

## FIELD WORK IN FULL FLOW!



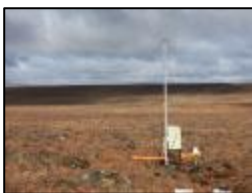
Renée Hermans and Jens-Arne Subke (U. Stirling) installing collars and data loggers in open bog controls near the Dyke plantation.

*The Flows have received a series of visitors over the last few months and many sites have been instrumented and prepared for the field season that is now well under way. Here are some updates on some of these projects that will start, or continue over the summer. It is great to see so many people doing research up here!*

*We would like to thank all the contributors of this edition of the newsletter and we wish you all a good field season!*

### New palaeoecological research in the Flow Country

One of the big outstanding research questions in the Flow Country is how much carbon has been taken up by the peatlands through the Holocene and how has this been affected by 20<sup>th</sup> century human impacts. This lack of long-term palaeoecological data was identified as a key information gap at the meeting in Thurso in October; previous study is limited to a few papers using a limited range of methods and all more than twenty years old. While several current projects are addressing peatland carbon balance by measurements of gaseous and fluvial fluxes, this short-term data needs to be placed in the long-term context which only palaeo data can provide. As a first step towards addressing this gap we have secured a large research grant from the Carnegie Trust, a small grant from the British Ecological Society and a partnership with The Conservation Volunteer Scotland (TCV) to study the long-term rate of C accumulation and impacts of management in Forest Research's experimental plots at Bad a'Cheo and Forsinard. The project will take the form of a one year MSc by research combined with a one year apprenticeship in soil ecology, and will bring together the incredible Scottish expertise in palaeoecology, with researchers from Universities in Aberdeen (D. Mauquoy), Stirling (E. Tisdall and A. Tyler) and Edinburgh (A. Newton) involved as collaborators. There is enough palaeoecological research potential in the Flow Country to fill several careers, but we hope that this small project will provide useful pilot data and open the way to future, larger projects. *Richard Payne (Stirling) and Roxane Andersen (ERI)*



### A second tower in Forsinard

Graham Hambley and Timothy Hill (U. of St Andrews) have begun to set up a second Flow Country flux tower. The second tower will monitor greenhouse gas fluxes in Talaheel (restored blanket bog) and will be *in situ* for at least two year before possibly moving to another site. This tower will be fully functional by mid-June. *Graham Hambley (St Andrews)*

The "Talaheel tower"

### Long-term monitoring of water level in Munsary Reserve and research opportunities

Since April, there are now five water-level loggers continuously monitoring water level and temperature in low ridges neighbouring pool systems in [Munsary reserve](#), a SSSI and SPA designated peatland located near Lybster, in Caithness. The ERI, who completed the installation of the loggers, will be in charge of downloading and managing the data, which will be available for researchers of the Flow Country Research Hub (contact Roxane Andersen for details). Paul Gaffney (ERI) also attended the Munsary Reserve management group meeting at the end of April to introduce the Hub and the projects currently on going in the Flows. The reserve is enthusiastic with the idea of supporting more research, and welcomes suggestions and proposals. For more information, do not hesitate to get in touch with [Davie Black](#), the current reserve manager. *Roxane Andersen (ERI)*



Paul Gaffney (ERI) installing loggers at Munsary

### RSPB project on common scoter continues



*Common scoter ducklings*

One of the most special birds of the Flows is a black diving duck - the common scoter. Despite its name, this is one of the rarest breeding birds in Britain, with roughly half of the UK population nesting in the Flows. Over the last few years, we have been trying to understand what makes scoters select certain lochs for breeding. We've been measuring food abundance (freshwater invertebrates), food accessibility (e.g. water depth and loch-bed substrates) and predator activity. Over the winter, analysis on this dataset has really emphasised the importance of large-bodied invertebrates - like large mayflies, caddisflies

and water-beetles - in affecting scoter lake selection. What's more, these invertebrates are more abundant where there are few trout - suggesting that trout and scoters may compete for food. Not only do lakes with few trout seem good for scoters, but their greater abundance of insect life also allows the trout themselves to grow to larger sizes, perhaps making for better angling. Our future research will explore this apparent pattern, with a view to developing conservation measures for scoters. We plan to use small fenced enclosures at two lochs on RSPB Forsinard reserve, to see how a reduction in trout predation affects invertebrate abundance. This year, we've been busy sampling invertebrates, to get a baseline picture of their abundance prior to the enclosures being built. This means donning a drysuit and wading in the lochs, trying to find what foraging scoters might find. Using sediment grabs, pond nets and colonisation traps, we're building up a detailed picture of invertebrates in our experimental areas. *Mark Hancock (RSPB)*



*Using the sediment grab to look at invertebrates in lochs on the Forsinard reserve*

### Updates from Leeds and CEH's "pool team"



*Ed Turner (Leeds) setting up the plots*

We've had a busy few months since the last newsletter, surveying our sites and constructing equipment ready to start monitoring water and carbon flows in and around the pools. In February we managed to assemble the whole team, along with Norrie Russell (RSPB) and Roxane Andersen (ERI), to agree which natural pools and restored drain pools we would instrument and sample intensively. We're using larger gas flux chambers to monitor CO<sub>2</sub> and methane emissions than are usually employed to increase the footprint of the measurements, so April's fieldwork trip meant towing a large trailer-full of gear all the way up from Leeds! Very soon we'll start the monitoring and sampling regime, with the help of Rebecca McKenzie, a newly

appointed technician at the ERI, and planning wider-scale surveys of vegetation and topography using UAV aerial photography. *Ed Turner (Leeds)*



*Mike Billet (CEH), Roxane Andersen (ERI) and Kerry Dinsmore (CEH) with Pippa Chapman, Andy Baird and Ed Turner (Leeds) in front of a pool selected for the NERC project, in Cross Lochs.*

### Studying the bugs in the bog

Our project is investigating the impacts of peatland restoration on insect communities, with particular emphasis on Coleoptera, Heteroptera and Auchenorrhyncha. Last July, we took 60 samples from the pristine bog, intact forest and restored areas using sweep-nets and a suction sampler. Even though bogs are known to be generally species poor, we were surprised to find such a low number of insects (both in terms of species richness and abundance). As anticipated, the Auchenorrhyncha seemed to have benefitted from previous restoration activities, as their abundance and species richness increased dramatically from forested areas and are almost as high as in bog areas. In contrast, beetles seemed to do slightly (and perhaps unexpectedly) better in the forest and worst in the bog, according to preliminary analysis of species richness and abundance. Overall, the Coleoptera were the most numerous across the three sites. We found hardly any Heteroptera across the bog and restored sites, and none in the plantation areas. Although the data is insufficient, it seems to suggest that slightly more Heteroptera occur in restored areas compared to the bog.



*Acalypta nigra* (Lacebug) – the most common bug in our samples



Suction sampling in action



Sweep-netting in perfect weather...



... and not so perfect weather.

We still have to identify the last batch of the beetle samples before multivariate analysis will shed some more light on whether and how the community assemblages differ between the areas/with restoration effort. We recently installed pitfall traps to complement the sweep-net and suction sampling (and because pitfall traps are less dependent on dry weather conditions). Since sweep-netting and suction sampling are both heavily dependent on dry weather conditions, we recently installed pitfall traps across our sampling plots with the hope to gather more robust data. *Lisa Becker (U. Aberdeen)*

### New global *Sphagnum* productivity project

Forsinard is included in a new project looking at global variability in *Sphagnum* productivity. The project coordinated by Gustaf Granath and Hakan Rydin brings together peatland researchers around the world to address this important issue. Key to the project is installation of 'cranked wires' in plots of *S. magellanicum* and *S. fuscum*. Wires were installed at Forsinard and in four other UK peatlands in April; *Sphagnum* growth and other parameters will be monitored over the next two years. *Richard Payne (Stirling) and Simon Caporn (MMU)*



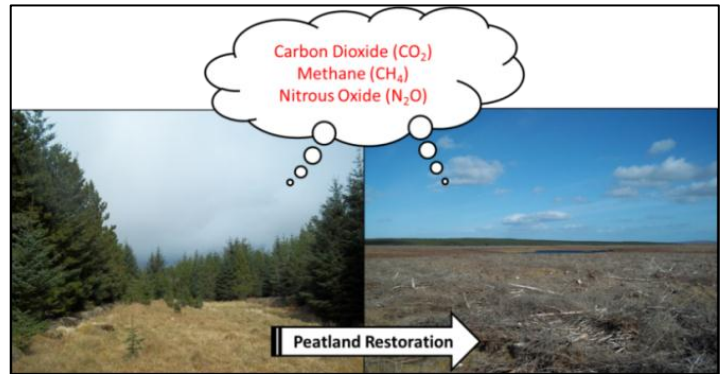
Cranked wires viewed from above

## NEW TO THE HUB

**Matthew Saunders was appointed at the James Hutton Institute in Aberdeen in March 2013 and is an expert in Eddy Covariance technique, a welcome addition to the Flow Country Research Hub!**



I am Dr Matthew Saunders and my work at the James Hutton Institute, based in the Environmental and Biochemical Sciences group, is focussed on the carbon and greenhouse gas (GHG) dynamics of terrestrial ecosystems. I am an ecophysiologicalist who specialises in the use of eddy covariance (EC) techniques to measure the turbulent exchange of mass and energy between biological systems and the atmosphere. My previous research has included the use of EC techniques to investigate the carbon and water cycles of tropical wetlands and the development of mobile analytical platforms to assess the impacts of land use change and land management on the carbon and GHG dynamics of temperate grassland, peatland, arable and forest ecosystems. I will be working in Forsinard to investigate the impacts of various peatland restoration options (drain, grip and furrow blocking) on net ecosystem GHG dynamics during the transition from forest plantation back to active peatland. In order to gain a better understanding of the time-dependant changes in net ecosystem GHG emissions after clearfell, particularly within the remit of inter-annual climatic variability, this work will be conducted in collaboration with the research activities of, the RSPB, the Environmental Research Institute, the Centre for Ecology and Hydrology and the University of St. Andrews. The information derived from this work will make a direct contribution to improving the evidence base of the GHG response from Scottish soils under particular land use options and will contribute to a better understanding of the utility of such land management strategies under future climate change scenarios. *Matthew Saunders (JHI)*



## RECRUITMENT &amp; OPPORTUNITIES

**Fully funded MSc by research - *The Flow Country peatlands: Studying the past to shape the future***

Supervisors: Dr. Richard Payne (U. Stirling) & Dr. Roxane Andersen (ERI/UHI)

We are seeking a dynamic and motivated student to undertake a one year **MSc by research** under our supervision. The project is fully funded, and will include training in palaeoecological methods with some of the UK's leading experts, and the opportunity to work alongside a growing team of researchers and PhD students within the Flow Country Research Hub. *Application deadline: 21<sup>th</sup> of July. Details will soon be available on the [ERI website](#).*

*The next edition of the newsletter will come out in September, please email details about grants, student progress, field work, publication or any other news to Roxane Andersen ([roxane.andersen@uhi.ac.uk](mailto:roxane.andersen@uhi.ac.uk)) before the 31<sup>st</sup> of August 2013.*