



## Soils and Nature Conservation

Newsletter of the Soils Lead Co-ordination Network

Issue No.3

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The Soils Lead Co-ordination Network was established by the Joint Nature Conservation Committee to bring together the views and expertise of the country nature conservation agencies and provide a common approach to UK issues.

### Welcome

Welcome to the third issue of the Soils Lead Co-ordination Network (LCN) newsletter. This issue focuses primarily on the work undertaken by the Soils LCN on the identification and characterisation of soil of conservation value and the workshop "Soil and Nature conservation" held at Reading University (December 2003) to promote discussion between policy makers, statutory bodies, the research community and other stakeholders in soil resources.

Other activities of the Soils LCN over the past six months have included an active contribution to the development of European and national soil protection policies through our continuing engagement in the European soil thematic strategy technical working group and inputs to national soil action plans. A full update on the European strategy will be given in the next issue of the Newsletter (July 2004), following the release of the first draft of the Monitoring Directive on Soil and related communications on contamination, erosion and decline in organic matter.

This newsletter also highlights the range of soil related projects and activities from the UK nature conservation agencies to help raise awareness of soils issues and promote interdisciplinary dialogue. We would very much welcome any comments or contributions to future newsletters.

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[Patricia Bruneau](#)

## Soil and Nature Conservation Workshop University of Reading, 16 Dec 2003

### OBJECTIVES AND OUTPUTS

This one-day workshop was organised by the Soils LCN and hosted by Professor Stephen Nortcliff at the Department of Soil Science, University of Reading.

Soils are the foundation of all terrestrial ecosystems. Soil functions and properties are key to the long-term conservation status of habitats and species. Raising the protection of soil resources to a similar level as water and air will promote better integration of environmental issues within existing policy frameworks. In the past, soils have too often been considered chiefly through their agriculture roles, thereby giving undue emphasis to the productivity function. This neglected their role in areas of lower management intensity, that are of direct concern to the UK nature conservation agencies.

The aim of the "Soil and Nature Conservation" workshop was to foster, through discussion, a better understanding of soil conservation and the nature of the threats. The four sessions addressed the following points.

#### **Topic 1: Are soils important for Nature conservation?**

- Why do soils matter for nature conservation?
- Do existing agency policies adequately address soil conservation?
- How do we address expected future developments?
- What is more important for nature conservation: diversity of soil type or soil diversity?

#### **Topic 2: Integrated approaches to soil conservation: links to habitats and species**

- Defining the conservation value of soil: soil function versus intrinsic properties, scale issues, links with habitats and species
- Links with agri-environmental schemes. Do we need to include rare arable soils?
- Integration of soil in wider environmental protection frameworks.

#### **Topic 3 : Indicators for soil in nature conservation**

- What type of indicators (general/specific/surrogates)?
- How much R&D is still needed and what information can be used now?
- How much can nature conservation contribute to development of soil indicators?

#### **Topic 4 : Monitoring and soil conservation**

- What is the role of designated sites and how can we exploit links to site condition monitoring?
- Do we need to link with existing monitoring schemes e.g. Countryside Survey and cross compliance?
- Is there any need for benchmark sites?

The discussions were supported by keynote presentations whose abstracts are included below.

During the discussions, the importance of soils in nature conservation was widely recognised. It reflects many key aspects of the variability of soil resources and functions. The role of soils in nature conservation includes ecological services, landscape values, habitat restoration and agricultural and agri-environmental concerns, as well as recreational aspects of use of the Natural Heritage.

The need for more integrated approaches between Lead Co-ordination Networks, other statutory bodies, policy makers and research communities to define conservation objectives for soils was emphasised. Nature conservation concerns extend well beyond the protection of rare soils; they include the conservation of habitats and species, as well as landscape and catchment approaches to conservation.

An ecosystem approach is one way to promote better integration of soil conservation. Soilscape and Ecoscape concepts, which promote an integrated soil/vegetation classification for the UK, could become a useful means for integrated management, although they might be of more limited use at a large scale. Similarly, models that link vegetation and habitats to soils and landscapes could be valuable management tools and help to raise

understanding of catchment and off-site issues. Integration requires a move away from problem identification to seeing a way forward.

Identification of indicators for soil in nature conservation is impeded by a lack of clarity in nature conservation policy objectives. Although it is not possible yet to describe and quantify the full extent of soil biodiversity, there is a range of soil species or properties that can be used as indicators for soil monitoring. Monitoring needs to be integrated with wider environmental monitoring schemes and be able to look at the resilience/resistance of soil under different management regimes.

Other points highlighted during the discussion were the need for greater public awareness of soil issues (among the general public, schools, and owner/occupiers), as well as maintaining a dynamic dialogue between the scientific community and the policy, advisory and regulatory agencies. Such dialogue can be extended through future issues of the Soils LCN newsletter which will report progress in development and implementation of soil policy in nature conservation. Further opportunities for dialogue are likely to emerge from the Convention on Biological Diversity (CBD) process.

For further information on the meeting, please contact the newsletter editor or your national Soil LCN contact.

## **ABSTRACTS OF PRESENTATIONS**

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### ***Overview of UK nature conservation agency soil policy***

**Tony Weighell (Joint Nature Conservation Committee, Peterborough)**

The Joint Nature Conservation Committee provides a means for the UK's nature conservation agencies to work together at the UK level and to provide co-ordinated UK advice on nature conservation issues to the UK government and the EU.

Joint work between the agencies is undertaken through a series of inter-agency groups, with a 'Soils Lead Co-ordination Network' (LCN) performing this role in relation to soil conservation. The role of this group, as with other inter-agency groups, is to share agency experience, both in terms of science and policy, and to develop a UK view of such issues.

The conservation agency soils work is driven by both national needs (i.e. Welsh, Scottish, etc.) and UK level policy, the latter being driven largely by requirements of the EU but also by global conventions. The key driving forces for the UK conservation agencies are seen as:

- the EU soils Thematic Strategy;
- national strategies/action plans;
- the need to determine a clear role for designated areas in soil protection;
- the need for focussed research by the agencies to answer specific questions of importance to their work;
- the need to advise government across a range of policy initiatives and programmes;
- the need for a common UK approach.

Soil conservation is above all a cross-cutting issue that is relevant to a wide range of conservation management issues and environmental programmes at national, European and global levels. There are now opportunities for the agencies to promote the importance of soil conservation at a high level through such instruments as the Habitats Directive and the Convention on Biodiversity. The conservation agencies must also seek ways to apply soil science in conservation management programmes at practical (i.e. protected site and farm) levels.

Recent developments in soil conservation policy suggest that attitudes to this resource are changing. The conservation agencies need to work through 'top down' policy initiatives and 'bottom up' practical application to maximise the conservation gain in this field.

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**UK, European and global view of soil conservation issues**  
**Stephen Nortcliff (Department of Soil Science, University of Reading)**

In the last decade there has been an increasing awareness of the importance of soils as key components in environmental systems. This importance was highlighted in the 19<sup>th</sup> Report of the Royal Commission on Environmental Pollution, 'Sustainable use of soil', published in 1996. The response in the United Kingdom has been varied, with different regional actions towards strategies for soil protection. In England, for example, DEFRA published in 2001 'The draft soil strategy for England', in which the soil was described as a vital part of our environment and an essential source for life.

The strategy emphasised the importance of soils as an integral part of the whole environmental system and highlighted the need to understand how soils functioned in this context. The strategy also emphasised the importance of conserving soils and their natural functioning as a key part of an environmental approach to sustainable land management. Indeed the strategy stressed that the management and protection of the soil must be a key part of the protection of the environment as a whole. In 2003, following from the 'Soil Strategy', DEFRA launched 'The First Soil Action Plan for England 2004-2006'. This action plan again emphasises the key role of soils in both natural and managed ecosystems and emphasises the need to ensure that soils are afforded appropriate protection to ensure that they are capable of performing the functions necessary to perform these roles.

There are similar approaches being developed in Wales, Scotland and Northern Ireland. Running almost in parallel to the programmes in the United Kingdom have been moves towards a 'Thematic Strategy for Soil Protection in Europe'. This was launched with a consultative document in March 2002, followed by a framework to develop a policy for this Thematic Strategy in 2003. There are strong parallels between the regional approaches in the United Kingdom and the Europe-wide approach of the European Commission.

At a global scale there are no such co-ordinated policies, but there are international conventions which serve to provide a framework for actions related to soil. These include Conventions on Climate Change, Biological Diversity and to Combat Desertification. Over the last decade there has been a major increase in the level of recognition of the important role that soils play in our environmental systems. There is a clear recognition that soils and their key environmental functions must be conserved and that this can only be achieved by a better understanding of the nature of soils, the functions they perform and their interactions with other parts of the environmental system.

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**Soil monitoring in the context of nature conservation**  
**Patricia Bruneau (Soils LCN, Scottish Natural Heritage, Edinburgh)**

There is growing pressure on the nature conservation agencies to include soils in the management of designated sites and contribute to the national soil monitoring programmes envisaged by the forthcoming EU Soil Monitoring Directive.

Past approaches to soil value assessments have been driven by agricultural needs, particularly the productivity function of soil (crop and fibre). Maps of soil classes for forestry and agriculture were produced and used to define conservation value on the basis of potential production. Soils in higher classes are offered some protection to preserve their productivity function (e.g. planning regulations to reduce soil loss, waste disposal regulation and fertiliser input guidelines to control contamination of water and soil). These approaches do not integrate the wider functions of soil and are of limited use for natural and semi-natural habitats.

Conservation targets, such as those used for habitats and species, are not either always directly applicable for soil assessments as soils are an "out-of-sight" resource which derives its conservation value from a combination of ecological and environmental functions all strongly spatially organised.

A fundamental requirement is that soils of conservation value play a key role in improving or maintaining a range of ecological services and functions for priority habitats both at local scale or within a wider environmental framework. Soils with intrinsic value or options for future conservation improvement are also likely to be of high value. Identification of suitable criteria for assessing the value of soils is key to the success of this approach. Ideally, selected criteria should be based on quantifiable information (parameters or indicators) that will help to explain and measure change over time as the result of a range of pressures.

This paper presents the outline of a protocol currently being developed by the Soils LCN to identify a means of measuring the conservation value of soil and how this information can be used to monitor soil functions and soil quality.

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### ***Mapping soils and vegetation – Soilscales and Ecoscales***

**Dick Thompson (National Soil Resources Institute), John Rodwell (Lancaster University)**

Strategic soil survey in England and Wales has been driven by concerns about the country's productive land resource for food production. The system of soil classification used in production of the National Soil Map allowed field description and classification based predominantly on relatively permanent properties of the subsoil that contributed to an understanding of the suitability of the soils for crop production.

With the growing interest in the environment and the maintenance of biodiversity, attempts are being made to re-interpret such maps in ways that lend themselves to interpretation by ecologists and biologists. The NSRI has condensed the 300 soil map units on the National Soil Map down to 27 broad soil landscape classes defined in terms of the general soil conditions and the types of semi-natural vegetation with which each is associated. The simplified map units are known as 'Soilscales'.

Independently of the above, Lancaster University, Unit of Vegetation Science, has been using a similar approach to characterise, in considerably more detail, what types of vegetation will result from the removal of intensive agricultural production on different soils within Cheshire and other areas. The units are classed as 'Ecoscales' and are slightly broader than NSRI's Soilscales. The two groups are now seeking to work together in the future to take these concepts forward.

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### ***Air pollution and soils***

**Simon Bareham (Air Pollution LCN, Countryside Council for Wales, Bangor)**

Widespread contamination of soils across many parts of N. America and northern Europe has occurred since the onset of the industrial revolution.

Deposition of sulphur and nitrogen compounds on often thin "poor" soils has led to widespread acidification of soils and concomitant damage to aquatic and terrestrial ecosystems. Although emissions of sulphur dioxide have declined substantially, acidification remains widespread, with indeterminate signs of recovery. Emissions of nitrogen compounds have become the main focus of concern, both in terms of a contribution to acidification, but also in terms of eutrophication of soils and habitats. Evidence to support these trends is presented and discussed.

The concept of critical loads is used as the basis for assessment of air pollution effects upon soils. Future trends and potential effects are outlined. The relevance of carbon and nitrogen dynamics in soils in the context of climate change is presented and options for future work in the area of air pollution and soils is recommended.

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### ***Soil biodiversity: indicators for nature conservation***

**Helaina I.J. Black (Soil Ecology Group, Centre for Ecology and Hydrology, Lancaster)**

The soil is home to some of the most fascinating organisms on Earth. The diversity in soils is several orders of magnitude higher than that above ground and is seen as the last frontier for biodiversity on Earth. We are, however, remarkably ignorant about which soil types host the highest biodiversity, how endemic soil organisms are or their habitat preferences, although habitats above ground rely upon the intimate interaction with the biodiversity below, whether the habitat is a crop being produced for economic reasons or indigenous plants integral to the character of semi-natural habitats; numerous plant species have intimate symbiotic relationships with soil fungi, many insect species are soil dwellers for at least some part of their life-cycle, while many mammals and amphibian species of conservation concern rely on the soil for food and shelter. There are many national and international initiatives, policies and guidance that will impact on soil biodiversity, though few mention soil biodiversity explicitly. The value of soil biodiversity in conservation terms is currently only addressed at the species level; there are over 100 species of soil invertebrates and fungi in UK Biodiversity Action Plans.

It is, however, equally important to recognise the wider benefits of soil biodiversity in support of nature conservation through maintaining soil functions (e.g. breakdown and retention of organic matter, restoration of damaged/impooverished soils, maintenance of water quality and associated biodiversity conservation etc). This multi-functionality encompasses the ecologically based concepts of soil health and soil quality (Doran and Zies, 2000), where soil health is the capacity of soil to function as a vital living system to sustain soil biological productivity, promote environmental quality and maintain plant and animal health, whether that is in a natural or managed ecosystem. There is still, however, much research required to develop reliable indicators for an assessment of the health of soil biodiversity and maintenance of soil multi-functionality and resolve goals for soil biodiversity in the context of nature conservation. In working towards these goals, it may be useful, in the short-term, to start with the measurement of one or two groups involved in the maintenance of individual soil functions. Such information would go a long way to addressing some of the shortfall in our knowledge of what soil biodiversity is present where, while research continues to develop reliable relationships between soil biodiversity and ecosystem function, what biodiversity is needed for soil resilience and a predictive understanding of what regulates soil biodiversity distribution.

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***Ecological restoration and soil systems: overcoming biotic and abiotic barriers***  
**Jim Harris (Institute of Water and Environment, Cranfield University, Silsoe)**

Conservation and sympathetic management of soils is increasingly being recognised as crucial to maintaining ecosystem service functions. There are many cases of land use, however, where the damage to soils is so severe that active intervention is required to restore these functions. Civil engineering activities such as quarrying and opencast coal mining result in severely degraded or even the loss of soil resources. In these circumstances there are significant barriers to restoring function which have to be overcome, and in some cases "accelerated pedogenesis" using soil making materials is required.

The concepts of ecosystem services, ecological restoration, and biotic and abiotic thresholds will be discussed, demonstrating the efficacy of using soil microbial community measures as a monitoring tool.

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***The National Trust: soil conservation strategies on National Trust properties (and their catchments)***  
**R. Jarman (National Trust), K. Hearn (National Trust), Nick Haycock (Haycock Associates Limited)**

In 1996-97 the National Trust developed its soil policy, which was accepted by the Trust's Council. The policy put soil protection on equal footing with nature and building conservation and explicitly expected all segments of the organisation to build soil protection into their work (soil proofing). The conservation department of the National Trust has for the past 6 years spearheaded this policy and sought to ensure that soil environments and resources are protected, conserved and or restored where applicable. This policy has had specific implications for nature conservation and the management of not only designated sites, but also for the general conservation of soil ecology in parks, gardens the built environment and within the Trust's agricultural holdings. The presentation will outline the areas where soil policy is developing and how soils are influencing land use and land management practices on Trust land holdings.

The main challenges facing the National Trust, and any environmental organisation wishing to protect our soil resources, is acknowledging the scale of the challenge, that new skills will need to be adapted, and that protection of individual sites is always interlinked with the site's relationship with its catchment. Being engaged with the catchment issues means engaging with land and land users who need to be made aware of the off-site impacts of their operations. In addition, many of the possible solutions to solve some of the worst problems of soil mismanagement draw heavily from agro-centric solutions, which are not necessarily appropriate for the soil's long-term conservation nor its ecology. The National Trust has found that the nature conservation industry needs to take stock of the practices that have taken place in the name of nature protection; some of these practices have not been in the best interests of soil conservation.

Over the coming decades, many of the most sensitive soils in lowland and upland Britain will face an uncertain future as a result of restructuring of agriculture and changing climate. The Trust's soil policy and associated property and farm management plans will seek, in small part, to identify the threats to soils on Trust lands and in some case, the catchments affecting Trust properties.

For more information on the National Trust's soil policy please go to the following link:

[www.nationaltrust.org.uk/environment](http://www.nationaltrust.org.uk/environment)

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***Erosion in the Scottish upland organic and organo-mineral soils.***

**Allan Lilly (MLURI, Aberdeen), John Gordon (Scottish Natural Heritage, Edinburgh)**

Soil erosion in the Scottish uplands occurs in response to over-steepened, glaciated slopes, a climate dominated by low winter temperatures, high rainfall and high wind speeds and often fragile vegetation. Over 50% of Scottish soils have an organic surface layer and erosion of these soils is of concern as they are an important carbon store.

Little is known about the key processes that initiate erosion in these soils, how the individual soil types respond to different pressures or of the potential for recovery. Land use, for example, grazing by domestic and wild animals may play a key role in either the initiation of peat erosion or in its exacerbation.

Studies of the spatial extent of soil erosion in upland Scotland give different estimates of the actual area eroded (from 6% of a limited sample area to a national estimate of 15%). A rule-based GIS model shows that over 44% of the Scottish uplands (as defined in SNH's Natural Heritage Futures framework) have soils in the high erosion risk category.

However, this model reflects the current lack of knowledge about the processes of erosion in upland organic and organo-mineral soils. Future work needs to concentrate on developing a process-based understanding of the causes and dynamics of peat erosion and improve the land use information within the model, for example, by the inclusion of data on past and present stocking densities.

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***Research at Moor House – Upper Teesdale National Nature Reserve***

**John K Adamson Environmental Change Network (Centre for Ecology and Hydrology, Lancaster)**

Moor House – Upper Teesdale NNR is an upland site in the North Pennines and has an area of 74km<sup>2</sup>. Habitats include exposed summits, extensive blanket peatlands, upland grasslands, pastures, hay meadows and deciduous woodland. Altitude ranges from 290m at High Force to 85 m at Great Dun Fell.

Since the pioneering meteorological recording of Gordon Manley in the 1930s the site has been a focus for diverse scientific research. Through the 1950s, '60s and '70s research was undertaken by staff of the field station and universities on the utilization of the uplands for grazing, forestry and grouse shooting and the impact of these activities. Sheep exclosures and a randomized block burning experiment were established, which are still maintained and monitored today. Productivity and decomposition of the peat soils were extensively studied in the late 1960s and early 1970s when the Moor House area was included in the tundra network of the International Biological Programme. In the 1980s Great Dun Fell was a focus for international campaigns on nitrogen deposition, and in the early 1990s it was a flagship site of NERC's Terrestrial Initiative in Global Environmental Research which included examining the impact of manipulated soil temperatures.

Today the site is used by NERC research centres and the staff and PhD students from seven universities. A common topic is the carbon cycle and a variety of approaches is being used to model aspects of the cycle including gaseous, dissolved and particulate losses. Many of these researchers place their work in context using monitoring data from the UK Environmental Change Network. Since 1992 the NNR has been an ECN Terrestrial Site and since 1997 the largest stream on the site, the Trout Beck, has been an ECN Freshwater Site. ECN monitoring includes 5-year sampling of the soil for physical and chemical variables, fortnightly sampling of soil solution and weekly sampling of precipitation and stream chemistry. In the last 10 years 125 refereed scientific papers and 15 PhD theses have resulted from research at Moor House – Upper Teesdale.

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## News in Brief: International and National Soil Policy and Projects

### **European Soil Thematic Strategy**

Phase II of the European Soil Thematic Strategy was launched at a stakeholder meeting in February 2003. The European Commission has set up an advisory forum and 5 technical working groups (TWGs) on Erosion, Contamination, Decline of Organic Matter, Monitoring and Research to support their work. The Soils LCN is representing the UK on the Monitoring TWG. Over the last six months, the TWGs have collated information on the status of soil resources and threats and prepared recommendations for monitoring and research. The first draft reports were produced in October, and after revision in late-Spring 2004, will form the basis for the Directive on Soil Monitoring and a Communication on erosion, decline of organic matter and contamination to be completed in Sept 2004.

In a bid to provide more integrated approaches to soil protection, the Commission has announced the merging of the Directive on Soil Monitoring, the revised Sludge Directive and the Directive on Bio-waste as a single package.

Further details can be found at <http://europa.eu.int/comm/environment/soil/index.htm>

### **The First Soil Action Plan for England 2004-06**

Over the last two years Defra has been working with key NGOs, other Government Departments, Government Agencies and several professional soil scientists to develop a Soil Action Plan for England. The aim of the Action Plan is to draw together all the ongoing work on soil management, protection and research and identify and set in train new work as needed. As this is a new government policy area, the plan will be of short duration, between 2004 and 2006, with the intention of then reviewing actions taken and developing a longer term set of actions.

In October 2003 a consultation draft of the plan was launched by Lord Whitty and comments upon the plan have been submitted on behalf of the Soils LCN by English Nature. The draft plan lists 57 Actions which are grouped under the headings:

- i. Core Actions
- ii. Overarching Soil Protection Issues
- iii. Soils for Agriculture and Forestry
- iv. Interaction between Soil, Air and Water
- v. Soils and Biodiversity
- vi. Soils and the Landscape and Cultural Heritage
- vii. Soils in Minerals Extraction and the Built Environment.

Particularly important for the conservation agencies are actions relating to the management of soils in designated conservation sites, and the use of soils information to target habitat restoration. Actions relating to farming and land use planning form the core part of the plan, many of which also have direct or indirect relevance to nature conservation.

The Action Plan will be complemented by a report to be published shortly by the Environment Agency on the "Quality of Soils in England and Wales" which will provide the broad context for the plan actions. It is anticipated that the First Soil Action Plan for England will be published in Spring 2004.

Further detail can be found at <http://www.defra.gov.uk/environment/landliability/soil/index.htm#policy> or contact John Hopkins (EN) at [john.hopkins@english-nature.org.uk](mailto:john.hopkins@english-nature.org.uk)

### **Soil Strategy for Wales**

The Soil Strategy for Wales is going through its final clearance procedure in the National Assembly and should be issued for public consultation in January 2004. The document is structured around issues for Wales (e.g. organic matter, erosion, diversity) and what actions the Assembly proposes.



The issues for Wales will be somewhat different from those in England, and to a lesser extent Scotland, and although the Welsh Strategy will have much in common with the Soil Action Plan for England, it will give a greater emphasis to upland, semi-natural and stocking density issues and lesser weight to lowland arable issues.

### **Soil strategy for Scotland**

There is no forthcoming development of a soil strategy for Scotland on the same lines as in England and Wales. However the Scottish Executive has launched a consultation process on the implementation of the CAP reform that will last from 6 October to 6 January. SNH is a contributor to the consultation. For further information, contact [claudia.rowse@snh.gov.uk](mailto:claudia.rowse@snh.gov.uk)

The implementation of Cross-compliance and Good Agricultural and Environmental Condition (GAEC) will have an impact on soil protection as it requires farmers to maintain land in certain condition (referred to as GAEC) and adhere to the statutory requirements laid down in certain directives (cross-compliance). Direct payments would be reduced or withheld where there is breach of the cross-compliance rules. The details of these requirements are still under discussion and will be put out for consultation in early 2004. Further information on the CAP reform implementation in Scotland is available at: <http://www.scotland.gov.uk/consultations/agriculture/refo-00.asp>

### **Identification and development of a set of national indicators for soil quality**

A meeting was convened by the Environmental Agency/Defra in November 2003 with the main UK statutory bodies to review progress with soil indicators since the publication of R&D Technical Report P5-053/2/TR (Loveland and Thompson, 2001) and to form a consensus of opinion on how best to take forward the development of soil indicators for the UK. The indicator set identified in P5-053/2/TR needs to be prioritised for suitability within a functional approach to soil monitoring. The Soils LCN has been invited to lead on "Habitats and biodiversity" functions. A target date of July 2004 was set for reporting.

### **The role of the planning system in protecting and enhancing soil**

This 1-year project commissioned by the Scottish & Northern Ireland Forum for Environmental Research (SNIFFER) on behalf of the Scottish Environmental Protection Agency, Environment and Heritage Service, the Environment Agency and Scottish Natural Heritage is due to be completed in early 2004. The detailed technical report and a more concise advice note aim to help planning authorities to address soil issues in forward planning and in the execution of their development control functions. It is relevant to the Scottish, Northern Ireland, English and Welsh planning systems. Two launch events will be held in Birmingham and Glasgow in March 2004. Please contact Fiona Mactaggart at SNIFFER if you are interested in attending ([fiona@sniffer.org.uk](mailto:fiona@sniffer.org.uk)). Further information about the project is available at the SNIFFER Land Quality Theme programme site (<http://www.sniffer.org.uk/>).

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## **News in Brief: Nature Conservation Agency and LCN Soil Related Projects**

### **Review of long-term, experimental studies of habitats and their management: request for information to compile an inventory**

The Lowland Grassland Lead Co-ordination Network (LCN) has been concerned about the future and status of some long-term experimental studies of grassland management and initiated a review. Following requests from the chairs of other LCNs, the scope will be extended to include all priority habitats covered by LCNs or Lead Agencies, i.e. freshwater; uplands; lowland grasslands; woodlands; coastal; lowland wetland; lowland heathlands; as well as soils and air pollution.

The first step is to compile an inventory. At present there are more than 25 columns in the spreadsheet, covering information such as locality, broad habitat, specific habitat, contact organisation, contact person(s), date started, is it current?, treatments, plot size, designated site?, notes, grid reference and source of information.

Criteria for including studies in the inventory are:

- They must be experimental studies of management, with scientific replication and controls. It is not intended to include the many non-experimental monitoring sites.
- Studies where habitats have been translocated will be included where good baseline data, regular scientific monitoring of progress and detailed management records exist.
- They must have run or been running for more than five years.
- 'Historic' studies (i.e. those that are no longer active or running) can be included if they meet the criteria above.

If you know of studies which meet these criteria, please could you get in touch with details, or references. It is hoped that those who are directly involved with such projects will also agree to validate the draft inventory and fill in any gaps at a later stage.

Information can be sent direct to Vicky Morgan, Lowland Grassland LCN Officer, JNCC: [vicky.morgan@english-nature.org.uk](mailto:vicky.morgan@english-nature.org.uk)

Many thanks in advance to anyone who can help.

### **Erosion in organic soils (SNH/Soils LCN)**

Scotland has a rich repository of organic soils. Recognition of their importance as a sink and source of carbon and their role in supporting many priority habitats has led to an increased interest in upland soil conservation. Improving our understanding of erosion drivers and control mechanisms is key to sustainable management of upland soils and also has potentially significant implications for assessing the change in carbon storage potential resulting from implementation of climate change mitigation protocols. SNH and the Soils LCN have initiated inter-agency discussions to seek information and comments on these wider environmental problems associated with erosion of organic soils. The results will be discussed in a meeting to be organised by SNH in early summer 2004.

For further information, contact [patricia.bruneau@snh.gov.uk](mailto:patricia.bruneau@snh.gov.uk)

### **West Lothian Soil Sustainability Plan**

In December 2003, as part of the review of its Biodiversity Action Plan, and in collaboration with SNH and the Scottish Agricultural College (SAC), West Lothian Council in Scotland produced a document intended to raise awareness and understanding of the soil resource in the county. This document is a user-friendly information source for planners and other soil users and provides a valuable introduction to the local soil resource.

For further information, contact [patricia.bruneau@snh.gov.uk](mailto:patricia.bruneau@snh.gov.uk) or [carolyn.clarck@snh.gov.uk](mailto:carolyn.clarck@snh.gov.uk)

### **Moorhouse project (Soils LCN)**

This research project, co-funded by JNCC and University of Reading and supervised by Prof. S. Nortcliff and Prof. V. Brown, aims to resolve the functional relationships between soils and important vegetation communities across a range of upland habitats (e.g. woodland, heath and calcareous grassland) at Moor House National Nature Reserve in the north Pennines. That information will form the basis for the development of models to predict the changes in soil properties in response to management practices.

For further information, contact Emilie Grand-Clement at [e.m.grand-clement@rdg.ac.uk](mailto:e.m.grand-clement@rdg.ac.uk)

### **The effect of stocking density on soil quality in upland Wales (CEH Bangor and SAFS, UWB)**

This 1-year project (reporting date 2004) will help inform on agri-environmental and cross-compliance soil management plan and strategies by looking at the effect of stocking density on soil quality in selected upland environments in Wales. The three selected sites are: Pontbren – farmer-led sustainable farming initiative of 10 farms in the upper reaches of the River Severn catchment; Pwllpeiran - ADAS managed grazing plots, part of Cambrian mountains ESA; Snowdonia - National Trust and private farms under heavy grazing or CCW grazing agreements.

For further information, contact Dylan Williams, CCW: [dylan.williams@ccw.gov.uk](mailto:dylan.williams@ccw.gov.uk)

### **Comparison of the effects of burning and mowing on aspects of soil chemistry, vegetation structure and regeneration capacity of blanket bog and European dry heath vegetation on the Berwyn Mountains (CCW North East Area Office)**

The 1-year study, due to finish in November 2004, will take place on the Berwyn National Nature Reserve (NNR) and will provide soil data showing management effects on soil condition and function. The objectives of the 'Review of Consents' project are to identify and compare trends between the soil characteristics and the species composition of blanket mire and European dry heath vegetation on the Berwyn Mountains in response to burning and mowing. Soil measurements include profile, seed bank, pH, CEC, soil and soil solution DON, DOP and DOC, extractable N and P, soil organic matter, bulk density and water infiltration. The Berwyn SSSI is the largest area of upland moorland in Wales. The 24,450 ha site includes areas of dry heath, wet heath and blanket bog, as well as areas of upland acid grassland, important hunting ground for hen harrier, merlin and peregrine. The majority of the Berwyn SSSI is part of the Berwyn and South Clwyd Mountains cSAC. The whole of the SSSI is classified as an SPA for its upland raptors.

For further information, contact Bethan Beech, Senior Conservation Officer, Berwyn: [b.beech@ccw.gov.uk](mailto:b.beech@ccw.gov.uk)

### **Studies into the condition and conservation of montane heath and summit heath vegetation in Wales (Upland LCN, CCW)**

The aim of this 1-year project (reporting date March 2004) is to investigate the relationship between species composition of remaining montane heath fragments on the Carneddau, nitrogen status of plant communities, chemical properties of underlying soils and current grazing impacts. Soil measurements include CEC, % base saturation, exchangeable acidity, pH, SOM, total N, P and C:N ratio. The main area of montane communities in Wales is on the Carneddau massif in Snowdonia. This is part of the Eryri SSSI/cSAC and forms the easternmost part of the site and the highest point of the massif is 1064m on Carnedd Llewelyn with most of the montane vegetation along the ridge. The project will indirectly provide soil data to inform soil strategy, particularly in relation to overgrazing and air pollution impacts on soil.

For further information, contact Barbara Jones, Upland Ecologist: [b.jones@ccw.gov.uk](mailto:b.jones@ccw.gov.uk)

### **Snowdonia atmospheric pollution assessment and site characterisation (Air pollution LCN, CCW)**

Phase I of this project (reporting date March 2004) aims to identify and catalogue 'environmental' data for Snowdonia relating to soils, habitat survey/data, air quality/deposition and water quality. It will include soil maps, LANDIS soils data, NSI data, RSSS data and other GIS soils coverage from national/regional level (e.g. critical load soil maps), discrete and project (e.g. PhD, GANE) data sets. Data will be examined to explore the spatial and temporal relationships of chemical and biological parameters and synthesised to give site characterisation for Snowdonia to describe status in relation to component variables measured. Outputs will link to the MONARCH Snowdonia study and define parameters to input to atmospheric pollutant modelling under the Review of Consents. They will also help better understanding of the impact of regulated releases upon protected sites (including their soils). The study will also provide an initial soils inventory for this area and should help inform plans for a Snowdonia soil conservation value study, as well as giving a better idea of the health of soils for state for environment reporting and the Wales Soil Strategy.

For further information, contact Simon Bareham Senior Pollution and Climate Change Impacts Adviser CCW: [s.bareham@ccw.gov.uk](mailto:s.bareham@ccw.gov.uk)

### **Changing nutrient budget of sand dunes: consequences for the nature conservation interest and dune management (CCW)**

The 2002 project (Jones et al, 2002, CCW Contract Science Report No 566a/b) studied N deposition effects on soil and vegetation processes and aimed at determining a critical load for N. Five sand dune sites in Wales and six in England, with a range of N deposition inputs, were sampled for soil, vegetation and groundwater parameters. Results showed that higher N inputs could help promote soil OM accumulation and thus soil development, which could cause increased rate of vegetation succession and loss of habitat in the mobile and semi-fixed dunes. The follow-up study (a 2003-04 Consents Review) of the dunes at Merthyr Mawr NNR (SSSI and part of Kenfig cSAC) in south Wales will look at nutrient budgets in dunes where the focus of ongoing management is the control of the introduced *Hippophae rhamnoides* (sea buckthorn) for the benefit of the two main SAC features represented on this component of the site - dune grassland and *Petalophyllum ralfsii* (Petalwort).

Further information, contact Rod Jones, Senior Coastal Scientist ([rd.jones@ccw.gov.uk](mailto:rd.jones@ccw.gov.uk)) or Peter Rhind, Coastal Ecologist ([p.rhind@ccw.gov.uk](mailto:p.rhind@ccw.gov.uk)).

### **Assessing the conservation value of soil and its relation with designated features for development of soil monitoring: a feasibility study (Soils LCN, SNH)**

This project (due to report early 2005) will identify means of measuring the conservation value of soil and how this information can be used for monitoring soil functions and quality in association with site condition monitoring. The proposed protocol incorporates an analysis using GIS of the spatial distribution of soil/parental material at the scale of designated areas, in combination with the spatial distribution of geology, topography, vegetation and to a lesser extent species and habitat information, to derive a functional conservation value. The measurement of an overall conservation value for a given soil will combine information on its rarity in the given context with all individual functional conservation scores. High overall conservation value could either reflect a single function with a very high conservation score or a combination of several low to moderate functional conservation scores.

For further information, contact Patricia Bruneau, SNH: [patricia.Bruneau@snh.gov.uk](mailto:patricia.Bruneau@snh.gov.uk)

### **Moorland ecosystem responses to grazing and environmental drivers (MERGED) (Moorland Forum, SNH)**

The aim of this three year project (2004-2006) steered by Scotland's Moorland Forum is to predict long-term vegetation dynamics in response to changes in grazing regimes and climate. This will be achieved using an integrated systems approach to reflect the complex interaction and feedback loops occurring over a range of temporal and spatial scales across moorland ecosystems. A simulation model will be developed using a

modular structure linking a core model for prediction of vegetation dynamics and landscape changes to grazing by sheep, deer and cattle as well as a range of burning and climate change scenarios. The model will generate key output modules for the prediction of the response of characteristic moorland species as well as socio-economic responses. Testing of the scenario development and moorland management will be undertaken in the final stage of the project. Very little is known about the relationship between soil fertility, burning and heather production, and this is a relationship the model may well be able to explore in the future.

For further information, contact Michael Thornton (Moorland Project Officer, SNH):  
[michael.thornton@snh.gov.uk](mailto:michael.thornton@snh.gov.uk)

### **Lunan Loch management project (Tayside & Clackmannanshire Area, SNH)**

The Lunan Lochs Catchment Management Project aims to restore water quality in the chain of five lochs which comprise the Dunkeld – Blairgowrie lochs candidate Special Area of Conservation. Water quality in four of the five Lunan lochs has, over the last 100 years, been declining, with higher pH, phosphate and nitrate levels and increased turbidity through suspended algal growth. Diffuse phosphate pollution from agriculture is thought to represent between 75 – 100% of the phosphates received by the lochs every year. Land use modelling work by MLURI (1997) has shown that there has been at least a doubling of the amounts of phosphates entering the system over the last 100 years.

There are 20 agricultural units in the catchment of 5877ha, from upland moorland and forestry management, through mixed livestock/arable farms, to productive arable including soft fruits. SNH aims to launch a Natural Care Management Scheme for the farms within the catchment in the spring of 2004 with the objective of reducing agricultural diffuse phosphate pollution through a number of measures aimed at reducing soil erosion and leaching of organic and inorganic fertilisers. The measures in the management scheme are based on the findings of individual farm pollution audits which were conducted in 2003. Each pollution audit comprised a whole farm visit, soil testing, phosphate budget, farm waste management plan, and a map of proposed remedial actions. Encouragingly 100% uptake was achieved. Land managers will not be able to *cherry pick* from a suite of standard measures but rather, their Natural Care scheme plans will be based on the priorities identified in the individual farm pollution audits. These include phosphate budgeting, farm waste management plans, soil testing, slurry/steading improvement works, removal of out-wintered cattle in sensitive locations, changes in cultivation practices and timings, changes in crop rotation and land use, creation of buffer strips and fencing of water courses and wet areas.

For further information, contact Denise Reed: [denise.reed@snh.gov.uk](mailto:denise.reed@snh.gov.uk)

### **Minimum tillage and soil conservation in Scotland**

A consortium of research organisations and industry partners led by the Scottish Agricultural College proposes to undertake a research project on the economic and environmental potential of minimum tillage in spring barley in Scotland. A concept note will be submitted in 2004 to the Sustainable Arable LINK Programme, which is a scheme in which the Government collaborates in the funding of industrially relevant research.

Minimum tillage could offer benefits to spring barley growers by saving on time and labour during establishing field crops compared to traditional cultivation methods. There could also be major benefits to wildlife by increasing the area of overwintered stubbles, which would provide birds with feeding grounds over the winter. However, weeds that tend to increase under minimum tillage are those with short-lived seed banks, while the species that are of greater benefit for farmland birds tend to decline in numbers. From a grower point of view, risks associated with minimum tillage include an increase in grass weeds and cereal volunteers. In addition, minimum tillage could impact on barley root activity and behaviour, resulting in changes in nitrogen uptake and thus leading to unpredictable grain nitrogen. If funded, the research project will investigate these issues in order to provide an accurate measure of the environmental benefits which come with minimum tillage and resolve issues regarding nitrogen use and grass weed control.

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## Other News

### **Looking to the Hills**

The Upland Lead Co-ordination Network (ULCN) newsletter 'Looking to the Hills' collates information about a wide range of upland projects, research and policy developments. It aims to share information about what is going on in the uplands and to provide links between people involved with the uplands. The newsletter is distributed to over 250 people and recent issues are now available on the JNCC website in the upland habitat resources section at <http://www.jncc.gov.uk/habitats/agency/newsletters.htm#upl>. The next issue is due out in February 2004.

For further information, contact Sally Johnson, SNH: tel: 0131 446 2056 [sally.johnson@snh.gov.uk](mailto:sally.johnson@snh.gov.uk)

### **SNH annual conference**

The 2003 SNH conference – 'Farming Forestry and the Natural Heritage' - was held in Pitlochry (4-7 November 2003). The conference was very well attended (300 participant) with 6 sessions over two days. Presentations were made under 6 main themes: 1) Key changes in land management; 2) Farming, forestry and biodiversity; 3) Farming, forestry and access; 4) Landscapes of farming and forestry; 5) Integrating biodiversity, landscapes and access objectives; and 6) Looking forward. Over thirty posters were also on display.

The Soils LCN presented two posters on: 1) Soil Biodiversity and Nature Conservation: the contribution of the Soils Lead Co-ordination Network; and 2) Soil and the Natural Heritage: recent developments of the EU soil protection policy.

Proceedings of the conference will be published by SNH.

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## Forthcoming meetings

### **EUROSOIL 2004**

6-12 Sept 2004, Freiburg, Germany

For more information consult: <http://www.forst.uni-freiburg.de/eurosoil/>

### **CIWEM**

'Soil Strategies: Uniting Science, Policy and Practice', 27 Jan 2004, Society of Chemical Industry, London

For more information consult: <http://www.ciwem.com/about/>

### **BES/EEF Annual Symposium**

'Ecology without frontiers: Environmental Challenges across Europe', April 2004

For more information consult:

<http://www.britishecologicalsociety.org/articles/meetings/current/2004/annualsymposium/>

### **NSRI/BGRG**

'Controlling the Loss of Soil to Water', 21 Jan 2004, Geological Society, London

For further information consult: <http://www.silsoe.cranfield.ac.uk/nsri/conference/bgrg/>

### **NSRI**

'The Role of Vegetation in Environmental Protection: Theory and Best Practice', 24

- 26th March 2004, NSRI, Silsoe

For further information consult: [http://www.silsoe.cranfield.ac.uk/rpm\\_conference](http://www.silsoe.cranfield.ac.uk/rpm_conference)

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## Contact points for soils in the country agencies

### **JOINT NATURE CONSERVATION COMMITTEE (JNCC)**

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### **CYNGOR CEFN GWLAD CYMRU/COUNTRYSIDE COUNCIL FOR WALES (CCW)**

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