THE MACAULAY LAND USE RESEARCH INSTITUTE

Minutes for RECIPE 'Kick-off' Meeting
held on Friday 14 March – Sunday 16 March 2003 in the Cairngorm Room, MLURI, Craigiebuckler, Aberdeen, Scotland UK

Present:

Steve Chapman (MLURI)(Project Co-ordinator and Chair)

Walter Rosseli (AR-WSL); Andy Siegenthaler (AR-WSL); Estelle Bortoluzzi (UFC-CE/LBE); Daniel Gilbert (UFC-LBE); Alexander Buttler (UFC-CE); André-Jean Francez (ECOBIO); Hauke Harms (EPFL); Antonis Chatzinotas (EPFL); Fatima Laggoun-Defarge (ISTO); Andreas Gattinger (TUM-BO); Philipp Steinmann (Inst. Géologie, by invitation); Philippe Grosvernier (LINECO); François Boinay (LINECO); Harri Vasander (UNHEL); Mika Yli-Petäys (UNHEL); Colin Campbell (MLURI); Duncan White (MLURI)

Date	Description	Action
Friday (14th) Evening	Arrival of delegates Pre-visit by S. Chapman, P. Grosvernier and F. Boinay to Red Moss, Netherley (guided by Peter Hulme) and to Tomintoul Peat Products, Tomintoul. Pre-meeting: welcome and introductions	
Saturday (15th) Morning Session	Brief introduction of the project by S. Chapman and outline of the objectives and Work Packages (WPs). This was followed by presentations by A. Buttler, A.-J. Francez, F. Laggoun-Defarge, D. Gilbert, A. Gattinger, H. Vasander and P. Steinmann (P. Steinmann is leading a Swiss National Science Foundation project). These provided some of the background to RECIPE, illustrated ongoing related studies and outlined the intended course of the experimental program within RECIPE.	
Saturday (15th) Afternoon Session	It was decided to focus the initial discussions on the Description of Work (DoW) that formed Annex I of the contract since this was the outline of the work to be carried out. There was a brief outline of the regulations (DoW p.4) and sustainability of peat production in Finland, France, the UK, Switzerland and Germany (see Table 1). Pressure on local production forces foreign imports from countries such as Ireland, Estonia and Russia. It was clarified that transitional bog habitats (DoW p.4) were those between fen and bog which were nevertheless important in biodiversity terms and often required very active management in order to be maintained in their current state. Regarding the framework that RECIPE results may cover (DoW p.5), it was clarified that "Conservative management" was equivalent to "Rehabilitation". Much of RECIPE should reflect on *rehabilitation* instead of the *restoration* of peatlands as it's not practicable, in the short term, to *restore* peat bogs. A. Gattinger suggested that "scientific value" should be changed to "scientific heritage". It was also suggested to add Global (or climate) change to the framework since conservation, restoration and rehabilitation all impact strongly on climate change. Conversion to agriculture should also include conversion to forestry. There was some discussion on the Canadian restoration approach using straw mulch. H. Vasander considered that this was not practical in Europe as:	

	i) The source of inoculum was not available, was too distant or was preserved by regulations ii) Deeper cutting was practised (to give energy peat) iii) The process was costly iv) Atmospheric inputs may interfere It was recognised that the DoW did not include any hypotheses as such though they were implicit in the experimental design. Hypothesis generation was an important step. Also it was discussed how to formulate guidelines and what do we need to know to generate these. The partners suggested that the project should develop around a number of testable hypotheses, which would then reflect on any guidelines resulting from the project. The meeting divided into two groups to draw up hypotheses relating to: 1) Work packages 02, 05 and 06; and 2) Work packages 03 and 04. These are summarised in table 3. Due to the shortage of time, it was recognised that these are not exhaustive.	
	Common protocols (DoW p.9) for the WPs are to be used as well as the number of samples and replicates. However, the number of samples to be taken has yet to be decided since this is dependent upon when the experiments are carried out as all analysis are performed at the end of the experiment. The common protocols will include the design of chambers and the use of keystone species in determining effects of peat rehabilitation on vegetation. The keystone species to be used will be dependent upon an initial site survey although a vascular plant e.g. *Eriophorum angustifolium* and a sphagnum moss (*Sphagnum phallax*) should be included and they should be present at all sites. The choice of site is dependant upon: i) age of site: at least 10-30 years ii) percent coverage with sphagnum iii) type of vegetation	All partners to draft protocols relevant to their own area of expertise/ commitment to sample analysis
	Discussion was also made on the timing of the experiments (DoW p.12 & p.16), i.e. when to start Workprogram 2 and whether 1 or 2 growth seasons for the experiment were required as there may be overlap between Workprogram 1 and Workprograms 2/3 and variation in the number of seasons that can be used by each partner. It was pointed out that to end (harvest) the core experiment at the end of September 2005 would only leave 4 months for all chemical and microbiological analysis, data analysis, collation of the results and drafting of the guidelines. Hence there was some merit in sampling in September/October 2004 (after one year?) so that samples could be analysed in time.	
	The total number of samples to be taken in the core experiment was debated. To take 90 samples might be too much to cope with if depth sampling is included (× 10 = 900) and the number of sites (× 4 = 3600!) is also taken into account. The decision of how many samples should be taken for Workprogram 2/3 will be partly dependent upon the outcome of Workprogram 1 and site topology (particularly potential changes with depth). One compromise would be to omit the water table level × peat type interaction and have two sub-experiments looking at each factor separately (still with 5 'plant' treatments and 3 replicates), having 45 and 30 cores, respectively. Since 15 cores would be common, the total needed would be 60.	A. Buttler to revise experimental workplan, taking sampling numbers into account
	Some attention was given to the design of the air-sampling chamber since it would be used for both the field sampling program and for the core experiment. It would be more efficient to have a common design. The chamber favoured was basically that currently used by E. Bortoluzzi though some merit in having temperature control (especially during photosynthesis determinations) was advanced by M. Yli-Petäys. The chamber would have a large enough base to cover the heterogeneity (and the vascular plants!) encountered during field measurements but would require an adapter to make them fit onto the PVC	A. Buttler to check on design in field

	piping used for the core experiments. Investigation of the design, material and construction of air-sampling chambers is to be made as well as a pilot study to determine the survival of over-wintered cores/plants susceptible to frost heave. The type of PVC pipe material (diameter and thickness) used in the core experiments is dependent on getting common material, as far as possible, for all the partners. The pipe size will determine the size of peat corer to be constructed. Workprograms 2 and 3 will use the same core design. It was agreed as a principle that, whenever possible, there should also be an exchange of samples to maximise efficiency rather than all partners performing all types of analysis, for example, all FTIR would be done by MLURI. Determination of acetate should be included in the ion-chromatography measurements (P. Steinmann).	A. Buttler All partners with field sites All partners where appropriate All partners where appropriate
Sunday (16^{th}) Morning Session	Since the remaining time was short it was decided to concentrate on those critical issues needing resolution before the project could proceed smoothly. i) <u>Production of labelled litter.</u> This would be required for the core experiments and should be produced during the first year. A. Gattinger confirmed that this would be done at TUM-BO (DoW p.38). Both C^{13} and N^{15} labelling would be concurrent. C^{13} labelling would be done on shoots and green material at around 50% (but not less) to reduce costs. It was recognised that 99% labelling was probably not practicable but at the same time at least 50% labelling would be needed in order to isolate C^{13}-DNA subsequently by ultra-centrifugation procedures. The labelled litter should be available by Feb/March 2004 (This is an extension to the time scale of deliverable 19, DoW p.19). *Sphagnum phallax* and *Eriophorum angustifolium* were identified as suitable plants for the litter decomposition study. ii) <u>Deliverables.</u> In addition to the production of labelled litter, the other deliverable at 6 months is the setting up of a web site. iii) <u>Collaborations.</u> A number of collaborations were emerging that would enhance the value of RECIPE: P. Steinmann (Institute of Geology) had already outlined the collaborative program with RECIPE and provided a document describing the SNF proposal. Several RECIPE participants had made contact with the Peat Ecology Research Group (PERG) based primarily at the University of Laval, Canada, under the direction of Professor Line Rochefort. H. Vasander had spoken at the PERG 10^{th} Anniversary workshop and S. Chapman had also visited Laval in February. A.-J. Francez has ongoing collaborative experiments at one of L. Rochefort's restoration sites (Bois-des-Bel). Dr Barry Warner (paleoecologist) from the Wetland Research Centre, University of Waterloo, Canada, was sending a PhD student to Europe. Dr Martin Kainz (expertise in lipid biomarkers) from Austria, had applied for a Marie Curie grant to work with F. Laggoun-Defarge. iv) <u>Socio-economics.</u> The current position on socio-economics was discussed. S. Chapman reported that he had been let down by Dr M. Nijnik of MLURI, who was to have co-ordinated the socio-economic effort but who had pulled out of RECIPE at short notice. Efforts were being made to secure a replacement person. A student had already been engaged in France (at Besançon) who was following a Master's program for 4 months,	A. Gattinger S. Chapman (MLURI)

	looking at methods in sociology and using interview methods. A student would shortly be taken on in Finland from April onwards. The socio-economics methodology to be used would be that developed by the French partners. v) <u>Sites for Workprogram 1.</u> The importance of selecting the most appropriate sites for the survey study was emphasised. These should be ideally 10-30 years old (age since last cut/milled). The colonising vegetation should include predominantly *Sphagnum phallax*, *Eriophorum angustifolium* and/or *Carex rostratum*. vi) <u>Date of next meeting.</u> It was decided to hold this in France over three days in October. Meeting in Besançon would allow site visits in the Jura Mountains in both France and Switzerland. The tentative date would be the week beginning the 27th. It was agreed to hold the meeting mid-week since there was little financial advantage in holding meetings over the weekend. Information would also be sent out to all partners about the Tampere meeting (Finland) to be held 6-11 June 2004. This would be a focus for the RECIPE project and coincide with a future RECIPE co-ordination meeting. The meeting would include a joint symposium giving the preliminary results from RECIPE, together with ongoing findings from PERG.	D. Gilbert to check out accommodation. S. Chapman (MLURI)
Sunday (16th) Afternoon	Site visit to Northern Peat and Moss Company (courtesy of Neil Godsman) at St Fergus Moss, including site description by Allan Robertson, and initial assessment of potential MLURI site at Lambhill Moss (New Pitsligo).	

Table 1 Regulations regarding peat use in the participant countries

Country	Regulation
Finland	Main option is to leave area for forestry. Now other options are negotiable, e.g. convert to agriculture, reinstate as a lake area, restoration of peatland. Latter is not popular but is increasing.
France	Peat harvesting is considered as "mining" and as such follows regulations for mining operations, i.e. sites have to be restored. Around 99% go to a pool surrounded by trees to support fishing and tourism.
UK	Peat cutting only operates under license and these are restricted to quite a small area. Cutting can only be to within 50 cm of the underlying mineral soil and after use the area has to be restored or reinstated.
Switzerland	It is forbidden to cut peat though there might be some very small cutting still going on. There is a political will to conserve though many abandoned peat cuttings have tended to revert to forest. Most cutting was stopped in 1945 and the last serious cutting ended in the 1990s.
Germany	There is now no significant extraction of peat. Most was fen peat and grants are given to manage grasslands on peat. Conservation is active and in some areas even entry is forbidden. There are strong moves to replace horticultural peat by composted products.

Table 2 Hypotheses to be tested within the experimental Workpackages (WP02-05)

Relating to carbon sequestration and turnover (WP02, 05, 06) 1) A restored peatland is positive (increased sink) for C sequestration while a damaged peatland is negative for C sequestration 2) Restoration will increase C sequestration 3) C sequestration is not necessarily equivalent to biodiversity (an increase in one may not parallel an increase in the other) 4) Rehabilitation will increase biodiversity 5) Rehabilitation will increase C sequestration 6) The water table in peatlands can be optimised to encourage specific keystone species 7) An increased (raised) water table will promote increased C sequestration 8) Physico-chemical properties of peat interact with the water table in affecting the success of rehabilitation 9) Keystone species differ in their ability to rehabilitate different peat situations
Relating to microbial communities (WP03, 04) 1) Microbial community structure parallels the successional stage of bog development 2) Ecological resilience is increased by a high microbial diversity 3) Microbial community structure is coupled with that of plants (mosses and/or vascular plants) 4) The vertical gradient in microbial structure is different depending upon the plant community being predominantly mosses or vascular plants (influence of rooting depth). 5) The utilization of carbon by the microbial community depends on the quality of the C supply from plants. 6) The relative proportions of methanotrophs/methanogens (and hence ratio of CH_4:CO_2) reflects the peat quality.