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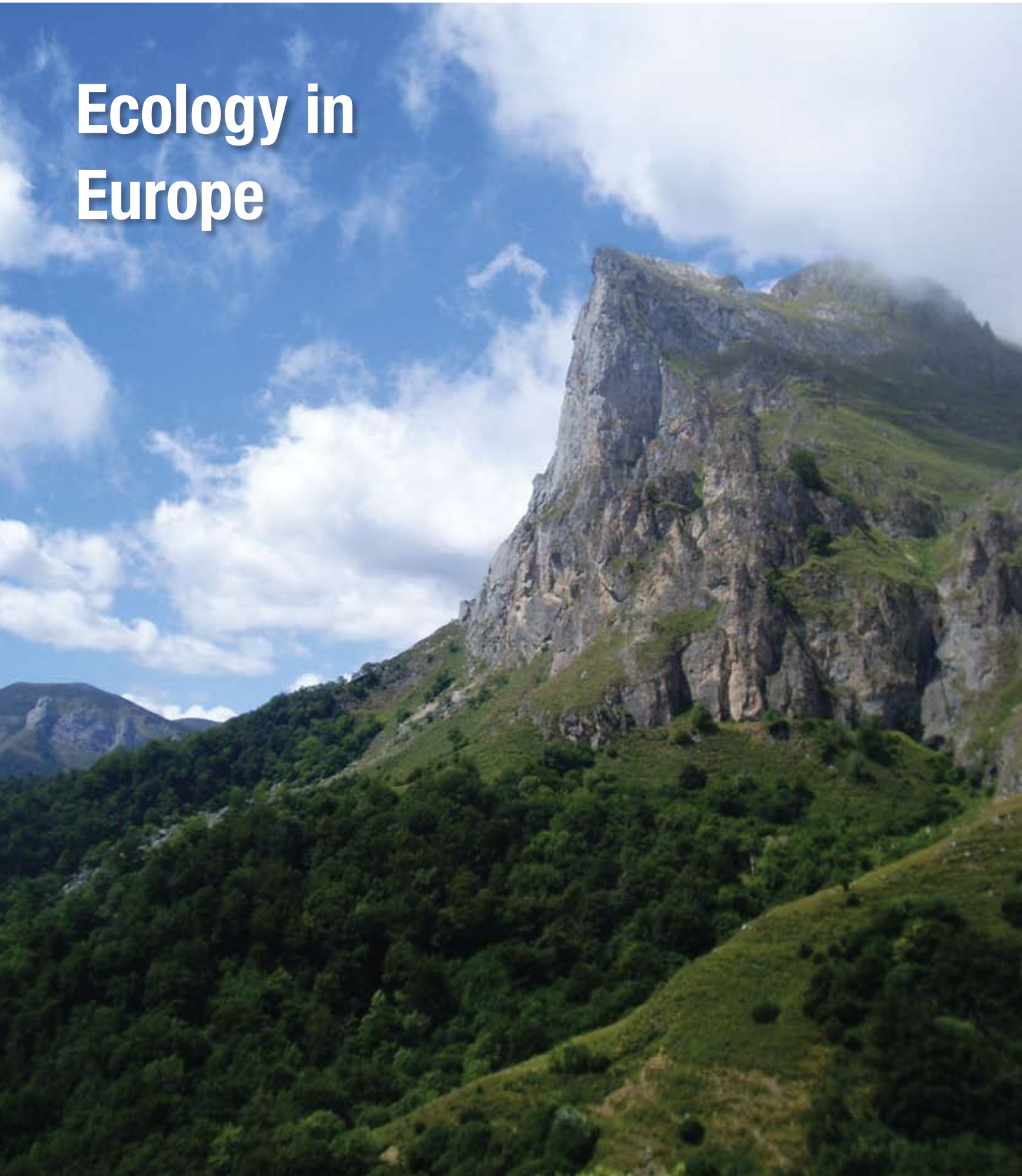
Ecology in Europe



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Institute of Ecology and Environmental Management

IEEM aims to raise the profile of the profession of ecology and environmental management, to establish, maintain and enhance professional standards, and to promote an ethic of environmental care within the profession and to clients and employers of the members.

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British Ecological Society

Editorial

None of us can easily escape the view that these are critically challenging times for the work of IEEM and its members, or indeed for those involved in ecology and environmental management worldwide. Even before the economic downturn added yet another pressure during 2008 and 2009, we were already wrestling globally with the quest for social and economic justice, political stability, food security, fuel security, the burgeoning threat of global water scarcity and the drive to convert remaining semi-natural land into explicitly productive use. Paradoxically, for a world that is now more environmentally aware than ever before, these pressures mean that it has become increasingly difficult to defend notions linked to the conservation of biodiversity, and to keep them on the political agenda.

Increasingly, I sense us slipping into a new epoch in which conservation no longer involves what we would wish to conserve for ethical, aesthetic or scientific reasons, but what we must conserve for the critical resources on which people's lives depend. In other words, the major goods, services, functions and life-support systems that ecosystems provide. But think carefully for a few seconds about what this could mean in a resource-hungry world, still growing at 80 million people per year, and seeking to re-equilibrate global wealth. Where will the balance tip, say, when the protection of large tropical forests, that contribute to global oxygen and carbon flux, is set against the demand to clear more land for biofuel production? How much value will be attached to the maintenance of migrant fish stocks in free-flowing rivers when set against the global pressure to increase dramatically the exploitation of rivers for water supply, irrigation and food production? These global examples might seem abstract, and far removed from our day-to-day work, and yet in our own islands, some large tests of our approach to biodiversity conservation are already on the horizon: housing developments in the Thames Gateway or on the southern heathlands; a Severn Barrage; airport development and expansion; commitment to agri-environment. More piecemeal tests are played out daily at a range of scales across our landscape.

These are circumstances in which the need for the endeavour, science, experience, and advocacy of ecologists could not be greater. In addition to ecological resource assessments and judgements on the ground, our roles are becoming many and varied: ensuring that we recognise the value of ecosystem goods and services; raising awareness about how climate change will interact with existing environmental pressures; maintaining and implementing environmental legislation in spirit and letter; preventing the conversion and loss of remnant semi-natural habitats; regulating potentially damaging activities; ensuring that ecological damage is mitigated, restoring impaired ecosystems...

In all these respects, our need to illustrate the importance of ecology and environmental management, to demonstrate their wider social value; to maintain and disseminate the skills on which our activities depends, and to encourage educational, training and career opportunities, are all part of our shared purpose. At our Glasgow conference last November – my first as President – I was bowled over by the huge degree of enthusiasm, energy and knowledge shown by IEEM members, and this must be among the Institute's major assets in taking our agenda forward.

I want to end this short editorial by paying tribute to my predecessor, Andy Tasker, in his role as IEEM President, and the way that he has added to the Institute's growth and purpose. Of course, every single one of our past Presidents has been the best, but Andy's particular contribution was to bring a mark of professionalism, business credibility and business standards to IEEM – all wrapped in his own brand of environmental knowledge, affability and good humour. On his watch, our membership grew rapidly to almost to 4,000 at 10-20% per year. This also represents the unstinting efforts of a dedicated – and growing – team of IEEM officers. In offering my own services as incoming IEEM President, therefore, I want to thank Andy, and all of the IEEM team, on behalf of all the IEEM membership, for maintaining the Institute's vision, momentum and purpose in this critical era for the use and application of ecology.

This editorial is based on Steve Ormerod's inaugural Presidential speech to the IEEM annual conference at Glasgow, November 2008.

Steve Ormerod FIEEM, IEEM President

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Cover image: The Picos de Europa ('Peaks of Europe') form part of the Cantabrian Mountains in northern Spain.

Photography: Jim Thompson CEnv MIEEM

Artwork on the cover will normally illustrate an article in, or the theme of, the current issue. The Editor would be pleased to consider any such material from authors.

Protecting European Sites in the British Territories of Cyprus

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***Principal Ecologist, Entec UK*

Introduction

The Sovereign Base Areas of Cyprus (SBAs) of Akrotiri and Dhekelia[1], are those parts of Cyprus that have remained under British jurisdiction since the creation of an independent Republic of Cyprus (RoC) in 1960. Under the 1960 Treaty of Establishment, Her Majesty's Government retained sovereignty over the SBAs, which cover 3% of the land area of Cyprus, a total of 98 square miles. The purpose of the SBAs is to support the military use of these areas. However, as 60% of land is in private ownership and home to many Cypriot nationals, a civilian 'Administration' was formed to govern the SBAs - the SBA Administration (SBAA), which is overseen by an Administrator. The SBAA uniquely reports to the Ministry of Defence in London due to the need for the SBAs to act as military bases, and all staff within the SBAA are Ministry of Defence (MOD) Civil Servants. Also under this arrangement the Administrator of the SBAs is also the Commander of British Forces Cyprus.

The SBAA is in effect the civil government of the SBAs. Its range of interest is that of any civil government but many of its functions, particularly in respect of the Cypriot inhabitants of the SBAs, are carried out by Republican officials on behalf of the Administration under delegated powers. The SBAA itself carries out those minimum functions directly related to the exercise of sovereignty – the enactment of legislation, maintenance of law and order and the control of immigration and development. The SBAA Environment Department is responsible for meeting the SBAs' obligations to sustainability and the environment, and notably those that relate to nature conservation.

The accession of the RoC to the European Union in 2004 brought with it a number of legal obligations to protect and conserve the wild fauna and flora of Cyprus. In line with the requirements of the EC Habitats and Birds Directives, the RoC was required to introduce legislation to protect habitats and species of European importance, including the designation of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). Although the SBAs are not part of the European Union, the Treaty of Establishment requires the SBAs to mirror the laws of the RoC. Therefore in line with these obligations, the SBAA enacted the Protection and Management of Game and Wild Birds Ordinance 2004 and the Protection and Management of Nature and Wildlife Ordinance 2007 to afford important habitats and bird populations with the levels of protection required by the EU Directives.

The process of designating formal SACs and SPAs within the SBAs commenced in early 2008 following the enactment of the Protection and Management of Nature and Wildlife Ordinance 2007. Prior to this, the SBAA used existing information on the areas and habitats developed by the RoC to consider whether an area would meet the necessary criteria to be designated as a SPA or SAC. 'Potential' designated areas would therefore be identified based on this information and Defence Estates, acting on behalf of the military, would take account of the value of these areas when assessing the ecological impact of key MOD projects in the SBAs, prior to their development.

Such projects included proposals in 2006/2007 for the provision of Single Living Accommodation (SLA) at two sites at Akrotiri and Episkopi within the Western Sovereign Base Area (WSBA) on the Akrotiri Peninsula.

Both of the proposed development sites were approximately 3 ha in area and were located in areas of natural habitat on the Akrotiri Peninsula, a 'potential' designated area of nature conservation value (cSAC[2] and pSPA[3]). However, the exact boundaries of the Akrotiri Peninsula cSAC2 and pSPA3 were unclear and as such, although it was known that the proposed Akrotiri development site lay within the cSAC/pSPA, the status of the land associated with the Episkopi development area was uncertain.

In 2007, Entec UK Ltd was appointed by Defence Estates to design and implement a baseline habitat assessment of both sites to inform the development proposals and the assessment of effects resulting from those proposals' important habitats. It was also Defence Estates intention

Habitat type 5330 Thermo-Mediterranean and pre-desert scrub, with the new SLA in the background
Photo: Charilaou (SBAA)

that the assessment methodology adopted would be utilised on further developments within the Sovereign Base Area Cyprus in the absence of any national guidance and in the absence of any reliable and recent data for the sensitive habitats in question.

Methods

A botanical study was undertaken by three Cypriot botanists using a total of 15 quadrats (10 m x 10 m) placed in each study area (*i.e.* the site of the proposed development plus a 200 m radius). The quadrats were spread relatively evenly across the study area but were also located so that they included representative samples of each general habitat type identified *i.e.* tall and low lying scrub habitats and ground level herbs.

The following information was gathered for each study area:

- brief site description [*i.e.* site character (general observable physical and ecological traits), substrate, habitat quality, habitat vulnerabilities/sensitivities];
- full botanical species listings;
- semi-quantitative abundance rating using the DAFOR[4] scale, assessed during the walkover survey; and
- percentage cover of each species within each quadrat sampled.

Botanical names were based chiefly on the *Flora of Cyprus* (Meikle 1977 and 1985), although, where appropriate, other floras, publications and papers were used.

In the absence of a more widely used method, the habitats on site were valued using a qualitative approach based on the presence and quality of notable habitats and species, the occurrence of factors resulting in habitat degradation, and general nature conservation principles based upon Ratcliffe's criteria for assessing nature conservation value[5].

Results

The dominant geological formation at the Episkopi site is the Pachna geological formation (chalks, marls, marly chalks, chalky marls and calcarenites) whilst at the Akrotiri site it is Alluvium-colluvium, composed chiefly of sands. At both sites the surface soil is shallow and the dominant soil group is lithic leptosols (LP.li) or epipetric Calcisols (CL.ptp), previously known as Calcaric regosols (RG.ca), which are calcareous at least between 20-50 cm of the surface.

Juniper Matorral
Photo: Ian Davidson-Watts

At Episkopi the study area is dominated by garrigue, and phrygana[6], while Akrotiri's vegetation is dominated by maquis[7] and phrygana. Within these vegetation types there are small openings dominated by annual, biennial and perennial herbs. Also, at the margins of the Episkopi site there are scattered plants of exotic species (eucalypts and other ornamentals) and, at some distance, plantations or groups of *Acacia saligna*. The Akrotiri site supports very small stands of tree-like *Juniperus phoenicea* and additionally, within the site and at its margins, plantations of *A. saligna*.

At Episkopi, the predominant Annex 1 habitat type was:

- 5330, Thermo-Mediterranean and pre-desert scrub.

Three distinct areas of varying habitat quality are apparent within the Akrotiri study area. Firstly, there is an area of disturbed ground where volumes of soil have been deposited in recent years. Secondly, there are areas mainly focused upon the periphery of the study area where invasive species, in particular *A. saligna*, are abundant. Finally, in the central area of the site, there were areas of semi-natural habitat that are relatively free from anthropogenic effects. One Annex 1 habitat was identified following analysis of the quadrat data by the survey team:

- 5210, *Juniperus phoenicea* arboresent mattoral.

Conclusions

Habitat quality at the Episkopi site was relatively homogenous across much of the study area when comparing the proposed development site with habitats beyond. However, some areas of degradation were apparent in peripheral areas close to existing infrastructure. The habitats present comprised representative species for one Annex 1 habitat type and was of sufficient extent to be considered a good example of this type. Habitats on the periphery of developed areas showed signs of degradation but only covered a limited area and were still representative of the Annex I habitat type. The value of these habitats could be enhanced through access management and maintenance.

The habitats present at the Akrotiri site comprised representative species associated with one Annex 1 habitat type and were of sufficient extent to be considered a good example of this type. Furthermore, the high numbers of protected, rare and endemic plant species present, and the habitats' species composition and species-richness indicated that they were good examples of their type. The area is considered to be of high nature conservation value.

The presence of the orchid *Ophrys kotschyi* across the Akrotiri study area (a priority European Protected species under the Habitats Directive and Bern Convention) is also a notable indicator of value. The orchid's ecology makes it susceptible to population decline as a

result of habitat degradation.

The only areas of habitat within the study area that were considered to be of limited ecological value were the plantations of *A. saligna*, where this invasive species totally dominated the vegetation and there were few other scrub species present within the locality, and no Annex 1 habitats present. However, following management and eradication of *A. saligna* it was considered likely that the natural habitats within the locality would soon re-colonise and essentially extend the area covered by Annex 1 habitats.

In conclusion, it was assessed that the study areas at both Episkopi and Akrotiri were worthy of inclusion within the potential SAC.

Implications for Development

The vegetation survey confirmed that the proposed development sites were of European importance and would meet the criteria for designation as SAC. Following discussion with the SBAA, Defence Estates looked more closely at alternative sites and both projects were re-designed to avoid damaging the habitats identified. In addition to this, a range of measures was also included to ensure that protected fauna were taken into account, particularly birds and reptiles.

The process also highlighted the positive attitude of the MOD towards it obligations to protect important habitats and associated species, despite the lack of formal SPA/SAC boundaries and legislative processes at the time. The Defence Estates project managers, environmental advisors and consultants followed a best practice approach, essentially mirroring UK legislation by undertaking an informal 'Appropriate Assessment', as defined by the Conservation (Natural Habitats, &c.) Regulations 1994, despite the lack of formal legislation requiring such.

The Future of Internationally Important Sites in the SBAs

The best practice approach adopted by the MOD over these cases was very encouraging, but ultimately only 40% of land within the SBAs is managed by the MOD, with the remainder, including significant areas supporting internationally important wildlife, being under private ownership. This survey highlighted the importance of obtaining accurate ecological data to support development-related decisions.

The need for formally designated sites and clear data sets from which the MOD and others can assess their activities has never been greater. Following September 2007 and the introduction of the Nature Ordinance 2007, the SBAA's Environment Department has made this objective their number one priority and in early 2008 drafted boundaries and issued a consultation for three SPAs covering nearly 5,000 ha in the Western Sovereign Base Area (WSBA). Funding was also obtained in late 2008 to undertake Annex 1 habitat mapping of over 64 km squares throughout the SBAs from which SAC boundaries can be established. Specialist botanical surveyors from Jonathan Cox Associates are due to have this work completed by April 2009.

In parallel to the designation process, guidance notes on 'Appropriate Assessment' procedures have also been issued, which although similar to the UK approach, differ in some significant ways.

For more information visit www.sba.mod.uk/environment.htm

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***Red Listed and endemic* Orphys kotchyi**
Photo: Charilaou (SBAA)

Notes:

[1] Usually referred to as Western Sovereign Base Area (WSBA) and Eastern Sovereign Base Area (ESBA) respectively.

[2] Candidate Special Area of Conservation

[3] Potential Special Protection Area

[4] **Dominant** (single species prevails over other species in terms of the ground cover of a sampling unit of a particular habitat);
Abundant (found regularly throughout a stand of a particular habitat and >5% cover of that sampling unit);
Frequent (scattered plants or small clumps of plants found regularly throughout a stand, <5% ground cover);
Occasional (scattered plants found, generally not contributing to the ground cover of that sampling unit); and
Rare (a few individuals or clumps of a species recorded in a sampling unit).

[5] Ratcliffe D A (1977). *A Nature Conservation Review*. Cambridge University Press.

[6] Garrigue habitats are low, soft-leaved scrublands that occur in dry conditions, often near to the coast where salt-spray and wind exposure is frequent. When heavily dominated by *Cistus* species, they are also referred to as phrygana habitats.

[7] Maquis is composed of dense evergreen thickets of sclerophyllous shrubs and small trees that occur as the climax community where environmental conditions limit further succession into woodland habitats or alternatively in areas as a result of degradation resulting from heavy disturbance (over grazing, human activities, *etc.*) and/or fire damage.

Opting for Long-Term Sustainable Development

Helping to Train Trainers for Protected Areas in the Carpathian Mountains Ecoregion

Wilf Fenten
Managing Director, EUROPARC Consulting, and member of the Yorkshire Dales National Park Authority

"*It's arnica, you know, the yellow stuff*", confided Miloš, the ecologist, conspiratorially to me. Here we were, standing high on a bare hill in the middle of Transylvania in Romania, surrounded by the remarkably German-looking landscape of so-called Saxon villages, coarse pasture, clumps of scrub wood, and sheep. Lots of sheep.

A coach load of delegates to the 2008 EUROPARC Conference in Brasov, Romania, on its field trip had been deposited near a cluster of rough wooden sheds, huts and irregular hurdles enclosing a large flock of sheep. The fierce dogs with their spiked collars had been shut away. They don't like strangers and would readily attack them, just as they would tackle the considerable population of bears and wolves hiding amongst the woods and hills around us.

The group made up from countries all over Europe had been brought here, near the miraculously well-preserved village of Viscri with its magnificent highly fortified church from around AD 1100, for our lunch, a sustainable lunch, consisting entirely of local food in season, really local. There was cheese that had been crafted in one of the cabins next to the sheep hurdles and made from the milk of the ewes, penned in here at the moment, but usually roaming around under the watchful eyes of shepherds. Bread, sausage, meatballs, butter, cake, wine, plum brandy – all local, all produced within less than three miles of where we were – and then 'arnica'. That came from many hundred miles away, from one of the national parks in Slovakia, where my colleague Miloš worked as an ecologist.

The conspiratorial whisper indicated that this was something special, not meant for the whole group. Every year Miloš gathered lots of arnica blossoms and rendered it down to an intensively highlighter yellow essence. Which he then tipped into the local tipple of high-octane palinka turning a frighteningly powerful spirit into something which he considered wonderfully medicinal. Not for him the warning that arnica should not really be taken internally. This was anti-inflammatory, boosting the immune system, warding off colds and being generally a good thing.

It all fitted together, the patchwork of nature with its high biodiversity, culture, civilisation, and of people who have dedicated large chunks of their life "to conserve and enhance the natural beauty, wildlife and cultural heritage" of protected areas like national parks, nature parks, biosphere reserves and other areas under protection.

In many parts of Europe we have long been accustomed to a whole hierarchy of well-functioning organisations and designations protecting our most precious landscapes and the culture they support and shape. Now that Eastern Europe is so much more open and, on the whole, looking westwards, the importance of the landscapes and cultures formerly east of the Iron Curtain is increasingly realised.

The 'Programme of Work for Protected Areas' for the Convention of the Biological Diversity

One of the milestones in strengthening this movement for better protection must be the 2012 Protected Area Programme, a global programme initiated by WWF to promote and support the implementation of the 'Programme of Work for Protected Areas' developed within the Convention of the Biological Diversity (CBD) in five priority ecoregions: the Carpathian Mountains, Dinaric Alps, Caucasus, Altai Sayan and West Africa Marine. The programme is supported by a significant donation from the MAVA Foundation.

Surveying the glorius limestone landscape of the Yorkshire Dales near Malham Cove

The 'Protected Areas for a Living Planet' Programme

Within this overall programme rests the Carpathian Ecoregion Project, also called the 'Protected Areas for a Living Planet' programme, in which EUROPARC Consulting is heavily involved.

The main aims of the Carpathian Ecoregion Project are to enable parties to the Convention on Biological Diversity from the Carpathian Ecoregion to achieve by 2012 certain targets, such as (quoting from the original terms of reference):

the establishment of a scientifically-

Head of Conservation, Gary Smith, Yorkshire Dales National Park Authority, giving a presentation to seminar participants from the Carpathian Mountains Ecoregion

based and representative regional network of well-managed protected areas that are sustainably financed;

- ensuring effective participation of local communities; and
- providing social and economic benefits to the region.

These aims are underpinned by the following main objectives (again quoting from the terms of reference):

- Establish a mechanism to drive, support and coordinate the implementation of the Programme of Work in the region as well as to ensure effective project management and monitoring.
- Ensure that the Carpathian protected areas are supported by a network of skilled professional protected area practitioners.
- Increase participation of key stakeholders in protected-area design, management and benefit sharing.
- Ensure that critical gaps in the protected area network are filled, with a particular focus on the creation of large intact blocks, freshwater ecosystems, wilderness and trans-boundary protected areas.
- Improve … and increase public awareness on the importance and values of the Carpathian protected areas.

None of this would be easy to achieve.

However, this Programme of Work for Protected Areas developed within the Convention of Biological Diversity provides an excellent opportunity to mobilise efforts to tip the balance of development in the region and ensure the long-term protection of the natural treasures in the Carpathians. The Programme of Work offers an ecosystem-based approach that translates the three pillars of the Convention of Biological Diversity – biodiversity, sustainable use and equitable benefit sharing – into the geographical context of the Carpathians and therefore meets priority-needs for people and nature.

It was realised right from the beginning that the Carpathian Ecoregion needed to find a sustainable path for development: one which secures an improved quality of life while holding on to the great natural, cultural and social wealth of the region. This was to be the key challenge for the communities, for biodiversity and for the natural resources in the Carpathian Ecoregion. Projects needed to look for a long-term sustainable development and not follow the kind of unsustainable way already experienced by many other parts of Europe, including the gradual erosion of its biological wealth. There seems to be a kind of race between the forces for conservation and sustainability trying to outpace the rapid growth of unsustainable developments such as excessive ski resorts and factories in the wrong places.

How could one mobilise efforts 'to tip the balance of development in the region and ensure the long-term protection of the natural treasures in the Carpathians'? How could one translate this far-reaching programme into practical measures and projects which would target all efforts and not bust the budget?

Working Together

In order to implement the programme, the WWF turned to a number of partners, among them to a like-minded NGO, the EUROPARC Federation. The Federation, based in Germany with members in 39 countries, is the pan-European umbrella organisation for all protected areas, ranging from large national parks to small, diverse reserves and scientific designations. For much of its practical work it uses its own company, EUROPARC Consulting, to carry out projects and organise events.

In 2007, EUROPARC Consulting and WWF got together and began to plan work for the period up to the end of 2010. Training was to be at the heart of the work programme in order to focus on building more capacity and to encourage knowledge-sharing activities in each country. Above all, they wanted to ensure that the work would have a powerful multiplier effect on the actions presently undertaken in the region.

Assessing Training Needs for the Right Kind of Training

It was to be the kind of training that Albert Einstein envisaged: 'The aim must be the training of independently acting and thinking individuals who, however, can see in the service to the community their highest life achievement.' Add to that service to nature and you have the guidelines for the 2007-2010 programme, which was given its own title 'Protected Areas for a Living Planet'.

Out of the intense discussions and budget calculations emerged a training programme which aimed to establish a network of protected-area practitioners that are well trained, and to develop local capacity through 'training the trainers' so that acquired learning could cascade down within the Carpathian protected areas.

The first step on the road to the training programme was a thorough but rapid training needs assessment, for which EUROPARC Consulting has plenty of expertise. An initial insight into the training needs of Carpathian protected areas was possible through a close examination of the information and evaluations already provided in the RAPPAM (Rapid Assessment and Prioritization of Protected Areas Management) results for three of the Carpathian countries; Romania, Slovakia and the Czech Republic. RAPPAM is a well-known and efficient rapid-assessment methodology. Instead of listing all topics by individual country it was decided that a topic group listing would be more helpful. This approach helped with the gap analysis and later in the priority setting for the training events.

One of the perhaps most striking elements of the assessment was the lack of good, or indeed any, management planning process. A management plan is a means to engaging the

stakeholders, gaining a measure of the job to be done; it provides structure and indicates the size of resources required. This element alone brings many aspects into focus, particularly governance and communication.

The training needs assessment carried out by EUROPARC Consulting in 2007 identified some of the most urgent training needs in the Carpathian Ecoregion, which could be divided into three topic groups:

1. Management planning and related topics such as design of management plans, management effectiveness, communication techniques, capacity building, community engagement, *etc.*
2. Sustainable tourism and related topics such as development and support for sustainable tourism and ecotourism, visitor management, communication techniques, community engagement, increasing public awareness, *etc.*
3. Community outreach and related topics such as community involvement and participation, community capacity building *etc.*

Training Seminars for Protected Area Practitioners

The first element of the work programme involved providing various training events for protected-area practitioners in the course of a year. Two seminars took place, both located in Poiana Brasov, Romania, a beautiful setting surrounded by a halo of the Carpathian Mountains.

The First Training Seminar for Protected Area Practitioners

The first session in May 2008 dealt with the topics of protected-area planning and 'Management planning with stakeholder engagement'.

An experienced team from EUROPARC Consulting hosted a group of carefully selected practitioners from across the Carpathian countries. A combination of group work, seminars, presentations and field trips led to an intense and fact-filled submersion in the topic.

During the training it was soon noticed that all the countries from which the participants came were were still adjusting to the impacts of the post-1989 changes and the subsequent accession to the European Union. It was also interesting to see how their approaches varied so that each could learn from their neighbours. Working together was seen to be a source of mutual support in moving forward.

Three specific changes were seen by the participants as being particularly significant:

- The change from state ownership of property to community or individual ownership, even in national parks.
- The EC Habitats Directive and how to respond to it. In some cases, the result had been the designation of new protected areas - which local people felt had been imposed and created predictable difficulties.
- The new EU programmes – like Structural funds, LIFE and LEADER - were not well understood and they were not as effective as they could be. Yet they were a potential method of progress for under-funded protected areas.

Participants felt in general that giving confidence to local people will take time but is vital. People have had a long history of 'control' from outside and little tradition of private property ownership or personal freedom. One participant said, "The first thing people do when given ownership of a forest is to cut it down to make money. They fear that their freedom recently given will not last so they need to make money while they can". Protected areas require a long-term vision and certainty in the minds of local people that there will be the stability to make them effective.

The Second Training Seminar for Protected Area Practitioners

The second seminar topic on 'Sustainable Tourism' was led in June 2008 by two EUROPARC Consulting trainers who are also heavily involved in the European Charter for Sustainable Tourism in Protected Areas. The Charter is managed by the EUROPARC Federation and allows protected areas all over Europe to subscribe to the ten Charter principles and sponsor sustainable tourism in their area. It is a practical management tool for ensuring that tourism contributes to balanced economic, social and environmental development in protected areas in Europe.

In order to check that the strategy and action plan for sustainable tourism complies with the Charter principles, EUROPARC sends its own 'auditors' (verifiers) into candidate Charter parks to evaluate what is happening there. The two trainers involved in the second seminar in Brasov were such accredited verifiers and could, therefore, speak about sustainable tourism out of their own experience.

This second seminar, too, contained a varied, stimulating programme and dealt with development and support for sustainable tourism and eco-tourism; visitor management; communication techniques; community engagement; increasing public awareness and more. The seminar was, according to the practitioners from the various Carpathian countries, very useful for their work. They felt inspired by the seminar because it opened up new perspectives. Beforehand they had the feeling that they could not do much about different situations they faced, but after learning all the different tools, techniques and approaches they found that new opportunities and ideas were developing. They could see a wider picture.

Coming Together on a Study Tour in the North of England

This introductory immersion in these subjects was just the start, however, as both groups from the Brasov workshops came to the UK in October 2008 for the third event of the protected area practitioners programme: a study through three protected areas in the North of England. Here they were to observe in practice some the principles they had studied in their seminars in Romania.

During the study tour they were to gain new knowledge and skills; identify specific ideas and transferable skills; share experiences and problem-solving methods; learn specific techniques and methods in management plan assembly and the theory and practice of sustainable tourism development; to engage in networking. There was also time to do some social networking since part of the aim of the whole project was to knit the professional community over the whole Carpathian Mountains Ecoregion closer together.

Based in the heart of dramatic limestone scenery of the Yorkshire Dales National Park the group spread their time between focused presentations, group work and field trips. Travels took them to the visitor 'honeypot' of Malham Cove, across the sweeping moorlands of the Forest of Bowland Area of Outstanding Natural Beauty and to the rain-drenched and grey Lake Windermere in the Lake District National Park. It was a group of real friends who left the UK, inspired and enthused

by the new skills and ideas they had acquired.

'Training the Trainers' – Launch of the 'Training Champions' Programme

2008 also saw the launch of the second leg of the training programme: the even more ambitious 'Training Champions' initiative. This is a structured training plan running to 2010, involving participants 'signing up' to a complete series of seminars, study tours, peer-group meetings and self-teaching programmes.

The programme is aimed at people from protected areas in the Carpathian Ecoregion who want to become trainers themselves and who would be willing to act as a contact or reference point for enquiries from protected area practitioners and others in their own countries. They would champion the idea of training in the protected areas of their country and be willing to train others so that all of them can put into practice the many ideas which they encounter by being part of an international network. They would not just be trainers but Training Champions.

In the course of three years they would take part in training events and be given other opportunities to improve their skills and knowledge. For example, they will be asked to carry out a small case study or write a profile of the area they work in. In addition, they will work on a short self-teaching programme between training events. It would also be helpful if they found ways to improve their English, as necessary, in the course of the training period in order to gain the maximum benefit from the training.

After successfully completing their training, participants will be issued with a certificate giving details of the training received.

Some of the most promising Training Champions will be offered further specialist training if they wish, such as an academic course at a university.

The first in a series of events was designed to build participants' confidence and ability in looking after their protected areas, and developing their skills in training others. It took place in Slovakia in October 2008 and was quite a challenge as it sought to address manifold topics such as management planning, project management and training skills in a few days. The group had much existing experience which was to be harnessed, so that everyone could learn from each other.

The whole programme from 2008 to 2010 is hosted by two experienced core trainers who call on guest lecturers for specific subjects at each training event. EUROPARC Consulting is proud that such positive foundations have been laid. Now lessons can be learned, benefits accrued and effects felt.

For 2009 and 2010, further seminars and study tours are planned in several countries of the Carpathian Ecoregion. These events will see further building upon the progress made, to be benefit of the Carpathian Ecoregion's protected areas.

The Carpathian Ecoregion has a unique chance to avoid the mistakes other areas have made. Its landscape, biodiversity, culture and people are unique. We can only hope that our relatively small contribution in helping to train some of the protected-area practitioners in the region will raise the profile of this most important European environment and make it shine as an example of excellence all over Europe.

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Countdown 2010 – Together for the 2010 Biodiversity Target!

Liza Drius
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The clock is ticking. In 2010, progress by political leaders towards the target set for biodiversity loss will be assessed. With less than 700 days to the end of 2010 it seems unlikely that this loss will be halted as pledged by European leaders in 2001. However, the target managed to trigger action at various levels and led to the EU Biodiversity Action Plan for 2010 and beyond.

After climate change, biodiversity is the greatest challenge facing humanity. Figures on the increasing loss of species in Europe are alarming. The recently published Mid-term Assessment of the European Biodiversity Action Plan reveals that 50% of species of 'Community interest' are in an unfavourable conservation status and 40% to 80% of habitats of 'Community interest' are deteriorating. At the global level, figures are even less encouraging. Virgin forests have completely disappeared in 25 countries, and another 29 countries have lost more than 90% of their forest cover (FAO 2001, 2006). 30% of coral reefs have been seriously damaged through fishing, pollution, disease and coral bleaching (Wilkinson 2004).

Continued loss will result in a rapid decline of the Earth's natural wealth and a dramatic reduction of future ecosystem services. We are losing both the beauty and richness of our natural environment as well as destabilising the very ecological processes on which we depend. Agricultural production will dramatically decrease if bacteria and fungi - which make soil fertile and breakdown wastes - disappear. The same will happen if insects, bats and birds - which ensure flower pollination - reduce in numbers. If no major actions are taken to reverse the trend of biodiversity loss, it is estimated the losses to the global GDP will be as high as 6% by 2050 (TEEB 2008).

Policy alone is not enough to ensure that our natural heritage is well protected and conserved. Action is urgently needed at all levels. Individuals, community groups, organizations and companies must join efforts to effectively reduce biodiversity loss. Hosted by IUCN Regional Office for Pan-Europe, Countdown 2010 is a unique time-bound platform that brings together all these actors to develop a coherent approach to reach the 2010 biodiversity target. More than 800 partners representing numerous sectors have committed themselves to concrete biodiversity actions by signing the Countdown 2010 Declaration. In less than four years Countdown 2010 has become one of the largest multi-stakeholder networks for biodiversity conservation.

> *"Governments alone will not achieve their 2010 biodiversity promise. Countdown 2010 and in particular its partners are key actors in supporting governments in achieve the 2010 biodiversity challenge by communicating, stimulating action and monitoring progress towards the target."*
>
> Sebastian Winkler, Head of Countdown 2010

National governments are responsible for the implementation of their international commitments, yet with increasing decentralization, local and regional authorities have a crucial role to play in managing biodiversity. Although the 2010 target is a global challenge, the solution and responses will be found through local action. Contrary to common perception, cities are host to a diverse array of species. For instance, more than 5,200 species of insects, 160 species of vertebrates, 140 species of birds and 26 species of mammals can be found within the area of the main motorway surrounding the city of Rome. More than 300 local governments have already joined the Countdown 2010 network. In Denmark every fifth municipality is now a partner. Also, each of the 44 municipalities of the province of Limburg (Belgium) adopted an endangered species in their region and developed concrete action plans to rescue them as their contribution to achieve the target.

To boost these efforts beyond the existing network, Countdown 2010 together with international organizations, including ICLEI (Local Governments for Sustainability), and local governments launched the Global Partnership for Cities and Biodiversity at the IUCN World Conservation Congress in October 2008. The partnership will improve coordination on urban biodiversity conservation through technical cooperation, capacity building projects and communication campaigns. Municipalities, associations of cities and interested stakeholders are encouraged to join the initiative.

Become one of our partners and help us saving biodiversity by 2010! Sign the Countdown 2010 Declaration and commit to direct action to reverse current loss trends.
www.countdown2010.net

Besides these successes, Countdown 2010 also engages with the private sector in mainstreaming biodiversity into their operations. A broad spectrum of businesses of all

Delegates at a Countdown 2010 event

sizes has joined forces under the Countdown 2010 umbrella by committing themselves to additional actions for saving biodiversity. For instance, the aggregate sector is working towards net positive biodiversity impact in all their operations and has developed a structured plan together with the Countdown 2010 Secretariat.

Civil society organizations, academic institutions and community groups are also active in the network. For example, the European Association of Zoos and Aquaria (EAZA) is very active in raising awareness of vulnerable and threatened species. The 2008/2009 European Carnivore campaign aims to make people conscious of the diversity of wildlife that still survives in their own country and, in particular large carnivores. Yet, conservation is not something that only environmental organizations should do. The Evangelical Church of Westfalen is contributing to the 2010 target through clerical nature management of approximately 60 church communities and clerical institutions in North-Rhine Westphalia.

Besides this myriad of 2010 actions, Countdown 2010 considers that monitoring progress towards the 2010 biodiversity target is equally important, in order to assess governments' performances and remind them of their commitments. As a response, Countdown 2010 has developed the 2010 Readiness Assessment. The study measures policy responses of national governments in terms of integrating biodiversity concerns and awareness raising efforts across sectors and decision-making processes. Status and trend indicators for biodiversity are equally important, however in a timeframe of only eight years since the target was set it is difficult to observe dramatic changes. Therefore, Countdown 2010 focused its study on policy responses of governments while it relies on other networks for the status and trend data sets. The latest findings of the 2010 Readiness Assessment - presented at IUCN World Conservation Congress and available at www.countdown2010.net/assessment - revealed medium to low performance of G8+5 countries in adopting measures to achieve the 2010 biodiversity target.

> *'We will increase our efforts for the protection and sustainable use of biological diversity to achieve our agreed goal of significantly reducing the rate of loss of biodiversity by 2010.'*
>
> G8 Summit declaration, Heiligendamm 2007

Numerous events in 2010 will hopefully raise awareness during the United Nations International Year of Biodiversity. Join us in these celebrations and stock taking events, as world leaders report on their commitments and discuss the future of biodiversity-related targets. What will happen after 2010? Countdown 2010 will continue mobilising action at all levels and will actively involve you in the definition of the post-2010 regime.

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Building On Bog?

Some Issues for Ecologists Evaluating Development Proposals Impacting on a European Protected Habitat

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Introduction

Bogs are increasingly recognised for the ecosystem services that they support as well as their highly specialist plants and animals. They are, however, under threat from a range of different sources. There are considerable uncertainties with regard to the potential effects of climate change, and we also need to recognise that we still know little about bog ecosystems: we do not even know if erosion, one of the commonest features of blanket bog landscape (and often used to justify the label 'modified bog') is natural or the result of land-use practices[1]. This article explores the issues involved for ecologists advising clients proposing bog developments, particularly those in the UK uplands. It is drawn from practical professional experience, largely of large-scale onshore wind farm developments, and aims to present a balanced view of the various issues.

Photograph 1 - Sphagnum magellanicum
Photo: ptyxis ecology

Background

Bogs have a history of socio-economic use stretching back millennia. Today, about half of worldwide peat extraction is for fuel, with peat-fired power stations providing 10% of Irish and 5% of Finnish energy use. The other half is mostly used for horticultural peat, an industry that has caused dramatic losses of lowland raised bogs in the last 40 years. Bulk peat is also used to produce multi-purpose absorbent board with a range of uses, including nappies and to clean up oil spills.

In Britain, since the 1930s, extensive afforestation and agricultural intensification has resulted in approximately 1.5 million hectares of upland blanket bog being drained and fertilized. Much of the remaining bog in England and lowland Scotland has been over-grazed and excessively burnt for decades, or removed for opencast mining or landfilling. Recent additional pressures include severe erosion from off-road vehicles, mountain biking and walkers; and from wind farm and hydroelectric developments. Indirect impacts, such as from water abstraction, atmospheric pollution and eutrophication, are poorly understood, although sulphur dioxide deposition in the South Pennines has been extensively studied and linked to the loss of bog moss *Sphagnum* species and habitat degradation.

Photograph 2 - Sphagnum fuscum
Photo: ptyxis ecology

Land continues to be limited in the UK and there is a government policy commitment to increase our renewable energy generation. Bog is agriculturally unproductive so of limited use to farmers, and its low land rental values, compared to improved pasture, can be attractive for developers. It is therefore likely that pressure to develop on peatlands will persist and we must actively engage in the process of evaluating such proposals.

Relative Values of Bogs

Active blanket and raised bog is a *priority* habitat under European legislation (under Annex 1 of the Habitats and Species Directive 92/43/EEC). It is often forgotten that degraded non-active bogs are *also* included on Annex 1 (just not as priority habitat). Bogs are also a UK Biodiversity Action Plan priority habitat (whether or not they are 'active') and therefore a 'material consideration'

in the planning process.

'Active' bog is defined in the Directive as 'still supporting a significant area of vegetation that is normally peat-forming'[2].

This definition raises several problems, including defining peat-forming vegetation, as 'the concept of 'peat-forming plants' is problematic. Even if some species more commonly give rise to peat than others, peat formation is a *process* that can befall most plant materials[3].' Peat formation is difficult to assess and varies considerably over time (see box: Peat processes).

Peat processes

Peat comprises the remains of vegetation (and animals) accumulating under waterlogged anoxic conditions. Peat formation is dependent on a complex interaction of climate, vegetation type, biotic and abiotic processes. In simple terms, 'production minus decay equals peat accumulation'. Slow decay rates are probably the most crucial element. But the ecosystem is highly variable, *e.g.* a strong summer drought, reducing plant photosynthesis, can cause production to be exceeded by total ecosystem respiration, halting peat formation, and four normal summers would be required to compensate for the resulting carbon (*i.e.* peat) losses[4]. A further complication is that peat formation processes may occur, but do not necessarily involve accrual of new peat and height growth of a bog, where accumulation and decomposition balance out[5]. Peat formation rates may be measured in-situ by installing towers to monitor gaseous exchange as a measure of production (from respiration) and decay.

In Britain, ombrotrophic peatlands are generally dominated by combinations of bog moss *Sphagnum* species and cottongrass *Eriophorum* species, with or without ericoid shrubs and other graminoids with air-conducting root tissues capable of survival in the extreme bog environment. Other vegetation may form the major proportion of peat in certain regions: *e.g. Racomitrium lanuginosum* in north-western Scotland; and in other parts of Europe, *e.g.* purple moor-grass *Molinia caerulea* in Ireland.

Numerous studies have shown that plants can be effective predictors of ecological conditions, especially bryophytes. Bryophytes lack roots, being adapted to source atmospheric and surface nutrients, so they are particularly susceptible to hydrological and chemical changes. *Sphagnum* species are arranged along well-documented moisture, pH and nutrient tolerance gradients[6]. Therefore, using *Sphagnum* species as indicators, if applied critically, is a valid, quick and simple proxy field technique to assess the *likelihood* that peat accumulation is occurring.

Some scientists caution against this approach to assessing complex bog processes, but the consensus at a British Ecological Society uplands conference in 1997 was that presence of *Sphagnum* is the most reliable indication that a bog is currently accumulating peat. Certain *Sphagnum* species are more robust indicators than others (see box: Bog mosses) and could be used to develop a 'peat-formation index' to bring some objectivity into site evaluation based on vegetation.

A peat-forming index could assess whether there was a high, moderate or low likelihood of vegetation being actively peat-forming by using a formula based on combined cover levels of *Sphagnum papillosum* and *S. magellanicum*, total *Sphagna* species cover excluding *S. fallax (recurvum)* and cover of hare's-tail cottongrass *Eriophorum vaginatum* (and/or other appropriate species according to geographic region), perhaps with the cottongrass cover down-weighted. Has any IEEM member been involved in devising anything similar while advising on whether a site has 'active' bog, or aware of anything in the literature?

Evaluating Development Proposals on Bogs

As with any development, our initial concern should be to define the potential zone of influence, which crucially requires an understanding of the likely hydrological effects of the development. Hydro-geological and hydrological input is essential to understand the extent of indirect effects such as de-watering.

A Phase 1 Habitat Survey is used to inform the baseline. However, there are two notes of caution that need to be made. Both concern terminology:

- In Phase 1, modified bog is defined as '*significantly damaged*' bog in which *Sphagnum* is '*much reduced or absent*'. In practice, surveyors tend to give more weight to obvious field evidence of damage - such as drainage grips - than the bryophyte layer. Yet it is the water table level, and *Sphagna* cover and abundance, that is crucial to assessing bogs. There may be evidence of extensive management by grazing, burning and/or drainage, but a bog may still be functional and recovering if there is enough cover of *Sphagnum* species, which in turn suggests what the hydrology is like; indeed, even heavily degraded M20 *Eriophorum vaginatum* mires with little *Sphagna* can be peat-forming[10].
- There is also the danger that surveyors may be misled by the 'wet' or 'dry' in the Phase 1 habitat categories. Dry modified bog is defined by an '*absence*' of *Sphagna* and wet modified bog has 'little or no' *Sphagna*. The substrate may be bone dry on the survey day, but the site mapped as wet modified bog. Obviously water levels fluctuate considerably on ombrotrophic mires, so plant species indicators should be used to assess modal likely wetness, not the actual saturation on any given day.

The use of the label 'modified' bog clearly has the potential to infer that a bog is of lower value, which can in turn lead to the assumption that it cannot qualify as an Annex 1 habitat. It is sometimes argued, by opponents of a scheme, that terms such as modified and degraded are over-emphasised and used simplistically to justify the development.

Bog mosses

- All bog mosses are central to peat formation. They act as ecological engineers: inhibiting decay rates, withdrawing nutrients, increasing acidity, and determining the carbon balance of the system.
- In Britain, the key peat forming species are *S. papillosum* and *S. magellanicum* (photograph 1) and on drier sites *S. capillifolium sensu lato*[7,8]. Other *Sphagna* are important in certain regions *e.g. S. fuscum* (photograph 2) in northern Scotland.
- *S. papillosum* is probably the most important peat-builder, as it decomposes at half the rate of other common bog moss species[9].
- Most British peatland was probably formed by *S. austinii (imbricatum)* (photograph 3) but this species declined around 1400 AD and is now scarce.
- *Sphagnum fallax (recurvum)* is very common, very variable (often mis-recorded as *S. cuspidatum* as it will grow inundated), tolerant of elevated nutrients, and a relatively poor peat-builder.

Photograph 3 - Sphagnum austinii
Photo: ptyxis ecology

In order to address these issues, it is essential that surveyors experienced in working on bogs should carry out the Phase 1 Habitat Survey, which will provide a wealth of information that can be used to test and inform the development design. It is unwise to be too prescriptive in determining the next course of action, since each scheme is of course unique. However, unless an ecologist can justify doing otherwise, based on site conditions combined with their botanical experience of mires and sound professional judgement, best practice should include a presumption that National Vegetation Classification (NVC) survey is the next step. This is essential in particular for any development proposals likely to affect bog that may be active (including 'modified' bog as defined by Phase 1 survey). Good practice further dictates that this must include a detailed study of the diversity of *Sphagna* and other key bryophytes (and sometimes lichens), as noted in Des Callaghan's recent *In Practice* article on bryophytes and Ecological Impact Assessment (EcIA).

A difficult, but important, objective of the survey work must be to assess the likely trajectory of plant communities on the bog using available evidence, such as the condition of field drains, and professional judgement. The outcome should ideally be an informed opinion as to whether the bog is deteriorating (drying out), stable or recovering (re-wetting after a previous period of drying out).

Mitigation

As with any Environmental Impact Assessment (EIA) development, avoidance is the starting point to minimise impacts and best practice is to use the survey findings to inform design development layouts so that bog is avoided. A range of mitigation is usually included to reduce residual impacts, such as controlling surface run-off, using excavated peat turfs to dress back infrastructure and adopting appropriate construction methodology such as the use of floating roads over deeper peat (usually >1 m depth). At this point, it is worth noting that floating roads are considered to *reduce* impacts compared to cut and fill – they do not avoid impacts, a point that needs to be adequately addressed in an EcIA. Furthermore, in practice there is some anecdotal evidence that floating roads do have a certain failure rate, often for reasons that are poorly understood, and their impacts on peat hydrology and ecology are not well known. Therefore it is important that the risks associated with floating roads are acknowledged and evaluated in the EcIA (this risk can be at least partly reduced through completion of a peat slide risk assessment[11]).

Restoration and Monitoring

Whilst peat is a resource that is very slowly renewable, bogs take thousands of years to form, so it is not a realistic proposition to 'create' a bog to compensate for any habitat loss arising from a development. Nor is it possible to translocate a bog unless you can also translocate the hydrological regime.

However, central to many developments are proposals to restore areas of bog both within and, often, beyond the boundary of the development site. In many cases restoration of existing systems is possible, including 'modified bog'. Restoration proposals should be supported by citation of sound published scientific evidence (for which, in Britain, there is much more for lowland raised bog restoration than for blanket bog), achievable and of sufficient size and nature to have a reasonable chance of achieving biodiversity gain.

Bog restoration is far from straightforward, and may be ineffective, or have unpredicted adverse impacts *e.g.* excessively elevated water levels may kill some *Sphagnum* species. It largely relies on establishing adequate water levels and *Sphagna* cover. It is therefore best practice to allow for this uncertainty by including monitoring of any bog restoration works. Where monitoring is conducted, there is an urgent need to promote publication and dissemination of results, preferably in a peer-reviewed journal, or at least on a suitable website. Such issues can be implemented through a Habitat Management Plan, secured via a legal agreement as part of the planning consent.

Related Considerations

Where a design still includes some construction on areas of bog, despite where we may have advised otherwise, ecologists should ensure all relevant practical implications of building on peat are addressed.

Major developments on bogs, such as large-scale wind farms, have the potential to generate significant quantities of excavated peat over and above the volumes that can be used for restoration. Disposal can present a significant problem. The preferred option is often to use the peat to replace excavated rock from on-site borrow pits, but this can be problematic if the peat is of poor quality and lacks any structure. Alternatives may be difficult to implement in practice, and risk further habitat damage, highlighting the need for early consideration of this point in any proposed development on bog.

Developments on bog have the potential to release significant stores of carbon and a calculation method has recently been published[12] to replace the

Photograph 4 - Bog habitats in the North Pennines: this managed and modified environment retains habitats of high conservation and landscape value.
Photo: North Pennines AONB Partnership

Photograph 5 - Notwithstanding drainage grips, in this case the vegetation is still of high conservation value due to the cover and diversity of Sphagna. Photo: North Pennines AONB Partnership

previous model issued by SNH. Elements of the calculation are somewhat uncertain (notably the extent of indirect drying-out effects associated with the development) and its publication has attracted some controversy[13]. However, because it provides a standard objective assessment, this calculation method is increasingly being requested by statutory consultees.

Conclusion

Given the uncertainties of climate change, and the existing range of threats to our bogs, it is vital that ecologists do not undervalue bog habitat during the planning process, or the complexities and uncertainties associated with mitigating and compensating for impacts on it. Where a development on bog has been granted planning permission and is to proceed, it is imperative that compensatory measures are implemented, as necessary to protect, enhance and/or restore bog, and ensure no net decline in the stock or quality of such habitats.

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Roads and Otters in the UK

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Few wildlife experiences in the UK are as rewarding as watching an otter *Lutra lutra* in its natural environment. Conversely, few can be as disappointing as seeing a dead otter at the side of the road, a sight which has become all too familiar in recent years.

Distribution and Decline

The Eurasian otter is the most widely distributed of all otters, found throughout Eurasia up to the Artic Circle, from Ireland to Kamchatka, and south to North Africa, Sri Lanka and Indonesia. Originally the species was widespread throughout its range, but declined dramatically in the 1960s and 1970s, disappearing from many parts of central and northern Europe including much of the UK.

The dramatic decline, coupled with increased lobbying from conservation bodies, brought about a change in the species conservation status, and today the otter is afforded national and international legal protection. Otters are included on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and further protected through the EC Habitats Directive. The Habitats Directive, transposed into UK domestic law through the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) ensures the highest level of protection is given to the otter, by its classification as a European Protected Species (EPS).

A severe decline in the UK otter population was first noted in 1957, primarily as a result of reduced hunting success. The decline in otter numbers correlated with the introduction of cyclodiene organochlorine insecticides such as Aldrin and Dieldrin, used in agriculture for dressing cereals and for sheep dip. These endocrine disrupting chemicals along with polychlorinated biphenyls (PCBs) from industry increased the mortality of breeding-age otters, resulting in the sudden population crash. The voluntary ban of Dieldrin in 1962 (spring sown cereals) and 1966 (sheep dip), followed by their eventual legal ban in 1975 marked the beginning of the otter's comeback in Great Britain. Conservation projects such as reintroductions and habitat creation schemes have helped toward the otter's recovery in the UK. However the species is still listed as 'Near Threatened' on the IUCN Red List of threatened species.

During the UK population crash, Irish and Scottish otters remained least affected by the chemicals, as evident by national surveys indicating an occupation rate of 91.7% (Otter Survey of Ireland 1980-1981) and 67% (Otter Survey of Scotland 1977-1979) respectively. In contrast, national surveys of England and Wales revealed a different story (Table 1).

Country	Percentage of Occupied Sites			
	1977-79	1984-86	1991-94	2000-02
England	5.8	9.7	23.4	36.3
Wales	20.5	39.0	52.5	73.8
Scotland	67.0	73.0	87.2	-

Table 1: Summary of Results from UK National Otter Surveys (1977-2002)

The greatest increase in occupied sites during the survey period was seen in Wales, from an initial 20.5% (1977-1978) to 73.8% by 2002. Today, evidence of otters can be found throughout the country, from mountain streams to coastal habitats. Despite the increase, numbers are still relatively low in areas of North Wales and in the industrialised south of the country.

A Modern Threat

The expanding otter population is clearly good news for the species and for conservationists, who have helped reverse the rapid decline witnessed during the 20th century. However, the recovery of otters throughout England and Wales has coincided

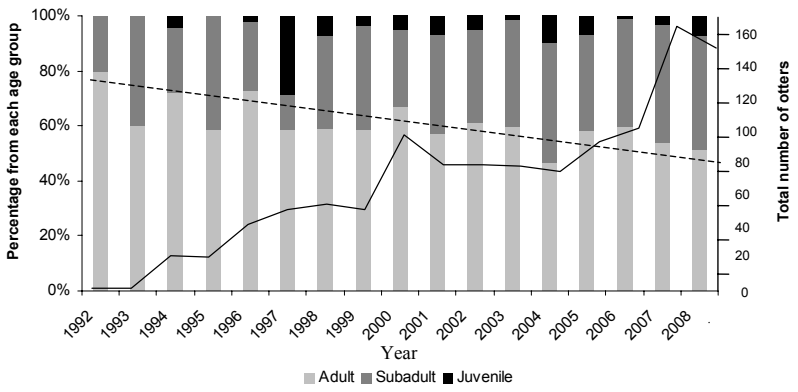

Figure 1 - Change over time in numbers and age-structure. The solid line represents the total number of carcasses received. The dashed line shows the decreasing trend in the percentage of adult casualties in the data.

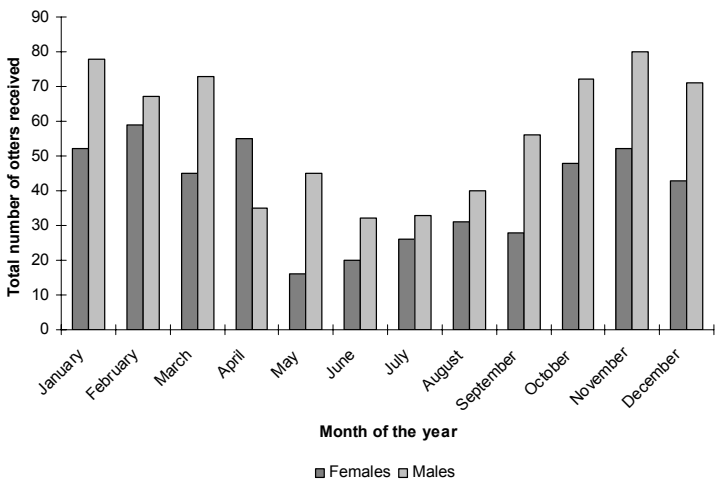

Figure 2 - Seasonal variation in otter casualties

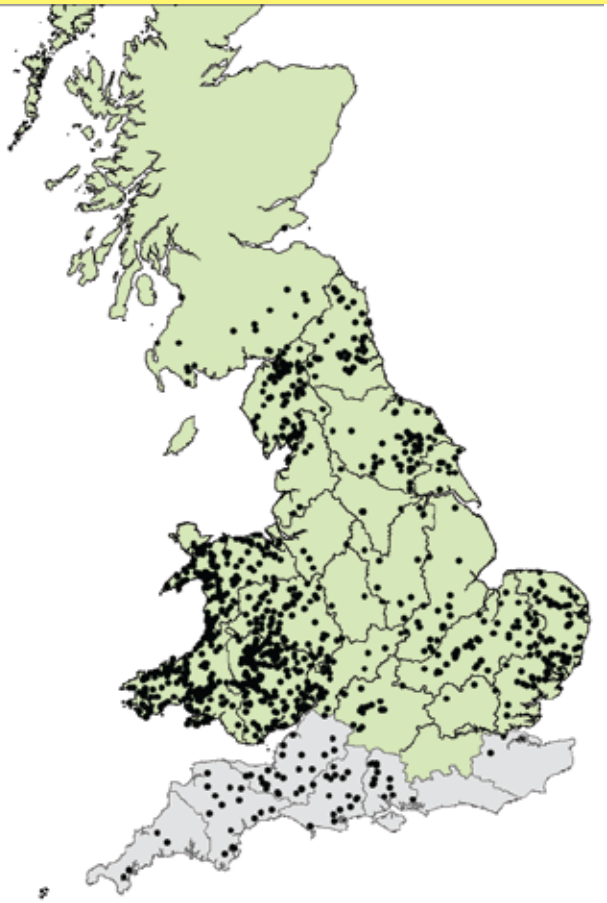

Figure 3 - Map of all otter casualties received by CUOP since 1994 (green area) and since 2007 (grey area). Prior to 2007, otters found in the grey area were sent to the Wildlife Veterinary Investigation Centre in Cornwall and are not mapped here.

with a dramatic increase in the extent and usage of our roads network.

Mortality on roads is now a major and increasing cause of otter deaths (Figure 1) (Philcox *et al.* 1999). Despite this, the impact of such deaths at a population level remains largely unknown, with evidence suggesting that in some areas at least, recovering otter populations are not adversely affected. However the UK Biodiversity Action Plan (UKBAP) still cites incidental mortality, primarily road deaths, as a contributory factor causing loss or decline of the species in the UK.

Casualty numbers vary seasonally, with most otters killed in the winter months (Figure 2). Winter peaks may be due to poor winter driving conditions, longer hours of darkness (otters in England and Wales are largely nocturnal so may be active over a longer period in the winter months), the coincidence of the hours of darkness with daily rush-hours, and/or more flood events (spate flows cause reluctance to pass through culverts and under bridges, and disrupt normal activity patterns).

While clearly undesirable, such deaths – through effective use of carcasses – do provide an invaluable source of information and samples, which aid our understanding of this charismatic species. By recording information on casualty locations, conservationists can identify areas where otters are at greatest risk from road traffic accidents. Once areas of concern are identified, appropriate mitigation measures can be implemented to ameliorate the immediate and future threat to the species' ongoing recovery.

Making the Most of a Bad Situation

Since 1992, the Environment Agency has part-funded collection and post-mortem examination of otters found dead in England and Wales. Currently, this is the only such national scheme in Europe, and relies on a network of otter collectors for information and recovery of carcasses. The network includes many members of the public, as well as governmental and non-governmental bodies.

Until recently animals from south and southwest England were sent to the Wildlife Veterinary Investigation Centre (WVIC) in Cornwall while those from the remainder of England and Wales were sent to the Cardiff University Otter Project (CUOP). Since 2007, all otters have been sent to CUOP; to date over 1,200 otters have been received by CUOP (Figure 3) and over 600 by the WVIC.

A common misconception is that post mortem examinations are primarily to ascertain the cause of death, but in fact this forms only a small part of the Project, which uses data and samples collected to: (i) generate detailed biological information to guide effective otter conservation; (ii) disseminate information on casualty black spots to appropriate authorities to guide targeted mitigation; (iii) monitor otter health, and screen for disease and parasites that might be a threat to livestock, humans or wildlife; and (iv) monitor the condition of freshwater ecosystems, using the otter as an indicator of contamination.

Typically (up to 90% in most years) the majority of otters received are found on roads, and are clearly road traffic casualties (RTCs). However, as otters on roads are more easily found than those elsewhere, it is likely that our assessment of the percentage killed by vehicle collision (rather than by other causes such as disease or infection) is heavily biased. Occasionally otters are found shot, snared or drowned in fish traps (Figure 4), but while the percentage found is extremely low, these causes of mortality are likely to be under-represented due to concealment of illegally killed animals.

During post mortem examination, a methodical series of data and samples are collected. Basic data includes features such as the sex and age-class of the animal, the length and weight,

Figure 4 - Illegal killings by (A) shooting (pellets removed from an otter found on a roadside in Humberside, March 2007), (B) snare (otter found on a roadside in Suffolk, December 2006) and (C) trapping (four otters found in a fyke net set illegally in the River Winster, near Lindale, Cumbria in October 2003. Two mink were also found in the trap). Photos: (A and B) E Chadwick, (C) Gail Butterill (Environment Agency)

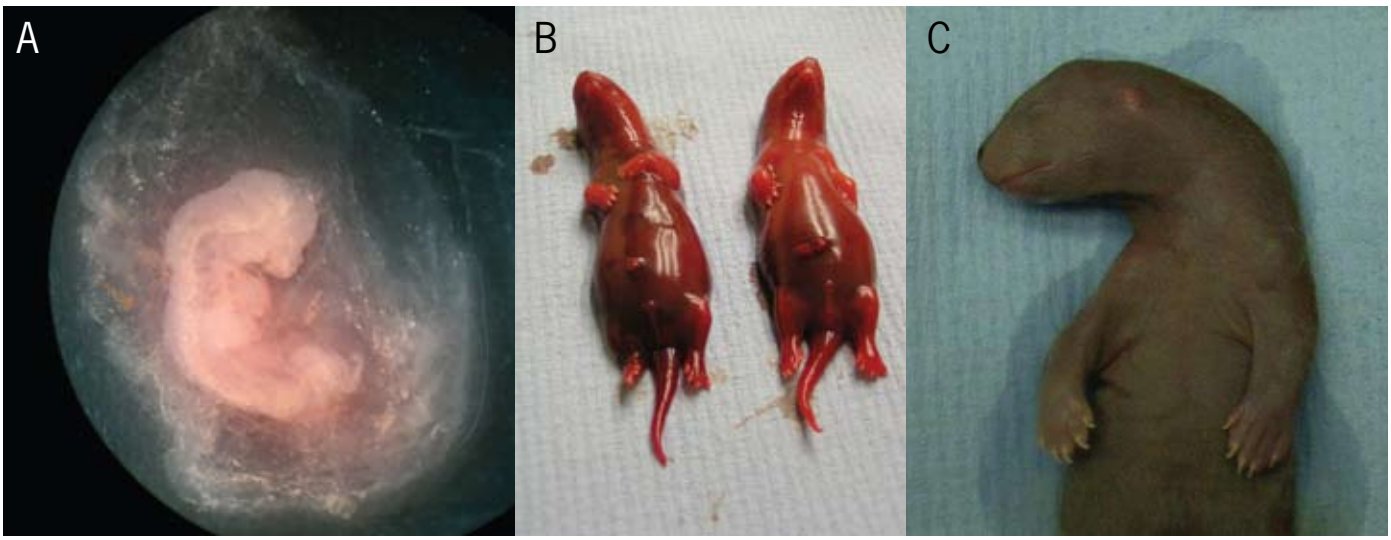

Figure 5 - Otter foetuses at various stages of development (A) ~5 mm crown to rump length (B) 115 mm length nose to tail tip, weight 23 grams, and (C) 191 mm length nose to tail tip, weight 56 grams
Photos: E Chadwick (CUOP)

and any obvious signs of injury. The ratio of males to females is typically 3:2, which is likely to reflect bias in mortality rather than bias in the population structure (males typically have a larger home range than females, and so are more likely to cross roads). Data on age-class show an interesting trend towards more juveniles and sub-adults over the course of the project (Figure 1), perhaps indicative of expanding populations. Length and weight data are used to gauge nutritional status, and while emaciated individuals are often found among non-RTCs, typically otters killed on roads are healthy and in good condition. Otters are carefully screened for ectoparasites (such as ticks), feet and teeth are examined for wear or damage, and the presence of milk-teeth is noted.

Due to the nature of the death, severe injuries are common, and are not informative about the individual or the population. However, careful examination often reveals intra-specific fighting injuries, typically around the anogenital area, the muzzle or the head. It appears that otters engage in highly ritualised aggressive behaviour; on some occasions fighting injuries lead to infection resulting in death; in extreme cases males can have a broken baculum (penis bone) or torn scrotum. As well as giving insight into behavioural interactions, such observations may also indicate changes in population size – it has been suggested that in the southwest of England an unusually high proportion of otters with fighting injuries (in 2007, 54.5% in the southwest, compared to 22.5% in England and Wales overall) may indicate that populations are approaching carrying capacity.

Protecting breeding females is particularly important for conservation, and reproductive activity is assessed by examining the nipples and the uterus of each female found. About 10% of females killed are pregnant (Figure 5), and about 20% are lactating – if lactating females are identified quickly it is sometimes possible to locate and rescue abandoned cubs. Placental scarring (scarring to the uterus) indicates whether a female has reproduced recently (scarring is thought to remain for approximately 6 months after birth or miscarriage), and how many kits were carried.

All major organs are weighed and examined - abnormalities include kidney stones, which occur in around 14% of adult otters. The only other common abnormality is enlarged adrenal glands, which indicates physiological stress of some kind. Occasionally signs of infection are found, particularly in the lungs – samples are sent to researchers at the Veterinary Laboratories Agency (VLA) who undertake a range of tests.

A wide range of tissue and bone samples are collected and archived for further research. Research projects are many and varied, utilising techniques from microscopy to molecular DNA analysis to address a wide variety of questions. Some are focused on the otter itself (*e.g.* Box A, quantification of diet), while others use the otter as an indicator (*e.g.* Box B, monitoring contamination of aquatic systems). Improvements in otter monitoring are essential, as recognised by the UKBAP, in which one proposed action is to 'develop and implement methods to estimate otter numbers and permit population modelling'. CUOP research attempts to address this need (*e.g.* Box C, scent profiling). Further details of these and other research areas can be found on the project website www.otterproject.cf.ac.uk.

A. Quantification of diet

Understanding otter dietary needs is a key component of conservation. Dietary studies typically rely on identification of hard remains from spraint (faeces); however these studies cannot match prey items to individual otters. CUOP retain the stomach and intestines at post mortem, and the contents are filtered and cleaned. Hard remains (typically fish vertebrae, gastroliths from crayfish, hair, feathers) can be identified to species or family, providing a detailed picture of diet. By using remains taken at post mortem, prey selection can be related to the sex, size and age of the otter, giving a clearer understanding of variation in diet.

B. Monitoring contamination of aquatic systems

As top of the aquatic food chain, otters can provide a useful indicator of contamination. CUOP take liver tissue samples which are tested by the Environment Agency for a range of pollutants including organochlorine (OC) pesticides and polychlorinated biphenyls (PCBs). It is generally accepted that these contaminants led to dramatic declines in otter populations in the 1960s-70s, as well as in populations of other top predators. Currently, OC and PCB levels in the environment are low, but monitoring is vital. By keeping an archive of tissue samples it will be possible to retrospectively check for other pollutants in the future as new monitoring techniques are developed or new threats perceived.

C. Scent profiling

Monitoring otters is challenging due to their elusive nature and low population densities. Standard surveys use spraint to identify otter presence, but spraint cannot be used to distinguish individuals, or assess parameters such as population structure or size.

Molecular analysis of spraint potentially allows identification of individuals, but is costly, time-consuming and has low success rates. Chemical profiling is a promising alternative, and potentially offers more information, at a lower cost, for less effort. Otters possess a pair of anal scent glands, material from which is secreted as part of spraint. Otters are thought to use scent to communicate sex, age, dominance, reproductive condition and individual identity. Interpretation of scent signals may enable the categorisation of animals according to such factors, including some (age, dominance and reproductive condition) which cannot be distinguished using DNA.

CUOP are currently analysing the volatile profiles of material from scent glands and matching this to corresponding data on sex, age, size and reproductive condition. It is hoped that within the next few years this will lead to the application of chemical profiling as a monitoring technique.

Mitigation on Roads

Otters can travel several miles in a night, and often cross roads where rivers are culverted or bridged. In many cases mortality can be limited or prevented by provision of simple mitigation measures such as dry culverts (*e.g.* Figure 6) or bolt-on ledges (Figure 7) in combination with appropriate fencing to guide the otter to the safe passage point. The Highways Agency and the other UK National Highway Authorities use advice incorporated into Volume 10 of the *Design Manual for Roads and Bridges* (DMRB) (Highways Agency 2001), which sets out good practice regarding otter mitigation on roads. Other useful references include Grogan (2001) and Liles and Colley (2000, 2001).

Experience in Wales shows, while (i) systems for collecting information on road casualties and (ii) designs of road mitigation structures are both well established, links between these two systems are poor, and follow up of mitigation sites (to assess whether mitigation was successful) is infrequent.

The Roads and Otters Steering Group (ROSG) in Wales is an excellent example of what can be done to help improve the flow of information regarding casualties, from initial incident reporting to influencing road mitigation (Figure 8). The group was formed in 2001 from a number of different representatives, including road engineers and both statutory and volunteer organisations such as:

- Welsh Assembly Government (WAG)
- North, Mid and South Wales Trunk Road Agencies (TRA)
- Environment Agency Wales (EAW)
- Countryside Council for Wales (CCW)
- Local Authorities (LAs)
- National Parks Authorities (NPAs)
- Welsh Police Forces
- Cardiff University Otter Project (CUOP)
- Wildlife Trusts Wales (WTW)
- Otter Specialists

Data collected at each mortality site is entered into a central otter road mortality (ORMS) database, managed by the Environment Agency Wales. The ORMS database links location details to information collected by CUOP at post mortem, such as age, sex and breeding condition of the otter. These data can then be analysed further to identify which sites should be prioritised for mitigation. Priority ORMS (or PORMS) are those where multiple casualties have occurred, or where breeding (lactating or pregnant) females or cubs have been killed.

Figure 6 - Dry culvert on A470, Wales
Photo: Jean Matthews

An important function of ROSG is to share and distribute information regarding PORMS to organisations and bodies that are best placed to implement appropriate mitigation work on the worst affected roads. Indeed, one of the greatest successes of the group has been to bring conservationists and engineers together to help ameliorate RTCs in Wales. A 'Roads and Wildlife' seminar was held in July 2007 in north Wales, and it is hoped that a similar event will be arranged in mid or south Wales in 2009. Also in 2007, CUOP and the Environment Agency held a series of 'Otter Roadshows' throughout England and Wales to highlight the importance of monitoring, post mortem research and links to mitigation. ROSG plays a key role in raising public awareness in Wales, reinforcing the need for increased reporting of otter road casualties, through posters and postcards at public locations and exhibitions.

CUOP and ROSG are currently seeking funding to allow production of a clear reference manual mapping both otter casualties and existing/recommended road mitigation in Wales. It is hoped that the manual will be of use to interested parties involved in otter conservation and for road developers and consultants. A range of criteria will be developed which will aim to assess sites and identify whether mitigation is desirable and/or achievable. It is hoped to do this on a county by county basis in Wales, as appropriate funding is made available. To help the project ROSG is asking for ecological consultants across the UK to share their experience and knowledge of road mitigation and monitoring schemes (both successes and failures).

To report an otter casualty, call the Environment Agency Incident Hotline on 0800 807 060.

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Figure 7 - Otter ledge at Pont Dolau in Wales
Photo: Geoff Liles

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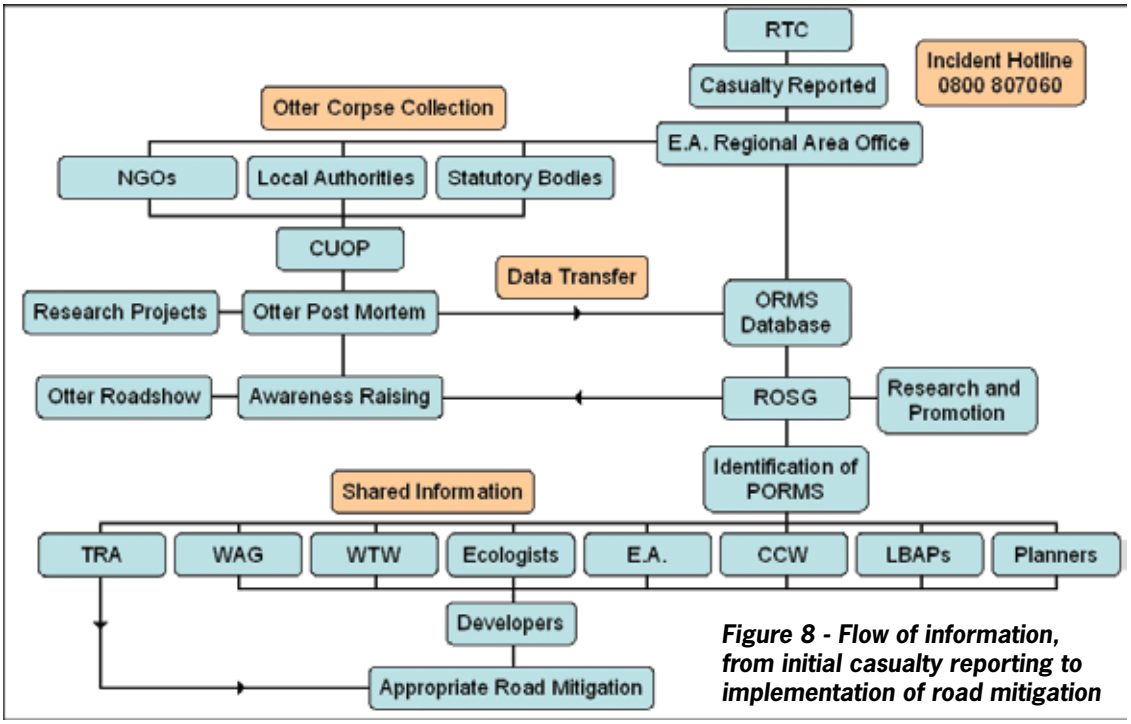

Figure 8 - Flow of information, from initial casualty reporting to implementation of road mitigation

Darwin – Gentleman, Amateur, Genius

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February 12th this year marked the 200th anniversary of the birth of Charles Darwin. 2009 also represents the 150th anniversary of the publication of his great work *On the Origin of Species by the Process of Natural Selection*. Widely quoted (and mis-quoted), sometimes misunderstood, and even deliberately mis-represented, Darwin's theory of evolution is still one of the most powerful and important ideas in science. The evolutionary geneticist, Theodosius Dobzhansky, said that nothing in biology makes sense, except in the light of evolution. So how did a Victorian naturalist, with little formal training, come to develop a theory that would change the face of our profession?

Darwin was born in Shrewsbury, the fifth child of Robert and Susannah Darwin, a well-known society doctor and a Wedgewood heiress. Growing up, Darwin had an early interest in natural history but this, it was always assumed, would be nothing more than a suitable pastime for a gentleman of his standing. However, this keen interest remained when Darwin attended Edinburgh University with a view to following his father's profession. He assisted Robert Grant in his studies of marine invertebrates in the Firth of Forth and rather neglected his own medical studies.

Realising that Darwin would never qualify as a doctor, Robert Darwin decided that the only respectable profession for his son to follow would be that of a country parson. In 1828, he was therefore sent to Christ's College, Cambridge to study for a BA. Again, however, Darwin's interests in botanising, collecting beetles and indulging in the normal country pursuits of an English gentleman of the time, far outweighed his interest in theology.

Whilst at Cambridge, however, Darwin read Herschel's book on natural philosophy, which described learning's highest aim as understanding natural laws through inductive reasoning based on observation. Inspired, he hoped to study natural history in the tropics after graduation. Therefore, when he was offered the opportunity of a place as a gentleman naturalist on the HMS *Beagle*, which was to chart the coastline of South America, he immediately seized the opportunity.

The Beagle set sail from Plymouth in December 1831 on what was to become a five-year journey. Darwin's role was partly professional, and the trip established him as a renowned geologist, but partly as a suitable gentleman companion for the Captain, Robert Fitzroy. Darwin spent a great deal of time on land and collected an enormous number of geological, botanical and zoological specimens. He became interested in the fossils of extinct mammals in South America. His most famous observations now, relate to the various species of what became known as Darwin's finches on the Galapagos Islands, though Darwin originally misidentified some as grosbeaks. Taxonomy notwithstanding, Darwin was fascinated by the way in which the beaks of these birds seemed so perfectly fitted to the tasks they needed to do, which varied according to the nature of the habitats in which they lived. Drawing on his experiences at Cambridge, Darwin applied inductive reasoning to his observations and attempted to explain what he found. These and many of his other findings, lead to his first thoughts about evolution, the early sketches of lineages and notes in his journal, which said 'if true, this would undermine the stability of Species'.

Returning to England, Darwin was something of a celebrity, invited to speak at various institutions, writing up his journal, and ensuring his collections were identified and curated by the best geologists and zoologists of the day. He moved in intellectual and free-thinking circles, and his thoughts about species and how they came about continued. By 1837 he was thinking the unthinkable, 'one species does change into another'. In 1838, he read Malthus on population and the mechanism for his transmutation of species fell into place, 'favourable variations would be preserved, and unfavourable ones replaced'. Despite having the outline of his theory prepared at this stage, it would be another twenty years before he published.

In 1839, Darwin married his cousin, Emma, famously having reasoned the pros and cons before deciding to do so. The pros included 'a companion in old age – better than a dog anyhow'. Darwin was clearly concerned that, in establishing the right work-life balance, he did not have too much home life interfering with his work and his books! The couple set up home at Downe House in Kent, the house is open to the public and well worth a visit to see Darwin's study.

Over the years, Darwin worked on the 'sketch' of his ideas, discussed them with friends and colleagues, and his wife, but resisted making them more public, fearing perhaps the controversy they would cause. He also battled with ill health of a rather non-specific nature. For many years, it was speculated that this was more of a psychological problem, but later analysis of his symptoms suggested that it could have been Chagas disease, caught from the bite of the *Rhodnius* bug in South America.

What eventually prompted Darwin to publish was his correspondence with Alfred Russell Wallace who had independently come up with a similar theory on the nature of species. At the time, Darwin was only part-way through what would become *On the Origin of Species*, and the two published jointly in 1858, though the paper was read in limited scientific circles and response was muted. Darwin finished his book and finally published in 1859. The response was totally different, it sold out almost immediately and Darwin's long argument for 'natural selection' was widely reviewed in society and in the press.

There were many critics of Darwin's theory, particularly the Church, and as Darwin's work was re-printed, he constantly added to and explained his theory in response to the various criticisms he received. By the sixth edition it gets quite hard to follow the original single long argument. If you are able to find a copy of the Penguin reprint of the first edition, you will find it the clearest, most open, explanation of his work, with an elegant simplicity of thought, if not of literary style.

In the last 150 years, the controversy, the wonder and the acclaim has not really died down. From the re-discovery of Mendelian genetics, which provided a mechanism for variation and natural selection, brought together in the neo-Darwinian synthesis, through the 20th century debates between punctuated equilibria and phyletic gradualism, to the current positioning of creationism as an alternate scientific theory in the US, Darwin's theory is still front page news.

In ecology, everything really can be explained in the light of evolution, and it is our challenge as a profession to understand and interpret some of the most complex systems in science. So this year please raise a glass to Charles Darwin and remember that sometimes revolutionary ideas change our thinking in an instant – after 20 years of pure intellectual reasoning.

Using Field Signs to Identify Water Voles – Are We Getting It Wrong?

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**Dolphin Ecological Surveys*
***Director, Barry Kemp Conservation Ltd*

Members of IEEM all know that correct species identification is essential, whatever the purpose of the survey. Where legally protected and Biodiversity Action Plan (BAP) species are concerned it is especially important to be accurate.

This short article addresses some specific problems inherent in using field signs to survey for water vole *Arvicola terrestris* presence. It stems from our experience in Sussex, though it may well be applicable throughout the UK.

There is an increasing demand for water vole surveys now that this species is fully protected under the Wildlife and Countryside Act (see box). The presence of water voles on a site is not always easy to determine and most surveys are designed to take advantage of their tell-tale field signs, particularly latrines, burrows, tunnels in waterside vegetation and feeding remains.

In parts of the country where water vole numbers are very low it can be hard to gain experience in identifying their field signs accurately. Distinguishing water vole signs from those left by the more common vole species and other small mammals is not always clear-cut.

Legal Status of Water Voles

The water vole is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and since April 2008 the species has been fully protected under Section 9 of the Act. This makes it an offence to:

- intentionally or recklessly kill, injure or take a water vole;
- possess or control a live or dead water vole, or any part of a water vole;
- intentionally or recklessly damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection or disturb water voles while they are using such a place; and
- sell, offer for sale or advertise for live or dead water voles.

As a species protected under the Wildlife and Countryside Act, Planning Policy Statement 9 on Biodiversity and Geological Conservation (PPS9) makes it clear that the presence of water voles on a proposed development site is a material planning consideration. Local planning authorities therefore need accurate information about the distribution of water voles so that they can ensure that populations of this species are not adversely affected by development proposals.

Under the Natural Environment and Rural Communities Act 2006, Section 40 all public bodies have a duty to conserve biodiversity with special attention paid to species included on the Government's list of species of principal importance, which includes the water vole.

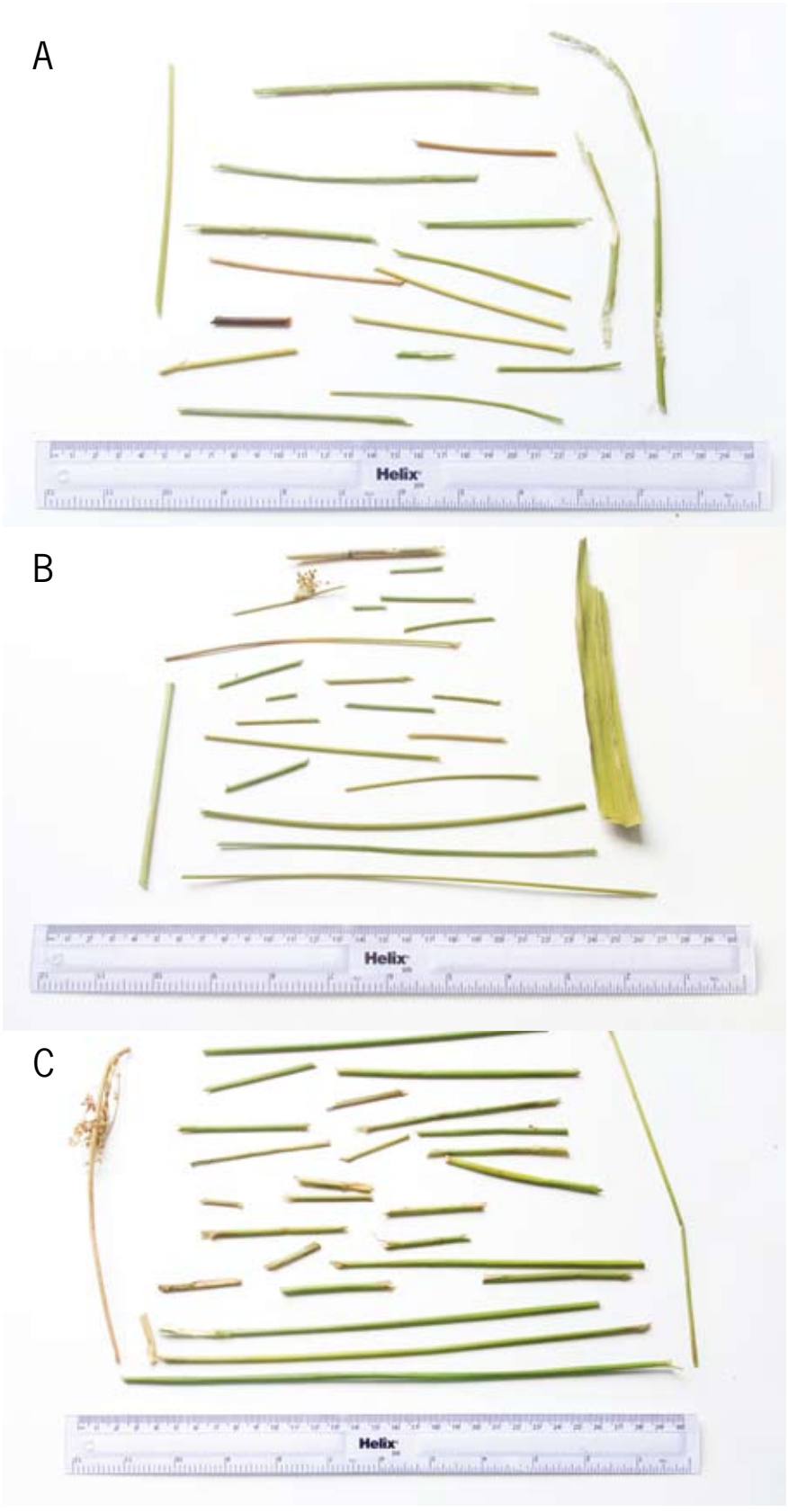
Water vole
Photo: Barry Kemp

Feeding Remains

One of the most distinctive field signs left by water voles are piles of cut vegetation, with characteristic 45° ends sometimes showing the marks of large incisors. These cached feeding remains are often found on the waters edge in places where water voles habitually feed amongst the emergent vegetation. Much of the current guidance on surveying for water voles makes reference to searching for these feeding stations and states that individual sections of vegetation are typically up to 10 cm long.

Over recent years we and other colleagues have found such feeding stations at many wetland and riparian sites across Sussex, despite the catastrophic loss of water voles from most of the county since 1990 (Strachan and Jefferies 1993). In particular cut sections of soft rush *Juncus effusus* of varying length but often in excess of 10 cm and showing distinct 45° angled cuts on both ends are found quite frequently in rush pastures, around ponds and along river or ditch edges.

The large, cached feeding remains that we have found in wetland habitats strongly suggested the presence of water voles but careful searching often failed to find any droppings or only very small quantities of droppings below the typical size left by water voles. At Arlington Reservoir in East Sussex our colleagues from South East Water tried trapping where they found these inconclusive field signs but caught nothing in Sherman traps. Over a period of time we began to suspect that, despite the received wisdom, in isolation these types of feeding signs are not a reliable indication of water vole presence.



Feeding remains from bank vole (A), field vole (B) and water vole (C) Photos: Barry Kemp

Instead the probable culprits are not water voles at all but field voles or bank voles.

We are not alone in drawing this conclusion. The authors of the last national water vole survey noted this phenomenon (Jefferies 2003) but the warning they gave in that report about the possibility of misidentification of voles does not appear to have been widely disseminated amongst professional and amateur ecologists.

Vole Feeding Experiment

In order to test our suspicion that there is a significant overlap in the size and appearance of feeding remains that are left by the three common British vole species we enlisted the help of the British Wildlife Centre (BWC) near Lingfield in Surrey. BWC has a collection of native fauna that includes captive bred water voles, field voles *Microtus agrestis* and bank voles *Myodes glareolus*.

In addition to the normal diet of apple and rabbit food, the BWC keepers provided their water voles, field voles and bank voles with a selection of freshly cut, typical riparian plant matter including soft rush *Juncus effusus*, reed sweet-grass *Glyceria maxima* and common reed *Phragmites australis*. The fresh plant matter was given to all three species over a period of several weeks during the summer of 2008.

All three species of vole showed a distinct preference for soft rush and largely ignored the other vegetation provided. Only the bank voles cached a piece of common reed. The most important thing we found was that all three species are able to produce both long and short lengths of cut vegetation, ranging from approximately 2 cm to well over 10 cm with 45° angled cuts on one or both ends of the stems.

As the photos show, the feeding remains of soft rush left by water voles, bank voles and field voles under these simple experimental conditions are indistinguishable.

Further experiments to establish whether all species of voles produce the same results with other riparian plants in the absence of soft rush would be of great interest.

Droppings

The presence of vole droppings, whether singly or in latrines, is by far the most reliable field sign to use when trying to distinguish which vole species are present on a site. There is usually a clear difference in size between field/bank vole and water vole droppings, although the shape of all three is essentially similar and droppings can swell and change shape slightly if they become wet.

Water vole droppings are longer and wider than bank/field vole droppings. They are cylindrical with blunt ends, 8-12 mm long with a diameter of 4-5 mm and are often found in latrine sites. They are of variable colour, though frequently greenish and with the texture of putty when fresh but more brown and a little smaller when old and dry. Field and bank voles leave piles of droppings, reminiscent of 'hundreds and thousands' or grains of rice. They are usually up to 5 mm in length, and only around 2-3 mm diameter.

Burrows

Active vole burrows may well have droppings nearby so it is worth searching carefully in their vicinity, but the burrows alone are not a reliable sign that water voles are present since other species, particularly brown rat *Rattus norvegicus*, can make or colonise waterside burrows.

Lessons to Learn

From our experience the only way to be certain that water voles are present on a site (other than by direct sightings) is through a combination of field signs but the most important and definitive field sign is the presence of latrines or individual droppings. Piles of cut vegetation alone are not a reliable indicator of the

Vole droppings
Photo: Barry Kemp

presence of water voles, even if these feeding remains are quite large.

This can be problematic for surveyors on sites where water voles may occur at low densities or in fragmented populations because there are generally fewer maintained latrine sites, so droppings are much harder to find. Outside the main breeding season, when latrines are not maintained, it can also be much more difficult to find droppings.

If typical vole feeding remains are found but in the absence of droppings it is very important that surveyors make it clear to their client that water voles may be present, but that there is a degree of uncertainty. More detailed investigations will be needed if water vole presence has to be confirmed beyond doubt, either through prolonged observation over their most active season (April to October) or possibly via live trapping.

Getting it right is important. Over-estimating the distribution and abundance of an uncommon or protected species could lead to reduced conservation effort if the population mistakenly appears to be recovering or increasing. Getting it wrong could also have expensive consequences for consultant ecologists and their clients if mitigation, compensation or even translocation is recommended in error. The cost to the client could include unnecessary delays as well as the expense of an unnecessary mitigation scheme, the cost to the consultant ecologist could potentially take the form of litigation. Misidentification of a protected species could also constitute a failure to meet IEEM professional standards.

This article is a summary of a longer article that is due to appear in British Wildlife later in 2009.

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Regulation of Standards in Environmental Mitigation Associated with Development

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Developments are required to mitigate for unavoidable environmental impacts from their actions and this mitigation delivery is set out in a range of supposedly legally binding documents (such as planning conditions) prior to the granting of planning consent. However, for a variety of reasons this mitigation usually fails to deliver what is required to enable effective discharge of the planning conditions. As a result the natural environment continues to subsidise development growth and profit and continues to be increasingly eroded. A new system is required to ensure that the mitigation is properly delivered and the quality of the natural environment is maintained, or indeed enhanced. This requirement also applies to cases where the developer needs to compensate for residual impacts that remain after mitigation is designed.

The main reasons why mitigation is failing to be delivered are:

- the Environmental Statement, which would normally reference the list of mitigation tasks, gets forgotten once planning consent is given;
- breaks in continuity through staff changes at both the developer and planning authority level result in a break down in understanding between parties;
- the developer purposefully waters down the mitigation actions on the grounds of cost; and
- a lack of appetite and resources for effective enforcement and monitoring on the part of the planning authority. The developer therefore considers mitigation to be a low priority and breaches of the mitigation plan go unpunished.

These reasons have remained the case since the early work of Treweek and Thompson in the mid 1990s, which identified the major gap between expected provision of mitigation and its actual delivery on the ground. There is no evidence that the situation has improved at all in the intervening period.

So, there is a general need to improve the system by ensuring that planning authorities commit to proper and effective enforcement of environmental mitigation so that the erosion of the natural environment is halted. I believe that this can only be achieved by more effective accountability on the part of the planning authority and more effective regulation of developments. A 'voluntary' approach, as the current system has become, is clearly ineffective at protecting the natural environment.

I therefore propose that a 'measure' for the protection and enhancement of the natural environment should be developed as part of the planning and development control sector, which would form a Public Service Agreement (PSA) between government and local authorities. In keeping with other PSAs the development mitigation PSA for the environment would have a target. Alongside this there should be an independent auditor that audits the planning authorities compliance with environmental commitments made at the time of planning consent for each development. The system must be open, transparent and reportable. The auditor would operate in the same way as Ofsted regulates standards in education for the benefit of students or Ofwat regulates the water industry for the benefit of its customers. 'Ofstenv' (The Office for Standards in the Environment) would regulate planning authorities to ensure environmental mitigation for development activities is enforced, monitored and delivered. Other environmental targets could also be audited by this body.

The process would work as follows:

1. The planning authority would consent to a development having assessed its impact and considered the proposed mitigation solutions.
2. The mitigation actions required to off-set the impacts would be listed in detail in a 'Schedule of Environmental Commitments'. This schedule would become legally binding on the part of the developer and planning authority.
3. The developer would pay a bond prior to the onset of

development to ensure the mitigation measures can be paid for and would assume no responsibility for delivery (which is usually where the watering down takes place). Without the bond in place the development could not proceed. The bond would be used by a third party to assume the responsibility for the mitigation delivery.

4. The regulatory body would make random checks on planning authorities to investigate the compliance of specific developments with their schedule of environmental commitments. By assessing a reasonable number of schedules, with the option of appropriate site visits (perhaps by competent registered assessors such as ecologists who would make a brief report on findings), the authority would score 'outstanding, good, satisfactory, inadequate' and these scores would be aggregated across the country in order to construct the overall score which would be assessed against the PSA target.

The overriding benefits of this approach are:

- mitigation would be properly designed and costed at the outset;
- removing the burden from the developer would remove the watering down effect and ensure all the required mitigation is delivered;
- it gives greater guarantees to the developer;
- it embraces the idea of off-setting and habitat banking whereby mitigation and compensation requirements for multiple developments could be pooled to create large-scale natural environment resources;
- it places greater onus on the planning authority to enforce the mitigation, and through drawdown of the bond would provide authorities with more resources to ensure the job is done effectively; and
- it would drive up standards within a relatively short period of time leading to a rapid halting of the erosion of natural environmental capital.

The only 'disbenefit' to the developer is some increase in cost. However, this could be factored in to the development uplift value on the land so it is unlikely that the developer would suffer significantly in economic terms. In fact, it is conceivable that the extra guarantees to the developer would result in lower costs in the long term since the mitigation delivery would be undertaken by a separate party. If this third party delivery route were embraced then the developer, *together with the planning authority*, would be responsible for setting out the brief for the mitigation and overseeing the appointment of the delivery company. Otherwise there is a risk that the cheapest contractor would be selected only to hit delivery problems down the line.

At present, the natural environment is subsidising development growth and profit and we need a system in which land users are required to pay the true cost of the use of that land. We know that the cost of returning the natural capital to our landscapes in Britain, which have been eroded by development and other uses, would be astronomically large. We cannot continue to erode this capital.

I believe that the above model would provide a substantial improvement to the way in which mitigation is planned and delivered, and that the benefits would far outweigh the small increase in delivery cost. However, when compared to the option of 'retrofitting' restoration to landscapes degraded by years of development, even the cost argument becomes irrelevant.

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EPS Licensing Update from Natural England

Edel McGurk
Wildlife Management and Licensing, Regulatory Services and Access, Natural England

Many IEEM members will be aware that Natural England has been working to improve the service provided to customers of its Wildlife Management and Licensing Service. This update signposts our latest guidance, flags recently announced changes and summarises new initiatives currently in development.

Improved Turnaround Times

Natural England has seen a 315% increase in European Protected Species (EPS) 'mitigation' licence applications since 2001 and, through recruitment of additional staff, training and process improvement over the last two years, we have extended our capacity to meet the increase in demand for these licences. Now, on average, 85% of all cases are processed within the 30-working-day period, with over half of licence modification requests and resubmissions turned round within 15 working days. With a programme of improvements ongoing, we expect to report improved figures again by mid 2009.

New Guidance

During Autumn 2008, we published new guidance for customers applying for survey and EPS mitigation licences, including:

- guidance on references for survey licences, including a new reference template;
- handy hints for getting EPS mitigation licences through on first submission;
- guidance on the experience we ask newt consultants to demonstrate when applying for a mitigation licence (with a version covering bats launched this February).
- a sample bat Method Statement to help applicants understand what information we need.

We also, following customers' feedback, launched an improved version of the Great Crested Newt Method Statement template.

To view all of these, go to our website and scroll down to the relevant links in our Latest News section at www.naturalengland.org.uk/ourwork/regulation/wildlife/default.aspx.

Liaison with Customers

We met with many of you over past months, at the Bat Conservation Trust conference in September, the IEEM conference in Glasgow in November and the Herpetological Conservation Trust meeting in January. We also hosted a focus group for a small group of consultants in November to 'road-test' a streamlining measure we were planning. At each of these events, we gathered a great deal of feedback that is helping to shape our improvements agenda.

Recently Launched Changes

Many consultants told us that they wanted to be alerted when a licence was issued. Taking advantage of our new database, we have now begun to copy PDF versions of licences (by e-mail) to the ecological consultant when we issue them to the licensee.

We now provide wildlife adviser telephone numbers and e-mail addresses on 'minded to refuse' responses, so that you can raise queries with them directly.

More recently, we have announced streamlining of the process for seeking EPS mitigation licences. Broadly, this change removes the requirement for the applicant to consult the Local Planning Authority, enabling the applicant to provide the required information themselves in a much improved Reasoned Statement template. The announcement on our website provides more detail - www.naturalengland.org.uk/ourwork/regulation/wildlife/default.aspx. We intend to begin accepting applications under this new process from 16 March 2009. In advance of making this change, we hosted a series of focus groups in which we consulted ecological consultants, planners, local government ecologists (represented by the Association of Local Government Ecologists) and representatives of developers, and we also gathered feedback by email from others who were unable to meet with us face to face; the new process and guidance we are launching reflects the feedback we received.

We have amended our minimum consent requirements for accepting licence applications in certain exceptional cases; this acknowledges the fact that, in some limited circumstances, consents may not be relevant or required or that it may not be possible to resolve them in advance of making an application. This change will be balanced by introducing a new licence condition (where appropriate) to ensure that licensed activities cannot begin before the relevant consents are secured.

To accompany this change of process, we also launched a comprehensive new guidance document *How to get a licence*. This document, which covers the process, key messages and licensing policies, is aimed at the licence applicant, generally the 'developer', but we expect that it will prove to be a useful summary for professionals such as ecological and planning consultants who support applicants through the licensing process. Improved application forms have also been released together with new report forms that can be completed and returned electronically.

Further Improvements in Development

1. Separation of Timetable of Works from Method Statement Delivery Document to reduce burdens on customers when modifications or resubmissions are needed (currently being scoped, implementation date to be confirmed).
2. Replacing the current Excel format of the Great Crested Newt Method Statement template with an MS Word document, incorporating some Excel features.

3. Regular publication of case numbers on our web site.

Did you know...

Before Natural England can grant an EPS mitigation licence, we have to be satisfied that your proposal meets three tests under the Regulations. Most of our customers are aware of the 'Favourable Conservation Status' test, which requires that the action taken will not be detrimental to the maintenance of the species concerned at a favourable conservation status in their natural range. However, we also need sufficient information from the applicant to be satisfied that:

- the action proposed meets one of the purposes set out in the legislation (usually preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment); and
- that there is no satisfactory alternative.

All three tests have to be met in every case, and under the legislation, all of the tests are given equal weight.

Further Changes to the Habitats Regulation and Off-Shore Marines Regulations

The Conservation (Natural Habitats, &c.) Regulations 1994 and Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 have been amended (as of 30 January 2009) in response to new concerns raised by the European Commission that UK legislation did not satisfactorily transpose the Habitats Directive into UK law. The Government views the changes as principally a matter of clarifying the wording of the regulations to allay the concerns of the Commission; the level of protection enjoyed by European Protected Species such as bats and cetaceans remains unaltered, and any effect on landowners and sea users will be minimal. Guidance on the changes has been published by Defra.

The existing guidance on interpreting the disturbance offence (Regulation 39(1)(b)), published following the changes in 2007 by Natural England and the Countryside Council for Wales, will be revised in the coming months to reflect the re-wording of the offence. In the meanwhile, people are encouraged to continue to follow the existing guidance, the essential essence of which remains unaltered by the new changes. Later in the year similar guidance will be published to aid interpretation of the offence in Regulation 39(1)(b), of damaging/destroying the breeding or resting place of an European Protected Species. The Courts will be required to take into consideration both sets of published guidance. This is intended to provide a proper balance between the need to effectively protect these species, and the need to avoid trivial acts of disturbance or damage, which have no bearing on the conservation status of the species, leading to prosecutions.

Some changes to the regulations in Scotland, Northern Ireland and Gibraltar have also been made.

Useful links:

Guidance on the changes: www.defra.gov.uk/wildlife-countryside/protection/bird-habitat/amend.htm

Statutory Instrument amending the regulations and the accompanying explanatory notes: www.opsi.gov.uk/si/sis09-01.

Existing disturbance guidance: www.naturalengland.org.uk/Images/esisgd_tcm6-3774.pdf

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West Thurrock Case Puts Biodiversity Planning Issues in the Dock

Jamie Roberts
Conservation Projects Manager, Buglife

Brown-banded carder bee Photo: Sam Ashfield

After a three-year battle by Buglife to save West Thurrock Marshes from destruction the Court of Appeal has judged that the decision to grant planning permission on the site was lawful. The case has highlighted a number of important issues relating to biodiversity and planning.

The legal campaign to protect West Thurrock Marshes began in February 2008 when wildlife charity Buglife took Thurrock Thames Gateway Development Corporation to the High Court on the grounds that it had failed to protect the biodiversity of the site. The Corporation had granted planning permission for a development that would cover 50% of the site including 70% of the extensive flower-rich grasslands, home to many rare species including the brown-banded carder bee and the saltmarsh short-spur beetle.

The Marshes are rated as one of the three most important sites for endangered wildlife in the country, with 17 UK Biodiversity Action Plan (UKBAP) Priority species and 36 species listed in the Red Data Book. The southern part of the Marshes are protected as a Site of Special Scientific Interest (SSSI), while the north lagoon – arguably of greater importance for biodiversity – has a lesser designation of 'Area of Local Nature Conservation Significance' in the local plan. Despite its importance for biodiversity, the Marshes are in the grounds of a former power station and is thus considered as previously developed land for planning purposes.

A planning application for a huge distribution hub on the north lagoon was submitted in early 2006. The environmental assessment concluded that the development would have 'significant' long-term impacts, particularly on the outstanding invertebrate interest. The scheme drew strong objections from conservation NGOs, Natural England, the local authority and other local stakeholders.

During subsequent post-application discussions between the developer and Natural England, a new proposal emerged to 'phase' the development. This would give time to see if the experimental translocation of flower-rich grassland would work. On the basis that this and other compensatory measures on the neighbouring SSSI could be secured through a Section 106, Natural England withdrew its objection. Despite continued opposition from the Local Authority, Buglife and the Wildlife Trust, planning permission was granted in November 2006. Critically the size or position of the area of the development to be phased had not been agreed in advance of the grant of permission.

The Legal Challenge

After careful consideration Buglife sought a judicial review of the planning decision on a number of grounds. Given the biodiversity importance of the site, Planning Policy Statement 9 (PPS9) was clearly an important material consideration. Yet that policy's crucial alternative sites and species protection tests (paragraphs 1(vi) and 16) had not been addressed (or indeed mentioned) in the relevant planning documents. The case posed the wider question of whether the planning authority could have fulfilled its legal duties under the Natural Environment and Rural Communities (NERC) Act having apparently overlooked such material considerations.

The proposals to phase the development also appeared to contravene the Environmental Impact Assessment (EIA) regulations. The phasing plan was considered by Natural England to be the key mitigation measure – without which the impact on the invertebrate assemblage could be (in their words) 'dramatic' – yet it emerged after the Environmental Statement (ES), had not been consulted upon by the public, and was secured through a loosely worded planning condition.

The Thurrock case reached the High Court in February 2008. Although the main points about PPS9 went unanswered by the defendant, Justice Mitting dismissed the judicial review, having declared that the NERC Biodiversity Duty was 'weak' and judged that the Thurrock Development Corporation was right to use its regeneration function to over-ride biodiversity considerations. Buglife decided to appeal the judgment with the aim of reversing a ruling that appeared to be a significant set back to wildlife protection laws.

At the two-day Court of Appeal hearing in November 2008 the judges agreed that the Development Corporation had failed to properly consider alternative sites for the development, and had not followed PPS9 in a rigorous manner. However, despite this the appeal was unsuccessful, with the judges concluding that the Development Corporation was entitled to rely upon a paragraph in a Natural England letter - which stated that the development offered the 'possibility of a long term nature conservation gain for the area' - as proof that the impacts of the development would not be significant, and that the development was therefore ecologically acceptable.

Future Implications

The Thurrock legal case has highlighted shortcomings in the protection that current legislation and planning policy affords to biodiversity, and the way that this is policed by the courts system. Although the judgment clearly establishes for the first time in court that the NERC Biodiversity Duty is an important consideration in cases such as this, the judges seemed to accept that statutory advice was sufficient to over-ride the predicted significant impacts on biodiversity including legally protected BAP Priority species.

Ultimately, there needs to be a step change in the way that the planning system protects habitats and species of 'principal importance for the conservation of biodiversity'. At present, inadequate consideration is given to the ecological significance of non-statutory sites and the endangered species they support. This is particularly the case with brownfield sites such as Thurrock Marshes, even though these now have their own BAP Priority habitat. With a review of the NERC Biodiversity Duty due in late 2009 there could be no more opportune moment to revisit its scope and effectiveness.

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1st International Symposium on Bat Migration, Berlin 2009

Katia Bresso CEnv MIEEM
Principal Ecologist, KB Ecology

Along with 300 other bat enthusiasts from all over the world, I attended an excellent symposium in January this year and would like to share some of the salient points relating to bats and wind farms which should become increasingly relevant to ecologists in the UK.

Paul Cryan, from the United States Geological Survey (USGS) at Fort Collins Science Center, gave a very interesting talk about wind farms and their impact upon migratory bats in northern USA. Here's a short summary of the main points he made.

Forty-five bat species inhabit the USA and many make short-distance movements between summer and winter quarters. However, four of these species may have longer migratory pathways than any other terrestrial mammal in the Northern Hemisphere. These four species, commonly referred to as 'tree bats', because they roost in the foliage or trunks of trees, are hoary bats *Lasiurus cinereus*, eastern and western red bats (*L. borealis* and *L. blossevillii*, respectively), and silver-haired bats *Lasionycteris noctivagans*.

Bat fatalities have now been documented at nearly every wind facility in North America where adequate surveys for bats have been conducted, and several of these sites are estimated to cause the deaths of thousands of bats per year.

Bat fatalities data have been gathered for 10% of the wind farms. Currently, migratory tree bats compose more than three quarters of the bat fatalities observed at wind energy sites. Out of the 4,762 dead bats recorded, approximately half were hoary bats and a quarter were red bats and silver-haired bats. The majority were male, with peak fatalities in mid August to mid September. The wind farms were located on mountain ridges or on flat agricultural land indicating that there does not seem to be any connection between local habitat characteristics and fatalities. However, there are higher fatalities in the east.

The seasonal peak in fatalities coincides with periods of both autumn migration and mating behaviour of tree bats, indicating that behaviour plays a key role in the susceptibility of bats to wind turbines, and that migratory tree bats might actually be attracted to wind turbines.

A number of hypotheses have been developed to answer the question of why bats collide with wind turbines:

Ultimate causes			
Random collision	**Coincidental Collision**	**Coincidental Collision**	**Attraction**
No difference in vulnerability	Vulnerable while migrating	Vulnerable while sedentary	Vulnerable when risky behaviour elicited by wind turbines
	Clump in time and space Fly higher Less likely to echolocate	Increased feeding activity Increased mating activity Lack of flight experience	Attraction to: Lights Sound Blade motion Insect aggregation

Another possibility is that tree bats regard wind turbines to be the tallest tree in the habitat.

Some of the species that die in smaller numbers at wind turbines are not known to migrate, although migratory habits of many bat populations are unknown and some of these species may actually do so.

Little was known until recently about bat migration. Although banding was undertaken in the USA between 1932 and 1972 (1.5 million bats of 36 species ringed), 22 species suffered high mortality and in 1972, a moratorium put a stop to banding.

One new research tool that is particularly well-suited to studying the origins of bats killed at wind turbines is stable isotope analysis. One element that is useful for such analysis is hydrogen. The stable hydrogen isotope ratio of local precipitation and groundwater is relatively constant in a localized area, but changes with latitude and elevation. In general, the isotope ratios of local precipitation are incorporated into the tissues of animals (hair, wing membrane and claws) inhabiting that area. Research using this technique will begin to be published soon.

You can read more at: www.fort.usgs.gov/BatsWindmills/

Pipistrelle bat
Photo: Katia Bresso

More Snippets From the Conference

What About Europe?

In Europe, 1,267 dead bats have been found since 1998 at wind farm sites. 19 species, out of the 38 existing in the European Union, have been killed by wind farms. In Germany and France, the fatalities peak in August to October. In Portugal, it peaks in May and

Romney Marsh Wind Farm
Photo: Katia Bresso

June.

It is thought that 55% of the dead bats are possible migrants including noctules *Nyctalus noctula*, which have been recorded to have flown over 1,600 km and Nathusius' pipistrelle bats *Pipistrellus nathusii*, which have been recorded to have flown over 1,900 km. Current surveys describe seasonal bat migrations between north-eastern and southern Europe. This information was extracted from the review of banding data (one million bats in 35 countries in Europe between 1932 and 2004).

However, the remaining 35% mainly comprise resident species. Therefore it is thought that although wind farm mortality seems to mainly impact migratory species, resident species may also be impacted when a wind farm is located close to habitats such as woodland or wetland. Therefore, a minimum distance of 200 m to woodland may be a valuable conservation tool to prevent fatalities.

Additionally, a German study looking at the recovery of dead bats, found that the radius to be searched should approximately equate to the height of the turbine.

For more information see: www.eurobats.org/publications/publication%20series/pubseries_no3_english.pdf

Technology Corner

DeTect (www.detect-inc.com) is an American firm which has developed the MERLIN Avian Radar System, the most advanced and proven system available for wind energy project avian survey, risk assessment, monitoring and real-time risk mitigation. Over 40 systems are operating worldwide.

The same company is currently developing a similar system for bats: the VESPER XVP Vertical Profiler Radar (on the commercial market in late-2009). It is a digital X-band fixed-beam vertical profile radar developed to provide differentiation of bird and bat targets in radar data. The system uses advanced signal processing to provide target identification based on wing beat frequency modulation and includes custom developed software and databases for real-time data processing.

Titley electronics (www.titley.com.au/index.htm) are currently trialling a system to allow remote check of anabat units left on site.

Research from Horn, Arnett and Kunz[1] using thermal infrared video recordings of operating turbines allowed the observation of bats actively foraging near operating turbines, rather than simply passing through turbine sites. The results indicate that bats:

1. approached both rotating and non rotating blades;
2. followed or were trapped in blade-tip vortices;
3. investigated the various parts of the turbine with repeated fly-bys;
4. were struck directly by rotating blades.

Blade rotational speed was inversely proportional to collisions, suggesting that bats may be at higher risk of fatality on nights with low wind speeds.

Seasonal 'low-wind' shutdowns during predictable nights or periods of high bat kills could reduce fatalities considerably, potentially with a modest reduction in power production and associated economic impact. Shutting down a wind turbine when wind speed is lower than 5.6 m/s showed good results for minimal cost to the developer (US$3,000 cost for August).

For more information on bats and wind energy visit: www.batsandwind.org/

The Fun Bit

Go to www.bu.edu/cecb/wind/video/ for video clips showing interaction of bats with wind turbines (using infrared technology).

Information about the bat conference: www.izw-berlin.de/de/veranstaltungen/index.html?symp%20on%20bat%20mig/Symposium%20on%20Bat%20Migration.htm~rechts

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Institute News

Conferences

2009 Spring Conference - Wildlife Crime
1 April 2009, Leeds

The programme for the conference is now on the website (www.ieem.net/conferences.asp) and we are again offering online booking. Join us for what promises to be a very interesting day in Leeds for our first one day conference away from London for some time.

2009 Annual Conference - Protected Areas
10-12 November 2009, Thetford, Norfolk

If the numbers for Glasgow were to be repeated for our next conference, it would be as well to note this conference in the 2009 diary right now. It is some time since the overall theme of protected areas has been looked at by IEEM and we hope it will be of particular interest to those working in this field. Please also note that the dates of this conference have been changed from those that were printed on the IEEM wallplanner.

Membership Renewals

Please note that unrenewed memberships expired on 1 February 2009. If there are issues that need to be resolved please contact the IEEM office as soon as possible.

Staff Movements

Jennifer Austin, who was employed on a temporary contract to do administrative work, left the Institute at the end of last year to seek more environmentally focussed employment. We wish her well.

IEEM is pleased to announce that we have two new appointments:

Zacyntha Dunhill-Rice

Zacyntha Dunhill-Rice (Ziggy) joins the Institute as Assistant Membership and Administration Officer. Ziggy has a performing arts degree from the University of Winchester and recently worked for the Museums, Libraries and Archives South East. The current membership numbers (nearly 4,000) has meant that extra support in that area had become essential and many administrative functions have also needed to be developed as the Institute has grown.

Stacey Travers

Stacey Travers joins us in the capacity of Sections' Co-ordinator and Administrative Support. Stacey has a degree in Biology from the University of Southampton. Stacey will provide added support to the growing activities of our Geographic Sections. There is now only one area in the UK and Ireland that does not have a Section – the West Midlands, which is due to be launched on 17 March 2009. Stacey will link with Ziggy on administration.

The IEEM team is now 10 strong and this is a very pleasing development. We are in an increasingly strong position to be able to respond effectively to the needs of the our members and the profession.

Professional Affairs Projects and Professional Issues

The Professional Affairs Committee is currently overseeing the drafting of several guidance documents to be produced in the Professional Issues Series. The topics are:

- Metadata;
- Contract Advice Notes (parts I and II);
- SUDS and Biodiversity; and
- Guidance for Ecological Site Evaluation.

The *Ecological Impact Assessment Guidelines: Marine and Coastal* has completed its first public consultation and is currently being revised in the light of the comments received. A short note setting out the differences between the various impact assessments (Regulatory, Strategic, Environmental and Appropriate Assessments) is to be added to the EcIA website shortly. The *Sources of Survey Methods* has been revised and this reference source is shortly to be updated. A Species Survey Competencies Project, in relation to protected species, is about to begin; its purpose is to provide guidance on the skills and knowledge an ecologist should have to undertake the range of different surveys for protected species.

Is Ecology Immune from the Depression?

There do now seem to be some hints of the slowdown in the economy hitting ecologists. Not that this is apparent in the number of recruitment adverts in this edition of *In Practice*. Equally, current membership applications continue to be buoyant.

Our contacts with some of the other Institutions do not yet suggest difficult times though they may be round the corner. The only exception may be the Landscape Institute, which has reported specific problems but unrelated to the current issue.

The situation for the financial year ending 31 March 2009 looks satisfactory. The financial strength of IEEM will continue to be influenced by the following factors:

- the number of new applicants;
- the numbers of members renewing;
- the success of the Conferences and events;
- the success of the workshops;
- any other sources of income such as advertising on the website or contract work.

As usual we shall be well into the second half of our financial year before the picture is fairly clear. IEEM has taken certain measures to safeguard its financial position, mostly by distributing its assets between various financial institutions and seeking to maximise investment income while at minimal risk. We currently have holdings in Barclays Bank, the Co-op Bank, the Triodos Bank and the Ecology Building Society. The latter three accounts are part of our commitment to ethical investment.

Ireland Section News

Green Infrastructure Conference Report

Hosted by Fingal County Council, and supported by IEEM's Irish Section, in early November 2008, 'Green Infrastructure – connecting nature, people and places' was a highly topical and cutting-edge event, bringing together a range of Irish and international speakers covering many aspects of the topic, from the philosophy and rationale behind a green infrastructure approach, to the issues and practical applications involved.

Professor Liam Heneghan, De Paul University, Chicago

The first session presented examples from the United States, as Donna Erickson and Michael Edwards gave us a flavour of what is being done in a range of cities across North America. They introduced two key concepts – that ecological soundness underpins good viable green infrastucure, and that in turn adds value to neighbourhoods. Following that, Hans Kampf and Abraham Vreugdenhil from the Netherlands spoke about the Dutch national ecological network and how this has been incorporated into their national spatial planning framework. Important points here included working at all levels, from the community and landowners right up to policy-makers, to build a vision and demonstrate the importance of a coherent network for nature.

Monday afternoon saw a mixture of community and planning subjects. Andy Gale from Natural England introduced a number of tools for bringing nature into urban areas, including policy instruments, guidance and standards, and strategies. Beatrice Kelly of the Heritage Council dissected the situation here in Ireland to give a snapshot of the issues affecting green infrastructure planning, particulary peoples' awareness and expectations, the need to integrate between plans and use existing building blocks such as waterways in developing a network, as well as anticipating and avoiding threats to heritage from greenway development. Elain Gibb of Greenspace Scotland showed how well-thought-out green infrastructure was helping improve some of the most deprived urban areas in Scotland, underlining the importance of quality greenspace, local champions, and community buy-in. Fingal County Council planners Kevin Halpenny and Stewart Logan gave us a picture of the significant green infrastructure resource in the county, which includes a number of EU-designated sites, and outlined how they have been using advanced ecological survey, planning guidelines, cooperation with other agencies and developers, and direct land acquistion to contribute to a green infrastructure strategy in the context of the most rapidly-growing population of any county in Ireland.

The lively discussion and debate continued at the conference dinner, with entertainment in the form of a local trad band headed up by a representative of the local council, with a guest appearance by one of the visiting delegates.

Tuesday morning opened with John Gormley, Minister for Environment, Heritage and Local Government, who re-iterated his commitment to bringing forward a new Planning Bill in early 2009, which would seek to make forward planning more sustainable. Richard Forman of Harvard University explained his 'ring around the city' approach to providing green space, and re-inforced the message of earlier speakers that protecting existing natural assets is more cost-effective and preferable to restoring degraded areas later. He described the use of agricultural nature parks in the urban fringe. Ciaran O'Keeffe of the National Parks and Wildlife Service (NPWS) described the existing Natura 2000 network as a basis for our natural ecological network, using Article 10 of the EC Habitats Directive to underpin the concept of ecological networks, and the difficulties of achieving meaningful connectivity.

Liam Heneghan of the Chicago Wilderness project suggested that ecologists often live in or near urban areas, but work outside them and in isolation. The Chicago Wilderness group brings together a range of people from different organisations with a common goal of protecting biodiversity and enhancing quality of life for people, integrating natural and social sciences. Thomas Stoll described the use of 'green wedges' spreading out from Stockholm into the rural hinterland, and mapping of biotopes and 'sociotopes' with space syntax analysis to plan the green infrastructure fabric. Peter Studdert of South Cambridgeshire District Council spoke about its aims to retain local character while encouraging urban growth, identifying growth areas and corridors and drawing up a green infrastructure strategy as one pillar of a set of 'quality of life' initiatives. Colin Byrne of the Water Inspectorate of the Department of Environment, Heritage and Local Government showed how measurement of 'good status' for waters under the Water Framework Directive could be used as an indicator of the soundness of water-based elements of the national ecological network. River Basin Management Plans should interact with Development Plans, and Strategic Environmental Assessment can be used to achieve a sustainable ecological network.

For me, the key take-home point was a heads-up to ecologists that we don't work in isolation and we must learn to engage with communities, policy-makers, and professionals in other fields if viable green infrastructure is to have a future. We must communicate the message that nature underpins society in an accessible way and strive to put sound ecological science at the forefront of decision-making for our green spaces.

Fingal County Council, and particularly Heritage Officer Gerry Clabby, are to be commended on this top-class event, not least in attracting an audience of planners, architects, community groups and councillors – though surprisingly few ecologists. Anyone who is interested in continuing the discussion can contact Gerry Clabby at Fingal County Council. The presentations are available at www.fingalcoco.ie/Planning/ConservationHeritage/GreenInfrastructure/ConferencePresentations.

Mieke Muyllaert CEnv MIEEM
Irish Section Convenor

Irish News

The Section Committee met with Linda Yost and Jim Thompson in Dublin before Christmas, to look at how the Section might progress in 2009. One outcome of this meeting was the decision to take a break from hosting a full conference in 2009, as this has proved to be quite demanding on the Committee's time, and doesn't leave much energy for organising smaller, regional events. Instead, we hope to organise at least one smaller seminar-type event incorporating a social element, as this proved very popular at the Galway conference. Also, we would like to support regional events that members around the country might like to help organise. The Section has a healthy bank balance that can be used, for example for room-hire, and if someone has an idea for a topical workshop, talk, seminar or outing, please do get in touch and we can help organise it.

The Committee is delighted to welcome two new members following our appeal at the end of 2008: Kate Harrington MIEEM and Anne Murray MIEEM, ecologists with Golder Associates, have offered to help out. We are still looking for a graduate/academic, and someone from one of the state agencies, as these sectors are not currently represented.

We are also delighted to report that the IEEM secretariat have been in direct contact with Enviroskillnet to discuss ways of working together to help meet demand for CPD events. Anyone who is interested in providing a workshop in 2009 should contact IEEM head office, and can also contact the Section for assistance in setting one up.

The National Biodiversity Data Centre in Waterford have kindly facilitated a re-scheduling of a day at the centre for IEEM members (first offered last summer but cancelled due to lack of numbers). This is now scheduled for Friday 17 April 2009, which is hopefully early enough in the season to avoid clashes with field survey schedules. Topics that will be covered include the proposed invasive species recording scheme, the national vegetation database, and an overview of how biodiversity data is managed at the centre. This will be an informal day out for members, free of cost, and will be very useful as an introduction to how the centre gathers and holds data. Tea/coffee and lunch will be provided. Anyone interested in attending should contact Mieke Muyllaert (+353 (0)52-27930, mieke@eircom.net) by 9 April 2009, so that catering arrangements can be made.

Mieke Muyllaert CEnv MIEEM
Irish Section Convenor

East Midlands Section News

Sustainable Communities Event Report

Over thirty individuals, consultants, civil servants and students alike, from across the Midlands gathered at SLR Consulting's Nottingham office on the evening of 28 January 2009, for a presentation by Dr Janet Jackson, University of Northampton, entitled 'Sustainable Communities Policies in Northamptonshire: An Ecologist's View'.

The presentation drew up Janet's experiences of Upton Meadows, a sustainable urban development located west of Northampton and focused particularly on the Sustainable Urban Drainage System (SUDS) which runs throughout the development. Challenges and issues faced in incorporating ecological networks into the daily lives and understanding of all involved in new development, from the architects and engineers to the residents who live there were discussed by all delegates.

The evening was the third joint CPD meeting between the East Midlands branches of IEEM and the Landscape Institute to be hosted by SLR Consulting and provided another excellent opportunity for local practitioners from these two professions to come together and discuss topics of mutual interest.

Rebecca Tarry MIEEM

East of England Section News

Penultimate Section Launched

Nearly one hundred East of England members and their colleagues attended an evening event in Cambridge on 27 January 2009 to successfully launch the penultimate IEEM Section.

Chaired by Max Wade FIEEM, the East of England Section launch comprised stimulating talks from three local members. David Collins CEnv MIEEM began by giving an overview of the Environment Agency's Anglian Region Habitat Creation Programme. Shaun Baker MIEEM provided an insight into the research being conducted in the Czech Republic on the Reintroduction of European Beaver Populations. Colin Shawyer MIEEM concluded with an illustrative talk on 20 Years of Research and Conservation of Barn Owls within the UK. Several members volunteered to be on the Section Committee and will be looking to local members for ideas to take forward a programme of events in the coming year.

Stacey Travers
IEEM Sections' Coordinator

Best Practice Awards 2009

The Institute of Ecology and Environmental Management is pleased to announce the call for entries for the 2009 Best Practice Awards.

Entries that demonstrate best practice whilst contributing to the five objectives of IEEM are welcomed from all sectors of the ecology profession including the public, voluntary and consultancy sectors. Projects of any size will be considered. At least one IEEM member must have been involved in the project.

The five objectives of IEEM are:

1. to advance the science and practice of ecology and environmental management for the public benefit in the United Kingdom and internationally;
2. to further the conservation and enhancement of biodiversity and maintenance of ecological processes and life support systems essential to a fully functional biosphere;
3. to further environmentally sustainable management and development;
4. to promote and encourage education, training, study and research in the science and practice of ecology, environmental management and sustainable development; and
5. to establish, uphold and advance the standards of education, qualification, competence and conduct of those who practise ecology and environmental management as a profession and for the benefit of the public.

Entrants will be expected to submit an entry form and then, if short-listed, to produce a poster for the IEEM Conference in November 2009.

The short-list will be announced in September 2009. A representative for each short-listed entry must be available for the IEEM conference in November 2009. The awards will be presented at the conference dinner.

The deadline for entries is 30 June 2009.

For more information and an application form please visit:
www.ieem.net/awards.asp

Partnership News

Society for the Environment

At the time of going to print, SocEnv is still without a permanent Chief Executive. Apart from that, the Office in Atherstone continues to function effectively and the day-to-day business of SocEnv continues. However, until a CEO is appointed, progress on making an impact on wider society and government circles will be slower than might be hoped.

www.socenv.org.uk

European Federation of Associations of Environmental Professionals

EFAEP has been actively promoting itself within the EU with meetings with:

- Magor Imre Csibi – Romanian MEP and Vice-Chair of Committee on the Environment, Public Health and Food Safety;
- Nick Hanley – Head of Communication and Governance, DG Environment; and
- Martijn Quinn - Deputy Head of Cabinet for Stavros Dimas (European Commissioner for the Environment).

It should also be noted that, due to EFAEP's intervention, 'professional networks' are now included in the opinion of the Internal Market and Consumer Protection Committee (Csibi report) on dialogue with the European Citizen. This is a very positive development as 'professional networks' have until now not been included in the EU's communication strategy. EFAEP will now follow the procedure closely to make sure that 'professional networks' will also be included in the final version of the Parliament's initiative report which will be voted on in the Plenary in March.

The next General Assembly of the Federation will take place on 17 March 2009 in Bilbao, Spain. There will be a seminar on the previous day on the theme of 'Waste and Climate Change'.

www.efaep.org / www.environmentalprofessionals.eu

IUCN - The World Conservation Union

The IUCN-UK Committee held its AGM in Bristol on 13 January 2009. The Committee reported that it had had a successful year in 2008 with a parliamentary seminar, attendance at the World Conservation Congress in Barcelona, a meeting with IUCN Director General Julia Marton-Lefèvre, and other smaller meetings.

The Committee also produced a report on UK spending towards the 2010 biodiversity target. IUCN-UK is also in the process of updating its strategy, which is to focus on reforming governance and functions, increasing its membership and resources, improving its programme delivery, and improving communication.

It was noted that the JNCC is the current secretariat provider, but that this service would be ending in March 2009 and that a new secretariat provider is currently being sought.

The AGM concluded with presentations from the wildlife filmmaking industry in Bristol, including the BBC's Natural History Unit, WWF-UK, Wildscreen and ARKive.

www.iucn.org / www.iucn-uk.org

Countdown 2010

Activities for Countdown 2010 are also reported on page 11 but attention is now starting to focus on recasting this programme for beyond 2010. It is already clear that the original target will not be reached – on the other hand there has been progress in raising awareness and a multitude of initiatives have been started. A high-level event which attracted an audience of more than 150, including Jim Thompson and several IEEM members, was held in Brussels on 11 February to discuss the way forward.

Struan Stevenson, Member of the European Parliament and Chair of the Intergroup on Sustainable Development announced that for the period 2009 – 2013 the Intergroup will focus on climate and biodiversity.

Stavros Dimas, European Commissioner for the Environment, highlighted that although the Action Plan provides a roadmap for action, implementation is still lagging behind. More has to be done for marine protected areas as part of the Natura 2000 network and to improve overall cross-sectoral policy integration. Also, new legislation needs to be adopted, such as the Soil Framework Directive and headway has to be made in relation to invasive species.

Besides assessing the progress in relation to the actions identified in the Biodiversity Action Plan, the European Environmental Agency (EEA) has developed indicators to assess the status and trends of biodiversity in Europe. This effort of Streamlining European 2010 Biodiversity Indicators (SEBI 2010) indicates that European biodiversity is still in decline.

Pavan Sukhdev, Study Leader of TEEB noted that 'in a business-as-usual scenario, the current decline in biodiversity and related loss of ecosystem services will continue and even accelerate. By 2050 we will be faced with an estimated further loss of 11% of the natural areas that still existed in 2000. In economic terms the loss of ecosystem services by 2050 in a 'business-as-usual' scenario represents an annual welfare loss estimated at 6% of global GDP.'

It was fascinating to hear from an economist how inappropriate GDP is to measuring these issues. In fact, he said that in years to come the GDP will rank with witchcraft and egocentricity! Tempting to think that the current economic crisis might lead to a reconsideration of its applicability but I wonder!

www.countdown2010.net

In the Journals

Jim Thompson CEnv MIEEM and Jason Reeves AIEEM

A J A van Teeffelen *et al.*

Maximizing conservation benefit for grassland species with contrasting management requirements

Journal of Applied Ecology 2008, **45**: 1401-1409

Conservation management often encompasses multiple, alternative management actions on a given site, sometimes involving issues of habitat restoration and maintenance. Which actions are preferable depend on the conservation goals, the expected outcomes of actions, and their associated costs. When actions affect habitat quality differently, species that vary in habitat requirements will not respond to the actions in the same way. When all these species are of conservation concern, trade-offs between them are inevitable and the selection of appropriate actions becomes less straightforward. Although this is a common planning problem, it has received little attention in the conservation planning literature. The authors demonstrate how to obtain cost-effective planning solutions for a set of species with contrasting requirements, when multiple alternative conservation actions are available for each site. The paper focuses on a community of vascular plants and Lepidoptera species dependent on mezic grasslands, which are maintained by cattle grazing and where the various species differ in their responses to grazing intensity.

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M A McCarthy, C J Thompson and S T Garnett

Optimal investment in conservation of species

Journal of Applied Ecology 2008, **45**: 1428-1435

Factors that have been considered when deciding how to invest resources in conservation of species include the efficacy and cost of management, the importance of the species, the level of threat, and the timeframe over which results are to be achieved. However, it is unclear how each of these different factors should be weighted and combined when making a decision. The authors examined how the probabilities of species changing in IUCN Red List categories are influenced by expenditure of resources. They used these relationships to determine optimal investment strategies, using Australian birds as a case study. The optimal level of investment in different species depends critically on whether managers wish to minimize the number of extinct species or a weighted average of all threatened species, and on the available budget. The level of investment should not necessarily reflect the level of threat. In this study, the timeframe of management had little influence on the investment decision. The results show that extinctions of Australian birds can be largely avoided over the next 80 years given current expenditure, but greater investment in conservation is required to reduce the number of threatened species.

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M Klaassen *et al.*

Optimal management of a goose flyway: migrant management at minimum cost

Journal of Applied Ecology 2008, **45**:1446-1452

This is an interesting paper which focuses on the whole flyway and uses modelling scenarios for protecting migratory birds, aimed at efficient and cost-effective conservation of flyway habitat. Using the population of pink-footed geese *Anser brachyrhynchus* that breed in Svalbard as an example, the authors calculated that the cheapest management scenario given current agricultural compensation payment rates at the various goose stopover sites yielded a 35% cost saving over current management. Given the global threats to migratory birds, developing a framework for efficient and effective conservation of flyway habitat is an urgent need. Such a framework could be used to assist in controlling migrants causing conflict with agriculture, such as several goose species, in an economic and responsible fashion. The study identified large unexplainable differences in management costs between regions. Such differences between staging sites for birds make big differences to the optimal management of a flyway. Hence, to achieve efficient and effective management of migratory birds, an objective assessment of the cost of management in different locations is needed, followed by a modelling approach and followed up by a collaborative action of managers along the entire flyway.

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J T A Verhoeven *et al.*

An Operational Landscape Unit approach for identifying key landscape connections in wetland restoration

Journal of Applied Ecology 2008, **45**: 1496-1503

Nature conservation and restoration traditionally focus on protecting individual sites. In parts of the world where the natural landscape has been severely altered for agricultural or urban use, individual patches are too small and isolated to ensure effective nature protection. Spatial processes, such as metapopulation dynamics, are disrupted and natural linkages in the landscape, such as water flows, are severed by modifications in the landscape and hydrology. In the context of restoration, the authors proposed the identification of Operational Landscape Units (OLUs), which are defined as combinations of landscape patches with their hydrogeological and biotic connections, as a tool to facilitate wetland restoration in catchments with a high degree of fragmentation and strongly altered hydrology. The key elements for delineation of OLUs developed by the authors are definition of the restoration objectives, identification of spatial landscape mechanisms and information on historic and present land uses and hydrologic management. As a case study, they delineated an OLU by applying these criteria in a restoration initiative for a large agricultural area that used to be a floodplain until the early 1950s in N.E. Twente, The Netherlands. The OLU encompassed not only the floodplain area to be restored but also a relatively remote nature reserve upstream as well as the stream connecting both areas. By restoring the historic water regime, flooding events was to become a regular feature in the two areas and organisms including seeds would flow from the nature reserve to the restored floodplain.

Discussions of the proposed OLU with stakeholders (water authorities, nature conservation agencies, farmers) results in shared insights leading to modifications of the original management plan for the area. The OLU approach will make natural resource managers aware of the importance of spatial processes and connectivity in landscapes and, if properly applied, will lead to more natural and more successful restoration projects.

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S Thirgood and S Redpath

Hen harriers and red grouse: science, politics and human-wildlife conflict

Journal of Applied Ecology 2008, **45**: 1550-1554

Human-wildlife conflict is an emerging issue in global conservation. The expansion of human activities throughout the world, combined with restoration of wildlife populations, has led to increased contact and greater conflict between people and wildlife. The mitigation of human-wildlife conflict requires ecological research, social research, and dialogue between scientists, stakeholders and policy-makers to guide management. However, conflict mitigation may be politically sensitive, particularly when legal issues are involved and human livelihoods are at stake. In such cases, political pressures may override scientific evidence. Conflicts over predator management are particularly revealing about the roles of science and politics in the mitigation of human-wildlife conflict. The paper focusses on the conflict between raptor conservation and grouse management in the UK. Research has demonstrated: (i) there is widespread illegal killing of raptors; (ii) raptor predation can limit grouse populations and reduce hunting revenues; and (iii) mitigation techniques are available but are either unacceptable to stakeholders or unproven in the field. Despite the scientific advances, mitigation of this conflict has been slow. The mitigation of human-wildlife conflict requires evidence-based management. Scientific evidence is insufficient, however, if the political will is lacking to find solutions. Mitigation of the conflict between raptors and grouse requires both natural and social science research and the recognition that compromises are required to achieve sustainable solutions. These lessons apply equally to human-wildlife conflict situations elsewhere.

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N Hanley *et al.*

Economic determinants of biodiversity change over a 400-year period in the Scottish uplands

Journal of Applied Ecology 2008, **45**: 1557-1565

Economic forces are recognized as an important driving factor behind current biodiversity losses. A combination of palaeoecological, historical and economic methods was used to construct and then analyse a database of factors contributing to changes in plant diversity over 400 years for 11 upland sites in Scotland.

Livestock price was found to be a statistically significant determinant of diversity change, with higher grazing pressures resulting in lower diversity values on average, although site abandonment was also found to result in a fall in plant diversity. The introduction of new animal breeds, was not found to be a statistically significant determinant.

Using post 1860 data on livestock numbers at the parish level, the authors were able to confirm this result in terms of the effects of higher grazing pressures on plant diversity.

Biodiversity levels have varied considerably over 400 years, partly as a function of land management, suggesting that establishing baselines or 'natural' target levels for biodiversity is likely to be problematic. This suggests that long-term management of upland areas for the conservation of diversity should focus on grazing pressures as a key policy attribute. Another policy implication is that drastic cuts in grazing pressures – such as might occur under current reforms of the Common Agricultural Policy – can have adverse biodiversity consequences.

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C L Devereux , M J H Denny and M J Whittingham

Minimal effects of wind turbines on the distribution of wintering farmland birds

Journal of Applied Ecology 2008, **45**: 1689-1694

The authors investigated the significance of the potential conflict between wind turbines and Agri environment schemes on farmland.

Various mechanisms potentially cause wind turbines to alter bird distribution including noise and physical structure.

Turbine location (controlling for other effects such as boundary location and crop type) did not affect the distribution of four functional groups of wintering farmland birds (seed-eaters, corvids, gamebirds and Eurasian skylarks) at differing distances from wind turbines ranging from 0–150 m to 600–750 m. The only species for which distribution was related to the presence of wind turbines was the common pheasant *Phasianus colchicus* L.).

In a further analysis of data collected at 0–75 m and 75–150 m from turbines, they found no evidence to suggest that farmland birds avoided areas close to wind turbines.

This is the first evidence suggesting that the present and future location of large numbers of wind turbines on European farmland is unlikely to have detrimental effects on farmland birds. This should be welcome news for nature conservationists, wind energy companies and policy-makers.

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M de Lucas *et al.*

Collision fatality of raptors in wind farms does not depend on raptor abundance

Journal of Applied Ecology 2008, **45**: 1695-1703

This paper reports on experience in Spain where avian mortality through collision with moving rotor blades is one of the main adverse impacts of wind farms. The authors analysed bird fatalities in relation to bird abundance, and tested several factors which have been hypothesized to be associated with bird mortality.

Bird abundance was compared with collision fatality records to identify species-specific death risk. There was no clear relationship between species mortality and species abundance, although all large-bird collision victims were raptors and griffon vultures *Gyps fulvus* were most frequently killed. Bird mortality and bird abundance varied markedly among seasons, but mortality was not highest in the season with highest bird abundance. Mortality rates of griffon vultures did not differ significantly between years.

Bird collision probability depended on species, turbine height (taller = more victims) and elevation above sea level (higher = more victims), implicating species-specific and topographic factors in collision mortality. There was no evidence of an association between collision probability and turbine type or the position of a turbine in a row.

Vultures collided more often when uplift wind conditions were poor, such as on gentle slopes, when thermals were weak, and when turbines were taller at higher elevations. New wind installations and/or repowering of older wind farms with griffon vulture populations nearby, should avoid turbines on the top of hills with gentle slopes.

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P Patthey *et al.*

Impact of outdoor winter sports on the abundance of a key indicator species of alpine ecosystems

Journal of Applied Ecology 2008, **45**: 1704-1711

Recent studies have established that disturbance by outdoor winter sports (*e.g.* skiing, snowboarding and snowshoeing) is a source of stress for wildlife. The authors tested the effect of outdoor winter sports (ski lifts and related recreational activities) on the abundance of the alpine black grouse *Tetrao tetrix*, a vulnerable indicator species of the timberline ecosystem, the favoured habitat for outdoor winter sports in the European Alps.

They modelled the number of displaying cocks as a function of habitat characteristics (vegetation structure and typology), ski lift density and hunting pressure at 15 natural sites (none or a very low level of anthropogenic disturbance) and 15 ski resorts in the south-western Swiss Alps.

Ski lift density and habitat typology were the principal determinants of black grouse abundance, whereas hunting pressure had no discernable effect. Ski lifts and related winter sport activities had a strong negative effect on the number of displaying cocks, which may have led to a mean 36% reduction of local abundance in ski lift areas, as determined after controlling for the confounding effect of habitat type.

Conservation action plans for black grouse should aim at reducing the multiple negative effects generated by outdoor winter sports (ski facilities and related winter sport activities). Firstly, vegetation patchiness (*i.e.* a mosaic of grassy shrubland with scattered trees) should be maintained along ski runs. Secondly, wintering preserves where human access is banned or strictly limited should be promoted within ski resorts.

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R Costa , D C Aldridge and G D Moggridge

Seasonal variation of zebra mussel susceptibility to molluscicidal agents

Journal of Applied Ecology 2008, **45**: 1712-1721

The zebra mussel *Dreissena polymorpha* is a well-known biofouler, having potentially serious impacts on freshwater-dependent industries. Chemical treatment is the most popular approach to control this pest. The identification of potential peaks of increased susceptibility of the species to molluscicidal agents may provide environmental and economic benefits, allowing control to be achieved through lower toxin load.

In this study, the seasonal pattern of the tolerance of zebra mussels to three reference toxicants with distinct modes of action was recorded by conducting static bioassays. The annual profiles of dry tissue weight of a reference individual and mussels' filtration rate were also followed.

The tolerance of the species to toxicants was found to follow a pronounced annual cycle, increasing up to 22 times between early summer and winter.

The role of temperature and filtration rate as predictors of the mussels' susceptibility was confirmed, but there was no relation between this and the animals' body condition. This study contradicts the common belief that physiologically exhausted adult zebra mussels are more susceptible to chemical control measures.

The results presented here enlarge the body of knowledge of *D. polymorpha* biology and may have practical implications at three levels. First, they reinforce the importance of judicious sampling while testing molluscicides against zebra mussels as well as the specification of the specimens' collection date in toxicological studies. Secondly, they provide information that may be useful to the design of reactive chemical control strategies. In particular, they suggest that the dosage scheme in periodic treatment may be optimized to take advantage of the significant variation of a mussel's susceptibility between late spring and autumn. Finally, the outcome of this study highlights the need of taking into account the seasonality of bivalve responses in ecological risk assessment and the regulation of the discharge of chemicals into surface waters.

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C C Vos *et al.*

Adapting landscapes to climate change: examples of climate-proof ecosystem networks and priority adaptation zones

Journal of Applied Ecology 2008, **45**: 1722-1731

Climate change has been inducing range shifts for many species as they follow their suitable climate space and further shifts are projected. Whether species will be able to colonize regions where climate conditions become suitable, so-called 'new climate space', depends on species traits and habitat fragmentation.

By combining bioclimate envelope models with dispersal models, the authors identified areas where the spatial cohesion of the ecosystem pattern is expected to be insufficient to allow colonization of new climate space.

For each of three ecosystem types, three species were selected that showed a shift in suitable climate space and differed in habitat fragmentation sensitivity.

For the 2020 and 2050 time slices, the amount of climatically suitable habitat in northwest Europe diminished for all studied species. Additionally, significant portions of new suitable habitat could not be colonized because of isolation. Together, this will result in a decline in the amount of suitable habitat protected in Natura 2000 sites.

The authors developed several adaptation strategies to combat this problem: (i) link isolated habitat that is within a new suitable climate zone to the nearest climate-proof network; (ii) increase colonizing capacity in the overlap zone, the part of a network that remains suitable in successive time frames; (iii) optimize sustainable networks in climate refugia, the part of a species' range where the climate remains stable.

Following the method described, sites across Europe can be identified where ecosystem patterns are not cohesive enough to accommodate species' responses to climate change. The best locations for climate corridors where improving connectivity is most urgent and potential gain is highest can then be pinpointed.

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M Gerard *et al.*

Importance of mowing and flood frequency in promoting species richness in restored floodplains

Journal of Applied Ecology 2008, **45**: 1780-1789

In recent years, European water management policies have promoted floodplain rehabilitation for flood mitigation purposes. This could provide opportunities for the restoration of valuable floodplain meadows. In this study, the authors focussed on the interaction between flood frequency and mowing in determining species composition of temperate lowland floodplain meadows. They compared the composition of annually mown and non-mown vegetation located in floodplain sites differing in flood frequencies. The presence of different plant growth forms and functional types was investigated in order to explain the

mechanisms underlying the differences found.

Both flood frequency and mowing affected species composition. However the flood regime was less important than the mowing regime.

Mowing was shown to strongly affect species composition by reducing productivity and competitiveness and offering opportunities for weak competitors. Annually mown sites harboured higher numbers of smaller species compared to non-mown sites which supported higher populations of tall graminoid species. Only the combination of frequent flooding with annual mowing clearly increased species richness. This is because mowing provides the necessary gaps for germination of flood imported seeds.

Many European riparian sites have been abandoned during the last 20 years as a result of changes in policies and agricultural markets, yet annual disturbance and/or the creation of open vegetation gaps through annual mowing are necessary in order to maintain species-rich vegetation. This poses a challenge for farmers and conservationists in determining the restoration and preservation of these valuable floodplain habitats.

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J van Dijk *et al.*

Diet shift of a facultative scavenger, the wolverine, following recolonization of wolves

Journal of Animal Ecology 2008, **77**: 1780-1789

Wolves *Canis lupus* L. recolonized the boreal forests in the southern part of the Scandinavian peninsula during the late 1990s, but so far there has been little attention to its effect on ecosystem functioning. Wolf predation increases the availability of carcasses of large prey, especially moose *Alces alces* L., which may lead in turn to a diet switch in facultative scavengers such as the wolverine *Gulo gulo* L. Using 459 wolverine scats, the authors compared diet inside and outside wolf territories. In the presence of wolves, wolverine diet contained more moose and less reindeer and small prey. Their diet in tundra consisted of 40% reindeer, 39% moose and 9% rodents. In forest with wolf, their diet shifted to 76% moose, 18% reindeer and 5% rodents; compared to 42% moose, 32% reindeer and 15% rodents in forest without wolf. The female diet consisted of more small prey than for males, but there was a tendency for females to use the highly available moose carrion opportunistically and to hunt less on small prey within wolf territories. The study highlights how wolves increase scavenging opportunities for wolverines, and how sexual differences in diet may also apply to large scavengers. The recolonization of wolves may therefore have contributed to the consequent recolonization of wolverines into the same area.

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M. Kleyer *et al.*

The LEDA Traitbase: a database of life-history traits of the Northwest European flora

Journal of Ecology 2008, **96**: 1266-1274

The LEDA Traitbase is an open internet data base of life-history traits of the Northwest European flora which is useful for large-scale analyses of functional responses of communities to environmental change, effects of community trait composition on ecosystem properties and patterns of rarity and invasiveness, as well as linkages between traits as expressions of fundamental trade-offs in plants.

The species-trait matrix comprises referenced information under the control of an editorial board, for ca. 3000 species of the Northwest European flora, combining existing information and additional measurements. The database currently contains data on 26 plant traits that describe three key features of plant dynamics: persistence, regeneration and dispersal. The LEDA-Traitbase is freely available at www.leda-traitbase.org.

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K J Gaston and R A Fuller

The sizes of species' geographic ranges

Journal of Applied Ecology 2009, **46**: 1-9

This is an interesting review paper to start the new year and, as ever with a review, a summary for In Practice does scant justice to the article itself. Geographic range size and how it changes through time is one of the fundamental ecological and evolutionary characteristics of a species, and a strong predictor of extinction risk. However, the measurement of range size remains a substantial challenge. Indeed, there is significant confusion in the literature as to how this should be done, particularly in the context of the distinction between the fundamentally different concepts of extent of occurrence (EOO) and area of occupancy (AOO), and the use of these quantities, including in assessments of the threat status of species.

The authors review the different approaches to determining the geographic distributions of species, the measurement of their range sizes, the relationships between the two, and other difficulties posed by range size measurement (especially those of range discontinuities when measuring EOO, and spatial scale when measuring AOO).

They argue that it is important to (i) distinguish the estimation of the distribution of a species from the measurement of its geographic range size; (ii) treat measures of EOO and AOO as serving different purposes, rather than regarding them as more or less accurate ways of measuring range size; and (iii) measure EOO including discontinuities in habitat or occupancy. The distinction between EOO and AOO is becoming blurred in many contexts, but most particularly in that of threatened species assessments for Red Listing.

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P E Hulme

Trade, transport and trouble: managing invasive species pathways in an era of globalization

Journal of Applied Ecology 2009, **46**: 10-18

This paper prefaces several papers on invasive species and is almost a review in itself. Humans have traded and transported alien species for millennia with two notable step-changes: the end of the Middle Ages and beginning of the Industrial Revolution. However, in recent decades the world has entered a new phase in the magnitude and diversity of biological invasions: the Era of Globalization.

Income growth is a primary driver of globalization and a clear association exists between Gross Domestic Product and the richness of alien floras and faunas for many regions of the world. In many cases, the exposure of these economies to trade is highlighted by the significant role of merchandise imports in biological invasions, especially for island ecosystems.

Post-1950, technical and logistic improvements have accelerated the ease with which commodities are transported across the globe and hindered the traceability of goods and the ease of intercepting pests. New sea, land and air links in international trade and human transport have established novel pathways for the spread of alien species. Increasingly, the science advances underpinning invasive species management must move at the speed of commerce.

Increasing transport networks and demand for commodities have led to pathway risk assessments becoming the frontline in the prevention of biological invasions. The diverse routes of introduction arising from contaminant, stowaway, corridor and unaided pathways, in both aquatic and terrestrial biomes are complex. Nevertheless, common features enable comparable approaches to risk assessment. By bringing together spatial data on climate suitability, habitat availability and points of entry, as well a demographic models that include species dispersal (both natural and human-mediated) and measures of propagule pressure, it is possible to generate risk maps highlighting potential invasion hotspots that can inform prevention strategies.

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D P Whitfield, M Ruddock and R Bullman

Expert opinion as a tool for quantifying bird tolerance to human disturbance

Biological Conservation 2008, **141**: 2708-2717

Human disturbance can have several adverse effects on wildlife and is increasingly seen as a threat to biodiversity conservation. A common resolution of problems associated with encroaching human activities is to separate them from sensitive wildlife areas by buffer zones. The most common method to establish such protective regimes is to record empirically the distance at which animals show signs of disturbance to human activity. However, a literature review for 26 bird species revealed that in only six of these species were there empirical measures of disturbance distances when breeding, but buffer zones had been recommended or designated in all species. This inferred prescription of buffer zones despite a severe knowledge gap. As a research stopgap, for the 26 species, the authors surveyed over 1,000 expert opinions, which generated estimates of alert distance (AD) and flight initiation distance (FID) in response to an approaching human during incubation and chick-rearing. Surveyed opinions on FID were not statistically significantly different to empirical measures of FID. Opinions on AD were much greater than predictions based on body mass derived from a previous study, but other evidence inferred a problem with predictions rather than opinions. The validation exercises provided some encouragement that the expert opinion survey produced realistic results, but the authors recommend that their use should be temporary until more empirical measures of disturbance distances are gathered. They further recommend that existing monitoring schemes in which field surveyors routinely visit birds' nests should incorporate protocols to measure disturbance distances to amass such information rapidly and in quantity.

Correspondence: phil.whitfield@natural-research.org

T P Moorhouse, M Gelling and D W Macdonald

Effects of habitat quality upon reintroduction success in water voles: Evidence from a replicated experiment

Biological Conservation 2009, **142**: 53-60

The authors examined the relationship between habitat quality and reintroduction success in an experimental reintroduction of populations of water voles *Arvicola terrestris* in the UK. Cohorts of 44 water voles were released into 12 replicate 800 m stretches of river, each supporting a different habitat abundance. Water voles initially established at nine sites, failing to establish at three sites due to predation from American mink (two sites) and atypically severe flooding post-release (one site). For sites where water voles established, at those with higher vegetation abundance more of the release cohort survived, and post-establishment survival rates and population densities were higher. A further two populations were lost to American mink predation post-establishment. The principal cause of a failed release in this study was insufficient mink control. However, whilst seven of the 12 reintroductions were 'successful', the results indicated substantial variation in the population densities and survival rates that the replicate habitats could support. The study highlights the need to ensure that any habitat selected for a reintroduction is the best obtainable.

Correspondence: tom.moorhouse@zoo.ox.ac.uk

D D Kohn *et al.*

Are native bluebells (*Hyacinthoides non-scripta*) at risk from alien congenerics? Evidence from distributions and co-occurrence in Scotland

Biological Conservation 2009, **142**: 61-74

The UK has the highest density of the worldwide distribution of its native bluebell, *Hyacinthoides non-scripta*, and the prevalence of alien bluebells (hybrids or 'Spanish') has been interpreted as an urgent threat. The authors quantified abundance and co-occurrence in south-central Scotland in relation to physical variables, land cover, and habitat types in order to assess the potential for competitive and hybridising interactions between natives and alien taxa in the UK. To do this they tested the influence of explanatory variables on incidence rates, densities and group sizes at various spatial scales. The authors found that natives accounted for nearly 99% of all bluebells recorded, aliens were encountered more frequently than natives though in much smaller maximum numbers per group, increasing rainfall was associated with increasing native and decreasing alien densities, the presence of aliens related to variables correlated with human density, and there was little evidence for habitat exclusivity. Mixed groups accounted for 10% of natives recorded, and over 40% of natives grew within about one kilometre of aliens. The results suggest that a high proportion of native bluebells lie within range of potential gene flow via insect pollinators.

Correspondence: d.kohn@rbge.org.uk

S Hynes and N Hanley

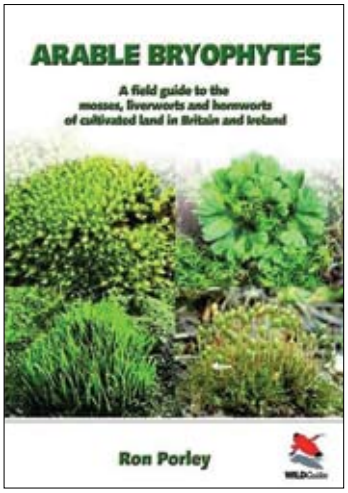
The "*Crex crex*" lament: Estimating landowners willingness to pay for corncrake conservation on Irish farmland

Biological Conservation 2009, **142**: 180-188

This paper considers farmers' willingness to pay (WTP) to conserve the corncrake *Crex crex*, an endangered Irish farmland bird. An Irish National Farm Survey was used to produce individual farm-level WTP estimates for the year 2006. These figures were then used to obtain a total value figure for the farming community of corncrake conservation in Ireland. The authors focused on the WTP of farmers rather than the WTP of the general Irish population, as farmers will ultimately be responsible for achieving any targets set out in the All Ireland Action Plan for corncrake conservation. The results indicate that the non-market benefit of corncrake conservation in Ireland may significantly outweigh the costs of existing conservation schemes.

Correspondence: stephen.hynes@teagasc.ie

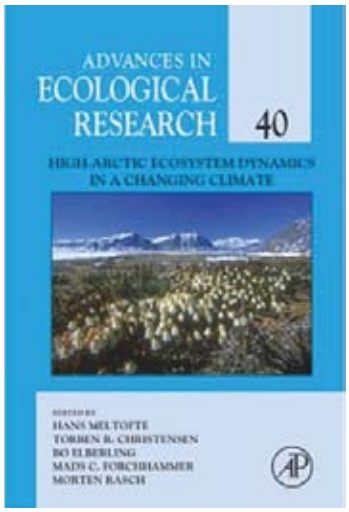
Recent Publications



Arable Bryophytes

Author: Ron Porley
ISBN: 978-190365721-8
Available from: www.wildguides.co.uk
Price: £22.00

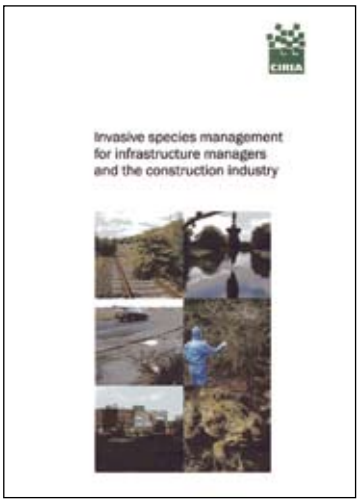
This book is has been produced to highlight the conservation importance of the mosses, liverworts and hornworts that are found on cultivated land. The stunning photographs will surely inspire interest in this relatively little-known group and enable even the novice bryologist to gain a better insight into the rich diversity of our bryophyte flora. There is information on the 81 bryophytes found in arable fields, with illlustrated profiles of the 47 bryophytes most closely associated with arable farming, highlighting those included in the UK Biodiversity Action Plan.



Advances in Ecological Research vol. 40: High-Arctic Ecosystem Dynamics in a Changing Climate

Editors: H Meltofte, TR Christensen, B Elberling, MC Forchhammer and M Rasch
ISBN: 978-0123736659
Available from: www.elsevierdirect.com
Price: £95.00

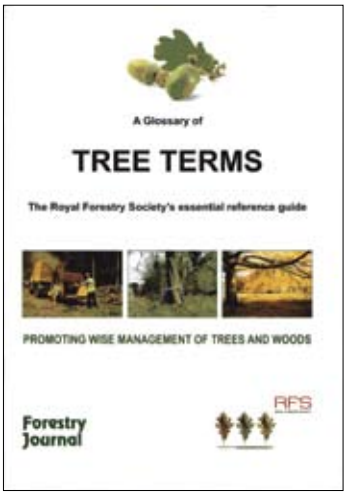
This book is based on data collected over the past ten years by Zackenberg Ecological Research Operations (ZERO) at Zackenberg Research Station in northeast Greenland. This volume covers the function of Arctic ecosystems based on the most comprehensive long-term data set in the world from a well-defined Arctic ecosystem. The editors offer a comprehensive analysis of how climate variability is influencing an Arctic ecosystem and how the Arctic ecosystems have inherent feedback mechanisms interacting with climate variability and change. It includes the latest research on the functioning of Arctic ecosystems and discusses the complex perpetuating effects on Earth.



Invasive species management for infrastructure managers and the construction industry (C679)

Authors: O Booy, M Wade CEnv FIEEM and V White AIEEM
ISBN: 978-0-86017-679-4
Available from: www.ciria.org
Price: £120.00

Business and industry need to respond to the challenge of invasive plants and animals, the cost of which, both economical and environmental, has increased dramatically in recent years. Part A of this manual describes the impact invasive species have, and the legislation and policy that regulates their management. The management of any land holding begins with surveying and assessing the invasive species present or likely to invade into it. This information coupled with the definition of the aims of management, feeds into a risk assessment leading to management options for dealing with invasive species: suppression, eradication and prevention. The final stage in the process is post-management surveillance, monitoring and maintenance to ensure any invasion or reinvasion is dealt with appropriately. Part B provides examples of 15 invasive plant and animal species and Part C covers 21 species that could become tomorrow's invaders.



Tree Terms

Author: Royal Forestry Society
Available from: www.rfs.org.uk
Price: £3.00

Forestry and woodland management is as rich in jargon as most other specialities and for the non-expert the terminology involved can be just as confusing and off-putting. For that reason, the Royal Forestry Society has compiled this new and expanded edition of their glossary to put tree-speak into plain English. Over 300 terms are here - some ancient, others modern. The latest version embraces a number of novel terms or concepts, especially on certification and sustainability. Many abbreviations or acronyms are listed too.

News in Brief

Women in science grants

The UK Resource Centre for Women in Science, Engineering and Technology (UKRC) Training Grant is a new scheme to help women progress. The focus of the grant scheme is to support progression at professional and technical levels and increase retention at key stages in science, engineering and technology careers. The grants may help with: moving from a support role to a technical role; returning to a professional/technical role after a career break; and moving up within technical and professional career paths. To find out if you are eligible and read more about the grant scheme visit www.ukrc4setwomen.org.

Amendments to the Habitats Regulations

New amendments to the Habitats Regulations came into effect in January 2009. For more details see the following links: England and Wales www.opsi.gov.uk/si/si2009/pdf/uksi_20090006_en.pdf, Northern Ireland www.opsi.gov.uk/sr/sr2009/pdf/nisr_20090008_en.pdf, Scotland www.opsi.gov.uk/legislation/scotland/ssi2008/pdf/ssi_20080425_en.pdf.

Environmental Liability Directive

The Environmental Damage (Prevention and Remediation) Regulations 2009 for England are expected to come into force in early March 2009. The Regulations, and the associated documents, can be found on the Defra website at www.defra.gov.uk/environment/liability. SSSIs were initially not to be covered by the regulations, but due in part to the efforts of IEEM, they are now included.

MAGIC survey

MAGIC (www.magic.gov.uk), the first web-based interactive map to bring together information on key environmental schemes and designations in one place, is currently running a survey asking users what they think of it.

Sea power potential to be mapped

The challenges and commercial opportunities of harnessing marine energy in the north of Scotland are to be set out in a new planning document. The Scottish Government said it would be the first time the potential of the Pentland Firth and sea around Orkney is mapped out in such a way.

Tyneside to be home of new Marine Management Organisation

Tyneside will be the home of the headquarters of the new body that is to regulate and manage the sea around England. The MMO, part of the government's Marine and Coastal Access Bill, will be a centre of expertise that will contribute to sustainable development, streamline regulation and improve enforcement. Tyneside's bid won strong backing across the North East, and Ministers decided that the area had the right mix of environmental, business and academic marine interests. The MMO's responsibilities will include: a new marine planning system; a new integrated marine licensing system; and enforcement of sea fisheries, nature conservation and licensing using powers under the Marine and Coastal Access Bill.

Saving pigeons from sparrowhawks

An experiment to save racing pigeons across Scotland from being predated by sparrowhawks will go ahead despite objections from the government's conservation advisers. Until the end of March, hawks from around pigeon lofts near Glasgow, Edinburgh, Kilmarnock, Stirling and Dumfries will be forcibly relocated. The trial is costing taxpayers £25,000 and is backed by the Scottish Homing Union, which represents Scotland's 3,500 pigeon fanciers. The Scottish government's ecological adviser and Scottish Natural Heritage have both expressed criticisms.

Forestry law change in Scotland

Scotland's largest landowner could soon be earning millions of pounds a year from the profits of wind farms and hydro schemes on some of its 1.6 million acres of land, while making a contribution to fighting global warming. Provision is being made in the Climate Change (Scotland) Bill to give Forestry Commission Scotland the same commercial freedom its counterpart already enjoys in England and Wales to mount joint ventures with the private sector in the likes of wind farm, hydro and biomass schemes.

Natural heritage project to inform Northern Ireland policy

A new £2 million partnership, between Queen's University and the Northern Ireland Environment Agency, will provide scientific evidence on which governmental decisions will be based on the conservation and protection of marine, freshwater and terrestrial ecosystems including habitats and species of local, UK and European conservation concern. The research programme will include work on species such as the corncrake, but will also focus on habitats including threatened coastal sand dunes, marine protected areas and the Lough Neagh ecosystem. It will also look at the relatively new discipline of environmental economics, which values ecosystem services in financial terms.

Chester Zoo's £225 million transformation

Chester Zoo has a £225m plan to transform itself into Europe's largest conservation attraction. The project includes a 56-hectare indoor African-themed rainforest where gorillas, chimpanzees and other tropical animals can move freely. The project, called Natural Vision, also includes a Conservation College.

Welsh-Manx cooperation on horse mussel reefs

Scientists from Wales are working with the government of the Isle of Man to protect a rare and special habitat that's found in both countries. CCW has been monitoring horse mussel reefs off the coast of Llyn near Morfa Nefyn since 1998 and now its experts are helping with the remains of a similar reef off the island's coast. Horse mussel reefs are found on the sea floor but the habitat has been dwindling in recent years as the sea bed is damaged by trawlers fishing for scallops and other species that live on the seabed.

Halting biodiversity loss report published

The UK Government's Environmental Audit Committee has released 'Halting biodiversity loss: Government Response to the Committee's Thirteenth Report of Session 2007–08'. The report can be found at www.publications.parliament.uk/pa/cm200809/cmselect/cmenvaud/239/239.pdf

Government says science for all

The UK Government has launched a campaign to reduce public perception of science as 'elitist'. The campaign includes adverts showing science in everyday life. The Science: So What? So Everything campaign is being run by the Department for Innovation, Universities

and Skills (Dius). The effort follows the publication of a survey that shows most people feel that science is remote, elitist and irrelevant to their lives.

Ireland's New Habitat Survey Guidelines

Following on from the February E-Newsletter, the Best Practice Guidelines for Habitat Survey and Mapping in Ireland questionnaire has now been produced to facilitate public consultation and is available on the IEEM (www.ieem.net) and Heritage Council (www.heritagecouncil.ie) websites.

Skokholm is number 71

The island of Skokholm, off the Pembrokeshire coast, has become Wales' 71st National Nature Reserve. The island was officially designated in December 2008, and now the island's main owners, The Wildlife Trust of South and West Wales, have plans to improve access. The island has the world's third largest colony of nesting Manx shearwater as well as storm petrels, puffins, guillemots and razorbills. Grey seals and three species of dolphin can also be seen in the surrounding waters.

Co-op bans pesticides to protect bees

The Co-op has become the first UK supermarket to ban the use of a group of pesticides implicated in the global honeybee decline. It is prohibiting the use of eight pesticides from the neonicotinoid family of chemicals that have been connected to honeybee colony collapse disorder and are already restricted in some parts of Europe. Studies suggest that that one of the banned chemicals, imidacloprid, can impede honeybees' communication and navigation systems and has been banned in France for 10 years as a seed dressing on sunflowers. Italy, Slovenia and Germany banned neonicotinoids in 2008 after the loss of millions of honeybees. The European Parliament has previously voted for tougher controls on bee-toxic chemicals. The Co-op has also launched a 10-point Plan Bee, which includes £150,000 for research into the impact of pesticides on the decline of honeybees in England and will also give away bee-friendly wildflower seeds.

EC starts legal action against UK

The European Commission has started infringement proceedings against the UK for failing to comply with the EU's air quality standard for dangerous airborne particles. These particles, emitted mainly by industry, traffic and domestic heating, can cause asthma, cardiovascular problems, lung cancer and premature death. The Commission's action follows the entry into force last June of the new EU Air Quality Directive. The UK is amongst 10 Member States that have been sent first warning letters. Other countries have exceeded the limit but have requested time extensions. Ireland and Luxembourg are the only countries not to report exceedances.

Assessing the effectiveness of marine reserves

According to a recent study in the *Marine Pollution Bulletin*, local fishing activity can become concentrated around the edges of Marine Protected Areas (MPAs), which can have a significant impact on their effectiveness as fishery management tools. The study suggests that intense fishing on the borders may reduce overall catches by reducing reproduction rates of fish and restricting migration into other areas. This in turn may have a social impact by reducing the benefits of MPAs for fishing communities. This is especially relevant as the EU implements a larger network of MPAs under the new Marine Strategy Framework.

EU-wide river survey

A Europe-wide survey of rivers and streams has tested water samples for a range of polar organic pollutants. The study, in *Environmental Pollution*, found that that only about 10% of the samples analysed, from over 100 water bodies in 27 European countries, could be classified as 'very clean' in terms of chemical pollution. The findings highlight the problems associated with the persistence of industrial pollutants and monitoring emerging pollutants.

Wolf tracks found in central France

For the first time in 70 years, grey wolf tracks have been found in the peaks of the Massif Central. The tracks were identified this January in the snow of the Cévennes Mountains, in the lower part of the Massif Central, northwest of Avignon. The sightings suggest that a few animals are spending their second winter in the mountains, 100 miles west of the Alps.

Light pollution forms 'eco-traps'

Researchers have found another form of light pollution that could have an adverse effect on wildlife. A study in *Frontiers in Ecology and the Environment* showed that as well as direct light sources, polarised light also triggered potentially dangerous changes in many species' behaviour. The researchers added that road surfaces and glass buildings were among the main sources of this form of light pollution, with insects such as stoneflies laying their eggs on asphalt instead of water.

EU boosts shark protection

The European Commission has unveiled measures aimed at protecting sharks, many of which are in sharp decline. The proposals would close loopholes in current shark finning regulations, cut catches of endangered species and set quotas according to scientific advice. Conservation groups have given a mixed reaction to the commission's proposals, which now go to the European Parliament and Council of Ministers for approval.

Google takes to the seas

The latest edition of Google Earth now includes underwater terrain and other content contributed by marine scientists. The new feature has 20 content layers, and includes information on marine protected areas, ARKive multi-media profiles, the ability to follow satellite-tagged sea animals, and information about the harmful impact of over-fishing.

Species found at both poles

A recent census has found that at least 235 marine species are living in both polar regions, despite being 12,000 km apart. Although some birds and whales migrate between the poles on an annual basis, it was the presence of smaller creatures, such as worms living in mud, sea cucumbers and 'swimming snails' at both poles, that puzzled the researchers. The findings form part of the global Census of Marine Life (CoML) report, which will be published in October 2010. CoML began in 2000 and has so far carried out 17 regional censuses involving more than 2,000 scientists from 82 nations.

Protected species TV documentary

A production company is making a documentary on protected species and developments for Channel 4. They are currently looking for stories where protected species (in particular badgers, newts, red squirrels or even dormice) are affecting someone's property. Whether it is a church, a development or a private home they would be interested in hearing from you. Are your clients fascinated by the fact they are living side by side with a protected species? Or are they frustrated? Or is it they think they are above the law and may go ahead and ignore your advice completely? Contact on 0208 965 6694 or kristy.m@rapidbroadcast.co.uk.

Tauro-Scatology and Yoghurt

In this issue of *In Practice*, Basil O'Saurus, our resident Professor of Tauro-Scatology continues his mission to bring ecological insights to all areas of daily life. We meet him in a supermarket. Let's see what has got him excited this time.

What's that you're holding, Prof?

It's a yoghurt.

Aha… let me guess, this rant is all about the importance of organic milk for maintaining rural biodiversity.

No.

…it's about packaging, leading on to a discussion of waste-disposal options in the 21st century?

No.

…it's about the benefits or otherwise of probiotic diets?

No.

I give up then. Tell us, Prof.

This yogurt pot claims to contain a Fruits of the Forest flavour yoghurt, so I was checking to see if it really does contain fruits from a forest. And, to be frank, I'm not impressed.

Why not?

Because most forest trees don't actually produce fruits, as we know them. Is an acorn a fruit? Is beech mast? Is a pine cone?

Technically, Prof, all but the pine cone are fruits because a 'nut' is just a large, dry, oily fruit…

That may be. But, in fact, the main fruit ingredient seems to be blackberries which, as *In Practice* readers will know, actually forms an underscrub or a ground layer in some forest types, or a shrubby layer at forest margins. So it may be more accurate to describe this as a Fruits of the Clearing yoghurt or a Fruits of the Forest Margin yoghurt. Then punters would know what they were buying.

But why stop at this – every yoghurt pot already contains lists of ingredients, information about additives, a sell-by date and more, so why not add the appropriate National Vegetation Classification type?

One obvious problem here, Prof, the blackberries in a Fruits of the Forest yoghurt probably come from a fruit farm, not a forest.

In that case, they should call it a Fruit of the Fruit Farm yoghurt, shouldn't they?

Are we not getting rather over pedantic here?

Not at all. Imagine the scenario: you go into the supermarket looking for a hazelnut yoghurt, see a yoghurt pot labelled Fruits of the Forest and think, 'Aha, this may contain the fruit of *Corylus avellana*, which is a constituent of many types of temperate forest. This must be the yoghurt that I'm looking for.' And so you buy the wrong flavour of yoghurt. A simple labelling system with the NVC code in brackets after the title would avoid such mistakes – Fruits of the Forest (W24), for example, would immediately alert the shopper to the fact that this yoghurt is derived from a stand of *Rubus fructicosus agg.* with *Holcus lanatus*, although I understand *Holcus lanatus* has not yet reached wide acceptance as a yoghurt flavour.

But, think of the marketing potential… Fruits of the Forest yoghurt with just a hint of Yorkshire Fog… most punters will have no idea what Yorkshire Fog is, but it does have a romantic ring…

It conjures up visions of Barnsley, Rochdale, Rotherham…

OK, not such a good idea. Let's try again. What about Fruits of the Forest (W10)?

Acorn-flavour, with a hint of blackberry and bracken. The latter, of course, is notoriously carcinogenic, so this one is probably a non-starter, even if the marketing guys can get the public to eat acorn-flavour yoghurts.

How about Fruits of the Forest (W1)?

This is more promising. W1 refers to *Salix cinera – Galium palustre* woodland. You probably know that aspirin is derived from willow bark, so here is a yoghurt that is both tasty and which cures headaches. And it keeps the blood thin. This one could be massive. *Mentha aquatica* is part of the field layer, which opens yet more possibilities for taste sensations.

This opens the door on a whole range of ethnobotanical adventures… why restrict ourselves to Britain, let's get Antipodial…

Fruits of the Forest, down-under variants - *Eucalyptus*-flavour yoghurts… peel off the top and you can simultaneously open your sinuses and devour a tasty snack. And we'll put a cute koala on the label. Another winner.

Fantastic. Is there no end to your ingenuity, Prof?

Probably not. Do you want to hear about my new scheme to put the ecological status of the burns that supply whisky distillers onto bottle labels? Soon, you'll be able to sip your dram at the same time as you muse on how a reduction in anthropogenic sulphur deposition has benefited upland ecology…

I think we've had enough for one day, thanks. Same time next issue?

You bet. I've got this great money-making wheeze I want to tell you all about…

I can't wait.

New and Prospective Members

APPLICANTS

If any existing Member has any good reason to object to someone being admitted to the Institute, especially if this relates to compliance with the Code of Professional Conduct, they must inform the Executive Director by telephone or letter before **10 April 2009**. Any communications will be handled discreetly. The decision on admission is usually taken by the Membership Admissions Committee under delegated authority from Council but may be taken directly by Council itself. IEEM is pleased to welcome applications for Membership from the following:

APPLICATIONS FOR FULL MEMBERSHIP

Mr John A Bayley, Miss Rachael J Brady, Dr Simone K Bullion, Mr Joshua QZ Evans, Dr Joanna Girvan, Mr Nick JR Mardall, Mrs Charmaine Noël, Mrs Lisa Roberts, Mr Craig Rockliff, Mr Alan Ross, Miss Rosalind F Salter, Miss Lisa M Wade

APPLICATIONS FOR ASSOCIATE MEMBERSHIP

Mr Christopher J Barker, Miss Laura Cotton, Dr Kerry Evans, Miss Darylle Hardy, Mr Simon T Parker, Miss Polly Redhead, Miss Victoria L Rowe, Mr Julian Vulliamy, Mr Richard Warren, Miss Verity O Webster, Mr Michael A Williams

ADMISSIONS

IEEM is very pleased to welcome the following new Members:

FULL MEMBERS

Dr Eleanor L Ballard, Dr Alexander N Banks, Ms C Zoe Banks, Dr Samuel Bridgewater, Miss Rachel Flannery, Mrs Penelope J Hemphill, Miss Bernadette Higgins, Miss Morgan A Hughes, Mr Philip James, Miss Pauline Jewett, Dr Janice A Martin, Mr Robert J McInnes, Miss Katherine E Mitchell, Mr Abbie Patterson, Mr Richard J Penson, Dr Philip M Perrin, Mr Luke M Shenton, Ms Emma J Simmonds, Dr Jill Sutcliffe, Mr Justin Tilley, Miss Julie Tuck, Mr Andrew Warwick, Mr Julian M Whitehurst, Mr Leslie R Williams, Miss Tracey J Younghusband

ASSOCIATE MEMBERS

Mr Richard Bickers, Mr Piran J Borlase-Hendry, Dr Brian DJ Briggs, Mr David K Browning, Mr Benjamin R Carpenter, Mr Christopher Cathrine, Miss Rebecca L Coneybeer, Mr Benjamin H Griffiths, Miss Emma L Hankinson, Dr Joanne B Harkness, Miss Heather Hickman, Mrs Catharine A Howell, Mr Del T Jones, Miss Jana Kahl, Miss Helen E Lloyd, Mrs Karen E Lloyd, Ms Rosemary A Lodge, Mr Aidan JT Mackay, Miss Alison E Pike, Miss Rebecca H Shelton, Dr Daniel Simpson, Miss Rebecca Smith, Dr Tanya CF Waring, Dr Sarah J Watson-Jones, Miss Cyrise D Weaire, Ms Tatiana White, Miss Jill Wood, Dr Catharine E Wüster, Miss Holly York

GRADUATE MEMBERS

Miss Fiona Anderson, Mr Nicholas G Andrews, Mr Faheem Anwar, Ms Sarah Armstrong, Miss Emily Aron, Mr Thomas Ash, Miss Jennifer J Austin, Miss Sarah Baulch, Ms Rebecca L Beale, Miss Evie M Bell, Miss Donna L Bigsby, Miss Alison J Birkett, Mr Stuart Blair, Mr Peter J Bonney, Mr Gavin F Boyd, Miss Victoria R Brooks, Miss Julia F Brown, Miss Tessa C Cole, Ms Caroline Coleman, Mr Matthew Cook, Mr Simon Cope, Mr Richard A Craven, Mr Benjamin W Deed, Miss Jennifer L Diack, Miss Anna Doeser, Miss Lisa Durrant, Mr Richard M Flight, Mr Daniel J W Free, Miss Rebecca Gill, Miss Katie Glover, Mr Craig Greenwell, Mr Stephen J Hancock, Dr Steaphan P Hazell, Ms Anna C Heaton, Mrs Jane Jukes, Mr Adam Kennedy, Mr David Kirby, Miss Elizabeth Ludlow, Mrs Barbara I Maciejewska, Miss Katie Mardon, Miss Hazel Marsh, Miss Louise Martin, Miss Samantha L Mellor, Mr Stuart Miller, Miss Joanne Moore, Dr Sian Moore, Miss Nathalie Moriarty, Miss Sheba Ndagire, Ms Abigail Oldham, Mr David M Prys-Jones, Mr Ben A Raybould, Mr David E C Rice, Miss Sarah Richards, Miss Jennifer S Rowlands, Miss Melanie Roxburgh, Mr Ravi Sachdev, Dr Richard C Sandifer, Mr Mark D Schofield, Ms Lucinda A Scriven, Miss Clare Silver, Miss Katie Spencer, Miss Lisa J Stephens, Ms Naomi G Stratton, Miss Alexa J Tweddle, Mr Matthew D Wilcoxon, Mr Edward N Walker, Miss Natalie S Wilkinson, Miss Hayley C Wiswell, Ms Gemma Worswick, Mr Luke P G Young

AFFILIATE MEMBERS

Mr Nigel Brooke-Smith, Mr Neil P Hairsine, Mr James McGinlay, Ms Catriona Morrison, Mr Andrew O Pankhurst, Miss Dominique Rhoades, Mr William Riddett, Miss Rachel L Roberts, Miss Beth Sidaway, Ms Kay Thompson, Miss Pamela Tindall, Mr Andrew Watson, Mr Ian West, Miss Ruth M Willans

STUDENT MEMBERS

Miss Isobel M Abbott, Miss Rebecca J Baker, Miss Clare L Black, Miss Stephanie J Brown, Miss Katherine Bubb, Mr Timothy J Buckland, Miss Rebecca Butler, Mr Thomas Churchman, Miss Sara Curtis, Miss Sophie Fairbank, Mr Adrian Farrell, Mr Steven Flynn, Miss Cindy L M Hobkirk, Miss Michelle Holland, Miss Victoria Hughes, Mr Keith James, Miss Philippa J Jones, Miss Sara V King, Ms Britta Koehler, Mrs Rachel Levi, Mr Richard Masson, Mr Kendrew McIntosh, Miss Claire McLaughlan, Ms Anne McMeel, Miss Alison Nicholls, Mr Stuart L Norris, Mr Uchenna Osunwa, Mr Samuel L Pinn, Miss Alison Sharkey, Miss Lisa Southwood, Mr Ian Stephens, Ms Rosalyn Thompson, Mr Jonathan E Tye, Miss Sally Walker, Miss Jenny Wallace, Miss Sarah C Warden, Miss Charlotte Warwick, Mrs Leonie Washington-Campbell, Miss Louise A Watson, Mr Mike Whitfield

UPGRADES

The following have successfully upgraded their Membership:

ASSOCIATE to FULL MEMBERSHIP

Miss Lorna M Bousfield, Mr Scott Cafferty, Mr Giles Coe, Miss Zoe Connelly, Mr Andrew Constable, Mrs Susan K Cooper, Ms Jennifer Davis, Miss Chloe Delgery, Mr Stephen R Dixon, Miss Penelope Foster, Dr Sally Fraser, Mr Russell Grey, Miss Gemma Harding, Mrs Pat Hilton, Mr John Honeyman, Mr John G Inglis, Miss Hayley D Jack, Mr Marc Jackson, Dr Paul Joyce, Mr Duncan Lang, Miss Katie Lawrence, Miss Morna McBean, Miss Poppy J McDonald, Mr Mark Morris, Mr Matthew Neale, Miss Leila Payne, Dr Christopher Peppiatt, Mr Anthony Prior, Mr Steven D Ralph, Mr Christopher Richards, Miss Fay Robinson, Mr Philip J Rogers, Dr Daphne A Roycroft, Dr Crona Sheehan, Miss Claire L Snowball, Mr Jonathan S Steele, Miss Julie A Swain, Dr John J Sweeney, Dr Kate Vincent

GRADUATE to ASSOCIATE MEMBERSHIP

Mr Daniel Atter, Mr Lee A Bagnall, Mr Alexander DL Baldwin, Dr Elaine Bennett, Mr Grant Bramall, Miss Annie Carpenter, Miss Helen Carty, Miss Kelly J Clark, Miss Wendy Collins, Mr John E Condron, Mrs Rachael Cooper, Miss Suzannah Dangerfield, Dr Claire V Dowding, Mr Jamie Edmonds, Mr Pete Etheridge, Mr David Fallon, Miss Laura Gore, Mr Richard Gowing, Mr Liam Hogg, Miss Lisa Hundt, Miss Jessica Hutchinson, Miss Caroline Jewell, Miss Marion Macnair, Mr Neil Madden, Miss Clare May, Dr Steven McMellor, Mr Timothy J Meakin, Miss Maral Miri, Mr Steven P Oram, Mr Thomas Owens, Mr Gareth J Parkinson, Miss Katie Partington, Mr Ben WR Ralston, Miss Katy Robson, Miss Gemma Russell, Miss Anna Senior, Miss Jodie Smith, Miss Catherine L Soper, Dr Nina Šraj, Mr Peter R Steward, Mr Paul Turner, Miss Cressida Wheelwright, Miss Vicky White, Mr Jonathan Woods

AFFILIATE to ASSOCIATE MEMBERSHIP

Mr Ian DM Fraser

STUDENT to GRADUATE MEMBERSHIP

Miss Fiona C Berry, Miss Mary Davies, Dr Jacqueline A Gilbert, Mr Daniel L Jones, Mrs Caroline J Kelly, Dr Lesley J Mason, Miss Rhia McBain, Mr Andrew B McMullan, Dr Norma O'Hea, Miss Anna K Price, Ms Caroline Renton, Mr Philip J Silk, Miss Sarah E Thornton, Mrs Mandy Trafford, Miss Emma C Tuckey, Mr Mark A Vivian

What's on April - June 2009

17 March 2009
IEEM West Midlands Section launch
www.ieem.net/wmidlands.asp

26-27 March 2009
Wildlife Law
County Durham
www.ieem.net/otherevents.asp

1 April 2009
IEEM Spring Conference - Wildlife Crime
Leeds
www.ieem.net/conferences.asp

1-2 April 2009
Learning to Fly... with Red Kites
Tyne and Wear
www.ieem.net/otherevents.asp

1-2 April 2009
River Restoration Benefits – Past, Present and Future
Nottingham
www.ieem.net/otherevents.asp

6 April 2009
Evidence base for Environmental Management and Conservation
Stirling
www.ieem.net/otherevents.asp

17 April 2009
IEEM Irish Section Event - National Biodiversity Data Centre Event
Waterford
www.ieem.net/irishsection.asp

17-19 April 2009
Mammal Society 2009 Easter Conference
Winchester
www.ieem.net/otherevents.asp

22 April 2009
IEEM NE England Section Event - Two Way Traffic: Improving Access to Environmental Data
Newcastle upon Tyne
www.ieem.net/nesection.asp

22 April 2009
Darwin-Wallace Celebratory Meeting - Insect evolution below the species level
Hertfordshire
www.ieem.net/otherevents.asp

23 April 2009
Sight and Sound - Field Identification Skills
Glasgow
www.ieem.net/otherevents.asp

24-26 April 2009
Using Anabats
Port Talbot
www.ieem.net/otherevents.asp

29 April-1 May 2009
Valuing our Life Support Systems - Natural Capital Initiative
London
www.ieem.net/otherevents.asp

12-16 May 2009
RFS Woodland Meetings
Across southern England
www.ieem.net/otherevents.asp

13 May 2009
Scotland's changing rural biodiversity: Policy and action needs
Perth
www.ieem.net/otherevents.asp

18-22 May 2009
Vegetation Surveying 1
Nottingham
www.ieem.net/otherevents.asp

26-27 May 2009
Bat Echolocation and Sound Analysis Workshop
Dumfries and Galloway
www.ieem.net/otherevents.asp

27 May 2009
IEEM Yorkshire and Humber Section Event - Evening meeting at Thorne and Hatfield Moors
www.ieem.net/yorkshire.asp

29-31 May 2009
Alchemilla ID and Survey
Teesdale
www.ieem.net/otherevents.asp

8-12 June 2009
Training in aquatic plant identification for Riverine plant surveyors
Menai Straits
www.ieem.net/otherevents.asp

22-26 June 2009
Invertebrate Surveying 1
Nottingham
www.ieem.net/otherevents.asp

23-26 June 2009
Green Week
Brussels
www.ieem.net/otherevents.asp

24 June 2009
IEEM Yorkshire and Humber Section Event - Grazing in Action
Details TBC
www.ieem.net/yorkshire.asp

17-18 September 2009
EFAEP General Assembly
London
www.ieem.net/otherevents.asp

10-12 November 2009
IEEM Autumn Conference - Protected Areas
Thetford, Norfolk
www.ieem.net/conferences.asp

For IEEM workshops please refer to the Training Workshop Programme, which can be found at: www.ieem.net/workshops.asp

Centres offering course programmes that might be of interest to IEEM members. Information from:

Centre for Alternative Technology, Machynlleth, Powys, SY20 9AZ
01654 705950
www.cat.org.uk

Field Studies Council, Preston Montford, Montford Bridge, Shrewsbury, Shropshire, SY4 1HW
0845 345 4071
enquiries@field-studiescouncil.org
www.fieldstudiescouncil.org

Freshwater Biological Association, The Ferry Landing, Far Sawrey, Ambleside, Cumbria, LA22 0LP
01539 442468
info@fba.org.uk
www.fba.org.uk

Losehill Hall, Peak District National Park Centre, Castleton, Hope Valley, Derbyshire S33 8WB
01433 620373
training.losehill@peakdistrict-npa.gov.uk
www.losehill-training.org.uk

Plas Tan-y-Bwlch, Maentwrog, Blaenau Ffestiniog, Gwynedd LL41 3YU
01766 590324
Plastanybwlch@compuserve.com

BTCV Training Programmes Unit, Red House, Hill Lane, Great Barr, Birmingham B43 6LZ
0121 358 2155
info@btcv.org.uk
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