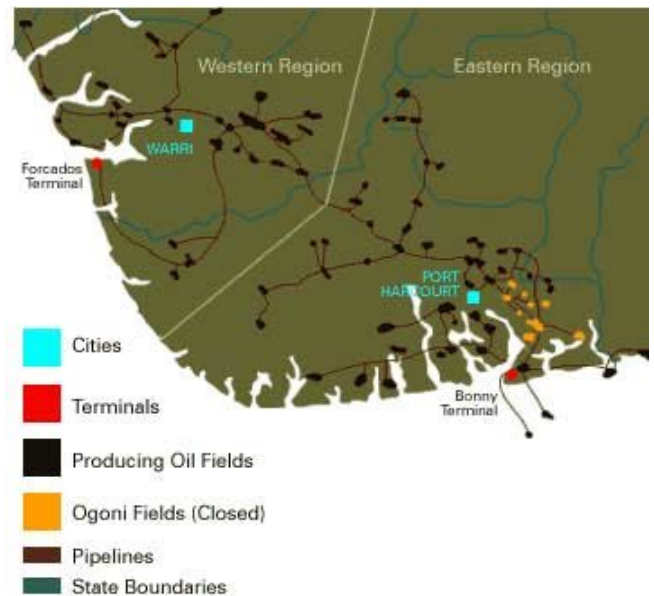
Yorgos Avgeropoulos (Athens, 1971) works as a journalist for the major Greek TV networks. Since 2000 he has collaborated on assignment from NET Channel on Exandas, a series of news reports from around the world, of which *Delta Oil's Dirty Business* is part.

On the International Film Festival and Forum on Human Rights (Geneva, Switzerland, March 2007) the film received the Junior Jury Award "for its aesthetics and its clarity in dealing with topical issues that touch and implicitly affect us. The film director managed to share his global view of governments just as compromised as multinational corporations."

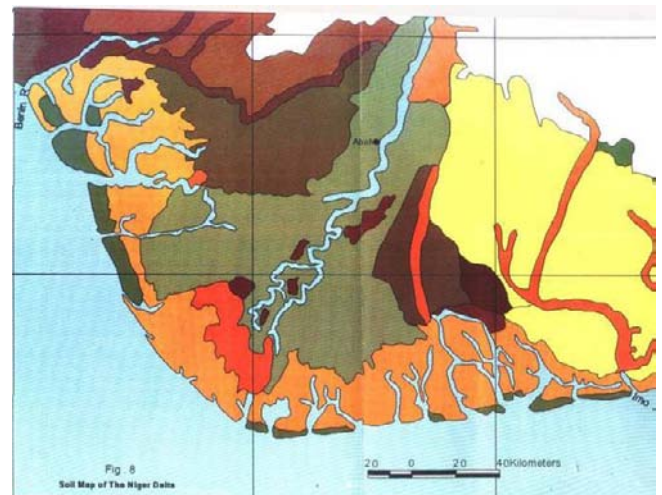
On the 10th Environmental Film Festival Cinambiente in Torino Italy (October 2007) the film received a special mentions in the International Documentary Competition. Jury's statement: "We felt this film deserved to be honoured because it delivers a powerful and blistering

indictment of the environmental and social devastation caused by the oil industry in the Niger Delta and contains highly moving footage of murdered environmental activist Ken Saro Wiwa."

Contacts: Small Planet Productions Greece
info@smallplanet.gr



Oil infrastructure in the Niger Delta
(www.theoil Drum.com/node/2348)



Soils of the Niger Delta. The brown areas represent peat soils (IMCG Global Peatland Database).

Coal mining in South Africa threatens peatlands

by Marina Caird

At present there are 114 applications for coal mining on farms in South Africa in an area encompassing Dullstroom, Kwaggaskop, Belfast, Dalmanuta, Wonderfontein, Carolina, Warburton, Chrissiesmeer, Breyton, Lothair, Ermelo, Holbank, and Sheepmoor. The total area with mining applications is approximately 22,000 hectares and contains extensive interconnected and interdependent wetlands and peatlands including the unique Mpumalanga Lakes Area (see next article in this Newsletter) and the 11,600 year old Lakenvlei peatlands.

Besides wetlands, there is valuable agricultural land that is farmed successfully in a country that is losing its agricultural potential. Thanks to tourism and related industries more long term jobs have been created in this area. These jobs in quantity and quality offer far more than what the coal mines can offer. One large hotel and leisure estate can offer as many as 500 permanent jobs, for example, requiring a broad mix of skills. Coal mining will destroy this and can at best offer 50 short-term jobs per (mostly small) mine with a lifespan of only 4 to 6 years, mostly in form of low paid sweepers working in unhealthy circumstances.

What's more, the coal from these proposed mines would only provide power for the country for one year. Unless Minister Buyelwa Sonjika has the foresight and political will to stop the Department of Minerals and Energy (DME) from granting the licenses, we will lose unique wetlands, productive agricultural lands, jobs and tourism all for one year's worth of low grade coal that is not even worth exporting.

This contemplated destruction of thousands of hectares of wetlands and good agricultural land is largely driven by Eskom (see box) for no better reason than that the coal underneath is near to Eskom power stations and they can get it cheaply. Mining of much of this coal is only economically viable if Eskom buys it.

Eskom is a South African electricity public utility, established in 1923 as the Electricity Supply Commission (ESCOM). The utility is the largest producer of electricity in Africa, is among the top seven utilities in the world in terms of generation capacity and among the top nine in terms of sales. Eskom has announced its intention to double electricity output in the next 20 years and the Department of Minerals and Energy is the main player and referee in issuing and policing coal-mining permits. In terms of a controversial Bill introduced in May 2007, landowners need not consent to plans to mine on their property.

There can be absolutely no justification for granting new coal mining licenses when we are already at a crisis point with more than 800 unrehabilitated mines, an estimated cleanup bill of R100 billion and water quality in our rivers and dams deteriorating. 70% of the coal mined in South Africa is currently being exported and we have an estimated 300 years worth

of coal left still to be mined. There is no shortage of coal; there may just be a shortage of very cheap coal. If the coal market is "tight" for Eskom, it is because it is reluctant to pay the export price for coal or to charge industry more.

The ultimate price for this short sighted penny pinching is the environment, in particular our water resources. Mining companies and industries are evidently encouraged to stay where they can exploit a cheap operating environment, allowing them to expatriate large profits with minimal restraints. Cheap electricity production is being exported along with our cheap water and cheap South African labour.

Many of the companies that have mining applications on these farms already have signed contracts from Eskom without even having embarked on the process of obtaining a mining license or even in some cases a prospecting license!

What makes all this possible despite objections from virtually every government department is the Minerals and Petroleum Resources Development Act (MPRDA) which succeeds in putting the actions and decisions of the DME almost completely out of the reach of just about all other legislation in the land.

Under the MPRDA it is very easy for a mine to have its Environmental Management Plan (EMP) approved. All it basically needs to show is that its impact can be mitigated in *some* way. Under the MPRDA each mine needs only to consider its *own* impact, making it very easy to show that impact will be minimal and will be mitigated. The impact of the applicant mine is never considered in relation to its contribution to the cumulative impacts many mines in the same area can have.

When objections from other government departments are submitted, these are referred to the Regional Mining Development Environmental Committee (RMDEC), DME's own internal environmental forum under the MPRDA. When no consensus can be reached the objections from "outside" departments are effectively devalued to the level of a "comment" and then submitted to the Minister of the DME for her "consideration". This implies complete concentration of power in the hands of the Minister of the DME.

Even the Department of Water Affairs and Forestry (DWAF) who has retained a little residual power in being able to refuse to grant a Water Use License can be overruled by a so-called Cooperative Governance Agreement. When a Water Use License for disposing dirty water on nearly 900 hectares of pristine wetlands was refused to the Goedgevonden Coal Mine at Ogies (the flagship mine of S. Africa's leading mining entrepreneur Patrice Motsepe), this regional decision was overturned by DWAF head office in Pretoria, without any explanation.

It appears that the DME and the Minister herself are not obliged to explain their actions or decisions to anyone. The way this department has set itself up under the MPRDA is illegal under the Constitution

because it effectively precludes other government departments their mandates in protecting our natural resources.

Opaque, concealed and absent mining records and decisions appear to characterize this industry. Not even the DWAF seems able to protect our water resources and catchments against the onslaught of these many small mines. When the mining companies state that they are operating within the law, what they mean is that they are operating under what they can get away with under the MPRDA.

The only recourse against these illegal actions is through private citizens appealing for relief through the courts. We cannot have a situation where one government minister, in one department, has the power to wreak such wholesale destruction. It is deeply shocking when private citizens are driven to fence off conservation worthy areas in a forced and costly war against the mines because the officials that are supposed to protect these areas can do nothing.

Most of the mines are still in the prospecting phase and the Minister could still intervene with complete justification and based on good socio-economic and

environmental grounds. Miners can now simply walk onto a piece of land and claim its use. No assessment is ever undertaken to determine whether such mining is sustainable or in the national best interest or whether it is damaging to the national interest. Apart from mining, the DME seems to have little interest in the nation's resources.

WESSA Lowveld appeals to the officials of all government departments, in particular the DWAF, to vigorously object to each and every one of these applications. WESSA Lowveld also appeals to any one who has any legal standing and expertise to work to restore environmental constraints on mining to our national environmental legislation. The "use it or lose it" clauses in the MPRDA should be scrapped and a national Sustainable Mining Development Planning Framework should be developed that leads away from the current unplanned and chaotic Wild West free for all.

Marina Caird, WESSA (Wildlife and Environment Society of South Africa) Lowveld; info@scoptics.net
17 July 2007 (Shortened and edited by HJ&JC)

Impact of the Energy Crisis in South Africa - Newly discovered peatlands under threat

by Anton Linström and Piet-Louis Grundling

The world is at present undergoing an energy crisis. The rising costs of oil and other fossil fuels such as coal bear testimony to that. The energy crisis is even more prevalent in South Africa and the country literally entered 2008 in the dark. A dearth of management skills in South Africa's state owned electricity supplier, ESKOM, has resulted in power shortages, shutting down of some generators and a shortage of coal at generators in general. Some mines in South Africa had to close down due to the lack of electricity, which again led to a rise in the cost of coal. The end result of this debacle in South Africa with its strong growing middle class is an increased demand in coal and with that an expansion of coal mining activities.

It is ironic that ESKOM is now heralding the construction of the Ingula pump storage scheme in the Ingula peatland (previously known as Braamhoek/Watervalvlei) as an example of the vision they had to avert the current coal crisis. Previous issues of the IMCG newsletter have covered IMCG support to environmentalists in South Africa to halt the destruction of the Braamhoek/Watervalvlei mire.

From an environmental viewpoint, the largest impacts of coal mining are on the grasslands and wetlands in the eastern highlands of South Africa in the Mpumalanga province (see elsewhere in this Newsletter). A variety of wetland types, including floodplains, peatlands, springs and seepage areas, occur here in valley bottoms, depressions (pans) and on hillslopes. The valley bottoms are targeted by the mining companies because of the relatively thin (20 – 40 m) layers overlying the coal. Open cast coal mining then results in a complete loss of these often unique systems.

In South Africa average annual rainfall amounts to 497mm (compared to a global average of 800mm) and South Africa is acknowledged as the 30th driest (arid) country in the world. In this light, the ease with which vital wetlands are destroyed should be met with much more scrutiny.

The latest area that is coming under pressure is the Lunenberg – Wakkerstroom area. This area is located within the Great Escarpment Mountain Peatland Eco region of South Africa. The Wakkerstroom peatland is part of a Ramsar site. Three peatlands, previously unknown to the authors, were recently recorded in the Luneberg area.

Eco-region name : Great Escarpment Mountains	
Provincial coverage:	Mpumalanga, KwaZulu-Natal and Free State.
Modelled peat eco-region area (ha):	1 387 739
% of total modelled peat eco-region area:	17.64%
Rank in terms of size/area:	2nd largest peatland eco-region.
Topography:	Discontinuous along the Great Escarpment of South Africa. High mountains with high relief and low mountains with high relief are common.
Altitude:	800 - 2 500 m a.m.s.l.
Mean Annual Precipitation:	978 mm.
Vegetation types:	Mostly mountain grassland types with patches of isolated afro montane forest in some parts.
Rock types:	Quartzite, quartzitic sandstone, sandstone and mudstone.
Soil texture types:	Sand-clay-loam, sand-loam and sand-clay.
Major land-use conversion and % area altered:	Forestry (21%)
Peatlands	
Number of peatlands:	13
% of total number of peatlands:	2.8%
Rank in terms of number of peatlands:	6th
Peatland area range (ha):	2 - 298
Total peatland area (ha):	849
Peat thickness range (m):	0.75 - 2.00
Peat thickness average (m):	1.27
Peat volume range (m ³):	3 000 - 360 000
Resource (m ³):	938 000

The 3 peatlands occur on the farms Paardeplaats 101 HT, Goedgevonden 134 HT and Zuurbon 132 HT within the Wakkerstroom Montane Grassland area where high humidity guarantees constant water input. Some special and unique wetlands occur on the farm properties and are responsible for conservation of high quality water. These wetland types include valley bottom peatlands, recharge areas, seepage areas and pristine riparian wetlands. These wetlands depend on three drivers that define their health and ecological characteristics:

- Hydrological – the presence and the flow of water – which will vary seasonally and after rainfall;
- Chemical and physical – water quality – which is a measure of the dissolved chemicals and sediment contained in and transported by water;
- Geomorphological – the physical land surface – the types of rock, soil and the slope of the surfaces over which the water flows, both in uplands and in the water-courses of rivers and streams; this includes the plant cover that controls erosion.



Peatlands in the Luneburg area



A hillslope seepage wetland in the Luneburg area

If any of these drivers is disturbed the health, integrity and sustainability of these wetland systems would be at risk.

Why are these peatlands important? Fifty percent of all permanent wetlands in the world are peatlands, and most of these are located in the Northern Hemisphere. Only one percent of all peatlands occur in Africa and South America collectively (Lappalainen, 1996) and are thus a rare feature in the southern African landscape. Wetlands, including peatlands, are recognised as fulfilling important functions in the landscape, many of which provide benefits for humankind. Besides outputs that can be consumed directly, other values relate to future direct outputs or to indirect uses. This includes groundwater recharge, flow augmentation, flood attenuation, erosion control, sediment removal and /or retention, nutrient removal and/or retention, toxicant removal and/or retention, habitat for fauna and flora including rare, migratory or unusual species and the provision of a carbon sink.

According to the National wetland classification system for South Africa, based on the Cowardin system of the United States of America (Cowardin *et*

al. 1979), the Luneburg Wetland Peatlands can be classified as a Palustrine Persistent Emergent Wetland. This type of wetland is dominated by emergent plant species, which normally remain standing at least until the beginning of the next growing season (Cowardin *et al.* 1979). Dominant and abundant plant species include *Carex acutiformis* and *Schoenoplectus* sp. supporting the classification. At a finer level of classification, these wetlands can be described as valley-bottom fens.

Consideration must be given to groundwater recharge. Areas where rainwater can move quickly to the water table via direct paths (such as fractured rock outcrops) are known as *preferential recharge areas*. These areas need to be identified and managed to maximize the recharge process. Some examples are outcrops of fractured hard rock, riparian zones, fault lines, scree fans and very shallow soil profiles (DWAf, 2005). Several of these areas do occur on all these mentioned properties.

Wetlands should not be seen in isolation but should be evaluated in the framework of its catchment. As such the conservation value of flood attenuation can increase if the integrity of other wetlands is taken into account. The farms Paardeplaats 101 HT, Goedgevonden 134 HT and Zuurbon 132 HT are riddled with wetlands. Delineation of all these wetlands and an assessment of their integrity and

their concrete goods and services is of the utmost importance.

Improper procedures were followed by the mining company and the South African Department of Minerals and Energy in applying and issuing mining licences (Grus, 2008). The environmental impact assessments have been insufficient and mitigating measures are improper. The scheduled mining of coal in this area will have a disastrous effect on its wetlands.

References:

- Cowardin, L.M., Carter, V., Golet, F.C. & Laroe, E.T. 1979. Classification of wetlands and deepwater habitats of the United States. US Department of Interior, Fish and Wildlife Services. Report FWS/UBS 79-31.
- Department of Water Affairs and Forestry, 2005. A practical field procedure for identification and delineation of wetlands and riparian areas. Department of Water Affairs and Forestry. Pretoria. South Africa.
- Grus, 2008. Newsletter of the South African Crane Working Group. Grus Grapevine. February, 2008.
- Heinl, M. 2002. Identification and Mapping of Peatlands in Southern Africa. IMPESA. Brochure.
- Lappalainen, E. 1996. General review on world peatland and peat resources, in Global Peat Resources, edited by Lappalainen, E. pp. 53-56, International Peat Society and Geological Survey of Finland.
- Mitsch, W.J. & Gosselink, J.G. 1986. Wetlands. Van Nostrand Reinhold. New York.

Anton Linström, alinstrom@lantic.net

Piet-Louis Grundling, peatland@mweb.co.za

The Tevreden Pan peatland complex of the Mpumalanga Lake District (South Africa)

by Piet-Louis Grundling¹, Anton Linström², Retief Grobler³ and Johan Engelbrecht²

¹Department of Geography, University of Waterloo, Canada;

²Mpumalanga Parks and Tourism Agency, Lydenburg, South Africa; ³Imperata Consulting.

More than 50 % of the world's permanent wetlands are reported to be peatlands and mires (mires are peatlands supporting peat forming vegetation), of which only 1% occur in Africa. Mires and peatlands contribute to biodiversity, regulate hydrological functions and contain a third of the earth's terrestrial carbon (Joosten & Clarke 2002). Nearly 10 % of South Africa's wetlands are estimated to be mires and peatlands. Most peatlands in South Africa are valley bottom fens occurring in our coastal areas such as Maputaland in northern KwaZulu-Natal and the Highveld areas and along the escarpment. Some peat occurs in hill-slope seepage areas (e.g. the Maluti Mountains), in interdune depressions, as well as around dolomitic and other springs.

Pans are depressions without outflow that occur mainly in the drier western parts of the country (including the Northern Cape, Free State and Northwest Provinces), but are also found in the wetter eastern parts (Gauteng and Mpumalanga Provinces) and in the Kruger Park National Park. The eastern extent of the pan belt in the Highveld is concentrated around the town of Chrissiesmeer. The area is unique due to the high density of pans, several

of which are permanently saturated. The pans range in size from less than a hectare to over a thousand hectares (Lake Chrissie). Collectively the pans inside the pan field are known as the Mpumalanga Lake District (fig. 1).

The Mpumalanga Lake District has a fairly high rainfall of 800 mm per annum compared to less than 200 mm per annum for the pans in the western part of the country. These pans in the west are mostly ephemeral whilst the pans in the Mpumalanga Lake District are more or less perennial and also less saline. Water sources include precipitation, surface run-off and groundwater. On the regional scale, run-off is an unimportant source as the Mpumalanga Lake District lies on a plateau surrounded by the drainage basins of large river systems that arise around the fringes of the pan field, namely the Vaal River, the Komati River (via the Boesmanspruit), the uMpuuzi River and the Usutu River (McCarthy *et al.* 2007). On a more local level, however, run-off from the immediate (though small) catchment is important for each pan and responsible for clastic sedimentation and nutrient input from the surrounding landscape (McCarthy *et al.* 2007).

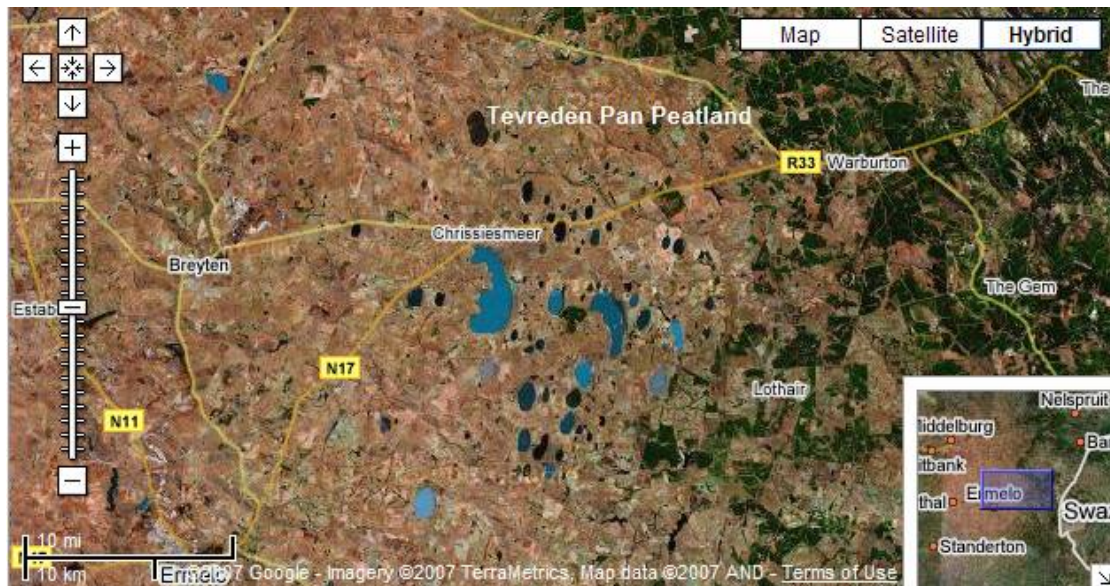


Fig. 1: A Google map image of the Mpumalanga Lake District with Lake Chrissie in the centre and Tevreden Pan peatland towards the north (top of image).

A total of ca. 320 pans occur in the Mpumalanga Lake District. Smuts (1997) already pointed at the existence of pan mires with up to two meters of peat in the Chrissiemeer area. Unfortunately his comment that these pans “exhibit interesting mire formation”, was not further elaborated.

The Tevreden Pan is by far the largest of the vegetated Pans, here a dense growth of *Phragmites* reeds (emergents) with a narrow outer ring of open water (fig. 2). The reed pans in the Mpumalanga Lake District usually retain high water levels throughout the year and are likely to be peat forming.



Fig. 2: Southward panoramic view of Tevreden Pan with the outer ring of open water visible in the foreground.

Located in the northern part of the Mpumalanga Lake District, the Tevreden Pan Peatland complex (S26°12'33" E30°12'18") consists of a larger perennial Pan (the Tevreden – Satisfied in Afrikaans – Pan) and a smaller Pan immediately south-east of it (fig. 3). The larger pan is approximately 300 ha in extent and the smaller 50 ha. These two pans have been covered by *Phragmites australis* (Common Reed or *Fluitjiesriet* – whistling reed in Afrikaans) as far as historic records go back. Pans with *P. australis* make out only 2.3% of the pans in the Mpumalanga Lake District (Allen 1985). With the high probability of finding peat, the Tevreden Pan was studied in detail.

On 31 May 2007 the larger Pan was accessed on the northern side where a stranded floating *P. australis* reed mat (or raft) was found. Figure 4 illustrates an example of such floating reedbed with a submerged peat body below the water surface. Samples taken with a Russian peat auger showed that the mat consisted of peat with an upper fibrous layer (H1 on the Von Post humification scale: 0-60 cm depth), a less fibrous middle layer (H4: 60-80 cm depth) and a bottom fine peat layer (H9: 80-100 cm depth) (table 1). A follow up visit in June revealed a water depth of more than 5m with a 1.5m thick floating peat layer and a peat detritus layer on the basin floor of about 0.5m. More comprehensive surveys are planned for the future.



Fig. 3: A Google image of the Tevreden Pan Peatland Complex. The white bar represents 500 m.

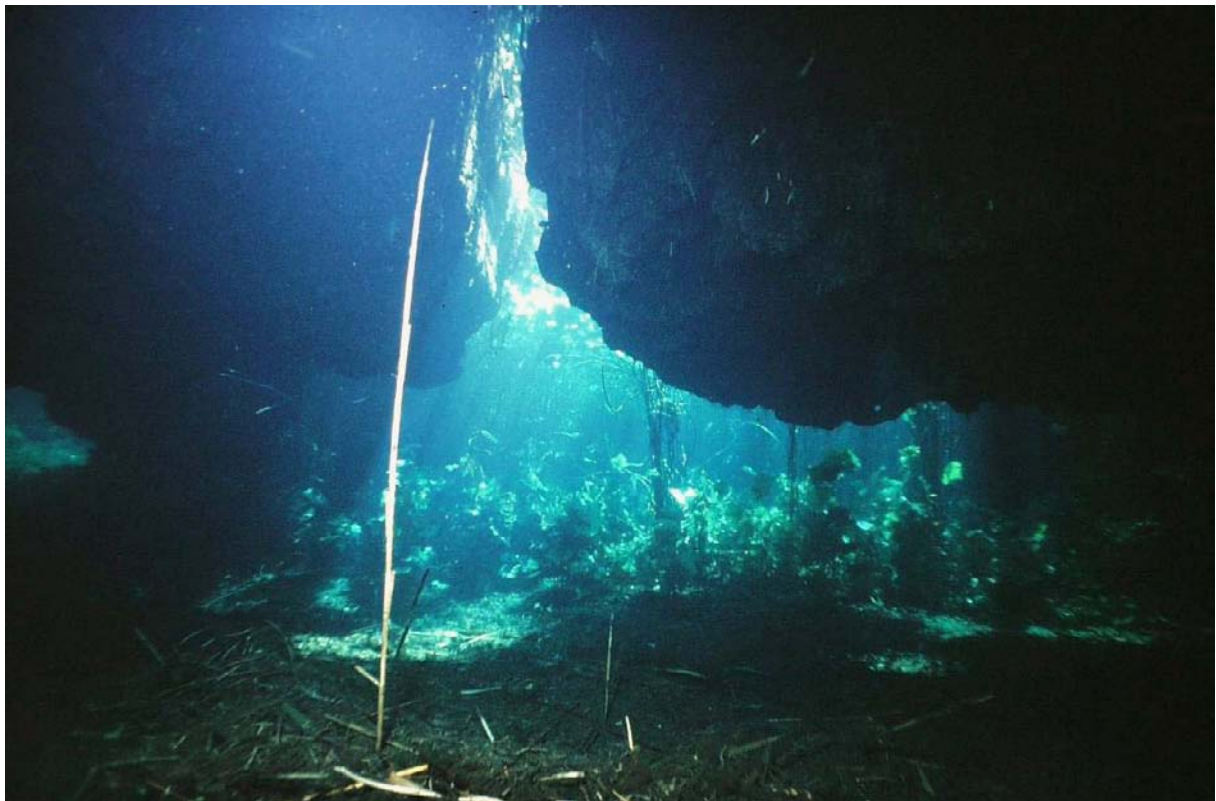


Fig. 4: An image of two floating *Phragmites australis* reedbed rafts with submerged peat bodies, similar to the peat body identified at Tevreden Pan (Photo taken at Marico-oog in the Northwest Province).

Table 1: Description of the peat profile.

Depth (cm)	Peat Colour	Peat water colour	Degree of humification (Von Post)	Description
0 – 10	Dark brown	Yellow to clear	2	Very fibrous, mainly reeds
10 – 50	Yellow brown	Yellow to clear	4	Very fibrous, mainly reeds and sedges
50 – 80	Dark Brown	Turbid	5	Fibrous, mainly reeds & root mass.
80 – 100	Dark brown	None	9	
100 +				Very clayey

Depending on water levels, the *Phragmites australis* reedbed is floating in most places. The peatland is a classical example of centrifugal infilling by a floating peat mat of a lake or open water body and quite similar to peatlands filling in kettle holes on the prairies in North America. An interesting feature of the Tevreden Pan peatland is that various other wetlands occur within its isolated catchment, varying from hillslope seepages to midslope/valley head and valley bottom wetland systems. Alluvial fans have developed over time at the valley bottom inlets into the pan.

Tevreden Pan holds a diverse flora, dominated by *P. australis*, which forms the dense reedbed covering the larger part of the pan basin. The peripheral ring of open water is between 20 and 150 m wide (figs. 2 and 3) and deeper than 5 m in places. It is characterised by submerged species such as *Lagarosiphon muscoides*, *Potamogeton thunbergii* and *P. pectinatus*. Shoreline species include *Cyperus difformis*, *Juncus effusus* and *Chenopodium glaucum*. The wetland also supports large numbers of diverse bird species such as *Podiceps cristatus* (Great Crested Grebe), *Anas undulate* (Yellowbilled Duck), *A. smithii* (Cape Shoveller), *Netta erythrophthalma* (Southern Pochard), *Plectropterus gambensis* (Egyptian Goose), *Fulica cristata* (Red-knobbed Coot), *Chalidris minuta* (Little Stint), *Chlidonia leucopterus* (Whitewinged Tern) and Avocet *Recurvirostra avosetta* (Barnes 1998).

Peatlands are rather uncommon features in the South African landscape. They are mainly comprised of valley bottom fens with some fens occurring on

hillslopes and in coastal interdune depressions. It becomes clear from this investigation and the abovementioned observations of Smuts (1997) that the Tevreden Pan Peatland represents a unique wetland type and should be conserved on the highest possible level. It is evident that more research on these pan peatlands is required to determine their extent and how they function.

Ideally, Tevreden Pan, along with other pans in the Mpumalanga Lake District should receive Ramsar status, given the uniqueness of the area, including its status as a globally important bird area (Global IBA: SA019 Chrissie Pans of approximately 62500 ha), as well as its geomorphological and hydrological features (Barnes 1998; McCarthy *et al.* 2007). The need for conservation efforts has become critical with serious new threats posed by a recent open cast coal mining application for the area. The proposed mining activities are regarded by specialists as being likely to cause an irreversible negative impact on pans inside the pan field (McCarthy *et al.* 2007).

References

- Allan, D. G. 1985. The conservation status of the Pans of the Transvaal Highveld. Unpublished report by Transvaal Division of Nature Conservation. Project No. TN 6/4/2/3/2
- Barnes, K.N. (ed.). 1998. The Important Bird Areas of southern Africa. BirdLife South Africa, Johannesburg.
- McCarthy, T., Cairncross, B., Huizenga, J.M. & Bachelor, A. 2007. Conservation of the Mpumalanga Lakes District. Unpublished report. Johannesburg.
- Smuts, W.J. 1997. Characteristics of South African peats and their potential exploitation. Phd Thesis, University of Pretoria.

Small mire habitats in Troodos National Forest Park, Cyprus

by Kimon Christanis, Stavros Kalaitzidis, Loizos Loizou, Dimitris Emmanouloudis

During a short stay in Cyprus we visited two small mires at Pashia Livadi and Almyrolivado, located on Troodos Mountain between 1560 and 1640 m a.s.l.. From what is known, these are the only mires existing on the island. Until recently the peat deposits had remained unstudied. Both mires are small (1.6 and 1.7 ha) and have elongated shapes with a length of ~300 m and the width not exceeding 100 m. Both occupy shallow valleys located within 350 m distance to each other.

The climate is typical East Mediterranean with cold, rainy winters (usually from November till March) with some snow and long, hot and dry summers. The mean annual temperature is +13°C and the mean annual precipitation nearly 1200 mm, highly varying over the years (Boronina et al., 2005).

The bedrock consists of serpentinised harzburgites of the Troodos Massif (Bear, 1959). Spring waters flowing downstream the valleys feed the mires. The peat started accumulating on the eluvial zone of the harzburgites; its thickness is up to 140 cm in the Pashia-Livadi mire and a few centimetres in the Almyrolivado mire.

Mainly *Juncus effusus*, *J. articulatus*, *Carex distans*, *C. spp.*, *Scirpoides holoschoenus*, *Mentha longifolia*, and other peat-forming species grow on the wet mire surface, whereas species from the surroundings such as *Calamagrostis epigejeos*, *Poa pratensis*, *Polypogon semiverticillatus*, along with endemic species such as *Crypsis hadjikyriakou*, *Brachypodium firmifolium*, *Taraxacum holmboei*, *Crocus cyprius*, also thrive on both mire surfaces during the dry season. In the surroundings conifers, mainly *Pinus brutia*, *P. nigra* ssp. *pallasiana*, *Cedrus brevifolia* and *Juniperus foetidissima* dominate (Life-Natura, 2008).



Fig. 1: Peat shrinkage due to summer drought.

Both sites are included in the Troodos National Forest Park, which is a NATURA 2000 area. They are considered rare in Europe and fragile habitats, which necessitate conservation (LIFE04NAT/CY/000013), as both suffer under severe drought during

the summer season (Fig. 1). Although the local authorities (Ministry of Forestry) seem to have realized the need for protection and have fenced both sites and created nice recreational picnic places in the surroundings, some interventions surprise the visitor.



Fig. 2: Embanked road through the Pashia-Livadi mire.

An embanked road, parallel to the short mire axis and leading nowhere, crosses the Pashia-Livadi mire at the upper part (Fig. 2) splitting the area in two. Moreover, a ditch hiding plastic and metal water pipes runs along the long axis of the same mire (Fig. 3).



Fig. 3: Pipes in a ditch through the Pashia-Livadi mire.

The road embankment significantly disturbs the water flow downstream, whereas the ditch facilitates the limited water amounts to flow downstream fast resulting in drying out of a large area of the mire. As the road is not in use today, it should be removed. Also the pipes need to be located outside the mire area and the ditch should be closed. In addition, small dams (wood) at several places along the long axes of both mire sites will help to retain water, keeping the mires wet during summer.

These two small mires are the southernmost mires of Europe and they should be protected and studied in more detail.

Acknowledgements

The field work is granted through the EU Community Initiative Programme INTERREG III B ARCHIMED, entitled "Integrated Development and Management of NATURA 2000 Protected Areas through Innovative Techniques in East Mediterranean" (ManagMED).

References

- Bear, L.M. (1959). The geology and mineral resources of the Akaki-Lythrodonta Area. Geological Survey Department, Memoir No. 3.
- Boronina, A., Golubev, S. and Balderer, W. (2005). Estimation of actual evapotranspiration from an alluvial aquifer of the Kouris catchment (Cyprus) using continuous streamflow records. *Hydrol. Process.* 19, 4055–4068.
- Life-Natura, 2008. http://www.life-natura-sites.cy.net/Page12_4.html

Mires and Peat Volume 2: 30–50% extra and all for free!

by Olivia Bragg and Michael Trepel

Volume 2 of the IMCG/IPS open-access web journal *Mires and Peat* is now complete. It contains 126 pages and nine peer-reviewed papers on a range of peatland-related topics (see Table). This amounts to a 50% increase in number of articles and a 30% increase in number of pages over Volume 1 (2006). It represents exceptional value for both authors and readers, as the journal is globally available free of charge. This is recognised by an ever-increasing number of people. In the first 24 months after we went online in January 2006 (i.e. up to the end of 2007) there were 16572 visits to the website, 29557 of its pages were viewed, and the most popular paper was downloaded 1787 times. We now have a regular monthly readership of around 1500 (see Figure).

For authors, another advantage of the journal's web-based format is that papers are published whenever they are ready. Although total turn-around time depends very much upon the quality of the material that is submitted – we do not compromise on the rigour of peer review and editing for the sake of speed – we have been known to publish a well-prepared manuscript 59 days after submission.

The journal also offers a flexible publishing medium for the proceedings of scientific meetings. If the number of publication-ready contributions turns out to be small, these can simply be put through the journal's standard publication procedure; whereas if it is large we can readily dedicate a sub-section of the current volume – or even a whole separate volume – to contain proceedings from a particular meeting.

Volume 3 (2008) of *Mires and Peat* is now open, with three papers already published. These are from Sarah Crowe and colleagues (Geomorphological controls on the re-vegetation of erosion gullies in blanket peat: implications for bog restoration); Gerald

Schmielewski (The role of peat in assuring the quality of growing media) – developed from his presentation at the IMCG-sponsored Lamoura conference; and Anssi Ahtikoski and colleagues who delve into the new 'hot topic' of peatland forestry economics (Ditch network maintenance in peatland forest as a private investment: short- and long-term effects on financial performance at stand level). For this and future volumes, the Editor will welcome all high-quality research papers dealing with any aspect of peatland science, technology and wise use.

Volume 4 (2008/9) will be an open special volume devoted to *Wind Farms on Peatland*. This is linked to the forthcoming IMCG symposium in Santiago de Compostela, but all manuscripts on any aspect of the theme are invited, even if they will not be presented at the symposium. There will be a final deadline for submission around the middle of 2008, so please let the Editor know if you are preparing a manuscript on this important topic.

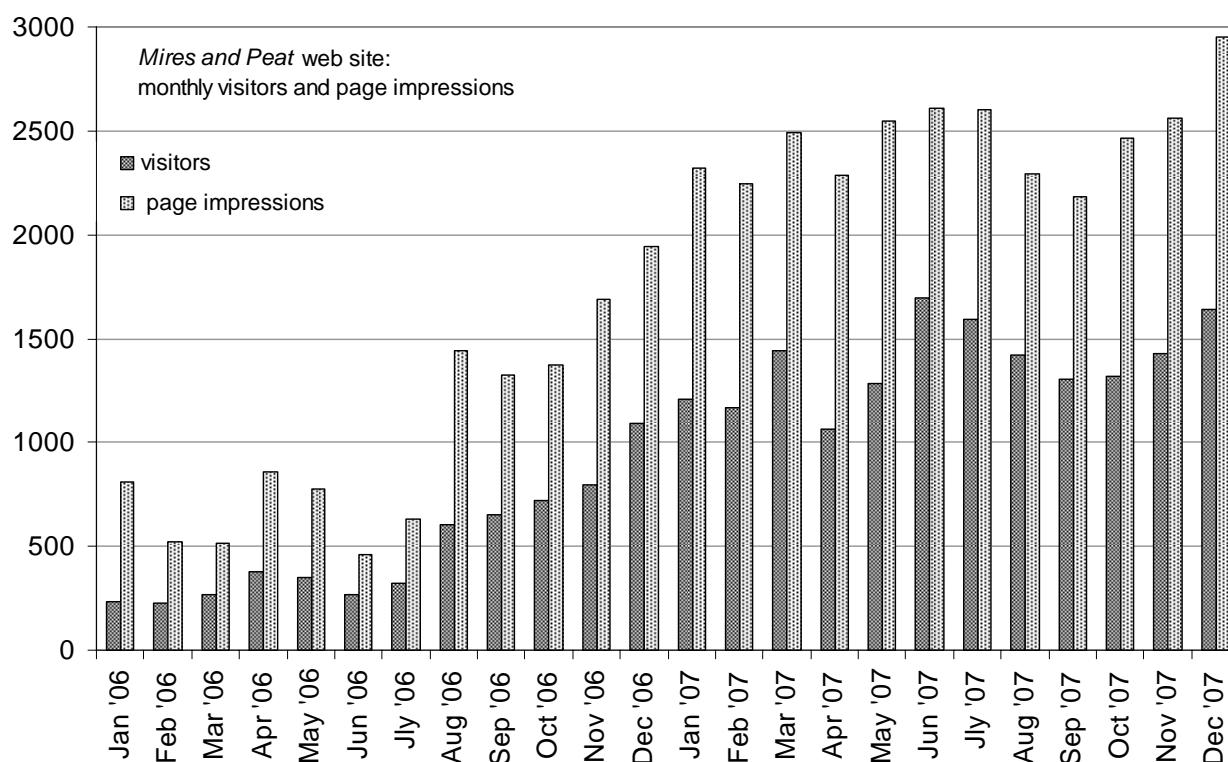
Responding to demand, we shall soon open a section of the web site for (selected) reviews of the most important new books on mires and peat. If you have recently read one of these and would like to write a review, the Editor will be very happy to receive your proposal – or indeed, your review.

See the *Mires and Peat* website at <http://www.mires-and-peat.net/> for further information. And if you like what you see there, please consider recommending us for coverage in *Web of Science*, e.g. via <http://scientific.thomson.com/free/essays/selectionofmaterial/journalselection/>.

Olivia Bragg (Editor)
Michael Trepel (Web Administrator)

Table. Contents of Mires and Peat, Vol. 2 (2007)

#	TITLE	AUTHORS	COUNTRIES	PAGES
01	Comparison of Finnish and Russian approaches for large-scale vegetation mapping: a case study at Härkösuo Mire, eastern Finland	O. Galanina, R. Heikkilä	Russia, Finland	16
02	The sensitivity of <i>Sphagnum</i> to surface layer conditions in a re-wetted bog: a simulation study of water stress	J.M. Schouwenaars, A.M. Gosen	Netherlands	19
03	Microwave dielectric properties of horticultural peat products	G. Ayalew, N.M. Holden, S.M. Ward	Ireland	10
04	Significance of large peat blocks for river channel habitat and stream organic budgets	S. Crowe, J. Warburton	UK	15
05	The occurrence of an upper decomposed peat layer, or "kultureller Trockenhorizont", in the Alps and Jura Mountains	P. Sjögren, W.O. van der Knaap, J.F.N. van Leeuwen, M. Andrič, A. Grünig	Switzerland, Norway, Slovenia	14
06	Plant diversity associated with pools in natural and restored peatlands	N. Fontaine, M. Poulin, L. Rochefort	Canada	17
07	The influence of degree of peat decomposition on phosphorus binding forms in fens	S. Jordan, S. Velty, J. Zeitz	Germany	10
08	Characterisation of a basin mire in the Azores archipelago	E. Dias, C. Mendes	Portugal	11
09	The influence of peat volume change and vegetation on the hydrology of a kettle-hole wetland in Southern Ontario, Canada	P. Whittington, M. Strack, R. van Haarlem, S. Kaufman, P. Stoesser, J. Maltez, J.S. Price, M. Stone	Canada	14



Volume 3 of Mires and Peat already has five papers.

Why not publish your next paper in Mires and Peat?!

<http://www.mires-and-peat.net>

The Global Peatland Fund: Emission trading to halt CO₂ emissions from peatland destruction

Global peatland degradation causes carbon dioxide emissions equal to over 11% of global emissions from fossil fuel consumption. Ending these emissions is very cost-effective. To enable rapid action for the rehabilitation of degraded peatlands, Wetlands International and BioX have established the Global Peatland Fund.

The vision of the Global Peatland Fund is to help avoid large quantities of carbon dioxide emissions by supporting projects that protect and restore peatlands and promote sustainable development. These projects will guarantee Voluntary Emissions Reductions and emissions removals (VER's). At the same time the Fund's investments will reverse trends of biodiversity losses and support alternative livelihood development in some of the poorest regions in the world.

The conservation and restoration of tropical peatswamps presents one of the most cost-effective means to reduce carbon emissions. The main focus will initially be on peat swamp forests in Indonesia; and later also include other developing countries.

Peatlands cover 3% of the world's land and freshwater surface. They represent one of the world's most important natural carbon stores, containing over 550.000 million tonnes of carbon, or 30% of all land-based carbon. All over the world these areas are threatened. Drainage takes place for forestry, agriculture or other purposes. Globally this leads to emissions of 3000 Mt of CO₂ per year.

With CO₂ emissions of 2000 Mt per year from degraded peat, Indonesia is responsible for by far the largest share. The emissions from its degraded peatlands put the country in third place in the global CO₂ emission ranking (after China and the USA). Already 12 million hectares (45%) of Indonesian peat swamp forests have been logged and drained for a variety of land uses. Emissions will increase further in coming decades unless land management practices and peatland development plans are changed. The people living in the peatland areas typically live in extreme poverty and have limited opportunities for further economic development.

Peatland destruction is a large problem, but it is occurring in a relatively concentrated area with the potential to reduce a significant source of CO₂ emissions through targeted restoration and protection measures.

VER stands for Verified (or Voluntary) Emission Reduction. A verified emission reduction is a reduction in greenhouse gas emissions that has been verified or checked by an independent third party. This third party verifier acts in a similar way to an auditor and is responsible for checking whether emission reduction estimates and calculations are correct. This is often done against emission reduction quality control standards and measured in the standard unit of tonnes of CO₂ equivalent. VERs also represent a bundle of legal rights that can be bought and sold.

The Global Peatland Fund will invest in peat swamp forest restoration and conservation projects. More specifically, this will entail the following types of peatland projects:

- re-flooding previously drained peat swamp forests and deforested peatlands by building dams in the drainage canals;
- reforestation of deforested peatlands using native species;
- protection of remaining peat swamp forests from deforestation;
- fire management plans to prevent and control peat fires.

The Fund itself will not operate projects, but tender out peatland restoration and conservation projects to interested third parties. Sustainable socio-economic development projects involving local communities will form an integrated part of the peatland projects, and will be financed by the Fund through grants or micro-credits. Peatland projects will be selected on the basis of a number of eligibility and quality control criteria adopted by the Fund.

The emission reductions achieved will be monitored in accordance with independently verified methodologies, so that they can be classified as Voluntary Emission Reductions and Emission Removals ("VERs"). The Fund will purchase VERs from the peatland projects through Emission Reduction Purchase Agreements. These will be entered into at an early stage of the project development and include advance payments for project development and provision of technical advice. 100% of the VERs generated by the peatland projects will be delivered to the Fund until the advance payments have been recovered, and the Fund may also purchase additional VERs generated by the projects.

The Fund will sell VERs on the international carbon markets, which will generate a good return for the investors in the Fund, capped at 15%. The remaining profits of the Fund's operations, in line with the broader goals of the Fund, will be invested into community development projects. The VERs generated by the Fund represent a high level of sustainability to investing companies: not only do these VERs guarantee greenhouse gas emission reduction, they also significantly contribute to socio-economic development in some of the poorest regions in the world, as well as the conservation of globally important biodiversity.

The geographical focus of the Global Peatland Fund will initially be on Kalimantan (the Indonesian part of Borneo) and Sumatra, where Wetlands International has successfully carried out community-based peatland conservation and restoration projects in cooperation with local governments. This will allow an efficient and limited risk implementation of the

Fund's first projects, both from a technical point of view and from a local stakeholder perspective.

Wetlands International and BioX are currently detailing the organisational and operational aspects of the Fund, e.g. its legal structure, the methodologies for VER monitoring, and the management structure. It is envisaged that the Fund will be managed by a professional management team (i.e. the Fund Manager), comprised of experts from Wetlands International and BioX assisted by other experts. In

order to ensure credibility and broad acceptance, the Fund will be supported by an Advisory Committee made of reputable peatland experts, NGOs, UN Conventions and government. Lead investors will be part of the Participants' Committee.

It is expected that the Fund's first pilot project will be operational in the second half of 2008.

For more information contact
Marcel Silvius marcel.silvius@wetlands.org

Review of international policies and experience on peat extraction, management and restoration – a UK Government project

by Roger Meade

on behalf of JBA Consulting Ltd, Maslen Environmental Ltd and Roger Meade Associates

The UK Government's Department for Environment, Food & Rural Affairs has commissioned research to inform the peat soils part of its Soil Strategy. The aim is to review and evaluate current international policies and national guidance on peat management (including peat trading), extraction, restoration and protection. It focuses on the experiences of countries outside the UK with significant areas of peat soils and, in particular, temperate peatlands. It is collating the lessons that can be learned from these international experiences and determining how they might be transferable to the UK in cases where there might be benefits.

The project picks up on many of the action points set out in the Guidelines for Global Action on Peatlands (GGAP), and it is strongly linked with developing strategies based on sustainable carbon management and the ecosystem services approach in the UK. The information gained will be available on the Defra website, and will contribute to the bank of information held by the IMCG and used in its future publication on European Mires.

The approach has been to use information from internet searches, completed questionnaires sent out to key sources in a range of countries, and follow-up questions about the most important issues and the most useful case studies. It has been greatly assisted by Hans Joosten in his endorsement of the questionnaires and by sending 46 out to key contacts; another 104 questionnaires were sent outside of the 'umbrella' of the IMCG.

To date, 30 questionnaires have been returned, covering primarily EU and non-EU temperate/boreal countries, together with some tropical countries. All the responses have been very helpful, and we hope to follow up some of the issues raised very soon. While there is still a long way to go before producing a rounded and considered account of the findings, some points have emerged quite clearly already.

Two quotes from the text of the draft IMCG European Mires book sum up the background against which the policies and guidelines are set:

- Greece – "It is a general rule that States with weak economies do not pay enough attention to the environment and its protection. Ecological thinking starts when daily life is ensured and some living standards have been achieved."
- Czech Republic – "For 30 years after the end of the 2nd World War, the political situation did not allow any great activities in environmental problems, landscape ecology and consequently, nature conservation. Rather, the opposite took place. Megalomaniac plans to dominate nature including extensive amelioration and drainage of wetlands were realised during these 'black' years."

A summary of key points gained from the returned questionnaires:

- Carbon dynamics are not yet driving policies for peat soil management.
- Ecosystem Services are recognised as important attributes of peatlands but do not underpin policy in any of the countries from which returns were received.
- The above comment from Greece is borne out elsewhere.
- Membership of the EU has not yet led to an equal and equivalent set of intra-State policies amongst Members; policies affecting peat may still be subsumed within e.g. forestry and agriculture legislation rather than to conserve biodiversity or to manage atmospheric carbon, or as general environmental aims within State constitutions.

We would like to take this opportunity to thank those in the IMCG who have given their time to fill in the questionnaires. Anything else IMCG members would like to contribute will still be gratefully received.

27 March 2008

IMCG-IPS Terminology Working Group established

Unmistakable and clear definitions of terms facilitate communication and decisions. In our world of peat and peatlands this is as true as in any other section of science, business or daily life.

Overbeck (1975), a famous German peatland expert, reminds us that “every international approach in peatland science and policy is complicated by the multitude of terms, the inconsistencies in their definition, and the different concepts behind similar terms in different languages”. Quoting Hofstetter (2000), who wrote that “communication problems arise out of confusion about or disagreement on connections between terms and concepts”, mirrors the complexity that discussions on terms may have.

At their last joint meeting in Sweden in July 2007 IPS and IMCG discussed problems arising with terminology on peat and peatlands. It was agreed that a small working group would be established to agree on definitions of some 10-20 peat and peatland related terms or concepts with policy implication that have caused misunderstandings.

It was agreed that Andrey Sirin (IMCG) and Gerald Schmilewski (IPS) would manage this project. Meanwhile IMCG and IPS have each nominated three additional experts to form the WG. For IPS these are Lars Lundlin, Veijo Klemetti and Line

Rocheffort; for IMCG Olivia Bragg, John Couwenberg and Piet-Louis Grundling are taking on the task.

Currently the members of the WG are listing words/concepts of relevance and common interest. From these a limited number will be selected to start with. It is likely that terms like biomass, peat extraction, pristine mire, restoration of cutaway peatland, sustainable use of peat and the like will be looked at from different viewpoints and common definitions sought.

To date such terms have been used with various meanings. In the process of discussion we might find that some terms are already clearly defined (e.g. in the Wise Use Book) and can be accepted as they are. Other terms or concepts, also defined in literature, might not be accepted by all, giving reason for debate. The objective is to restrict the use of terms to a certain meaning so that misuse may be avoided.

This project might seem to be easy but it probably won't be due to the present (mis)interpretation of various peat and peatland related terms.

The group was asked to give a progress report during the IPS Peat Congress in June 2008.

Gerald Schmilewski



Peatland on the Ukok plateau (Russia). The Ukok region is threatened by the building of the Altai gas pipeline. The proposed pipeline will be 2800 km long considered to transport natural gas from Nadym and Urengoy in W-Siberia with the Xinjiang region in Western China. Construction is planned to start in 2008. Environmental organisations have criticised the pipeline because it threatens the habitat of the snow leopard and other endangered species (Photo: Vladislav A. Zagorulko).

Regional News

News from the USA:

Standards for wetland restoration

The U.S. Army Corps of Engineers and the Environmental Protection Agency (EPA) have announced much-anticipated regulations to guide the restoration of wetlands and streams around the country. There are concerns that the standards will not require sufficient restoration to offset the continued destruction of wetlands.

Under the Clean Water Act, any activity that might harm wetlands or streams must be reviewed by the Corps of Engineers. If damage is unavoidable, the property owner must compensate by either creating new wetlands or restoring existing wetlands elsewhere. The goal is no net loss of wetlands. In 2001, the National Research Council of the U.S. National Academies determined that the corps was failing to meet that goal and that it needed better ways to assure the quality of wetlands restorations. After a controversial first attempt to improve its regulations in 2001, the corps released a second draft in 2006. That version was criticized by environmental groups for not being specific enough and giving too much discretion to the corps managers about whether to approve restoration projects.

The new rules set down performance standards, and they establish a priority system for types of restoration projects. If destruction cannot be avoided, the preferred option is to have property owners contribute funds to a "mitigation bank" that manages large wetlands in one place. The alternative is for landowners to undertake wetland creation or restoration near the construction site.

Source: <http://sciencenow.sciencemag.org>

News from Indonesia:

DPWN supports WWF project

Deutsche Post World Net and WWF are starting up a joint global climate protection project that aims to restore peat swamp forests in Indonesia and to develop an internationally recognized standard for forest-related climate protection projects.

The project intends to rewet forest areas in the Sebangau National Park in Indonesia in an effort to restore the ecological function of the forests as reservoirs and habitats for a range of different species. This will reduce the environmental damage caused by peat fires and the subsequent release of CO₂.

As part of the project, it is intended that a new international certification method be developed by the end of 2008. The standard will combine biological and socio-economical interests and can be widely used for different types of projects.

Source: www.dpwn.de

Haze

The annual haze over Southeast Asia caused by forest fires in Indonesia is expected to worsen this year due to changing weather patterns. Wetter weather conditions caused by the La Niña phenomenon – the abnormal cooling of sea temperatures in the Pacific Ocean – had helped suppress the haze problem last year. But the effects of La Niña will wear off by the start of the fire season by the end of this year.

Whether Indonesia's efforts to curb the problem have been effective will become clear then. It should be noted that not the climate, but human use is responsible for the fires.

Source: International Herald Tribune

News from China:

Wetlands protection

China will make a series of efforts to effectively protect 50 percent of its natural wetlands by 2010, according to the State Forestry Administration (SFA). China has so far made significant progress in wetland protection, with 47 percent, or more than 17 million hectares of the country's wetlands, effectively protected.

However, the overall situation of wetlands is not optimistic, and strong measures need to be taken in such areas as laws and regulation, policies, investment and administrative systems, so as to step up wetland protection. Statistics show China has established 18 national wetland parks and more than 470 wetland nature reserves, including 36 internationally recognized important wetlands.

China is rich in various types of wetlands, with a total area of 38.48 million hectares, ranking fourth in the world and first in Asia.

www.chinaview.cn

News from Korea:

New peatland Ramsar site

The Republic of Korea, which will be playing host to the 10th meeting of the Ramsar Conference of the Contracting Parties next year, has added two new sites to the List of Wetlands of International Importance, including the raised bog of Moojehineup (4 hectares, 35°27'N 129°08'E). This 'Wetland Conservation Area' harbours various rare flora and fauna species, including locally and nationally endangered species. Insect diversity is particularly high with some 197 species. The name of the site comes from a ritual praying for rain in the Ulsan area.

Source: ramsar.org

News from Africa: Training courses

Wetlands International calls for applications for four regional training courses on Wetlands and Poverty Reduction in nine African countries (2 French and 2 English). Following topics are addressed: Wetlands and integrated water resource management, Wetland valuation, Policy setting and advocacy and Financial mechanisms.

The project is offering a scholarship of 2500 USD to each selected participant, which covers tuition, accommodation, training materials, field trips and meals throughout the training. Participants are expected to cover their own travel costs including visas where necessary.

For more information: <http://tinyurl.com/4lqajg>

News from Nigeria: Lake Chad Ramsar site

Nigeria has designated 'Lake Chad Wetlands in Nigeria' (607,354 hectares, 13°04'N 013°48'E) for the Ramsar List of Wetlands of International Importance. The large new Ramsar site is in northeast Nigeria, bordered by Niger to the north, Chad to the northeast, and Cameroon to the south. It comprises a disjointed complex of permanent freshwater marshes (formerly inundated as part of Lake Chad), some rivers and their deltas, and the remaining part of Lake Chad. The main feature, Lake Chad, is a historically large, shallow lake whose size has varied greatly over the centuries. The major vegetation types include grasses, sedges, floating macrophytes, and shrubs, which form important habitats for a great variety of migrating waterbirds, including the vulnerable Marbled Teal. The lake supports some indigenous fish species and is economically important, providing water, fish and other resources to the surrounding populations. Agriculture is also practiced around the wetlands. Threats to the site include recession of lake waters due to climatic influence and upstream dam construction, and the consequent continuing desiccation of the wetlands. The only element of management in the area is provided by the Kanuri traditional rulers, who see to the sale of fishing rights in ponds and stretches of water as well as farming rights on the receding lakebed.

Source: ramsar.org

News from Serbia: Two new peatland Ramsar sites

Serbia has designated two new Ramsar sites. Gornje Podunavlje (22,480 hectares, 45°45'N 018°57' E) is a marsh complex along the Danube River that is part of a natural unity with the Gemenc and Kopacki Rit Ramsar sites in Hungary and Croatia respectively. Vlasina (3,209 hectares, 42°42'N 022°21'E) comprises, along with the surrounding countryside, the reservoir Vlasinsko, which at the time of its creation in

1949 inundated what was thought to be the largest peatland in the Balkans and one of the largest in Europe.

Gornje Podunavlje is a marsh complex along 36km of the Danube River, forming a natural unity with the Gemenc and Kopacki Rit Ramsar sites in Hungary and Croatia respectively. The site is a unique mosaic of aquatic, wetland, and terrestrial ecosystems and an important centre of ecosystem, species, and genetic diversity. A large number of rare and nationally or internationally threatened plant species and their communities are supported, as well as vulnerable habitats. This area is the habitat of rare plant species such as winter aconite *Eranthis hyemalis*, water violet *Hottonia palustris*, and mare's tail *Hippuris vulgaris*, an important spawning place and a migratory route of fishes, a nesting place of the white-tailed eagle *Haliaeetus albicilla* and the black stork *Ciconia nigra*, as well as the habitat of the largest population of the red deer *Cervus elaphus* in Serbia. Especially rich ethnic and folkloric traditions converge in the area, which is a centre for traditional festivals. Hunting and commercial and sport fishing are well developed, and controlled forestry is practiced within the site. The effects of previous drainage and irrigation works present a threat, as do eutrophication and invasive alien species.

Vlasina comprises the Vlasinsko reservoir (created in 1949) and surrounding gently rolling hills, jagged shore, wet meadows, peatlands, and the valley of the River Vlasina, along with two islands and several narrow and elongated peninsulas with many meadows and birch thickets, giving the site a characteristic and unique appearance. The peatlands represent important habitats for typically boreal flora in southern Europe. More than 125 bird species are recorded, amongst them the endangered corncrake (*Crex crex*), as well as a colony of sand martins (*Riparia riparia*) with around 300 active nests, unique in this biogeographical region. Prior to creation of the reservoir, the Vlasinsko Blato peatland was considered the largest peatland in the Balkans. There are 1,400 farming households in the area, but the human population is declining as in other mountainous areas of Serbia. Sport fishing and other recreation, as well as tourism, supplement small-scale farming.

Source: ramsar.org

News from Hungary: New peatland Ramsar sites

Hungary has announced the designation of two new Ramsar sites. Borsodi Mezőség (17,932 hectares, 47°44'N 020°54'E) is a Landscape Protection Area and Natura 2000 site, an alkaline wetland on the bank of the river Tisza. Montág-puszta (2,203 hectares, 46°21'N 020°40'E) is part of a National Park located on the Hungarian Great Plain. In addition, one of Hungary's first Ramsar sites, Hortobágy, designated back in 1979, has been extended by over 8,000 ha. to 32,037 ha.

Borsodi Mezőség is the largest alkaline wetland complex on the right bank of the river Tisza. The main wetland types, still preserved in good, natural conditions, are permanent and intermittent wetlands, hayfields and alkaline wet meadows which form a special mosaic vegetation pattern with arid vegetation habitats (such as steppe grasslands on loess and sandy soil). The site has outstanding significance for migratory birds, providing key staging habitats and waterbodies, and for the preservation of endangered species of Eurasian steppes (Saker, Imperial Eagle, Red-footed Falcon, Roller and Lesser Grey Shrike). Thanks to water restoration projects managed by the Bükk National Park Directorate, the numbers of nesting waterfowl have grown significantly, but the site is also important for many other animal and plant species, some endemic and many endangered. The most important cultural value is the survival of ancient, traditional pastoral life. Extensive animal husbandry has been practised there for thousands of years, and pastoral traditions, tools and lifestyle have been preserved. Kurgans (tumuli) have also been found in the area. Source: ramsar.org

News from Estonia:

New transboundary peatland Ramsar site

Estonia has designated the Sookuninga Nature Reserve (5,869 hectares, 58°00'N 024°45'E), a Natura 2000 SPA and BirdLife International IBA, as its 12th Wetland of International Importance. Citing a Joint Latvian/Estonian Commission on "Management of Nature Conservation in Transboundary Context", the two countries have established a Transboundary Ramsar Site, including Sookuninga and the Nigula Nature Reserve in Estonia and the Northern Bogs (Ziemelu purvi) Ramsar site in Latvia, with the name of North Livonian Transboundary Ramsar Site.

The Sookuninga Nature Reserve is a complex of six different raised bog massifs with hummock and hollow complexes as well with numerous pools. The site supports rare, vulnerable and endangered species of birds and plants, some of them occurring in great numbers or densities. Highly endangered and strongly protected are Black Stork, Golden Eagle, Lesser-Spotted Eagle, Great-Spotted Eagle and Lagopus lagopus Willow Grouse. The site also supports populations of large mammals including Canis lupus Wolf, Lynx lynx Lynx, Ursus arctos Brown Bear and Alces alces Elk. The site plays an important role in the recharge and discharge of groundwater as well as maintenance of water quality in southwest Estonia and northwest Latvia. It also has a significant cultural and historical importance for its small-scale battlegrounds, burials, and war routes. Due to its remote location the area is sparsely inhabited, and the main uses are tied to forestry, berry and mushroom picking, and small-scale hunting - all at comparatively low intensities.

Source: ramsar.org

News from Finland

Peat to liquid fuel

The Finnish fuel supplier Vapo will construct a facility to turn peat and wood into liquid fuels (often inappropriately referred to as "biodiesel"). The plant will cost around €300 million. Vapo will sell the crude oil to an oil refinery, where it will be converted into liquid car fuel. Vapo has the technical capability to produce crude oil from peat alone.

The location for the facility is yet to be selected. Decisive factors include the availability of natural resources, mainly wood and peat, and the distance to the nearest large consumption centre. Vapo would also be able to produce the crude from wood alone, but Finland's forest reserves do not allow for this. The opportunity for commercial exploitation of peat diesel appeared when the EU announced that within 12 years 10% of all fuel used in traffic should be biofuel. Whereupon Finland promptly decided to bend for industry lobby and classify peat as "biofuel".

Despite heavy lobby from Finland and Sweden, the EU still considers peat a form of fossil fuel. Whereas the Intergovernmental Panel for Climate Change (IPCC) has placed peat in a separate class next to biomass and fossil fuels, a fact often cited by peat industry to suggest that IPCC is on "their" side, this separate class only serves to underline the comments of IPCC that it considers peat a non-renewable, non-biomass fuel with a high emission factor.

By converting peat to liquid fuel the emission factor will only increase further as the conversion process causes additional emissions.

www.biofuels-news.com/news/finland_peat.html

News from the UK:

Peatscapes

The North Pennine grouse moors are riddled with hundreds of miles of drainage ditches, a legacy of government land management from the last century.

Last year, the Area of Outstanding Natural Beauty Partnership commissioned a survey to discover the extent of ditches in the North Pennines. It identified almost 60000 individual ditches with a combined length of 9400km.

Grouse moor managers already have experience with blocking up eroding ditched, and the 3000km that have already been blocked over the last 15 years have benefited both grouse and wader as well as the peatland habitat itself. Now, through the Peatscapes Project, more sites are being targeted.

Various techniques have been developed to work in the delicate habitat. Working with the landowner, action plans are devised to block up damaging ditches and leave those that are beneficial. Blocking up ditches that are eroding helps conservation of rare habitat and helps stop or even mitigate climate change without detriment to land use.

News from Ireland: Offaly bogs

Offaly County Council have recently granted planning permission for the extraction of moss peat for horticulture from Kilballyskea Bog, an intact raised bog located near Birr, Co. Offaly. This time the target is one of the few remaining intact peatlands in Offaly. Only 2,304ha (3.6% of the original area of peatland) of raised bogs in Offaly are designated for nature conservation. Kilballyskea is a midland raised bog and was first surveyed in 1983 and designated as an Area of Scientific Interest. It was put forward for designation as a Special Area Conservation in 2002 by Ireland's leading Non-Governmental Organizations because of its rare bog woodland habitat. Ireland contains over 50% of the raised bog habitat remaining

in North Western Europe and has an EU obligation to protect this rare and endangered habitat. Since this designation Kilballyskea has been damaged by drainage. However, with management of the peatland, including drain blocking, Kilballyskea Bog could have been restored to a favourable conservation status. The granting of permission by Offaly County Council for the extraction of peat from this raised bog habitat shows no regard for biodiversity conservation.

Besides contributing to the destruction of the peatland biodiversity in the county this development will also release large amounts of carbon into the atmosphere. This is unacceptable with Ireland's carbon emissions running at twice the rate they should be.

Source: IPCC



Western Siberia is dominated by peatlands and by oil-and-gas industry. We have prepared an online supplement to this Newsletter with more pictures from Western Siberia and Sakhalin (see newsletter section of the IMCG webpage; photo: Andrey Sirin)

New and recent Journals/Newsletters/Books/Reports/Websites

Black carbon a major factor in climate change

Black carbon, a form of particulate air pollution most often produced from biomass burning, cooking with solid fuels and diesel exhaust, has a warming effect in the atmosphere three to four times greater than prevailing estimates, according to scientists in a review article in the journal *Nature Geoscience*.

Soot and other forms of black carbon could have as much as 60 percent of the current global warming effect of carbon dioxide, more than that of any greenhouse gas besides CO₂.

Previous estimates are based on computer model simulations that do not take into account the amplification of black carbon's warming effect when mixed with other aerosols such as sulfates. The models also do not adequately represent the full range of altitudes at which the warming effect occurs. The most recent observations, in contrast, have found significant black carbon warming effects at altitudes in the range of 2 kilometers (6,500 feet), levels at which black carbon particles absorb not only sunlight but also solar energy reflected by clouds at lower altitudes.

Between 25 and 35 percent of black carbon in the global atmosphere comes from China and India, emitted from the burning of wood and cow dung in household cooking and through the use of coal to heat homes. Countries in Europe and elsewhere that rely heavily on diesel fuel for transportation also contribute large amounts. Obviously peat fires play an important role here as well.

Elimination of black carbon, a contributor to global warming and a public health hazard, offers a nearly instant return on investment. Black carbon particles only remain airborne for weeks at most compared to carbon dioxide, which remains in the atmosphere for more than a century.

The article can be found here: www.nature.com/ngео/journal/vaop/ncurrent/pdf/ngео156.pdf

Source: www.sciencedaily.com

Verberk, W.C.E.P. (2008) Matching species to a changing landscape – Aquatic macro-invertebrates in a heterogeneous landscape. PhD thesis, Radboud University Nijmegen.

To explain how abiotic and biotic factors set limits to species occurrences and ultimately shape ecosystems, knowledge on the relationship -or 'match'- between a species and its environment is required. This knowledge is essential to understand the impact of degradation and to derive sound possibilities to restore biodiversity. In this thesis a method to explain how aquatic macroinvertebrate species are associated with a bog landscape was developed, applied and evaluated.

Causal mechanisms explaining a species' environmental requirements are rooted in species traits (*e.g.*, fecundity, diapausing eggs, parental care,

development time). Based on the interrelations between traits and their function, species were grouped in so-called life history tactics. These life-history tactics represent different solutions to particular ecological problems, thus connecting species and their environment through species traits

The thesis deals with a case study on a heterogeneous bog remnant located in the east of the Netherlands. Life-history tactics were successfully applied to study the importance of environmental heterogeneity in a restoration context. The thesis reports the response of aquatic macroinvertebrates to restoration measures, which were taken to mitigate desiccation in a bog landscape.

Effects of restoration measures on environmental conditions could be consistently related to changes in composition of life-history tactics (species abundances pooled per life-history tactic). Retention of rainwater increased water tables and decreased influence of groundwater. Species with a high tolerance and species that employed risk spreading increased, indicating environmental conditions had become harsher and less predictable. Reduced drainage locally increased groundwater, enhancing predictability of environmental conditions, which promoted species with a synchronised life cycle.

Large-scale retention of rainwater decreased environmental heterogeneity. Cumulative numbers of species declined in the rewetted parts and life-history tactic composition became more similar. These results indicate that rewetting through rainwater retention acted as a species filter, promoting the expansion of a few life-history tactics at all water bodies, while constraining the other tactics.

In light of these results increasing the supply of groundwater is a more promising restoration strategy for degraded bog remnants. Increased supply of minerotrophic groundwater gradually gives rise to stable, minerotrophic transitions, which are important hotspots for biodiversity in pristine raised bog landscapes. Restoring such natural processes driving heterogeneity may increase the effectivity of restoration plans for animals by restoring both ecosystem functioning and structure.

Available for download at: http://webdoc.ubn.ru.nl/mono/v/verberk_w/matcspta.pdf

Wilco Verberk, w.verberk@science.ru.nl

Giesen, W., Wulffraat, S., Zieren, M. and Scholten, L. 2006. Mangrove Guidebook for Southeast Asia. FAO Regional Office for Asia and the Pacific, Bangkok. 534p.

This book marks the first attempt to cover all mangrove plant species in Southeast Asia. Produced by Wetlands International in Indonesia in partnership with FAO, it can be downloaded from the FAO web site: www.fao.org/docrep/010/ag132e/ag132e00.htm

Asingh, P. & Lynnerup, N. (eds.) (2007) Grauballe Man – An Iron Age Bog Body Revisited. Aarhus University Press. 347p. 33€/46.

The Grauballe Man, whose sacrificial death was determined to have occurred around 290 BC, is one of the most remarkable bog finds from Denmark's Iron Age, and has for many years been the center of considerable attention. After its discovery in 1952, the body was scientifically examined and preserved for posterity.



Hand of Grauballe Man (photo: Malene Thyssen)

With the availability of new analysis methods, the Grauballe Man underwent closer examination. The Grauballe Man was 'hospitalized' and underwent X-Rays, CAT-scans and other tests, allowing for the creation of an exact, three-dimensional chart of his inner and outer body. From analyses of his teeth, to his hair, to his stomach contents – and even to a reconstruction of his face – the research has provided an important insight in life in Northern Europe more than two thousand years ago.

Similar research was carried out on Tollund man and published in Fischer, C. (2007) Tollundmanden – Gaven til Guderne. Mosefund fra Danmarks Forhistorie. Hovedland. 180 s. (in Danish).

Michel, J.-C. (ed.) (2008) Proceedings of the International Symposium on Growing Media, Acta Horticulturae 779.

In September 2005 the International Society for Horticultural Science (ISHS) organised a symposium on growing media for the first time together with the International Peat Society (IPS). Now the proceedings are published in Acta Horticulturae. In 704 pages the state of the art (from 2,5 years ago) about the use of peat and alternatives to peat in horticulture – e.g. compost for conifers, coir fibres for strawberries, rockwool for melons, sheepwool for cucumbers or Sphagnum biomass for Tagetes – are presented in 89 papers. Besides new methods in horticulture, papers also focus on microbiology and physics of different growing media. In addition, Donal Clarke presents the Wise Use principles for peat in horticulture. Table of contents and abstracts can be downloaded at www.actahort.org where the book can also be ordered for 146 €

Herbichowa, M., Pawlaczyk, P. & Stanko, R. (2007) Conservation of Baltic raised bogs in Pomerania, Poland. Naturalists Club Poland, 147 pages (in Polish and English)

Baltic raised bogs (= "true raised bogs" according to Ellenberg 1988) are a specific kind of raised bogs, with limited distribution around the Baltic sea. About 80 baltic raised bogs were recorded in northern Poland, but no more than 30 are protected till now. In the framework of an EU Life project, 23 sites in the Pomerania region were selected, based on their providing good opportunities for maintaining or restoring favourable conservation status of bogs as a whole as well as of natural bog habitats.

This book presents the results of the project. It describes Baltic raised bogs in general terms and gives details of the selected sites focussing in on their conservation, including practical restoration measures.

A PDF can be downloaded here:

<http://www.kp.org.pl/plbaltbogs/ear.pdf>

Klaus G. (ed.) (2007) Zustand und Entwicklung der Moore in der Schweiz. Ergebnisse der Erfolgskontrolle Moorschutz. Umwelt-Zustand Nr. 0730. Bundesamt für Umwelt, Bern. 97p.

The report summarises the most important results of monitoring the effectiveness of Swiss mire protection. In Switzerland mires of national importance – 548 bog sites and 1170 fen sites – have been under strict protection for the past 20 years. They have to be conserved entirely and regenerated where possible. With a representative sampling design the state of the mires in Switzerland has been assessed twice (1997/2001 and 2002/06) and the two stages have been compared to detect ongoing changes. The findings are representative for all geographical areas and height levels of Switzerland and for both bog and fen sites.

The areas of raised bog and fen of national importance approximately have been maintained. However, the quality of the mires has clearly declined. Many mires have become drier, poorer in peat and richer in nutrients, and there is an increased amount of woody plant growth. Regeneration measures have been successful, but they were too infrequent and at too small a scale to compensate for the qualitative losses. There are considerable deficiencies in the implementation and execution of buffer zones. In mire landscapes, as in the past, buildings, roads and paths are being constructed, which are inconsistent with the objectives of protection.

The report can be downloaded free of charge from: <http://tinyurl.com/2pqq2e>

For more information, contact ulrich.graf@wsl.ch

Durfort, J (ed.) (2007) Les Tourbières de Bretagne. Le Cahier naturaliste de Bretagne, Région Bretagne. 175 p. (in French)

This book presents information on the character, status and conservation and management of the peatlands of Brittany (Bretagne) while also looking into threats and degradation. In addition there are chapters on palaeo-ecology, archaeology and historical peat extraction in Brittany. Eight sites are presented in detail.

For more information contact fcbeviro@yahoo.fr or visit <http://fcbe-tourbiere.info>

Seyrig, R. 2007. Fiscalité et protection des zones humides. Mémoire de fin d'études. Université Lyon 2. 120 p. (in French)

Various texts and instruments exist to support wetland conservation, but those are not sufficient to achieve actual protection. This thesis explores fiscal and other financial mechanisms in support of conservation. You can find the document online here: www.pole-lagunes.org/ftp/fiscalite_zh_850Ko.pdf

Greenpeace (2007) How the palm oil industry is Cooking the Climate. Greenpeace, Amsterdam. 86p.

Every year, 1.8 billion tonnes of greenhouse gas (GHG) emissions are released by the degradation and burning of Indonesia's peatlands – 4% of global GHG emissions from less than 0.1% of the earth's land surface.

This report shows how, through growing demand for palm oil, the world's largest food, cosmetic and

biofuel industries are driving the destruction of peatlands and rainforests. These companies include Unilever, Nestlé and Procter & Gamble, who between them account for a significant volume of global palm oil use, mainly from Indonesia and Malaysia.

Indonesia offers a critical example of why GHG emissions arising from deforestation and land-use change need to be dealt with at the international level, by governments and corporations.

<http://www.greenpeace.org/raw/content/international/press/reports/cooking-the-climate-full.pdf>

A shorter 8 page report on the same topic is available as well: <http://www.greenpeace.org/raw/content/international/press/reports/palmoilexpansion.pdf>

Okavango Delta Management Plan

From the Botswana Department of Environmental Affairs, this 216-page resource constitutes a Management Plan for the Okavango Delta which is largely based on the Government of Botswana planning system and complemented by elements from the New Guidelines for Management Planning for Ramsar Sites and the Ecosystem Approach. It is available on-line in PDF format: www.ramsar.org/wurc/wurc_mgtplan_botswana_okavango.pdf

Films: Central Kalimantan Peatland Project

Two films on the Central Kalimantan Peatland Project are available online:

http://www.youtube.com/watch?v=SCsxJKs_HZY

<http://www.youtube.com/watch?v=tmT7UeJM8eM>



Protect Our Children – Shell to Sea: On Saturday 29 March 2008 a "Shell to Sea" protest took place at the Finglas Road Shell petrol station (Dublin, Ireland) to support the people of Rosspoint (Mayo), who are under siege from Shell's scheme to run a production pipeline through the blanket bog landscape near their homes. In October 2007 Shell to Sea protestors successfully stopped Shell drilling on the Glengad Bog Complex and Shell was forced to remove its equipment from the area. For the past 3 days Shell had been drilling test bore holes in the area. See www.mayogasinfo.com for more information. (Photo: Hans Joosten 2007).

IMCG Main Board

Chair:

Jennie Whinam (Australia)
Nature Conservation Branch
Dept of Primary Industries, Water & Environment
GPO Box 44; Hobart TAS 7001
Tel.: +61 3 62 336160 / Fax: +61 3 62 333477
<http://www.parks.tas.gov.au/index.html>
jennie.whinam@dpiwe.tas.gov.au

Secretary General

Hans Joosten (Germany, Netherlands)
Botanical Institute,
Grimmerstr. 88,
D-17487 Greifswald, Germany;
Tel.: + 49 (0)3834 864177/ Fax: 864114
joosten@uni-greifswald.de
<http://www.uni-greifswald.de/~palaeo/>

Treasurer

Philippe Julve (France)
HERMINE Recherches sur les Milieux Naturels
159 rue Sadi Carnot,
59280 Armentières, France.
Tel. + fax : + 33 (0)3 20 35 86 97
philippe.julve@wanadoo.fr
<http://perso.wanadoo.fr/philippe.julve/>

additional Executive Committee members

Tatiana Minaeva (Russia)
Wetlands International Russia Programme,
Nikoloyamskaya Ulitsa, 19, strn.3,
Moscow 109240 Russia;
Tel.: + 7 095 7270939 / Fax: + 7 095 7270938
tminaeva@wwf.ru
<http://www.peatlands.ru/>

Piet-Louis Grundling (South Africa, Canada)
Department of Geography, Univ of Waterloo, Canada
Tel.: + 1 519 885 1211 X35397
Cell: + 1 519 591 0340
peatland@mweb.co.za / pgrundli@fes.uwaterloo.ca

other Main Board members:

Olivia Bragg (Scotland, UK)
Geography Department, The University,
Dundee DD1 4HN, UK;
Tel: +44 (0)1382 345116 / Fax: +44 (0)1382 344434
o.m.bragg@dundee.ac.uk

Rodolfo Iturraspe (Tierra del Fuego, Argentina)
Alem 634, (9410) Ushuaia, Tierra del Fuego,
Argentina;
rodolfoiturraspe@yahoo.com
iturraspe@tdfuego.com
<http://www.geocities.com/riturraspe>

Tapio Lindholm (Finland)
Dr, Doc, Senior Scientist
Nature Division
Finnish Environment Institute
P.O.Box 140
Fin-00251 Helsinki Finland
tel +358 9 4030 0729
fax +358 9 4030 0791
tapio.lindholm@ymparisto.fi
tapio.lindholm@environment.fi

Asbjørn Moen (Norway)
Norwegian University of Science and Technology (NTNU)
Museum of Natural History and Archaeology
Section of Natural History
7491 Trondheim
Norway
tel: +47-73 59 22 55
fax: +47-73 59 22 49
asbjorn.moen@vm.ntnu.no

Faizal Parish (Malaysia)
Global Environment Centre,
2nd Floor, Wisma Hing, 78, Jalan SS2/72,
47300 Petaling Jaya, Selangor, MALAYSIA
Tel + 60 3 7957 2007 / Fax + 60 3 7957 7003
fparish@genet.po.my / faizal.parish@gmail.com
www.gecnet.info / www.peat-portal.net

Line Rochefort (Canada)
Bureau de direction Centre d'Études Nordiques
Département de phytologie
Pavillon Paul-Comtois Université Laval,
Québec, Qc, Canada G1K 7P4
tel (418) 656-2131
fax (418) 656-7856
Line.Rochefort@plg.ulaval.ca

Dr. Jan Sliva
Glonner Straße m10
85567 Grafing bei München
Tel: +49 8092 232650
Fax: +49 8092 232651
sliva@wzw.tum.de
<http://www.weihenstephan.de/vegoek/index.html>

Lesław Wolejko (Poland)
Botany Dept., Akad. Rolnicza,
ul. Slowackiego 17, 71-434 Szczecin, Poland;
Tel.: +48 91 4250252
botanika@agro.ar.szczecin.pl or ales@asternet.pl

Meng Xianmin (China)
Mire research institute,
College of City and Environmental Sciences
Northeast Normal University
No. 138, Renmind Street, Changchun 130021
The People's Republic of China
Tel/Fax: 0086 431 5268072
mengxm371@nenu.edu.cn / mxm7949172@mail.jl.cn

UPCOMING EVENTS

See for additional and up-to-date information: <http://www.imcg.net/imcgdia.htm>

Nutrient retention and wetland and river restoration

8. - 9. April 2008, *Schneverdingen, Germany*

For more information: <http://tinyurl.com/3xuzln>

IMCG Symposium on Windfarms on peatland

27 April - 02 May 2008, *Santiago de Compostela, Spain*

More information in the previous IMCG Newsletter or visit: <http://wfps.environmentalchange.net/>

Restoring Raised Bog in Ireland

8 - 9 May 2008, *Carrick-on-Shannon, Co Leitrim, Ireland.*

A 2 day international conference that marks the end of an EU LIFE project focusing on the restoration of 14 raised bog sites within the EU Natura 2000 network of protected sites.

For further information: www.raisedbogrestoration.ie

13th International Peat Congress After Wise Use - The Future of Peatlands

9. - 15. June 2008, *Tullamore, Ireland*

for more information, visit ipcireland2008.com

German French workshop on ecology and conservation of mires in Vosges mountains

19. - 21. June 2008, *Bitche, France*

Bilingual workshop held in the transboundary biosphere reserve Pfälzerwald–Vosges du Nord focussing on peatlands of the region, on conservation of forested peatlands, on fauna and flora of peatlands and on general issues related to peatlands and their conservation.

For more information, download call for papers: <http://www.imcg.net/docum/08/vosges0801.pdf>

Raised Bog Conservation and Management

30. June - 4. July 2008, *Lielupe, Latvia*

Seminar devoted to Raised bog conservation and management; includes an excursion to the 3 raised bogs in Latvia where management actions have been carried out within the LIFE-Nature project "Implementation of Mire Habitat Management Plan for Latvia".

For more information, see call for papers: http://www.ldf.lv/pub/?doc_id=28863

8th INTECOL International Wetlands Conference: Big wetlands, Big Concerns

20. - 25. July 2008, *Cuiaba, Brazil*

for more information read call for papers:

www.imcg.net/docum/08/TropicalPeatlands08.pdf

International Symposium and Workshop on Tropical Peatland

19. - 22. August 2008, *Kuching, Sarawak, Malaysia*

for more information read call for papers:

www.imcg.net/docum/08/TropicalPeatlands08.pdf

4th International Meeting on the Biology of Sphagnum

2 - 11 August 2008, *southern Alaska*

For more information:

<http://www.biology.duke.edu/herbarium/alaska.html>

IMCG Field Symposium and Congress

27 August – 11 September 2008, *Georgia/Armenia*

For more information see elsewhere in this and previous IMCG Newsletters

6th European Conference on Ecological Restoration

Towards a sustainable future for European Ecosystems – Providing restoration guidelines for Natura 2000 habitats and species.

8. -12. September 2008, *Ghent, Belgium*

for more information visit:

<http://www.ser.org/europe/conference2008.asp>

International Interdisciplinary conference on Predictions for Hydrology, Ecology, and Water Resources Management

15.-18. September 2008, *Prague / Czech Republic*

for more information go to

<http://www.natur.cuni.cz/hydropredict2008/>

10th Ramsar CoP

Healthy Wetlands, Healthy People

28 Oct - 4 Nov 2008, *Changwon, Republic of Korea,*

For more information: www.ramsar.org

Implementing environmental water allocations

23 – 26 February 2009, *Port Elizabeth, South-Africa*

For more information: ewa.innercirclestudios.co.za/

VISIT THE IMCG HOMEPAGE AT

<http://www.imcg.net>

REGISTRATION
IMCG BIENNIAL MEETING GEORGIA/ARMENIA
31 August - 16 September 2008

Please copy this sheet, fill in and return by e-mail until 31 of May, 2008.
Please note that this is how you will be indicated on your badge and the list of participants.
A Word document of this form can be found on the IMCG webpage

Participants information: (please use block letters or type)

Prof. Dr. other: **Mr. Ms. Mrs**
Surname:
First name:
Organisation:
Address:
Postal code: City:
Country:
Telephone:
Fax: E-mail:

Registration fees:

- ☐ Total Package (31 Aug – 16 Sept): € 800 (IMCG members), € 900 (non-members)
- ☐ Pre-congress Field trip only (31 Aug – 13 Sept): € 700 (IMCG members), € 800 (non-members)
- ☐ Scientific congress only (14 – 15 September): € 200 (IMCG members), € 250 (non-members)
- ☐ General Assembly (16 Sept, IMCG members & invited guests only): no costs (no hotel included)

Payments should be made in advance by bank transfer to:

Volksbank Raiffeisenbank, Steinbeckerstrasse 26, Greifswald, Germany

BIC: GENODEF1ANK (take care: the 1 is a “one”, not an “el”)

IBAN: DE65 1506 1638 0101 0627 78

Johannes Joosten, Dorfstrasse 4, Mesekenhagen.

I wish to present a paper/poster entitled

.....

I would like to present the paper in the form of:

- ☐ oral presentation ☐ poster presentation

Please include an abstract in English of about 300 words. Deadline is the 30th of May 2008.

Note: Participants, who need an **invitation for Georgia** please contact the Ministry of Environment and Natural Resources.

Contact person: Gia Kolbini, e-mail: gmep@access.sanet.ge with cc to: tchaobi@yahoo.com

Note: Participants, who need an **invitation for Armenia** please contact the Ministry of Nature Protection

Contact person: Karen Jenderedjian: e-mail: jender@arminco.com with cc to: tchaobi@yahoo.com

Special dietary

- ☐ vegan ☐ vegetarian ☐ other:

Contact Persons:

Hans Joosten

joosten@uni-greifswald.de

Izolda Matchutadze

tchaobi@yahoo.com

Karen Jenderejian

jender@arminco.com