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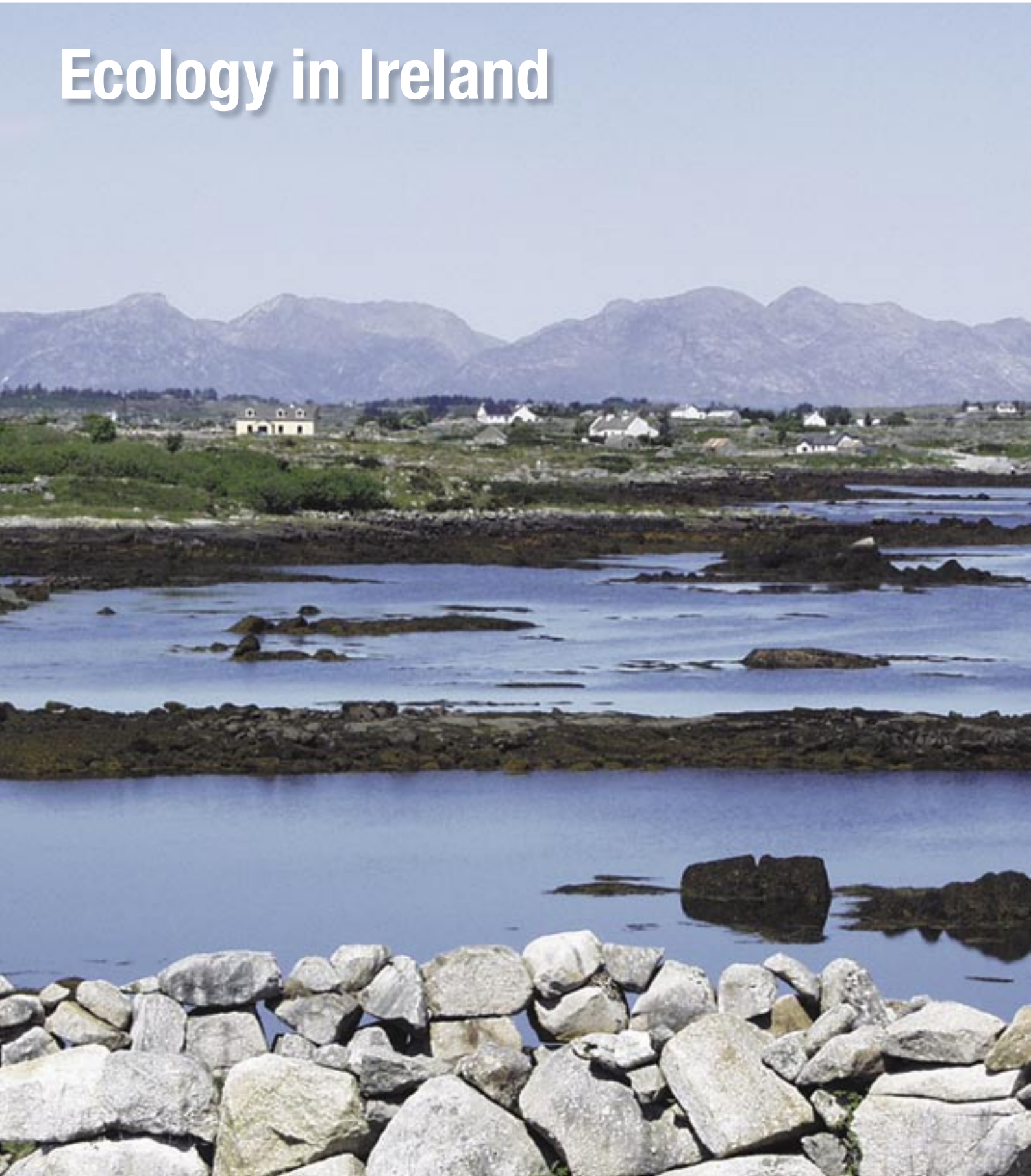
Ecology in Ireland



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British Ecological Society

Editorial

The Current State of Ecology in Ireland

When I was invited to write this piece I felt that my view, from a background of academic research as a vegetation scientist followed by many years in consultancy, may not truly reflect the wider scene. So I solicited opinion from many ecologist colleagues - throughout the island of Ireland - on their perception of the current state of ecology in Ireland.

The volume of replies was gratifying (thanks to everyone) in that it shows the depth of commitment and concern amongst ecologists for their profession. Replies came from both members and non-members; North and South; from individuals in private, state, local government, academia and NGO. In fact the volume was such that I have enough material for a future article in *In Practice*! So many points were raised that I can only highlight a few here.

There have been huge strides forward in terms of knowledge and legislation - both EU and National; and considerable progress has been made in the conservation of habitats and species but there are still gaps. A chronic lack of resources in terms of funding and ecological personnel means that legislation is not being fully implemented. This results in a lack of protection of some of the most vulnerable habitats and rare species. In both the Republic of Ireland and Northern Ireland shortage of resources means that for example, planning conditions such as monitoring requirements, tend not to be followed through.

The whole issue of biodiversity is a matter of real concern, because of a lack of understanding of what it is and a lack of recognition of its significance in the broader context for society.

A particularly worrying trend is the lack of a skill base in certain sectors of private consultancy, not helped by the development of broad-based environmental science qualifications. The onus is very much on consultants to consciously maintain an adequate scientific knowledge base as well as high professional standards. The ideal perhaps would be to have membership of the IEEM an obligatory requirement for employment as is the trend in the UK. This is a challenge for Ireland with its two jurisdictions and a variety of perspectives on the role of IEEM in this island.

Attitudes to, and perception of, ecology in Ireland have changed vastly in the 38 years that I have been working as an ecologist. The history of ecological development in the Republic of Ireland is set out by Paul O'Donoghue's first paper in this issue, and discussed from the perspective of a large consultancy. There are many positives, but from experience I know that many practising ecologists in Ireland take issue with some of the existing Irish-based guidelines in that they do not go far enough; and, for example, the National Road Authority's guidelines (for ecological impact assessment; and for the treatment of species) are taken as absolute and cast in stone rather than as guidelines. Considered best practice advice from experienced specialists is frequently not accepted in environmental impact statements because it requires more than the guidelines allow for.

We should not consider ecology in Ireland without looking at the role of IEEM. Personally I think IEEM is key and am delighted at the growth of membership in Ireland. Surely we all have a recruiting role in our daily contacts with non-member ecologists as this enables a one to one explanation of the potential role of IEEM. But there is still a worrying uneasiness that it is not an international organisation, which can accommodate some people's views in Ireland. This position must be addressed by IEEM, particularly in public at conferences, meetings and in publications.

Jenny Neff CEnv FIEEM
Director and Principal Consultant, Ecological Advisory and Consultancy Services (EACS)

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Cover image: The Connemara Coast in County Galway, Republic of Ireland.

Photography: Richard Nairn CEnv FIEEM

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.

The Co-Evolution of Ecological Practice and Employment Opportunities in Engineering and Environmental Consultancies in Ireland

Paul O'Donoghue CEnv MIEEM
Principal Ecologist, Atkins (Ireland)

The practice of ecology in Ireland has undergone significant changes in recent decades. Traditionally, ecological studies were the remit of academic institutions, non-governmental organisations and freelance ecologists or specialist ecological firms. The accession to what was then the European Economic Community has resulted in a progressive increase in both the volume and nature of environmental and ecological studies which are undertaken as part of requirements for planning and for infrastructural development. This has also opened new and parallel areas of ecological work and research in Ireland and the adoption of new fields within the discipline of ecology such as restoration ecology, landscape ecology, industrial ecology and more specifically roads ecology.

After the recession of the late 1970s and 1980s the Irish economy went through a period of rapid growth and expansion through the 1990s in what came to be known as the 'Celtic Tiger' economy. This was paralleled by the entry into the Irish market place of a large number of UK based engineering and environmental consultancy firms, either directly or through the purchase of locally based firms as in the case of Atkins, which acquired McCarthy and Partners in February 1999.

Moreover, the growth in construction and large scale infrastructural projects in Ireland coincided with the introduction of fundamental European environmental legislation and its transcription into Irish law. This has included the Birds Directive (79/409/EEC) in 1979, Environmental Impact Assessment Directive (85/337/EEC) in 1985, and the Habitats Directive (92/43/EC) on the conservation of natural habitats and of wild fauna and flora in 1992. These have been complemented in recent years by additional legal instruments such as the Water Framework Directive (2000/60/EC), which rationalises and updates existing water legislation and provides for water management on the basis of River Basin Districts (RBDs).

Prior to accession to the EU, however, Ireland had already embarked on a strategy for the protection of biological diversity. The Wildlife Act of 1976 provided the legal framework for species protection and for a network of sites of ecological and geological interest, known as Areas of Scientific Interest (ASIs). Ireland was also a signatory to the Bern Convention (The Convention on the Conservation of European Wildlife and Natural Habitats, 1979), the forerunner of the Habitats Directive which sought to protect species and habitats across Europe.

In the mid-nineties, following a successful legal challenge, the ASIs were replaced by a network of sites called Natural Heritage Areas (NHAs); these are designated to protect habitats, flora, fauna and geological sites of national importance. Together with Special Areas of Conservation (SACs) and Special Protection Areas for birds (SPAs) (Natura 2000 sites) these sites form the backbone of site-based conservation in Ireland. National Parks, Nature Reserves, Wildfowl Refuges and other designations further add to this network of protected sites, while instruments such as the Flora (Protection) Order, 1999 provide species-specific protection (in this case for a prescribed list of plant species).

Protection of the wider landscape under the European Landscape Convention (2000) and the reduction in the loss of local biodiversity are now also seen to be critical to the protection of biodiversity in Ireland. In the absence of legal instruments to protect these features we are likely to continue to loose semi-natural habitats and their attendant species. Our protected sites will become ever more isolated islands within a biologically denuded wider landscape in which homogenization becomes the dominant trend. The effective isolation of such sites also places them at greater risk of, for example, local extinction events in the absence of effective connectivity to facilitate animal and plant dispersal and hence gene flow. This is particularly pronounced amongst those taxa with limited dispersal capabilities.

Appropriate implementation of Article 10 of the Habitats Directive at the local authority level, which encourages the establishment of corridors and other landscape features between protected areas, is critical. This can be achieved through Local Area Action Plans and County Biodiversity Plans which should then feed into a National Network of Ecological Corridors in line with the National Spatial Strategy and the network of Natura 2000 sites.

The pace of recent development in the country has been such that biodiversity is increasingly under threat, especially in urban and peri-urban habitats. While the above mechanisms offer protection to species and habitats that are deemed to be of national or international importance, it does not effectively address biodiversity at the local level. One of the key constraints on protecting biodiversity at a local level has been the lack of readily accessible baseline data on habitats and species distribution within the counties. While datasets are available for designated sites, such as Special Areas of

Conservation and proposed Natural Heritage Areas, it is often the sites of local or county value that are at greatest threat. A first hand example is a small wetland on the outskirts of Cork City, which does not qualify for designation as a Natural Heritage Area, but hosts a diverse mix of poor fen, alder scrub and wet grassland.

However, since publication of the National Biodiversity Plan in 2002, great strides have been made to fill this gap. Through the preparation of County Heritage Plans, and more recently Biodiversity Action Plans, targeted studies have been identified and are now being commissioned to collate biological data, which will increase our understanding of biodiversity at the local level. These can in turn inform decisions as to whether a particular site is appropriate for development. The surveys include Phase 1 habitat surveys and more detailed assessments of hedgerows and wetland habitats, which are being commissioned on a county basis by Local Authorities. They are further complemented by a range of studies from the Irish Wetland Bird Surveys and Countryside Bird Surveys co-ordinated by BirdWatch Ireland, to the recent car-based bat survey undertaken by Bat Conservation Ireland. All such studies are leading to a greater understanding of biological diversity in Ireland and a resultant increase in the quality and comprehensiveness of ecological assessments being undertaken for planning of developments. The establishment of a National Biodiversity Data Centre should assist in the collation and dissemination of data collected from such studies.

One of the most significant developments has probably been the publication of a *Guide to Habitat Classification in Ireland* by the Heritage Council (Fossitt 2000) and the subsequent *Draft Habitat Survey Guidelines* (Heritage Council 2002). This has allowed for the implementation of a nationally accepted scheme of habitat classification which facilitates inter-site and temporal comparison of habitat change. Ongoing national surveys such as the Native Woodland Survey and Semi-Natural Grassland Surveys (commissioned by the National Parks and Wildlife Service) are developing more detailed classifications of specific habitat types using modern ecological data analysis methods which will hopefully in time lead to an updated and improved national habitat classification system.

Road building represents the single biggest investment in infrastructure in Ireland in the last decade. In response to the requirement placed upon State bodies by the National Biodiversity Plan to integrate consideration of biodiversity into their strategic planning, the National Roads Authority (NRA) has been producing a series of ecological guidance documents. These include guidance on ecological impact assessment, bats, badgers, watercourses, *etc.* The NRA published *Guidelines for Assessment of Ecological Impacts on National Road Schemes* (NRA 2006) includes the only formally adopted scheme for the evaluation of ecological importance and assessment of development related impacts in Ireland. While it has been developed for roads it has, in the absence of an alternative scheme, begun to be used as the basis for assessments for a range of development types.

As a consequence of the above, Ireland has seen a rapid growth over the past 10 years in ecological recording and surveying throughout the country, with an associated growth in employment opportunities for ecologists. The need to undertake ecological impact assessments, as part of the Environmental Impact Assessment for large infrastructural developments, has led many engineering firms to develop in-house environmental skills. More recently, this has led to companies being able to support ecological staff who primarily

undertake ecological work rather than multi-disciplinary environmental work as was previously the norm. Atkins in Ireland, for example, currently employs seven ecologists, most of whom dedicate their time entirely to undertaking ecological work.

One problem that has emerged as a consequence is a difficulty in finding suitably qualified staff, especially graduates with basic taxonomic skills. As Phase 1 habitat survey plays such a crucial role as the first step in evaluating the importance of a site, knowledge of plant and habitat identification is an invaluable skill. Sadly most university courses no longer focus on basic animal or plant taxonomy and identification skills, despite the emergence in recent years of ecological consultancies as a major employer of graduate ecologists. In fact, it is only in recent years that courses have begun to be specifically tailored to address this, such as the Masters in Biodiversity and Conservation at Trinity College Dublin and the new course in Ecological Assessment proposed at University College Cork. However, there is also a reciprocal role to be played by the industry in, for example, providing training opportunities, such as work experience as part of such courses, thereby furthering the development of closer links between academia and potential employers of graduate ecologists. This can only further enhance the quality of ecological assessments being undertaken by ecological consultants/consultancies. IEEM, through its student membership, could also play a leading role in furthering closer links.

One of the key advantages of working as an ecologist within a large scale engineering firm is the range of development types encountered for which ecological assessments are required, and thereby the range of ecological issues encountered. This in turn leads to ongoing professional development. For example, in the past number of years Atkins have undertaken studies on subjects as diverse as: specialist habitat and rare plant surveys; remotely operated vehicle surveys of marine biodiversity; designing bird studies to facilitate pre- and post-construction assessment of impacts of wind turbines on birds; undertaking wintering bird surveys to examine patterns of spatial distribution and seasonal variation in numbers at a proposed marina site; designing mammal mitigation measures for a large road scheme; and surveying for white-clawed crayfish.

By recently co-sponsoring the Roads and Ecology conference with Engineers Ireland, IEEM recognizes the need for closer communication and understanding to be developed between ecologist and engineer (or indeed the wider design team employed on many large projects). Working closely with engineers on a day-to-day basis fosters a better understanding between disciplines and hopefully helps to iron out prejudices that both parties bring to the table. It certainly trains ecologists to be much more focused when undertaking studies as engineers will always push one for clear and concise answers to their questions, though admittedly this is not always possible from an ecological perspective. By also educating engineers as to the rationale behind ecological impact assessment it can also result in ecological issues being considered much earlier in the design process when something can actually be done about identified constraints.

One key disadvantage is that much of the work done in such an environment is either published in the grey literature or left unpublished. As a consequence, large volumes of unpublished survey data are often held by engineering and environmental consultancies. The establishment of the National Biodiversity Data Centre may offer an opportunity to address this. Furthermore, the above can preclude easy movement of expertise from industry back to academia where recruitment is very much driven by ones record of publication in peer reviewed scientific literature. It, however, presents no such obstacle to movement in the other direction.

No doubt, in years to come, as ecological practices continue to evolve so too will employment opportunities for ecologists. It is critical, however, that we ensure that academic and industry based training and career development continue to keep pace with such changes in order to continue to ensure the highest standard in ecological assessment, as espoused by IEEM.

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The Current State of Habitat and Species Conservation in Northern Ireland

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Redshank
Photo: Andy Hay (RSPB)

Northern Ireland's position at the extreme northwest of Europe, and its relatively isolated situation since post-glacial times, means that it has more restricted flora and fauna than that of Britain, and particularly of Europe, very much in keeping with biogeographical theory. For example, there are no moles or weasels in Northern Ireland. However, its marine biodiversity, benefiting from the Gulf Stream, is remarkably rich and this is further enhanced by the great variety of coastal topography. An amazing 28 sponges, new to science, were found in the seas around Rathlin Island in a recent survey.

Northern Ireland also supports a large number of important coastal and freshwater sites that provide habitat for vast numbers of migratory waterbirds in the winter, relatively large expanses of active blanket and lowland raised bog, and some of the most spectacular landscape and geological features anywhere in the world. Many visitors to Northern Ireland travel specifically to see the magnificent Giant's Causeway and the Mourne Mountains or to experience wildlife spectacles such as the arrival of tens of thousands of light-bellied brent geese as they arrive to spend the winter around our coast.

Unfortunately, mirroring the situation elsewhere in northwest Europe, many of Northern Ireland's species and habitats have suffered from changes in agriculture in recent decades. There has been extensive and widespread loss of natural and semi-natural habitat, largely because of agricultural intensification in recent years. For example, the results of the Countryside Survey published in 2000 showed that the area of species-rich wet grassland had declined by 37% and wet bog by 21% between 1991 and 1998. Many farmland birds such as the yellowhammer, lapwing and curlew have declined by 50% since the mid 1990s also due to intensification of the wider countryside. Others like the grey partridge and corn bunting are now extinct as breeding species in Northern Ireland. Like elsewhere, European agricultural policy has been the ultimate cause of these problems.

Corncrake
Photo: Andy Hay (RSPB)

However, the agri-environment scheme available in Northern Ireland, the Countryside Management Scheme (CMS), has and will continue to reward farmers for adopting land management practices that can reverse many of these declines. With a new Rural Development Programme for 2007-2013 already agreed in Brussels, over £400 million is available for CMS, Less Favoured Areas and forestry management, and this should make a big difference to halting biodiversity loss in Northern Ireland. Other initiatives, such as the recently implemented Nitrates Directive Action Programme, are addressing the diffuse pollution problems in the wider countryside whilst the River Basin Management Plans being prepared under the Water Framework Directive will provide new opportunities to secure improvements to the water environment. The farming community is definitely playing its part and needs to be part of the solution to halting the loss of species and habitats.

Nature conservation is primarily a devolved issue in Northern Ireland. Species protection is offered by the Wildlife (Northern Ireland) Order 1985 and site protection under the Environment (Northern Ireland) Order 2002 and the recently amended Conservation (Natural Habitats, &c.) Regulations (Northern Ireland) 1995. Further

improvements to these laws are planned to bring them in line with the comparable legislation in England, Scotland and Wales. For example, a duty of public bodies to further biodiversity has been proposed, adopting the legal wording used in Scotland. However, unlike the rest of the UK, there is still no restriction on the use of lead shot over wetlands and further improvements to forestry and water legislation are required to secure benefits to biodiversity through the work of these sectors. There is also no option of custodial sentencing for those who commit wildlife crimes; only fines of up to £20,000 are available to the courts.

To protect important features, the Northern Ireland administration has identified many internationally or nationally important sites based on their landscape, habitat and species interests. The country currently supports nine Areas of Outstanding Natural Beauty, 16 Special Protection Areas, 53 Special Areas of Conservation, 23 Ramsar sites and over 220 Areas of Special Scientific Interest (ASSIs - similar to the Sites of Special Scientific Interest (SSSI) designation elsewhere in the UK). The rate of designation of ASSIs has been slow since the Nature Conservation and Amenity Lands (Northern Ireland) Order was passed in 1985 and 59% of habitat features are currently in 'unfavourable' condition, compared to 36% across the whole of the UK. Research by the RSPB is showing that the slow rate of progress towards protecting nationally important sites has resulted in damage or destruction of some important areas for wildlife.

The Northern Ireland Biodiversity Strategy was published in 2000 and provides a framework for species and habitat conservation, complementing the UK Biodiversity Action Plan. There are 272 Priority Species (those requiring conservation action) in Northern Ireland. Another 457 have been identified as Species of Conservation Concern. Complementing the UK action planning process, there are currently 23 Northern Ireland-specific Species Action Plans, four all-Ireland Species Action Plans and 37 Northern Ireland Habitat Action Plans,

Lapwing
Photo: Sue Tranter (RSPB)

RSPB Portmore Lough Reserve Photo: Andy Hay (RSPB)

with others in the production pipeline. The delivery of the overall Strategy is overseen and reviewed by the Northern Ireland Biodiversity Group; a team made up of independent, non-statutory representatives from a variety of sectors. The first report from this group has been helpful in improving the way in which government departments and agencies can support the biodiversity process, with each now preparing individual plans for direct action.

Although the new Northern Ireland Assembly remains in its infancy, it has produced a Programme for Government that sets targets to halt biodiversity loss by 2016 and a timetable for the designation of new ASSIs. It will be a major challenge for the elected Assembly and the rest of the administration in Northern Ireland to ensure that the push to develop economically and socially after a prolonged period of conflict and direct rule from Westminster does not result in further damage to Northern Ireland's unique natural heritage.

One way of tackling this challenge would be to reform how species and habitats are protected in Northern Ireland. Environmental organisations in Northern Ireland have been campaigning for many years for improvements to the environmental governance system, in particular the creation of an independent environmental protection agency similar to those established elsewhere in Britain and the Republic of Ireland. The statutory agency currently responsible for nature conservation and environmental protection sits within the Department for the Environment and does not have the freedom to act as a voice independent of government. Independence would enable a new agency to act as a champion for the environment, questioning government actions in relation to the environment.

With the development of new legislation across the UK to tackle climate change and marine management, there could be some major benefits for species and habitats in Northern Ireland. If plans to help wildlife to adapt to the effects of climate change and a more effective approach to protecting important areas for wildlife at sea are introduced, we could be entering a new era for the protection of our natural heritage. However, we must not forget that there are some 'old jobs' that still need to be completed if we are to meet the target of halting biodiversity loss.

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Integrating Nature Conservation and Military Training in Northern Ireland

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Background

The Ministry of Defence (MOD) Estate has been called a 'jewel in the crown' regarding its rich biodiversity and the sympathetic management of habitats and species is a core part of MOD business. As Northern Ireland has moved to normalisation, the defence estate is being rationalised in line with the reduced number of military personnel present. Some areas will be retained for military activities such as the two principal training areas of Ballykinler and Magilligan Training Centres. This is in line with the Defence Estate Strategy *In Trust & on Trust 2006*, which states that the Vision for the Estate is: '*To have an estate of the right size and quality to support the delivery of defence capability, that is managed and developed effectively and efficiently in line with acknowledged best practice and is sensitive to social and environmental considerations*'.

Ballykinler Dunes

Large areas of both Training Centres have been designated as Areas of Special Scientific Interest (ASSIs) and Special Areas of Conservation (SACs) for the extensive and undisturbed nature of the dune habitats and associated species. The sites are also important for UK and Northern Ireland Priority Biodiversity Action Plan (BAP) Priority habitats and species such as sand dune habitats, otter *Lutra lutra*, brown hare *Lepus europaeus*, marsh fritillary *Euphydryas aurinia* and petalwort *Petalophyllum ralfsii*.

The MOD ensures appropriate management of ASSIs and other sites with biodiversity interests is based upon appropriate management plans, which form part of the site based Environment Management System (EMS). Detailed five-year nature conservation management plans were completed for both Ballykinler and Magilligan Training Centres during 2007 by Defence Estates (DE) in partnership with the Northern Ireland Environment and Heritage Service (EHS), and members of the MOD Conservation Groups.

Both Ballykinler and Magilligan Training Centres are used for 'dry training' such as foot patrols and tactical drills and 'live firing' activities including small arms and helicopter firing. The integration of military activities with other land management interests provides a unique, sometimes challenging, but often positive opportunity to implement large scale conservation measures. Works such as the restoration of grazing and removal of invasive scrub are well underway and are making a significant contribution towards the Government's target, achieving 95% of SSSIs and ASSIs as being in 'favourable' or 'unfavourable recovering' condition by 2010.

This article describes some of the ASSI and SAC features present at both sites and some of the practical, ecological and military management issues that have required considerable discussion and innovation to implement agreed nature conservation objectives.

Ballykinler Training Centre

Ballykinler Training Centre (BTC) is situated at the mouth of Dundrum Inner Bay near Newcastle and the foot of the Mourne Mountains and lies within the Lecale Coast Area of Outstanding Natural Beauty. The Training Centre covers 559 ha with 416 ha designated as part of the Murlough ASSI and SAC. The Murlough dunes are described as one of the oldest, most diverse and natural dune systems in Northern Ireland, with part designated as Ireland's first National Nature Reserve in 1967.

There are seven ASSI features present at BTC as shown in Table 1 below.

Table 1: Murlough ASSI features on MOD land and their condition

Murlough ASSI features on MOD land	Condition as at completion of Management Plan 2007
Coastal sand dunes	Unfavourable declining
Higher plant assemblage	Unfavourable (although BTC was not surveyed as part of the assessment)
Marsh fritillary	Favourable
Common seal	Not assessed
Invertebrate assemblage	Not assessed
Coastal processes	Favourable
Sea level history	Favourable

The two geomorphological features of coastal processes and sea level history are considered to be 'favourable'. They require little if any active management by MOD as there are no hard sea defences or other works undertaken that could affect the dynamics of erosion and deposition within the bay.

BTC has a complex mosaic of different sand dune communities, some of which are very species-rich. Marram *Ammophila arenaria* and red fescue *Festuca rubra* are dominant over much of the area, while species such as common restharrow *Ononis repens* and wild thyme *Thymus polytrichus* are prevalent where the sward is shorter and more herb-rich. There is a well-developed natural succession from embryonic shifting dunes and shifting dunes along the shoreline ('white dunes') to areas of dune heath and mature 'grey dunes' with very small areas of dune slacks and extensive gorse *Ulex europaeus* scrub on the landward side.

The dunes are in 'unfavourable declining' condition for two main reasons. There is extensive scrub and tree encroachment particularly by gorse, bramble, sea buckthorn and bracken on the dune heath, dune slacks, grey and white dunes. There is also a lack of community character species such as carline thistle *Carlina vulgaris*, viper's bugloss *Echium vulgare* and small cudweed *Filago minima*, plus bryophytes and lichens.

Murlough ASSI holds one of the largest populations of marsh fritillary in Northern Ireland and BTC probably supports a small ephemeral subpopulation as part of a metapopulation. At Ballykinler, EHS found 13 larval webs at BTC in April 2001 and two webs in 2007 with evidence of breeding from the presence of caterpillars. The distribution of the butterfly is determined by the presence of devil's bit scabious *Succisa pratensis*, which is used for egg laying by, and is the sole food plant for, caterpillars. Research undertaken by DE at other MOD sites with marsh fritillary populations (*e.g.* Salisbury Plain and Castlemartin Ranges) suggests that the food plant must be at least frequent over a sizeable area if a site is to support a sustainable population.

In addition to the marsh fritillary, a large number of other scarce species closely associated with diverse and good quality dune, saltmarsh and estuarine habitats have been recorded across the ASSI, such as the archers dart moth *Agrostis vertigialis*, the small elephant hawk moth *Delephila porcellus* and the Minotaur beetle *Typhaeus typhoeus*. The invertebrate assemblage across the ASSI is currently the subject of a two-year study by EHS due to be completed in 2008.

The secluded beach at BTC is an important haul-out site for the common seal *Phoca vitulina*. Detailed recording of seals throughout the bay is undertaken by Dr Sue Wilson, who is a member of the Ballykinler Conservation Group. The data from 2002-2007 shows there has been an increase in both the number of seals recorded on the beach each year and those nursing pups. It is thought that seals may select this area of the bay because access restrictions mean there is far less disturbance from people, dogs and other recreational activities that use the beach. It is anticipated that the seal colony will not require any management action on the part of the MOD other than the continued enforcement of access restrictions. It is also important that seal counts continue in order to inform the management of the bay as a whole.

The dune habitats have also been designated as being of European importance with the presence of two Annex I habitats and one Annex II species, all of which occur at BTC. The fixed dunes with herbaceous vegetation and Atlantic decalcified fixed dunes *Calluno-Ulicetea* are currently assessed as 'unfavourable' with marsh fritillary as 'favourable'. The secondary, qualifying Annex I habitats and species present are embryonic shifting dunes, which are in 'favourable' condition, the dune slacks with *Salix repens* ssp. *argentea (Salicion arenariae)* in 'unfavourable' condition and common seal which has not yet been formally assessed.

Magilligan Training Centre

Magilligan Training Centre (MTC) lies on the north coast in County Londonderry and to the west of the coastal towns of Portstewart and Portrush. The site extends over a total of 911 ha and lies within the North Derry Area of Outstanding Natural Beauty. Most of the Training Centre at 795 ha has been designated as Magilligan ASSI and SAC and is one of the best examples of a sand dune system in Northern Ireland with a wide range of plant and animal communities. This includes specialist dune invertebrates such as the scarce crimson and gold micro-moth *Pyrausta sanguinalis*, one of the UK's rarest moths.

The adjoining intertidal areas are designated as the Lough Foyle Special Protection Area (SPA) and Ramsar site, which supports internationally and nationally important bird populations, in particular bar-tailed godwit, redshank and turnstone and an overwintering assemblage of at least 20,000 wildfowl.

Five ASSI features occur at MTC as shown in Table 2. As at Ballykinler, contemporary processes and sea level history are considered to be 'favourable' whilst the botanical interest is 'unfavourable' and the invertebrates are currently being assessed.

Table 2: Magilligan ASSI features and their condition

Magilligan ASSI feature	Condition as at completion of Management Plan 2007
Coastal sand dunes	Unfavourable declining
Assemblage of rare and notable vascular plants	Unfavourable declining
Invertebrate assemblage	Not assessed
Contemporary processes	Favourable
Sea level history	Favourable

The MOD-owned part of the ASSI dunes has a strong pattern of ridges and valleys with mobile dunes dominated almost entirely by marram grass, semi-fixed dunes and fixed dunes with tall swards of mainly downy oat-grass *Helictotrichon pubescens*

Magilligan

and more open and herb rich areas of red fescue *Festuca rubra*, lady's bedstraw *Galium verum*, wild thyme *Thymus polytrichus* and the wrinkle-leaved feather-moss *Rhytidium rugosum*. There is an extensive and well-developed series of dune slacks which contain virtually all of the dune slack vegetation in Northern Ireland. The main sub community being creeping willow *Salix repens* ssp. *argentea (Salicion arenariae)* with less abundant, more open, humid slacks and older hollows filled with mire vegetation.

The dune habitats and the assemblage of rare and notable plants such as moonwort *Botrychium lunaria* or viper's bugloss *Echium vulgare* are in 'unfavourable' condition. This is due to the rank nature of the dune grasslands and extensive presence of scrub and thus many of the characteristic plant species are either not present or not currently recorded in sufficient abundance.

Part of the ASSI is also designated as Magilligan SAC with the primary reasons being the presence of three Annex I habitats. The dunes with *Salix repens* ssp. *argentea (Salicion arenariae)* and fixed dunes with herbaceous vegetation ('grey dunes') were assessed as being in 'favourable' condition, in contrast to the humid dune slacks, which failed regarding successional processes. Further research has been recommended to define the attributes of the early stages. The secondary, qualifying Annex I habitats of embryonic shifting dunes and shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') are in 'favourable' condition.

Petalwort is a qualifying feature of the SAC and a European Protected Species, associated with dune slack habitats which have a high proportion of bare ground. The baseline report, *Research on Priority Bryophyte Species in Northern Ireland 1999* (Holyoak 2002) only recorded petalwort in very small numbers at a few locations including MTC. Two other rare bryophytes were also found by Holyoak, short-tooth hump-moss *Amblyodon dealbatus* and the Northern Ireland priority species, large hook-moss *Dreplanocladus lycopodiodies*. Both were recorded in the wheel ruts within dune slacks which provide ideal damp conditions. The management plan recommends that to ensure such habitat niches remain for the future, ruts could be carefully created in selected locations.

It is unclear whether the marsh fritillary, which is another SAC qualifying feature, occurs at Magilligan. EHS found no webs during a survey in September 2007 but the distribution of devil's bit scabious was mapped and this information along with the introduction of grazing on parts of the site should increase the abundance of the plant and therefore benefit the butterfly if it is present.

Another specialist dune invertebrate which is present is the crimson and gold micro- moth whose status in Northern Ireland was largely unknown until a survey in 2005 recorded the moth at a total of four sites. Two are on MTC making it a very important site for this species. The ecology of the moth is not well known but in Northern Ireland it appears to favour sparsely vegetated dune blow outs with an abundance of the foodplant, which is thought to be wild thyme *Thymus polytrichus*.

The nature of military training on parts of the dunes helps create ideal conditions for this species with some regular disturbance of the dune blow outs as part of live firing exercises. Careful monitoring of this species will highlight whether any targeted management is required to maintain or promote the population.

The small eggar moth *Eriogaster lanestris* is also rare and a Northern Ireland priority species. During the 2005 survey, 54 webs were recorded, making this the largest colony ever recorded at a site in Northern Ireland. The abundance of blackthorn scrub across the site means that a large amount of suitable habitat is available for this species and a proportion will be retained through the scrub removal programme.

Magilligan

Nature Conservation Management Plans and Work Programme

The comprehensive management plans for both sites detail the ASSI, SAC and other biodiversity interests, nature conservation objectives, management aspirations and reducing conflict with the primary military training use to achieve favourable nature conservation outcomes. This integration and reduced conflict has been achieved by very successful partnerships working within the framework of the two MOD Conservation Groups. These Groups have a wide range of representatives from statutory bodies, NGOs and private individuals who have specialist knowledge of flora and fauna and provide valuable data, advice and support for nature conservation and other land use interests.

Both Ballykinler and Magilligan Training Centres have similar, principal nature conservation objectives. These are to maintain and/or bring into favourable condition all ASSI and SAC features which occur on the MOD estate, undertake monitoring of priority species and maintain active conservation groups. To assist in producing detailed objectives and actions, the sites were divided into management compartments and occasionally subcompartments. The work programmes outline the more specific objectives, identify a responsible party and timescale for implementation of management actions.

The key management action at both sites is the extensive removal and subsequent control of scrub and the re-introduction of grazing. At Ballykinler the main scrub types are mature gorse, bramble, sea buckthorn plus bracken whilst at Magilligan, these are mature blackthorn, bramble and low growing burnet rose. For example, in order to attain favourable condition at Ballykinler, EHS has set the objective of no more than 15% bracken cover across the designated area as a whole, compared to the current estimate of 25% on the fixed dunes.

Management has been prioritised in agreement with EHS for both sites, such as targeting mechanical scrub removal to areas that will be grazed to assist with longer term maintenance. Another priority was to break up large stands of scrub near to firing ranges in order to minimise the chances of large scale fires and their potential to limit military training and damage habitats. Previous small scale scrub management work has been greatly enhanced by addressing much larger areas with more funding. For example, during 2007, gorse management at Ballykinler was undertaken using specialist equipment which prevents enrichment and a specialist flail has been purchased for use at Magilligan.

The two sites impose considerable challenges for management. For example, as on many other MOD sites with extensive sand dune systems such as Penhale, Barry Buddon and Eskmeals, the presence of live firing and known or possible unexploded ordnance requires a flexible and often more costly approach to scrub management. Scrub cannot usually be physically dug up by the roots but can only be cut and treated with herbicide which is generally less effective and/or more costly regarding long term management.

Grazing was part of the traditional management of dunes for centuries, although often difficult in such dynamic environments. On both sites, grazing has been severely restricted for many years due to the difficulties of integrating live firing and other military activities with adequate and safe grazing. Hardy and native breeds of cattle and ponies are being used on the dunes, as sheep are considered unsuitable for grazing coarse, rank swards and will become easily entangled in the dense scrub causing serious welfare problems.

Through close liaison between all parties, substantial new grazing compartments and subcompartments were created on both sites during 2007. For example, at Ballykinler, in addition to a small number of existing ponies, 22 Galloway cows and calves were released into a 48 ha paddock with a further grazing of 56 ha planned for the near future. At Magilligan, the aim is to graze up to about 310 ha which has involved erecting nearly 11 km of fencing during 2007 and the very large number of extra long posts needed for stability in the sandy soils, were eventually sourced from Latvia. The fenced boundaries are sometimes 'wriggly' so as to fit in with the safety considerations of the live firing templates whereby the 'safety cover' of dune ridges are used to protect the stock.

The condition assessment surveys undertaken by EHS for ASSI and SAC features are the best means of assessing whether nature conservation objectives for these features are being met. Additional and continued monitoring to record the status of priority habitats or species such as scarce crimson and gold moth, common seal and petalwort is also important and helps inform the management plans. Funding bids to support some specialist surveys are being made through the Defence Training Estate Rural Funding programme.

In summary, both Ballykinler and Magilligan Training Centres are very important for biodiversity in Northern Ireland. The completion of two comprehensive management plans in 2007 through partnership working with the two MOD conservation groups and openness and flexibility of mind by all parties, has resulted in significant implementation of positive habitat management whilst allowing the primary activity of military training to continue.

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Little Egret Expansion in Ireland: Cork – A Case Study

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The expansion of the little egret *Egretta garzetta* into Britain and Ireland as a breeding bird has been well publicised in both the scientific literature and the general press. What is probably less well understood, however, is the speed and scale of the subsequent expansion of breeding numbers and locations.

In Ireland, breeding was first proven in 1997 (Smiddy and Duffy 1997). This followed a pattern of increased levels of vagrancy from roughly 1989 onward with birds largely resident in Ireland from 1990 onward. Most birds were recorded from coastal areas in the south and southeast. A large influx of birds occurred in the autumns of 1995 and 1996; this led to a wintering population of about 60 birds (Smiddy 2002) and may have provided the final impetus for breeding on the south coast. As noted, breeding was first proven in 1997, when 12 pairs were recorded at a site on the River Blackwater on the border between counties Cork and Waterford (on the south coast). By 2001 egrets had been recorded breeding at four separate sites in counties Cork and Waterford (Smiddy 2002), and the number of nesting pairs increased from 12 in 1997; 22 in 1998; 32 in 1999; 45 in 2000 to 55 in 2001 (Smiddy 2002).

By 2000 egrets had established a breeding colony in Cork Harbour (Ballyannan Wood; northeastern harbour) confirming a suspected westward expansion. When a further colony was discovered in the harbour in 2004 (Little Island; mid-harbour), the authors were prompted to undertake a systematic survey for egret breeding sites. Cork Harbour is a large complex system of basins, channels, estuarine areas and river channels, which offers a multitude of sites for foraging and breeding egrets. Further breeding sites were proven in 2005 (Fota Island; mid-harbour and Rostellan; eastern harbour) and 2007 (Atlantic Pond; public park within city bounds), bringing the known number of sites to five and the number of breeding pairs in Cork Harbour alone to over 70. Furthermore, two young birds were observed with two adults in late summer 2005 near Carrigaline on the upper Owenaboy Estuary (western harbour), indicating the possible occurrence of a sixth site. The number of egrets in this area of the harbour is also suggestive of another breeding site, which could support in the region of 5-10 nests (location unknown). Survey work in 2007 has also highlighted a possible seventh site within the eastern harbour, while there is anecdotal evidence of a pair from an eighth site (Minane Bridge). To date all sites also support breeding grey herons *Ardea cinerea*. Close human activity has not been a deterrent in site selection.

In 2007 egrets were breeding at up to four sites in West Cork, with Rosscarbery the furthest west known to the authors (*c.* seven nests in 2006). The expansion in range and breeding numbers/sites in Cork is mirrored elsewhere along the south, southeast and east coasts. Coincident with this increase in numbers has been an increased incidence of field feeding. Little egrets are also now being recorded from small streams and large inland rivers such as the River Bandon upstream of Innishannon and the River Blackwater upstream of Fermoy. The observed use of new habitats and feeding strategies raises the possibility of breeding away from traditional coastal sites at large river and wetland sites, and in fact the first inland colony was recorded near Fermoy in 2007 (on the Blackwater). The Bird Atlas 2007-2011 provides a perfect opportunity to examine this trend further and we would encourage surveyors to keep a lookout for breeding little egrets.

This winter has also seen the influx of large numbers of cattle egrets *Bubulcus ibis* to both Britain and Ireland prior to Christmas. Up to 20 birds have been recorded in West Cork with up to 10 roosting at a known grey heron/little egret breeding site; up to three birds were recorded in the same area last year. It will be interesting to see in coming years whether cattle egret may be the next addition to our breeding avifauna.

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Little egret
Photo: Paul O'Donoghue

The Habitats Directive and Sewage Treatment Upgrades in the Republic of Ireland

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Ireland is famously wet, so it is no surprise that it has a wonderfully rich range of wetlands – from bogs to sea loughs and saltmarshes, along with a wide variety of freshwater fens, streams, rivers and lakes in between, including extensive floodplain wet grasslands (callows) and the fascinating seasonal lakes in limestone areas known as turloughs.

Nine large river systems drain approximately 50% of the land area within Ireland with the remaining area being drained by smaller coastal catchments. There are a large number of lakes, with some 6,000 being greater than one hectare in area. Many of these freshwater habitats are of exceptional quality and support vegetation communities listed on Annex I of the Habitats Directive – meaning that the European Community has decided that, to ensure their conservation, Special Areas of Conservation (SACs) need to be established to protect some of the best examples.

These rivers and lakes also support populations of Atlantic salmon, lamprey (brook, river and sea), twaite shad, freshwater pearl mussel, white-clawed crayfish and otter. Populations of these species have declined across many parts of Europe and so they are listed on Annex II of the Habitats Directive (species whose conservation requires the establishment of SACs). Some of these species (Atlantic salmon, white-clawed crayfish and otter) are widespread across Ireland. The others are either less widespread or simply under-recorded. Nevertheless, there are records of lamprey from seven river systems, whilst twaite shad has been known to spawn in the lower reaches of six. Of greatest note are perhaps the Irish populations of freshwater pearl mussels, since as well as the typical *Margaritifera margaritifera margaritifera* of soft waters, Ireland has a unique population *M. m. durrovensis* adapted to hard water and restricted to a 10 km stretch of the River Nore in County Laois.

Ireland is also very important for wintering waterfowl (ducks, swans, geese and waders) and in addition to the SACs, many wetland Special Protection Areas (SPAs) for birds have been established under the Birds Directive, for example the Shannon Callows, Lough Swilly and Lough Corrib.

Notable by their absence are great crested newts and water voles which never made it across before rising sea levels after the last ice age separated Ireland from Britain.

The National Parks and Wildlife Service (NPWS), which is part of the Department of the Environment, Heritage and Local Government, manages the Republic of Ireland's nature conservation responsibilities under the Habitats and Birds Directives, a key element of which is the designation and protection of SACs and SPAs (together referred to as European sites). The NPWS has designated a significant extent of freshwater and estuarine habitat in Ireland as European sites, including SACs that take in the main watercourses and waterbodies of whole river catchments, for example the Moy, the Barrow and Nore, the Boyne and Blackwater, and also many individual lakes, river reaches and floodplain wetlands whose ecology may be profoundly influenced by what happens elsewhere in the undesignated parts of their catchments.

Water Quality and the Influence of Sewage Effluent

Water quality influences the nature and species composition of the plant communities that develop in a particular watercourse. It also has a direct effect on the ability of a watercourse to support particular fish and invertebrates and an indirect effect on otter by influencing the availability of prey species. The freshwater pearl mussel and Atlantic salmon in particular have stringent water quality requirements.

The Water Framework Directive requires that, in general, all waters should achieve good ecological status or equivalent by 2015, and deterioration in status is not acceptable. The challenges in Ireland are how to improve the approximately 30% of river channel length, which suffers from slight to serious pollution, and how to prevent the deterioration of stretches currently classed as unpolluted. This is a very real challenge as the Environmental Protection Agency notes that between the reporting periods of 1995-1997 and 2001-2003 the number of water quality monitoring stations classified as having high water quality halved.

Eutrophication

The discharge of sewage effluent has an adverse influence over water quality with phosphorus being the water quality parameter of greatest concern in freshwaters. Elevated concentrations of biologically available phosphate can, in some circumstances, result in imbalances in riverine plant communities as growth rates of individual plant species (algae and higher plants) are affected by the increased nutrient supplies. In such a eutrophic system nutrient-tolerant species will dominate. (There are many strict definitions of eutrophication associated with European legislation and put forward by academic researchers so please don't be offended if we don't follow any particular definition in a general article such as this!).

This imbalance in the aquatic ecosystem can cause adverse effects on fish and invertebrates due to the oxygen depletion which can occur as large algal populations die and microbial decomposition uses up the oxygen in the water. The excessive growth of plants can also cause physical alterations to river

channels and increase the accumulation of silt.

Exceedences of effluent standards and deficiencies in monitoring regimes at many sewage treatment works have been reported by the Environmental Protection Agency, with non-compliance being particularly problematic at small works. Inputs from sewage effluent however need to be considered in the context of other sources of anthropogenic nutrient load, for example in the Western River Basin District it is estimated that agricultural inputs contribute 78.5% of the nutrient load compared to just 2.3% from sewage treatment works. Agricultural inputs are being addressed through controls on fertilizer use under the recently introduced Good Agricultural Practices for Protection of Waters Regulations.

Other Effects

As well as eutrophication, the organic component of sewage can directly cause oxygen sags in freshwaters due to microbial activity, while ammonia can poison fish if concentrations are too high.

Sewage Treatment Upgrades and Discharge Location

In Ireland the majority of sewage treatment works are owned and operated by County Councils acting as the water service authority for the local area. Unless specific conditions were placed on a planning permission as a result of an Environmental Impact Assessment, in general, the County Council need only comply with the discharge requirements set out under the Urban Waste Water Treatment Directive. This aims to prevent the environment from being adversely affected by the disposal of inadequately treated sewage, and sets out the type of sewage treatment that must be adopted and the generic effluent standards that must be met, based on the size of the population served.

In-river water quality targets derived from legislation, such as the Phosphorus Regulations or those set out in other EU Directives, such as the Freshwater Fish Directive, also need complying with. Often assimilation capacity calculations are carried out to ensure that no standards will be breached. Clearly though, if the water to which a discharge is being made is already failing to reach standards, the discharge will exacerbate the problem unless up-stream sources can be controlled.

Now a new licensing system is being introduced, under the Water Services Act 2007, requiring all sewage treatment works to be licensed by the Environmental Protection Agency taking into account the EU Water Framework Directive and associated legislation. Entec and Nicolas O'Dwyer are currently assisting the Water Services National Training Group (part of the Department of the Environment, Heritage and Local Government) in developing implementation guidance and training programmes for this.

Due to the need to comply with increasingly stringent European legislation on water quality nearly all County Councils are upgrading sewage treatment works in their area with many of these proposing the installation of phosphorus removal works to combat eutrophication. To illustrate the scale of these sewage treatment improvements, between 2004 and 2006 a total investment value of €5 billion was set aside for about 850 water and sewerage schemes at different stages of development and this rate of investment is being maintained.

In addition to legislative requirements to improve the current situation, Ireland is having to respond to new demands. Over the past ten years, the economy of the Irish Republic has

Nenagh Waste Water Treatment Works - in the heavily designated Shannon catchment

been booming – and between 2002 and 2006 the population increased by 300,000, largely through immigration. This trend is anticipated to continue, and there is also a drive towards more balanced regional development, so that areas where populations have remained static for many years are now experiencing, or preparing for, significant growth. The provision of improved sewage treatment systems is essential to ensure that such development will be sustainable.

So, many County Councils are increasing the capacity of sewage treatment works in their area as well as improving treatment levels. The County Councils, in their role as planning authorities, are also requiring private developers to install small scale treatment systems for housing developments in rural areas that would have previously been connected to septic tanks.

In upgrading sewage treatment works careful consideration needs to be given to the discharge location and in particular the assimilative capacity of the receiving watercourse – which is determined by river flow and background pollutant concentrations, and can be used to calculate the load of sewage effluent which could be accommodated while still achieving compliance with in-river water quality standards.

Large rivers tend to have a high assimilative capacity and so, all else being equal, it is best to discharge directly to them to take advantage of this. The disadvantage is that any pollution incidents, however unlikely, may have more far-reaching effects on the ecology of the catchment. Smaller rivers and tributaries tend to have a low level of dilution and are thus more susceptible to eutrophication, but any pollution incidents are likely to have more restricted effects. There is no one solution that is appropriate in all circumstances, and it is therefore essential to understand both the nature of the discharge (remembering that some sewage works take industrial as well as domestic effluent) and the biodiversity interests and priorities of the catchment – especially where the catchment includes European nature conservation sites.

Need for Appropriate Assessment

Sewage treatment works of strategic economic or social importance are approved at national level by An Bord Pleanála (The Planning Board), whereas smaller schemes are approved in-house by the County Councils. Since many of these smaller schemes are unlikely to result in significant effects, an Environmental Impact Assessment is not always required. However, many of the receiving waters are designated as SACs or SPAs or are ecologically linked to them – either because they flow into them or because they form part of an aquatic network that supports migratory or wide-ranging species. This

means that, irrespective of the need for Environmental Impact Assessment in general, the competent authority must still take into account the requirements of the Habitats Directive before approving any sewage treatment upgrade.

The Habitats Directive obliges the competent authority to undertake Appropriate Assessment where a development is likely to have significant effects, either individually or in combination with other developments, on a European designated site. To avoid an adverse effect on the integrity of the European site, any proposal should at the very least ensure the maintenance of the existing extent and quality of designated habitat features and the maintenance of a viable population of any species for which the European site is designated. Ireland was recently subject to an adverse ruling from the European Court of Justice on some aspects of its implementation of the Habitats Directive (ECJ case C-418/04) and this appears to have raised awareness of the Directive's requirements. Certainly, we are increasingly finding that Appropriate Assessment is being requested by NPWS.

Undertaking Appropriate Assessment in Ireland

Since the majority of sewage treatment upgrades are let as Design and Build (and sometimes Operate too) contracts by the County Councils, precise details of the treatment process and outfall design are not usually available at the Appropriate Assessment stage. The approach Entec has taken towards addressing this information gap is to specify design limits and mitigation measures that will ensure adverse effects on integrity will not arise. The Council incorporates these into the contract documents once the scheme has been granted planning approval, and the contractors will not be permitted to vary them unless they can agree alternatives with the NPWS.

Lack of baseline information on the distribution of qualifying features is also an issue when undertaking Appropriate Assessment in Ireland. For example, we needed to prepare a 'report to inform' an Appropriate Assessment of a new discharge into the Unshin catchment in County Sligo. The River Unshin is designated for its floating river vegetation communities and for Atlantic salmon, but in the absence of recent survey data it would not have been possible to ascertain the status and distribution of these 'qualifying features' without undertaking extensive original field work. We therefore adopted a precautionary approach whereby although a site visit established that floating river vegetation was currently absent from the reach in question, the potential effects on the vegetation and on all life stages of salmon were considered.

The other main information gap is a lack of clarity on what constitutes favourable conservation status. Entec therefore uses the best available information on the water quality requirements of the habitats and species supported. For example, for an effluent discharge to a watercourse that supported salmon, lamprey and white-clawed crayfish, the guideline for compliance within the Salmonid Waters Regulations of less than or equal to 5 mg/l Biochemical Oxygen Demand (BOD) for 95% of the time was taken as an appropriate target concentration to mitigate potentially significant effects on the SAC. This standard was selected because the water quality requirements of Atlantic salmon are more onerous than those of lamprey and white-clawed crayfish, so compliance with the Salmonid Waters Regulations will ensure that the water quality requirements of all three species are met. Understanding of the water quality requirements of particular species is growing and it is important to maintain contact with researchers in these areas. For example, the acceptable phosphate and nitrate parameters for freshwater pearl mussels have been lowered as our understanding of their ecology has improved.

The effects of constructing any new outfalls also need to be considered. The most common risks are of increases in suspended sediments and turbid run-off to watercourses which, amongst other things can scour the gills of juvenile fish and smother fish eggs - both issues of concern in Ireland's world class fishing rivers, whether or not they are SACs. While it is impossible to entirely remove the risk of such pollution-related effects in any works involving construction, there is a range of appropriate guidance available detailing best practice measures to minimise the risk of construction-related pollution that can be specified for implementation, though when it comes to the timing of works there can be difficult choices to make between the competing needs of the various species.

Conclusions

Habitats Directive Assessments are an increasingly important part of the process of ensuring better management of Ireland's rich diversity of river and wetland habitats and their wildlife. Sensitive upgrading of sewage treatment systems and better controls on agricultural fertiliser use are vital for maintaining and enhancing its habitats and species populations of European importance, as well as for ensuring that Ireland continues to benefit from the full range of wetland ecosystem services it enjoys.

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White-Clawed Crayfish: Use of Drainage Ditches

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White-clawed crayfish *Austropotamobius pallipes*, Ireland's only native crayfish, is the largest mobile invertebrate in aquatic systems in Ireland. It is viewed as a keystone species which is under threat across its European range from habitat loss, pollution, competition from introduced non-native species (such as the North American Signal Crayfish *Pacifastacus leniusculus*) and in particular from crayfish plague or *aphanomycosis* (Matthews and Reynolds 1995). As such it is listed for protection on Annex II and V of the Habitats Directive (92/43/EEC) and Appendix II of the Bern Convention and nationally under the Wildlife Act 1976 and the Wildlife (Amendment) 2000.

On a broad scale its distribution is largely dictated by a combination of local geology and water quality factors. It favours areas with relatively hard, mineral rich waters on calcareous rocks (Holdich 2003) and as such is widely distributed throughout the limestone rich Irish midlands and west. In Ireland, crayfish have been recorded from a wide variety of habitats, including canals, mill races, streams, rivers, lakes, reservoirs and water-filled quarries. However, little mention is generally made of the use of drainage ditches that are hydrologically connected to such habitats despite these being ubiquitous in the Irish landscape. Demers *et al.* (2005) found that crayfish were most commonly encountered in unpolluted waters, but that they were also found in slightly polluted and moderately polluted water, so the potential would seem to exist for movement of crayfish into such habitats, as long as other factors are suitable.

In a recent study of 27 watercourses conducted by Atkins in east Co. Galway (hydrometric areas 26 and 29), which included rivers, streams and drainage ditches on a total of seven different sub-catchments, crayfish were recorded at six sites (22% of sites) (under NPWS licence no. C69/2007).

Of the above 27 sites, five drainage ditches were surveyed; three additional watercourses which were degraded small stream habitats, in many ways characteristic of drains, were also surveyed. Adult crayfish (*i.e.* two to three year plus individuals) were recorded in two ditches and in two of the three degraded ditch-like small streams; in all cases these were either trapped or caught in a sweep net. One site was within 30 m of a river where large numbers of young crayfish were also captured. In a separate study in Co. Tipperary, an adult crayfish was also encountered in a drainage ditch which connected a wetland pond to the River Multeen Special Area of Conservation.

While we do not as yet have adequate data to look at habitat factors positively associated with distribution, the presence of in stream macrophyte cover, especially *Apium nodiflorum*, was notable, as was the presence of cobble and gravel substrate in the base of the ditches and positive for the presence of crayfish.

White-clawed crayfish Photo: Gordon Howe (Environment Agency)

The above results indicate that drainage ditches cannot be discounted as a potential habitat for white-clawed crayfish and highlights the need for further work in this area. Consideration should be given to the potential role of ditches as refugia (*e.g.* for repopulating watercourses in the event of pollution events; or as safe refugia for young in high flow conditions or in cases of high population density), availability of foraging habitat, and the possibility that they may play a role in terms of crayfish movement and habitat connectivity.

In particular, the study highlights the need for the adoption of an agreed methodology for the evaluation of ecological importance and assessment of development related impacts on ditches in Ireland. To this end we understand that Ms Jane Kavanagh is reading for a PhD under Dr Simon Harrison in University College Cork on the *Freshwater Ecology of Drainage Ditches* from which it is hoped to develop an appropriate survey and evaluation methodology.

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The International Institute of Ecology and Environmental Management?

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In 1991, IEEM was launched as an institute to serve professionals working in ecology and environmental management in the United Kingdom. Right from the start there were a few members from outside the UK, but it was not until 2005 that the first Geographic Section, to include a bit of 'foreign soil', was launched. The now well-established Irish Section covers both Northern Ireland and the Republic of Ireland and is thus truly an international Section. Has the time come to develop the international terms of reference of IEEM to include other European countries?

'What are the likely benefits of such a step?', I hear you say. Well firstly, all the big environmental issues of today are global in nature. Climate change must be tackled on an international scale if we are to have any chance of making a difference. Habitat loss is happening much faster in the developing world, largely due to the resource demands of the richer countries. The consequent loss of species and biodiversity is a global issue which has to be faced by all countries together. Second, much of the legislation to which we operate now in Britain and Ireland, derives from European Union edicts. The Birds Directive, the Habitats Directive, the EIA Directive, the Water Framework Directive, and many more such overarching statements form the basis for our own national laws and regulations and define the top priorities in Biodiversity Action Plans. As an international institute, we could begin to have an influence on new European legislation in this area. We could play our part in bringing the professionals in other European countries together to act as a real force for change in the environmental policy area. Thirdly, at the practical level, there is a serious need to improve professional practice in ecological work in some other parts of the continent, notably the accession countries and newer member states of the EU. We already have our own best practice guidelines for EcIA which could quite easily be adapted for application in other like-minded countries.

And what would be the costs? IEEM is already active at the international level. As a leading member of the European Federation of Associations of Environmental Professionals (EFAEP) and, as an active participant in the work of IUCN, we are already contributing to international conservation work. A greater emphasis on global issues might include the appointment of an International Officer and could ultimately involve the establishment of an office in Brussels to serve the dual function of direct access to the European Commission and support to new Geographic Sections in other member states. The RSPB is a good example of a UK-based charity which has fostered the development of like-minded national environmental NGOs in other countries and has supported these financially and logistically. The Irish Section is already generating funds for the institute through its successful all-Ireland conferences. Surely, active Sections in other prosperous European countries could be equally profitable or at least self-funding.

The Republic of Ireland now has, for the first time, a coalition government involving the Green Party. With two Green ministers at the Cabinet table, including the Minister for the Environment and the Minister for Energy, there is a unique situation where professional environmentalists are in a position to make a serious difference in national government policy. Changes are evident already, such as the recent budget decision to tax new motor vehicles in line with their greenhouse gas emissions. If the Government could also be persuaded that ecosystem services provided by our natural habitats and species are essential to our long-term survival, we might see a significant move forward in biodiversity conservation. The Irish Section of IEEM does not currently have the resources to influence these powerful decision makers, but with the backing of an International Officer, we would carry much greater clout. 'Think globally, act locally' is a well-worn catch phrase, but it is one that IEEM could do well to adopt in the coming years.

Healing the Sea – The Role of Marine Reserves

Lisa Chilton
Marine Development Manager, The Wildlife Trusts

Introduction

For British lobsters, Lundy is the place to be. Since 2003, scientists have recorded a dramatic increase in the size and abundance of these crustaceans off the island's east coast. The reason is very simple: Lundy's waters boast the UK's first conservation area to be fully protected from all fishing, dredging and other damaging use. At just 3.3 km², this sanctuary is small – less than 0.001% of the UK's sea area – but it's a start. Importantly, the rapid changes taking place at Lundy are demonstrating the power of marine reserves to promote the recovery and conservation of marine habitats and wildlife.

Marine reserves (also known as 'highly protected marine reserves') are areas where the habitats and wildlife are permanently protected from all damaging use. In marine reserves, habitats can recover and wildlife can flourish. It's common sense. Take away the pressures and nature can usually bounce back. Stop fishing and there will be more fish. Stop dumping waste and there will be cleaner water. And the end result? A healthy and wildlife-rich marine environment that all can appreciate and enjoy. An environment that is as near to its natural state as we can possibly achieve, and which helps us understand how our seas work. And an environment that is well-equipped to cope with a changing climate. Marine reserves are not the whole solution to fixing our seas, but they are a vital part. Without marine reserves – delivered through a UK Marine Bill and devolved legislation – we will continue on our downward spiral. With them, we can start to replenish our living seas.

Marine Protected Areas in the UK

For many people it's a surprise to learn just how poorly our seas are protected. The Wildlife Trusts' ICM poll asked 1,300 people what proportion of UK seas they believed to be fully protected for wildlife conservation. On average, participants thought that 27% of our sea is already fully protected in marine reserves – and they thought that 62% should be protected in this way. In fact, only 1% of our sea area is designated as any kind of Marine Protected Area (MPA) for wildlife conservation, and most of these MPAs are multi-use sites where fishing and other potentially damaging activities continue.

The UK is committed under the World Summit on Sustainable Development to creating an effectively-managed, representative

Grey seal
Photo: Martha Tressler

network of Marine Protected Areas by 2012 (in addition to a similar commitment under the OSPAR Convention with a 2010 deadline). New legislation will be needed to deliver this commitment – and we must get a move on. The UK Government has admitted that the current approach is inadequate, and is proposing that the developing Marine Bill will introduce a new type of MPA: the Marine Conservation Zone (see Figure 1). Marine Conservation Zones offer a flexible approach, through which the level of protection can be tailored for each site, from low levels of restriction through to highly protected areas (marine reserves). The Wildlife Trusts support this proposal and are urging Government to progress the bill as quickly as possible.

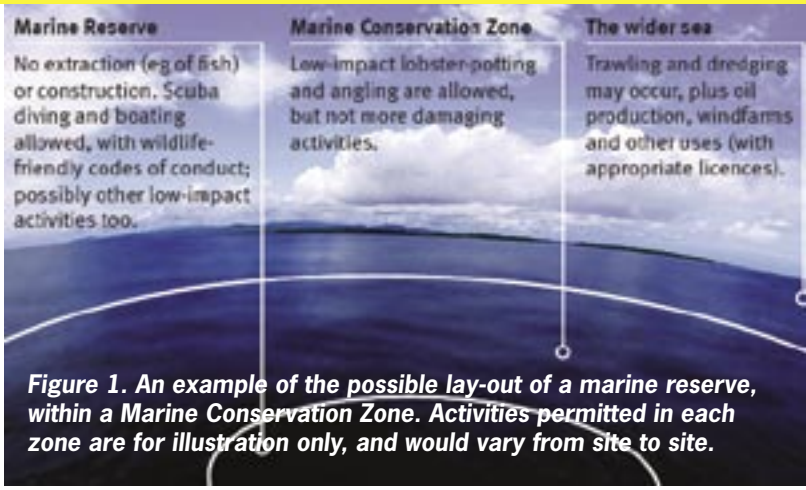

Figure 1. An example of the possible lay-out of a marine reserve, within a Marine Conservation Zone. Activities permitted in each zone are for illustration only, and would vary from site to site.

Box 1: MPAs - the status quo

There are currently two mechanisms for designating MPAs in the UK:

Marine Nature Reserves – The provisions for creating Marine Nature Reserves under the Wildlife and Countryside Act 1981 were fundamentally flawed. Particularly problematic was the requirement for all conflicts to be resolved prior to taking the proposal to the Secretary of State. This effectively amounted to the power of veto for any objector. Only three small reserves were designated (Lundy, Skomer and Strangford Lough). The Government has admitted that the system was a failure, and proposes replacing it with a new system.

European Marine Sites – These consist of Special Areas of Conservation and Special Protection Areas designated under the EU Habitats and Birds Directives respectively. There are more than 100 sites around the UK, but they protect only a very limited range of habitats and species chosen by Europe. Many nationally important habitats and species are not eligible for protection. Moreover, European Marine Sites are multi-use sites, where fishing, dredging and other activities continue with few restrictions. It has proven very difficult under the current regulations and management approach to introduce higher protection (e.g. to ban certain damaging types of fishing) where needed in these sites.

Marine Reserves

The concept of marine reserves has been around for a long time. New Zealand was an early pioneer, establishing its first sites more than 25 years ago. Australia followed suit, along with the USA, South Africa, the Philippines, Belize, France, Italy and Spain, to name but a few. There is now a vast literature documenting the history, ecology and management of marine reserves, both from the tropics and from temperate seas.

In 2001, 160 of the world's most eminent marine scientists and MPA experts signed a Scientific Consensus Statement drawing conclusions from the body of related scientific work. They concluded that marine reserves result in 'long-lasting and often rapid increases in the abundance, diversity and productivity of marine organisms', and that 'full protection (which usually requires adequate enforcement and public involvement) is critical to achieve the full range of benefits'. This last point is an important one. While multi-use MPAs unquestionably have a role in protecting marine biodiversity, they rarely perform as well as highly protected areas. Only if you take away all of the pressures can the wildlife bounce back to its former (often unknown) glory. Lundy is a case in point: the seas had already been protected from most fishing activity for some years, but the complete fishing ban in 2003 still resulted in dramatic changes. In essence, marine reserves provide breathing space: places where habitats and wildlife can recover to a near-natural state. In doing so, they protect biodiversity and help 'prop up' the wider marine ecosystem.

In the face of all this evidence, why are we – an island nation – dragging our heels? Ultimately, it comes down to legal power and political will, and it's fair to say that both have been thin on the ground. The legal powers for our existing MPAs are limited and it has proven very difficult to restrict fishing activities. Moreover, successive governments have repeatedly shown

Rock pool exploration ***Photo: Trevor Rees (www.trevorreesphotography.co.uk)***

unwilling to give the environment the benefit of the doubt. In one notable case, a government conservation agency even had to pay for an area of fragile habitat to be dredged, in order to demonstrate the devastating impact. This just would not happen on dry land.

For Lundy, after a long struggle, it was a byelaw from the Sea Fisheries Committee that finally secured the lobsters' happy ending. We have learned lessons the hard way and now it is time for change. We urgently need the UK Marine Bill – together with complementary legislation from the devolved administrations – to deliver a new, fit-for-purpose system that irons out the problems and provides for the creation of an effective and comprehensive MPA network. This network must include marine reserves.

Environment Secretary Hilary Benn MP at The Wildlife Trusts' Petition Fish campaign finale in the House of Commons

The Marine Bill

The Government's Marine Bill White Paper, published in spring 2007, sets out a new direction for marine conservation and the regulation of human activities at sea. The paper proposes a network of Marine Conservation Zones, ranging from areas with minimal restriction through to highly protected sites (*i.e.* marine reserves). Although this is a big step forward, The Wildlife Trusts' response to the White Paper highlighted several concerns, including that the provisions would not be strong enough to deliver marine reserves.

The draft Marine Bill is expected to be published in March/April 2008, together with a national policy statement on MPAs. The draft Bill will be scrutinised by one or more parliamentary committees, and could go before Parliament in late 2008, or 2009. A Scottish Marine Bill is also in development.

Meanwhile, the country conservation agencies are starting to plan for implementation of the MPA network. Natural England is aiming to submit a proposed English network to Defra by 2011, and is trialling a regional network approach through the Finding Sanctuary project. The Wildlife Trusts will be heavily involved in the development of the MPA network – from public engagement at the local level to UK advocacy – and will be striving to ensure that the end result is a well-managed and effective network that includes a suite of marine reserves.

Jewel anemones
Photo: Sally Sharrock

Marine Reserves in Practice

Figure 1 shows how a zoning approach might be applied to MPAs in UK seas. Often a marine reserve will take the form of a highly protected area within a larger, multi-use MPA (a European Marine Site or Marine Conservation Zone). Arguably, all European Marine Sites and Marine Conservation Zones would be more effective if they included at least one Marine reserve. In some cases though, a marine reserve may stand alone. This is most likely to happen when the feature to be protected is small or very isolated, or when the surrounding area is not threatened by human activity.

In a recent report, *Marine reserves – TLC for our seas and sea life*, The Wildlife Trusts listed some of the factors (see Box 2) that might be considered when selecting sites to designate as marine reserves, together with a couple of sites to illustrate each factor. We expect the Marine Bill and devolved legislation to bring in a dedicated legal mechanism and clear process for creating Marine Conservation Zones (including marine reserves) in the sea regions around the UK. This should include a robust set of scientific and technical criteria for selecting suitable locations. The chosen sites must be those that present the very best opportunities to conserve wildlife and restore the health of the ecosystem – not just the 'leftovers' that are of no interest to other sea users.

The list of factors and sites included in our report does not attempt to pre-empt the future selection process. It is simply a non-technical introduction to some of the factors that might be taken into consideration, drawing on the concepts already used in other formal site designation processes (eg for Sites of Special Scientific Interest on land).

Box 2: Important factors in selecting marine reserves

1. Naturalness (Illustrative sites: Solway Firth, Isles of Scilly)
2. Rare, threatened, vulnerable or important habitats or wildlife (Illustrative sites: Lyme Bay Reefs, Easington-Dimlington Reef)
3. Critical lifecycle area (Illustrative sites: The Wash, Shell Flat)
4. Biodiversity hotspot (Illustrative sites: Strangford Lough, Rathlin Island, Menai Strait – see Box 3)
5. Typical habitats and wildlife (Illustrative sites: The Manacles, The Overfalls)
6. Ecosystem engine (Illustrative site: Dogger Bank)
7. Community initiative (Illustrative site: Lamlash Bay – part of which has recently been selected as Scotland's first marine reserve)
8. Research and education (Illustrative sites: Studland Bay, Skomer)

The illustrative sites are shown in Figure 2. For more detailed information please see the full report.

The areas shown in Figure 2 illustrate the sorts of sites, habitats and wildlife that could benefit from marine reserve status. In many cases, the benefits could be achieved from protecting part of an area (e.g. part, or parts, of The Wash) as a marine reserve, rather than the whole area. These are not formal site proposals and have not been identified through a thorough scoping exercise that would be required as part of an MPA network programme. Any site would have to go through a rigorous selection process from nomination to final designation.

Figure 2. Map showing the location of the illustrative sites.

Box 3: Illustrative sites in Northern Ireland

Strangford Lough is the UK's most biologically diverse sea lough. There are tidal rapids, seagrass meadows, beds of horse mussels, muddy areas favoured by scampi, and mixed reefs of bedrock and boulders. Wildlife includes rare and threatened species such as seapens and native oysters, as well as the common seal. The lough has been badly damaged by trawling and dredging – in spite of supposed protection as a Marine Nature Reserve and European Marine Site – and a restoration plan is in development. Designating one or more fully protected marine reserves in Strangford could help speed the recovery of this internationally important site.

Rathlin Island is another important hotspot. More than 25 new species of sponge – found nowhere else in the world – were recently discovered there. The site is also home to a population of rare fan shells. Rathlin Island is a European Marine Site, giving protection to its reef and cave habitats, but the site has been damaged by scallop dredging.

Further Reading

The Wildlife Trusts' Marine Bill Campaign and SOS team
www.wildlifetrusts.org

Marine Reserves – TLC for our seas and sea life
www.wildlifetrusts.org/index.php?section=environment:marine:achieve

The Wildlife Trusts/ICM poll
www.wildlifetrusts.org/index.php?section=marineopinionpoll

Scientific Consensus Statement on Marine Reserves
www.nceas.ucsb.edu/Consensus

Finding Sanctuary
www.finding-sanctuary.org

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Lyme Disease - Mountain or Molehill?

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Anyone working in the countryside where either sheep or deer are prevalent, or who owns a dog, will surely know about Lyme disease. But how much do you know and how accurate is that information? A few hours spent browsing the internet, including the national Lyme support groups in the USA and UK and several major medical sites such as the Lancet and the British Medical Journal, have only proved that there is enormous confusion and conflicting evidence about the disease, its diagnosis, treatment and outcome. This article attempts to give the reader a layman's overview of the available information.

Lyme disease was first reported in the USA in 1970 in one isolated case, followed in 1975 and onwards by the diagnosis of cases of 'Lyme arthritis' in the Connecticut town of Old Lyme, by physician Dr Allen Steere. He mistook the disease for juvenile rheumatoid arthritis (Steere *et al.* 1977). The mechanism whereby infection from a tick bite took place was not finally isolated until 1982, when Dr Willy Burgdorfer identified spirochetes of a species of *Borrelia* bacteria in the mid-guts of a tick (*Ixodes* species) (Burgdorfer *et al.* 1982). The species is named *Borrelia burgdorferi* in his honour and technically Lyme disease describes infections caused by this bacterium only. However, the disease is known to have existed in Europe since the late 19th Century with records of symptoms known to be caused by *Borrelia* bacteria and ticks from that period testing positive for *Borrelia* (Matuschka *et al.* 1995).

A number of other bacteria of this spirochete type cause similar infections and use the same tick vector, but there are differences between the infection caused by *Borrelia burgdorferi* sensu stricto and *Borrelia burgdorferi* sensu lato (in Europe three species – *Borrelia burgdorferi* sensu stricto, *Borrelia garinii* and *Borrelia afzelii*). However, such differences are very hard to distinguish; it is most common to describe the suite of symptoms caused by *Borrelia burgdorferi* sensu lato under the term Lyme borreliosis (LB). Other bacteria and virsues can also be transmitted in the same way causing a variety of diseases (Burrascano 2005).

The *Borrelia* spirochete bacteria involved are very similar to those that cause syphilis, though there is no known similarity in the method whereby the bacteria is introduced to the body, merely the way in which the bacteria infects the body once it has been introduced and the systems which it attacks. Apparently *Borrelia* is also far more effective as a pathogenic agent than *Treponema pallidum*, the bacteria which causes syphilis (Taylor 2004).

To further complicate matters, it is apparent that ticks carry many other bacteria that can cause illness in humans, such as four species of the genus *Ehrlichia*. These are introduced in the same way as *Borrelia* and many chronic patients may experience multiple infections giving rise to a greater diversity of symptoms and greater difficulty in diagnosis and treatment (Burrascano 2005).

In the UK there is one species of hard tick involved in LB, the sheep tick *Ixodes ricinus*, which may be found anywhere from the city centre parks to the wildest parts of the Highlands – anywhere that suitable hosts may be found. Ticks have four stages in their life-cycle: egg, larvae, nymph and adult. The latter three describe the different stages or sizes of ticks that anyone who has seen ticks will recognise, while it is the nymph and adult stages that are thought to be largely responsible for borreliosis infection (Taylor 2004).

The bacteria enter the body while an infected tick is feeding on a human host. This occurs during the initial introduction of saliva, which contains bio-chemicals that are into-coagulant, anti-inflammatory and anaesthetic, or in the process of regurgitation that may take place during feeding. Taking a minimum of 12 hours to enter the blood (Burrascano 2005), the spirochete form of *Borrelia burgdorferi* is able, once it has penetrated a new host, to literally wind its way into any or all of the major organs or tissues of the human body (ILADS 2004). The bacterial lipo-proteins on the outer surface of the *Borrelia* cell cause a massive inflammatory immune response that can become chronic and self-perpetuating without intervention (Marshall and Marshall 1999).

The main difficulties with LB are the range of systems that may be affected, causing a very wide range of symptoms (over 100 are generally attributable to LB) and the inability of laboratory tests to provide a concrete and accurate test for the presence of the bacteria (ILADS 2004; Burrascano 2005). A further complication must also be the very diverse range of opinion that exists within the medical community about this disease, its existence, its diagnosis and its treatment (Wilson 1999, ILADS 2004). Like many newly-identified diseases, it takes time for the medical community to bring itself fully up-to-date with what is happening and the process of discovery itself is neither instantaneous, nor without controversy.

The lack of a definitive test for LB is apparently the result of two separate factors. Firstly, the bacteria are extremely difficult to grow in the laboratory, which makes them very difficult to study; prolonging efforts to discover a definitive test and a viable vaccine. Secondly, a person infected with *Borrelia burgdorferi* may present a negative test as the bacteria is able to effectively 'hide' from the patient's immune system

Red deer
Photo: www.wildstock.co.uk

and therefore does not initially trigger a measurable immune response. This is achieved by the bacteria generating a genetic response in its tick host, giving rise to excessive production of a salivary protein which then coats the bacteria; this coating acts as an immunosuppressant in the new host. The figures given vary but there are sufficient seronegative results for patients with a positive infection for the guidelines given in both the USA and the UK to state that diagnosis should be on clinical presentation, rather than serological testing alone (ILADS 2004, Burrascano 2005); a positive test confirms the presence of the bacteria but a negative is not conclusive. There is additional comment suggesting that not all laboratories are using the same standards and that results from some laboratories should be regarded as suspect (Ho-Yen 2006).

Many patients are unaware that they have received a bite from a tick (ILADS 2004). Within 3-30 days, a characteristic rash (Erythema migrans or EM) may appear, whose presence confirms LB. This may or may not have the typical 'bull's eye' feature but generally grows concentrically over 5-10 days before disappearing after 7-14 days, thus setting itself apart from the rash caused by an allergic reaction to the tick's saliva. The occurrence of multiple EM rashes indicates the systemic spread of the organisms. Although characteristic, this rash appears in less than half of LB infections (ILADS 2004).

As *Borrelia* spreads throughout the body, headaches and flu-like symptoms may start to appear, generally 4-6 weeks after the onset of the infection. These may be followed by joint pain; often very severe but not persistent and generally affecting the larger joints. Encephalitis, with associated cognitive dysfunction, and facial (Bell's) palsy may then develop, this within a few months of infection or during relapses. As infection progresses and the range of systems and organs vulnerable to the bacterium increases, so the range of possible symptoms increases, posing one of the biggest challenges of LB, as described above. Eventually, chronic disease may develop with, uniquely in humans, a significant neurological component. It is potentially hugely debilitating, with patients possibly being confined to a wheelchair and unable to work or care for themselves. Although some medical websites claim that LB is never fatal, there are numerous obituaries on the support websites of people, some very young, who have died from conditions attributed to LB and with confirmed *Borrelia* infection.

Diagnosis of the disease is problematic. This is attributable to the wide range of possible symptoms, the absence of 'characteristic' symptoms in many patients, and the generally poor state of knowledge within the medical profession. The National Library of Health Primary Care Question Answering Service (www.clinicalanswers.nhs.uk) is perhaps the most likely point of reference for GPs unsure of their knowledge and seeking guidance. This site refers to the recently updated American guidelines (ILADS 2004) and emphasises the fact that diagnosis needs to be made on clinical presentation, supported by serologic testing, rather than the converse. The guidelines are written by Dr J.J. Burrascano, most recently updated in September 2005, and are extremely comprehensive. If you suspect you may be suffering from LB, then it may be a very good idea to download the guidelines, make yourself familiar with them and take them with you when you visit your GP.

Treatment in the early stages of the disease relies on antibiotics. There is much debate over how long these should be taken and may relate to the degree of infection (ILADS 2004, Burrascano 2005). The response to antibiotics appears to be generally good. Treatment with steroids is strongly contra-indicated, in spite of the desire to alleviate the inflammation that accompanies the disease (Burrascano 2005). Later stages of the disease are, however, extremely difficult to treat and systemic treatment options are often very limited.

Early identification of the disease is, therefore, of paramount importance for the patient's outcome and this is clear in all the guidelines.

The number of cases every year is about 500 in the UK, though this is a recognised underestimate by a factor of 4-10 (ILADS 2004, Ho-Yen 2006). The provisional figure for Scotland is 171 in 2006 (Health Protection Scotland); in Scotland the disease is classified as notifiable. In the USA the rate is approximately 25,000 per annum (Taylor 2004), perhaps reflecting the slightly more advanced levels of awareness and testing that exist there, although it is also thought that this is an underestimate by a factor of 10 (ILADS 2004). The distribution of cases in the USA also probably more accurately reflects levels of awareness than the level of threat (Taylor 2004), though whether this is reproduced in the UK is not clear. Distribution figures and maps are almost impossible to find.

For outdoor workers prevention is better than cure. Wear long-sleeved tops, long trousers and possibly gaiters when working in long vegetation. Consider applying insect repellent (DEET) to lower legs and arms, but be careful not to use too much and preferably keep the concentration at 25% as a significant amount is toxic (Burrascano 2005). Carefully inspect your body for ticks after a day in the field; this may require the assistance from someone else, for all those areas you can't see. Don't be shy – your crotch is a favourite place for a tick to end up. If you have a tick, remove it with a pair of tweezers, as close to the head as possible and at the earliest opportunity. Keep an eye on the area and if you do develop a rash or, a month or so later, flu-like symptoms, GO AND SEE A DOCTOR! Tell them about the tick and if they are not inclined to take you seriously, consider getting another opinion. Make yourself as well-informed as possible since it may be up to you to pursue a diagnosis and treatment if you have contracted LB (Mervine 2000). Some of

the most revealing literature comes from doctors who have themselves developed LB; they have apparently all experienced difficulties in getting the right diagnosis and treatment (Wilson 1999, Taylor 2004).

It would seem that we are currently at a stage where both discovery of the disease process and manifestation, and the learning that takes place within the medical community (and also the wider public) are very much in a state of flux. This is confusing, especially so for patients who may be suffering from chronic and devastating symptoms without certain diagnosis or treatment regimes. It is inevitable that the response of sufferers is aggressive towards those that they believe have let them down and, sadly, the internet is full of tragic stories of people's lives that have been devastated by what they believe to be LB. There are also obituaries of those who have died from LB, including one really harrowing tale of a young professor in England who took his own life in the face of the awful neurological damage caused by LB.

In the absence of concurrent medical opinion, it would be wise for anyone working in the outdoors in the UK, Europe and North America to be aware that they are at risk. Be aware that untreated, this disease could be highly damaging, if not (in rare cases) fatal.

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Are the New EIA (Agriculture) Regulations in England Failing to Protect Semi-Natural Grasslands?

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The Grasslands Trust

The Grasslands Trust is campaigning for a review and strengthening of the Environmental Impact Assessment (Agriculture) Regulations 2006 because the regulation is failing to protect semi-natural grasslands from cultivation and other damage. We are asking *In Practice* readers to send us any examples of semi-natural grasslands that are being damaged or destroyed in England this year.

The new Environmental Impact Assessment (Agriculture) (England) Regulations came into force on the 10 October 2006, replacing the earlier regulations of February 2002, to enact the EU Environmental Impact Assessment (EIA) Directive as it applies to agriculture. Both Statutory Instruments are to protect 'uncultivated land and semi natural areas' and yet during the four years the regulations have been in place in this country, only 253 ha of land have been protected[1]. The first set of regulations were poorly drafted and following a challenge in the high courts, were rendered effectively useless. Despite a redrafting which has helped define 'cultivation', 'intensive agricultural activities' and 'semi-natural', the 2006 regulations have been substantially weakened in an attempt to reduce 'administrative burdens on farmers' as part of the Better Regulation Agenda[2].

There are several problems that The Grasslands Trust believes need to be addressed.

Two Hectare Threshold

Despite widespread opposition, the 2006 regulations now include a threshold which allows landowners seeking to cultivate land under 2 ha in area to proceed without consent from Natural England. The introduction of this threshold is designed to reduce the administrative burden imposed on land managers: Defra calculate this burden to be £180,000 over four years. Defra argue that the 2 ha threshold strikes a balance between protecting uncultivated land or semi natural areas whilst keeping the rules proportionate and cost effective. The Grasslands Trust believes that this attempt to reduce red tape for small businesses and 'produce savings within Natural England of perhaps 2-4 staff years' is to the detriment of the land the Directive is designed to protect **because so much of the surviving resource of semi-natural grassland in England now occurs in fragments below this threshold**.

As part of its justification for introducing the threshold, Defra states that had the 2 ha threshold been in place since February 2002 then the loss of uncultivated land or semi natural area would be only 12 ha (or less than 5% of the total land protected).

However, research commissioned by Natural England has shown that a significant proportion of the wildlife-rich grassland resource outside the Sites of Special Scientific Interest (SSSI) network occurs in small sites, often under the 2 ha threshold. Data show 92 of 483 (19%) of unprotected but important grasslands in England were subject to some form of agricultural improvement during the *c.* 20 years up to 2001. Of these, 56 sites (61%) were under 2 ha in area[3].

During the first 12 months that the new regulations have been in operation, several examples have been brought to our attention of wildlife-rich grassland under 2 ha lost to agricultural improvement. The Grasslands Trust is concerned that unless the threshold is removed – substantially more than Defra's prediction of 12 ha of uncultivated land or semi-natural area will be lost to agricultural improvement.

Screening Notices

Natural England may use screening notices to remove the application of thresholds from relatively modest areas of land: up to 20 ha for uncultivated land projects. This enables the UK to meet the requirement of the EIA Directive to avoid cumulative significant effects on the environment caused by several projects and to ensure that smaller projects which are still likely to have an impact are caught. Screening notices can only be applied in limited circumstances, and require an assessment of the facts and risks in each case.

From its own experience with a site near Sheldon in the Peak District National Park, Derbyshire, The Grasslands Trust believes that at present no system exists for properly determining the facts and risks needed to determine a screening notice. For example, no definition of what constitutes a 'threat' to the land exists or the age, type and quality of ecological data needed. The type of evidence needed to establish intent to cultivate on the part of a landowner is at present unclear and this needs to be clarified urgently.

At present, for a screening notice to be issued, Natural England require data confirming that the grassland concerned is included in the UK Biodiversity Action Plan definition of the relevant grassland type (*e.g.* lowland meadows and pastures, lowland calcareous grassland *etc.*) and the data needs to be up to date National Vegetation Classification (NVC) quadrats. These requirements are extremely onerous and are not defined within the regulation, but rather arise from a perceived need for Natural England to have robust defensible data to support their contentions that a site supports BAP quality habitat. This leads to the explicit exclusion of species-rich semi-improved grasslands, some of which now constitute the last surviving remnants of wildlife-rich grasslands in parts of England. The dividing line between species-rich semi-improved and unimproved grassland is by no means clear within the NVC and there is danger that a statistical approach to identifying this dividing line (*e.g.* by using MATCH) to assess whether a stand is

unimproved or semi-improved, will lead to important grassland sites falling 'outside of the scope of the regulations'.

Furthermore, the screening notice mechanism only applies to the current owner, so if the land is sold the screening notice no longer applies to the new owners unless one is served on them immediately. Land is often at its most vulnerable when its ownership passes to someone new and one such case has already happened under the new regulations in Worcestershire, where a meadow in the process of being designated as a county wildlife site was sold and ploughed by the new owner. Natural England has required the new owner of the meadow to re-instate the unimproved grassland habitat, although it is too early to say whether the habitat has been permanently damaged.

Consent

The Grasslands Trust is concerned that Natural England does not appear to be keen to inform landowners that they 'will' require consent under the new EIA regulations, merely that they 'may'. It is understood that Natural England legally cannot use the word 'will' under the current regulations because until the landowner reveals his intention, there is no evidence that whatever he is doing 'will' require consent.

While the regulations seem to place the burden of proof on the landowner to prove that they have cultivated land and therefore do not require consent, in practice this requirement is not being applied. It is not known how many sites are being cultivated without any contact with Natural England to determine whether consent is required, but for those sites where contact is made, only a small proportion are visited by Natural England staff to determine their status before a decision is made as to whether an environmental statement is required or whether the site falls outside the scope of the regulations.

Archaeological Features

The Grasslands Trust is concerned that uncultivated land or semi natural areas containing unscheduled archaeological features (such as Ridge and Furrow grassland) are no longer protected by the regulation and are thus at risk. Natural England is now using a different approach to protecting archaeological features, by applying the Entry Level Scheme (ELS) rules that require entrants to protect archaeological and historic landscape features identified within their Historic Environment Record (HER) or lose their right to receive ELS payments. Of course this approach does not protect archaeology on land not covered by agri-environment schemes.

Definition of Project

Under the 2006 regulations, projects that fall within the scope of the regulations are defined as 'projects which increase the productivity for agriculture of uncultivated land or semi-natural areas'. The definition of cultivation has also been widened to include not just physical ploughing, but also fertilizer and herbicide use. Although an improvement on the wording of the 2002 regulations (as a result of the Vixen Tor court case), this definition is, in practice, difficult to tie down.

It is also unclear to what extent the definition of a project covers the use of semi-natural grasslands by horses - overgrazing and inappropriate timing of grazing by horses is one of the biggest threats to unimproved grassland in some parts of England, and if these activities are outside of the scope of the regulations, this is of great concern.

Definition of Semi-Natural Land

One major omission in the regulations is that land supporting BAP-listed species, but not reaching the standard required to be recognized as BAP quality habitat, falls outside of the scope of the regulations. Thus significant resources of habitat supporting priority species is unprotected from cultivation. While this may be more contentious for widespread mobile species, sites for sedentary BAP species, such as many invertebrates, should be covered by the EIA mechanism.

The Grasslands Trust recommends:

1. Withdrawal of the 2 ha threshold based on evidence on number of sites now under threat.
2. Clarify when to use screening notices through a clear definition of 'threat'.
3. Allow screening notices to be applied to land rather than the landowner thereby continuing to protect land if sold.
4. Clear guidelines are needed on the use of the NVC to identify BAP habitats avoiding use of statistical packages such as MATCH.
5. Natural England to be granted powers to enter land to carry out ecological assessment.
6. Include unscheduled archaeological features within the regulations.
7. Extend the definition of agriculture to include all horse uses of semi-natural grassland
8. Define in more detail what is meant by 'project'.
9. Include species-rich semi-improved grasslands within the category of semi-natural.
10. Include grasslands and other habitats which support BAP listed species even if they do not qualify as BAP habitats in their own right.

The Grasslands Trust is working with Plantlife, Natural England and other conservation organizations to push for a review of the regulations. Please send us examples of sites in your area, and also comments you may have about our campaign or other issues around the EIA regulations applied to Agriculture. Information about sites will be treated as confidential and sources can remain anonymous if desired.

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Notes

[1] Explanatory memorandum to the Environmental Impact Assessment (Agriculture) (England) Regulations 2006, Annex A - paragraph 4.

[2] Explanatory memorandum to the Environmental Impact Assessment (Agriculture) (England) Regulations 2006, paragraph 7.7.

[3] English Nature Research Report No 636. The condition of lowland BAP priority grasslands: results from a sample survey of non-statutory stands in England.

Best Practice for the Identification and the Assessment of UK BAP Priority Ponds

Jim Fairclough MIEEM and Pascale Nicolet***
**Senior Ecologist, Golder Associates*
***Senior Freshwater Ecologist, Pond Conservation*

Introduction

Our attitude towards the conservation of ponds is changing. As little as a decade ago, the typical approach towards any development affecting ponds was to focus effort on surveys for great crested newt (GCN) or other suspected protected species that might inhabit the pond. Indeed, for ponds located outside of statutory designated sites, the legislative framework offered little protection, and their saving grace typically came in the form of a breeding population of GCN. Where supported by locally derived policy in relevant development control planning documents, or where ponds fell within non-statutory sites, better informed ecologists were able to persuade the developer of the need for more detailed survey, most often focusing on diverse marginal and aquatic vegetation communities and Red Data Book (RDB) and/or Nationally Scarce species of aquatic invertebrate. Nonetheless, there remained no tangible measure by which ponds of high ecological value could be assigned a respective level of importance.

In August 2007, however, following the Joint Nature Conservation Committee's (JNCC) review of priority habitats and species, ponds of high ecological quality were identified as a new UK Biodiversity Action Plan (BAP) priority habitat. This new level of importance assigned to ponds heralds the beginning of a new era for the conservation of ponds, and it is not just the amphibians that will benefit.

Pond 1 of a former sand and gravel quarry in Peterborough

Ponds – A New UK BAP Priority Habitat and HAP

The case for the inclusion of ponds as priority habitat in the UK BAP was provided by evidence from national and regional surveys (*e.g.* Biggs *et al.* 2005, Williams *et al.* 2004, Nicolet *et al.* 2002). This new pond priority habitat sits neatly within the UK BAP Broad Habitat: Standing open waters and canals.

The Pond Habitat Action Plan (HAP) is currently being developed

Box 1 Draft Pond HAP targets

- **Target 1 (maintaining extent): Maintain the number of Priority Pond sites.** Estimates suggest that around 20% of the c. 400,000 ponds outside curtilage might meet one or more of the priority habitat criteria (see Box 2). In addressing this target, particular emphasis should be placed on maintaining functional pond networks and species metapopulations. A pond site is a pond or a cluster of ponds including its surrounds.
- **Target 2 (achieving condition): Maintain quality of Flagship Pond sites.** The aim of this target is to work directly with a sub-set of c.1% of Priority Ponds ("Flagship Ponds") to ensure they are monitored and their quality is maintained. The list of Flagship Ponds is yet to be agreed.
- **Target 3 (restoration): Restore pond sites to priority status to deliver Species Action Plan (SAP) targets.** This target can apply to any non-Priority Pond with good potential for successful restoration for a SAP species, and can be aimed at improving water quality, or directly managing habitats. Invasive habitat management (e.g. plant clearance or dredging) should be undertaken only where there is little risk of damage to the existing biodiversity value of the pond site.
- **Target 4 (expansion): Create new pond sites of high quality potential.** The aim of this target is to create a new network of ponds with clean water and high biodiversity potential. The provisional definition of 'high quality potential' is 'Ponds located in areas where they drain a semi-natural surface-water catchment, which are unlikely to be significantly impacted upon by their after-use (e.g. stocked with fish, used to treat contaminated runoff)'. Creation of (a) pond mosaics/complexes, (b) new ponds that increase landscape connectivity or form protective networks, and (c) new sites that are targeted to support pond-associated BAP species are particularly encouraged. Ponds cannot be counted against this target if they are created to compensate for the destruction of existing high quality ponds.

'Curtilage is defined as the area of land surrounding a dwelling within the propertyboundaries, including gardens.

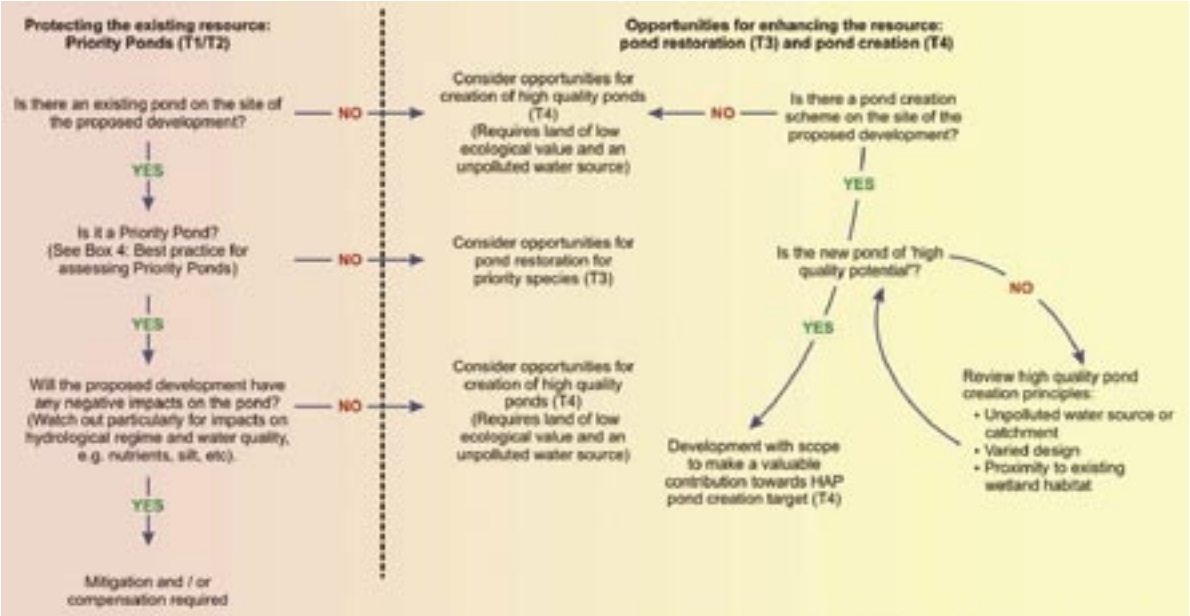
Box 2 What makes a Priority Pond?

UK BAP Priority Ponds are defined as permanent and seasonal standing water bodies up to 2ha in extent which meet one or more of the following criteria

- Criterion 1: Habitats of international importance. Ponds that meet criteria under Annex I of the Habitats Directive (see Table 1).
- Criterion 2: Species of high conservation importance. Ponds supporting RDB species, UK BAP species, species fully protected under the Wildlife and Countryside Act Schedule 5 and 8, Habitats Directive Annex II species, a Nationally Scarce wetland plant species, or three Nationally Scarce aquatic invertebrate species.
- Criterion 3: Exceptional assemblages of key biotic groups. Ponds supporting exceptional populations or numbers of key species. Based on (i) criteria specified in guidelines for the selection of biological SSSIs (currently amphibians and dragonflies only), and (ii) exceptionally rich sites for plants or invertebrates (i.e. supporting >30 wetland plant species or >50 aquatic macroinvertebrate species).
- Criterion 4: Ponds of high ecological quality. Ponds classified in the top PSYM category ('high') for ecological quality (i.e. having a PSYM score >75%).
- Criterion 5: Other important ponds. Individual ponds or groups of ponds with a limited geographic distribution recognised as important because of their age, rarity of type, historical or landscape context e.g. pingos, dune slack ponds, machair ponds.

By this definition and these criteria, any ponds can potentially be Priority Ponds, even small or temporary ponds, or those which are unsightly.

and is jointly led by the Environment Agency and Pond Conservation. Four targets have been agreed by the HAP steering group which aim to maintain the extent and the quality of Priority Ponds in the UK (see Box 1). These are defined as pond sites which fulfil one or more of the Priority Habitat Pond criteria (see Box 2). The HAP targets address the primary reasons for the recommendation of ponds as priority habitat, which are:



Box 3 Decision tree for implementing the Pond HAP targets in the context of development control planning (see Box 1 for definitions of the Pond HAP targets T1 – T4)

- **Habitat for which the UK has international obligation.** Six Habitats Directive Annex I types are included within this habitat (either entirely or in part, see Table 1). The importance of ponds as a 'stepping stone' habitat is recognised in Article 10 of the Directive. Freshwater habitats within the BAP did not adequately meet the UK's obligations under the Directive because the majority of designations covered lakes.
- **Habitat at Risk.** Ponds are vulnerable to loss and damage from a wide range of factors including nutrient enrichment, diffuse pollution, and the spread of exotic species. There is also a growing concern that shallow or temporary ponds may be particularly vulnerable to climate change. Every year, about 1% of ponds are created or destroyed, but evidence suggests that the quality of new ponds does not compensate for pond losses.
- **Habitat important for key species.** Ponds support a considerable number of key species, including at least 65 UK BAP species, at least 28 animals and plants listed under the Wildlife and Countryside Act (WCA, Schedule 5 and 8), and six Habitats Directive Annex II species (*e.g.* GCN, white-clawed crayfish, and otter in larger ponds). Ponds have also been shown to support at least 80 aquatic RDB species. The number of RDB species using the damp margins and drawdown zones of ponds (*e.g.* Diptera, ground beetles) is also likely to be considerable. Furthermore, it is being increasingly recognised that ponds are an important feeding resource for bats and farmland birds (*e.g.* tree sparrow and yellow wagtail).

Pond 4 of a former sand and gravel quarry in Peterborough

Table 1. Habitats Directive Annex I types which include ponds

Number	Habitat type
2190	Humid dune slacks
3110	Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)
3130	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or the *Isoeto-Nanojuncetea*
3140	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* species
3150	Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation
3160	Natural dystrophic lakes and ponds
3170	Mediterranean temporary ponds
3180	Turloughs

The Pond HAP and Development

The Implementation of the HAP Targets

So how does the Pond HAP affect development and the level of survey associated with it? Under Planning Policy Statement 9 (PPS9), development control planners are now required to adhere to a number of key principles to ensure that the potential impact of planning decisions on biodiversity are fully considered or indeed avoided. Furthermore, PPS9 requires that Development Plan policies are now made which add to biodiversity interests and promote opportunities for biodiversity within the design stage of development proposals. Advice to development control planners is currently being developed which will cover all four Pond HAP targets (see Box 3). The assessment of existing ponds for priority status will be particularly important for their protection (Targets 1 and 2).

Perhaps one of the most fundamental benefits of the priority status for ponds is that it provides clear, primarily quantitative, criteria for assessing the conservation value of a pond, and can provide a valuable tool in demonstrating to stakeholders the level of significance attached to an individual waterbody. The

level of survey required to apply these criteria according to best practice will vary from site to site and may require anything from protected and BAP species surveys, an assessment of the overall ecological quality of the pond using the Predictive System for Multimetrics (PSYM), or a detailed survey using the National Pond Survey (NPS) method (Pond Conservation 1998) (see Box 4).

The PSYM Approach

The PSYM method (Predictive System for Multimetrics) aims to assess the overall 'ecological quality' of a pond. The method is compatible with the Water Framework Directive and was developed for the Environment Agency for pond monitoring. PSYM is particularly useful for identifying Priority Ponds (see Box 4).

PSYM is both a pond survey method and a computer model. Predictions of the wetland plant and macroinvertebrate species which should occur in a pond if it was unimpaired, are generated from a small number of simple environmental variables (*e.g.* grid reference, pH and waterbody area). From the predicted species list, six metrics are calculated (*e.g.* number of submerged and emergent plants, number of water beetle families) which relate to the overall 'health' of the pond. These predicted metrics are then compared with actual values derived from biotic data collected in the field. A simple Index of Biological Integrity (IBI) is generated by comparing predicted and actual metrics. For a full account of PSYM refer to Pond Conservation (2002).

For the macroinvertebrate survey, PSYM adopts the standard survey technique developed for the NPS, whereby a pond is split into mesohabitats all of which are surveyed using a pond net over a three minute period. Each mesohabitat is sampled for an equal amount of time. A further one minute of hand searching is carried out to seek out the more elusive species that would not normally be netted (*e.g.* various snails and leeches). Invertebrate samples are sorted in controlled conditions in the laboratory and identified to family level. Wetland plants are surveyed by walking/wading in the pond as defined by the maximum water level, and recording all the species present (using a standard list of aquatic and emergent plants). A grapnel is used to sample deeper water areas.

Assessing Pond Priority Status: PSYM in Practice

In this section a worked example of PSYM in practice is described. Table 2 shows the PSYM IBI scores for five ponds located at a former sand and gravel quarry in Peterborough. Three of these have PSYM IBI scores of ≥75%, and are therefore Priority Ponds. The two ponds which have PSYM IBI scores below 75% also support water vole and/or GCN, so in fact all five ponds are Priority Ponds and any negative impacts arising from development should be mitigated and/or compensated (see Boxes 2 and 3).

Pond 1 was clearly a pond of very high conservation value, and in fact met several of the Priority Pond criteria. In addition to exceeding the threshold score for Priority Pond criterion 4 (ponds of high ecological quality), it also had two protected species present and supported three Nationally Scarce species of aquatic invertebrate, meeting criterion 2 (species of high conservation importance) on two counts. Additionally, Pond 1 had the greatest taxon richness, albeit less than the 50 species needed to qualify for criterion 3 (exceptional assemblages of key biotic groups). Pond 4 had the highest PSYM score, the second highest taxon richness and also supported one Nationally Scarce species and a breeding metapopulation of GCN. The contrast between the two ponds is quite startling, however, with Pond 1 being much larger, and having a greater diversity of mesohabitats than Pond 4, which is mid to late successional, shallow and as a result, with an abundance of marginal and emergent vegetation.

Table 2. Summary of results from survey of five ponds at a former sand and gravel quarry in Peterborough

Pond ID >	**1**	**2**	**3**	**4**	**5**
PSYM IBI Score (Criterion 4)	83	72	56	89	78
Taxon Richness (Criterion 3)	29	14	11	21	18
No. water beetle species	15	7	9	4	3
No. water bug species	5	3	5	6	6
Rare/ scarce species of aquatic invertebrate (Criterion 2)	*Berosus affinis, Limnephilus decipiens, Gyrinus paykulli*	*Berosus signaticollis*	*Berosus affinis, Berosus signaticollis*	*Hydroglyphus geminus*	*Limnephilus decipiens*
WCA (Schedule 5 and 8 species) (Criterion 2)	GCN, water vole	GCN, water vole	Water vole	GCN	-

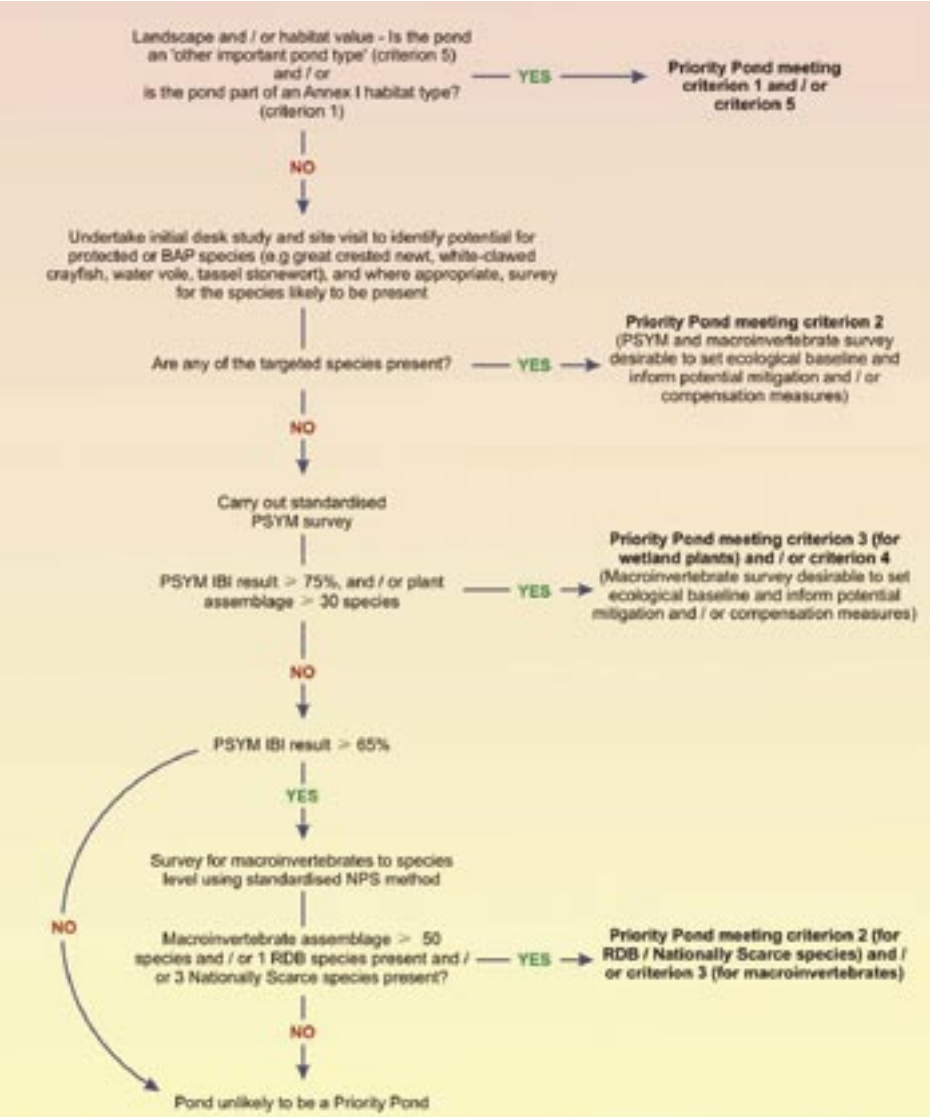
Advantages and Limitations of PSYM

PSYM allows criterion 3 and, for wetland plants only, criterion 4 to be used to assess pond priority status. The main advantages of the PSYM method for ecologists is that it only requires a single survey visit, during a suitable time of year (June to August) and macroinvertebrates only need to be identified to family level, rather than to species level, thus reducing the need for microscope work and significantly reducing the number of specimens to identify.

The limitations of PSYM are that the method cannot be used in Scotland or Northern Ireland, and that temporary ponds are not very well represented by the model and, therefore, the PSYM IBI should be interpreted with caution with this pond type (*i.e.* PSYM is likely to predict too high a value for naturally species-poor temporary ponds). The case study above also shows that where important decisions need to be made affecting ponds that have borderline PSYM IBI scores, a cautious approach is recommended (see Box 4). Thus for such borderline cases, where the PSYM IBI score is between 65-74, further, more detailed invertebrate species survey is advised to determine whether the pond classifies under criterion 2 (Species of high conservation importance) by supporting 1 RDB or 3 Nationally Scarce invertebrate species, or criterion 3 (exceptional assemblage of key biotic groups) (by supporting an assemblage ≥50 species). Of course, a survey for species of conservation concern (*e.g.* protected species and UK BAP priority species) would be a requirement wherever there is a likelihood of presence.

Pond Mitigation and Compensation

Having determined that our pond is a Priority Pond, what ramifications might this have for a development in which the pond falls within its footprint? Importantly, the pond must be acknowledged as a significant ecological feature, either in its own right, or perhaps with a suite of other ponds or wetland habitats. Ideally development would seek to protect the pond, for example by maintaining/improving water quality or controlling exotic/invasive species, if present. In order to satisfy HAP target 4 it is also worthwhile exploring opportunities for the creation of ponds of 'high ecological potential' (see Box 3). However, in many cases, avoidance may not be an option and the development will involve the destruction of a pond. In this situation, the fact that the pond is recognised as a priority BAP habitat should typically imply a level of compensation that is appropriate. Taking the guidelines for GCN for example, '*there should be no net loss of sites, and in fact where significant impacts are predicted there will be an expectation that compensation will provide an enhanced habitat (in terms of quality or area) compared with that to be lost'* (English Nature 2001). Accordingly, opportunities for enhancement, such as creating a complex of ponds, would be a suitable level of compensation for the loss of a Priority Pond. Indeed, this is in keeping with PPS9 that makes clear reference to the value of planning applications that provide enhancement of biodiversity interest. Pond HAP target 4 can only be achieved, however, where 'enhancement' can be demonstrated, over and above the normal compensation that would be applicable for loss of a BAP priority habitat.



Box 4 Best practice for assessing Priority Ponds (Refer to Box 2 for definitions of Priority Habitat selection criteria)

It is worth briefly noting that, in addition to the general biodiversity criteria noted above, several other considerations would need to be taken into account by the respective Local Planning Authority before the destruction of a Priority Pond could be sanctioned. The most important of these are:

- What is the position of the pond in an ecological unit? For example, does it form part of a network of wetland habitats, and how might a development affect this?
- What stage of succession is the pond in and how readily can it be re-created? Note

A recently created pond on a landfill site in North Yorkshire

that the creation of a new pond is not a substitute for the loss of a mature pond. Where possible a new pond should be created several years before the development takes place. Certain measures may be taken to 'prematurely age' new ponds for specific species identified during the baseline survey. Thus, translocation of bed material, vegetation and even water may be a consideration where more mature ponds are being lost. (Note however that little information is available on the success of these techniques.)

- What species are associated with the pond? Certain, often rare species, are associated with very specific conditions and are likely to be the most difficult to mitigate. Expert guidance may be required for such instances.
- Is a method statement being prepared that considers all aspects of pond creation, from the soil properties and new pond contours to the volume of translocated material and time scale across which pond creation will take place?
- Is a monitoring programme in place to evaluate the rate of establishment of a new pond? This should include a contingency strategy if the rate/direction of establishment is not as intended and further measures are required. The results of the baseline survey, such as the PSYM IBI score can be a useful yardstick against which the rate of establishment of the pond is gauged, thus demonstrating the application of PSYM as a monitoring tool.

Ponds are an important habitat for freshwater biodiversity and it is hoped that their new priority status will help better protect them from loss and degradation, by promoting and developing the use of existing and new tools to assess their ecological value.

For further information about the Pond HAP, survey methods, PSYM training courses and pond creation and management, visit: www.pondconservation.org.uk

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Editorial Comment

The article by Penny Simpson in the December 2007 edition of *In Practice* ('New Species Protection Legislation: Opportunities and Risks for Consultant Ecologists') underwent some minor editorial amendments without consultation with the author and which the author considers may have lead to confusion. These included:

- the insertion of the wording of only one of the European protected species disturbance offences, rather than all three;
- a rearrangement of some of the wording; and
- a new paragraph stating that the role of obtaining planning permission documents has now been moved from Defra to consultants, which is likely to involve more work for consultants. This was included as it is important for IEEM members to know that the consultant now needs to obtain information from the local planning authority (LPA) regarding the reasoned statement part of the licence application.

The editor would like to apologise for any misunderstanding or inconvenience caused.

Institute News

IEEM Joins EUROPARC

Joining the EUROPARC Federation is a welcome move as it will allow IEEM to develop further contacts in this area. EUROPARC has a number of regional sections and the Executive Director was actually Chairman of the then UK Section some years ago and sporadic contacts have been maintained in recent years. For more information please see page 38.

Membership Applications

IEEM is growing faster now than at any time in its history. No less than 800 new applications were received in 2007 and in January 2008 we had 127 applications. The largest proportion of applications is from Graduates, which is very welcome and must bode well for the long term health of the Institute. As a plea from the Secretariat, if you are acting as a sponsor do please check carefully with the candidate that the information requested is actually supplied. Perhaps because more applications are now downloaded from the website, it seems that an increasing number of incomplete applications are being received. This causes extra work and also causes delays in processing the application.

It is often said that there are still many uncompleted application forms on desks around the country, if not the world. If you suspect a colleague is hesitating to take the plunge do please encourage them to do so. There are still very many individuals in the Statutory Agencies, the NGOs, Local Government and Central Government (devolved or otherwise) who would be very welcome as members of IEEM.

Membership Survey

Last year the Institute carried out a survey of members from the viewpoint of salaries, status and general working conditions – the professional issues. This produced a good response and there was much interest in the results, which were then reported in *In Practice*. As IEEM grows it is important that we get feedback from members as to whether we are fulfilling their expectations and if there are areas into which we should be expanding. The last such survey was carried out in 2001 and IEEM is now a very different organisation. With this in mind we are preparing another online survey to be sent out in the spring. This will repeat some of the questions asked previously and cover new areas as well. Do please take the time to complete it as the responses will be invaluable in charting our way forward.

Drop in to IEEM

A member has recently suggested that IEEM might like to organise some casual drop in sessions for networking. This is apparently popular with some other institutions and is probably something best organised through the Geographic Sections. It might take the form of a gathering in a pub or restaurant on a regular basis – monthly or bi-monthly and they would probably have to be in major centres. The Sections are organising various field events throughout the year and these also offer opportunities for networking but do of course have to be properly organised. If the idea of something more informal appeals, please register your interest with Harry Earle at IEEM.

Don't forget also that the IEEM HQ in Winchester can be visited at any time and members are welcome to see how the inner workings of IEEM operate. It's best to let us know in advance as on some occasions a number of staff members may be away.

Consultations

Since the last edition of *In Practice*, IEEM has responded to two consultations:

- The review of schedule 9 to the Wildlife and Countryside Act 1981 and a ban on the sale of certain non-native species (Defra).
- Living with climate change in Europe (EC).

Forthcoming consultations and past responses can be found in the members' section of the website.

University Challenge 2008

A number of members are interested in having a further try for University Challenge in 2008. If anyone would like to put themselves forward for this year please let the Secretariat know by 14 April. The procedure will be that we will have a confidential internal IEEM assessment based on a pub-style quiz and the team will be chosen based on the scores. A good mix of gender and age would be desirable.

Whistleblowing Update

Thank you to all of you that responded to the article in *In Practice*. The Professional Affairs Committee (PAC) considered your responses and recommended that the Institute should work with its lawyers to develop an appropriate clause to be included with the contract's terms and conditions. It also recommended guidance should be produced in the Professional Issues Series, which will be drafted by Lisa Kerslake with support and advice from others. Whatever is prepared will have to be legally assessed and approved by the lawyers. The work will be done as soon as possible but Lisa is doing this in her own time and before anything is published it will have to have final approval from PAC.

Commercial Directory

Members are reminded that the Institute has a Commercial Directory, which promotes the services of Fellow, Full and Associate members as professional ecologists and environmental managers. The electronic registration form for the Commercial Directory is available in the members' section of the website. Registration on the Commercial Directory requires Continuing Professional Development (CPD) to be up-to-date and that you have Professional Indemnity Insurance (PII) appropriate to your work; these will need to be checked annually at the start of January. The purpose behind establishing criteria for registration is that it enables us to promote your professional services over those of non-members – a form of accreditation by IEEM.

We will shortly be writing to all the heads of planning departments of local and regional councils in the UK and Ireland to encourage them to use your services, those of professionally recognised ecologists and environmental managers.

Ecological Impact Assessment Seminar/Workshop

Do you have questions or queries, want advice or have particular issues with regard to the use of the Ecological Impact Assessment Guidelines for the UK? IEEM is proposing to hold a seminar on implementing the EcIA Guidelines on 10 June 2008 in Birmingham. The seminar will be open first and foremost to members that have used the Guidelines. There will be a (small) charge to cover administration and catering. If you are interested please contact Linda Yost.

IEEM Conferences

Bookings are now being received for the two one-day Conferences (Environmental Liability Directive, London, 16 April 2008; and Environmental Economics, London, 3 June 2008). The programmes for both, which are now complete, are posted on the website.

The two-day conference programme (Mitigation, Glasgow, Scotland, 18-20 November 2008) is still in preparation and offers of papers would be very welcome - please contact Nick Jackson.

Obituary

IEEM regrets to report the death of Mrs Karen Edwards, who was an ecologist (Senior Scientific Officer) with the Westcountry Rivers Trust/Tamar Consulting.

Yorkshire and the Humber Shadow Section News

Overview to the End of January 2008

Following a well attended initial meeting in December (kindly hosted by Golder Associates in Tadcaster), the following five people have volunteered to form a Committee with a view to organising a series of events – Gordon Haycock, Bernadette Lobo, Vicky Hanslip, Dave Martin and Simon James. Our first Committee meeting was held on Tuesday, 15 January 2008, at Thomson Ecology in Otley, and after a fortifying curry we started to formulate a plan!

The following events are already organised for this year:

- A presence at 'Green Drinks' in Leeds each month.
- Wednesday, 4 June 2008 – an evening on Strensall Common with NE Heathlands Project Officer Julian Small. Meet 7.30 pm at the car park at Grid ref SE648611. Julian will lead a guided walk until 9.45 pm, however, he has offered to take members into the night on the Common with the aim of hearing nightjar and finding glow worms!

The following events are in the pipeline:

- Yockenthwaite Meadows SSSI – National Trust-owned wildflower meadows in Wharfedale.
- Thorne and Hatfield Moors NNR.
- Old Moor/Dearne Valley restoration project.
- Staveley Nature Reserve.

In addition to visiting sites to gain an understanding of their biodiversity value and management issues, we discussed the idea of informal groups where professional dilemmas, grey areas and interpretation of legislation could be discussed to the mutual benefit of all participants. If people are interested, a programme for autumn/winter 2008 could be explored.

More information regarding our events will be e-mailed directly to all Members in the Yorkshire and Humber Region.

At present we are entirely open to ideas and we would welcome input. Sadly (for us!), Simon is moving to a new post with RPS in Cambridge heading up their Ecology group. If any other members are interested in participating in the Committee, or would like to offer an event for this year or have any ideas/input, please do not hesitate to contact me or another Committee member.

For more information on the Yorkshire and the Humber Shadow Section please contact Gordon Haycock CEnv MIEEM at gordon.haycock@thomsonecology.com, or visit www.ieem.net/geographicsections.asp.

Buckden Pike, Yorkshire
Photo: Wharfedale Naturalists Society

South West England Shadow Section News

Section Committee

The SW Shadow Section is now looking to set up a Committee this year to help plan/deliver events and assist with running the Section. The Section Convenor, Matt Jones, would like to remain as Convenor (unless anyone has any objections) but he is looking for about 4-6 people to help out. Membership of the Committee would not require significant time inputs - 5-10 hours would be all that is required over the year. If you would like to join, please contact Matt directly. Without more people being involved, it is likely that a number of SW events will not happen.

Puffins
Photo: Ross Bower

Ideas for Meetings and Field Trips

Please could you let Matt know what sort of events you would like to see run by the SW Section this year. There is already one field trip planned (more details to follow) and he is still keen to hold a 'Biodiversity Gain' event, probably a half-day or full-day conference. However, over to you. Let him know what you think.

For more information on the South West England Shadow Section please contact Matt Jones CEnv MIEEM at mattj@eadconsult.co.uk, or visit www.ieem.net/geographicsections.asp.

North East England Section News

Recent and Forthcoming Events

Northumberland Wildlife Trust kindly hosted an evening meeting of the NE Section on 12 December 2007. Caroline Gettinby (of Entec) gave an entertaining account of the mitigation methods applied on a project involving ancient woodland, dormice, great crested newts, bats, badgers and important plant and invertebrate species. The problems were highlighted and a lively discussion followed focussing on the specific issues of the project and those of more general concern. Members were asked to highlight topics that they felt should be included within the forthcoming conference on Ecological Mitigation to be held in Glasgow in November 2008. Key issues raised included the role and expertise of Natural England staff; proportionality of mitigation costs; mitigation on brownfield sites; monitoring of the implementation of mitigation methods; legal challenges to mitigation methods; and the need for sharing of data and experience. With regard to the last of these points it is timely that Durham Biodiversity Partnership is launching a new biodiversity data service to facilitate access to such information. Andy Lees has provided the press release below.

There are several forthcoming events in the NE Section. In the spring we have field meetings on managed coastal retreat and habitat creation (6 March); badger and water vole ecology and survey techniques (April and May respectively); and Phase 1 grassland survey and species identification (6 June). Details will be advertised on the NE Section webpage, circulated to members via e-mail, and may (in due course) be obtained from Andy Cherrill at andrew.cherrill@sunderland.ac.uk.

Durham Biodiversity Data Service

Members of IEEM in the North East will be interested to hear that a new biodiversity data service has been launched for the Durham area. Covering the local authority areas of Gateshead, South Tyneside, Sunderland and County Durham, the Durham Biodiversity Data Service (DBDS) provides high quality, verified and current species and habitat data to ecological professionals.

Data is sourced from many different organisations and individuals with whom DBDS holds data sharing agreements, and from internally commissioned survey work and verified public survey data from work undertaken by the Durham Biodiversity Partnership. The aim of the service is to protect biodiversity better through the sharing of high quality biodiversity data, and on the basis of the principles established by the National Biodiversity Network (NBN).

The impetus for DBDS came three years ago when Partnership staff were asked to look at revising the Durham Biodiversity Action Plan and it became obvious that they had little or no data that they could use to even estimate baselines.

The project has grown to encompass more than just Biodiversity Action Plan (BAP) targets and the DBDS now co-ordinates the sharing of data for most groups of species (except bats) and priority BAP habitats.

With all the work that has taken place to establish robust data and good links with data providers, a key outcome of the present phase of work is to establish sustainability for the service. Data will be made available for free at coarse resolution to the public, but more detailed data searches for professionals will be charged. A series of Service Level Agreements with other partners will also cover some of the DBDS running costs.

The service is based at Durham Wildlife Trust and is managed by Trust staff on behalf of the Partnership. All data and data sharing agreements are held by the Durham Wildlife Trust.

More details on the data held by the service, policies, procedures and how to access the data are available on the DBDS website (www.dbds.org).

For more information on the North East England Section please contact the Convenor, Andy Cherrill CEnv MIEEM, at andrew.cherrill@sunderland.ac.uk, or visit www.ieem.net/geographicsections.asp.

Guillemots

Scottish Section News

The Role of Effective Communication in Sustainable Development

On 1 November 2007 the IEEM Scottish Section held a seminar on 'The Role of Effective Communication in Sustainable Development'. The seminar was chaired and introduced by Chris Spray, Environment Director of the Scottish Environmental Protection Agency (SEPA) and sparked some lively debate, ranging from the morality of business to the wisdom of installing water meters in Essex!

Chris introduced the topic by outlining SEPA's role in delivering sustainable development, and his own personal insight into the issues of the use of language in effectively communicating the ideals of sustainable development, and delivering real change through a number of channels. The discussion was opened up to the floor and one of the first points raised was: do we know what we want the message to be, and are we using the right language to express it? There is often a great difference in language between the business sector and environmental sector; how do we go about bridging this language barrier?

A long discussion was held on the best language to use, is it simple or complex? Do you talk in generalities or specifics? It was felt that in order to encourage a wider understanding of sustainable development; communication needs to be simple and straightforward. The recycling slogan 'Reduce, Re-use, Recycle' was raised as a good example of a simple, understandable slogan that has been used to raise awareness of a similar issue.

It was also felt that it was necessary to engage with a range of audiences at different levels and vary the level of detail used for each so that a detailed message delivered at a high level, to academics or policy-makers, could still be translated into a simple effective message for a wider audience of businesses. Methods of spreading this simple message were also discussed, and the importance of having a common language was highlighted.

An interesting view was expressed by an ethical investor who introduced some ideas from the 'other side of the fence' to many of the usual views expressed by IEEM members. He felt that in order to influence the way a business operates it is necessary to influence the four moral voices of that business. These were expressed as the customers, the employees, the share holders and regulatory framework within which the business operates. He highlighted that you have to work out how you appeal to each of these four voices and asked the question: which would be the most effective at delivering sustainable development for any particular business?

The overlap between environment and business was also discussed. The selling of the benefits of sustainable development to business was highlighted as an important tool in changing mindsets.

The role of governments and statutory agencies was discussed and the need for effective enforcement was raised. Some members were concerned that there was a tendency for policy to be decided without a firm basis in research, and that there should be more evidence based policy rather than policy based evidence. It was also felt that the choice facing people had to be made clear, *i.e.* you either choose sustainability today or be forced to be sustainable in the future. This led into a discussion of how best to influence policy and governments. It was felt that IEEM often did this by responding to consultations but could also do more to influence policy.

Ultimately, it was felt that IEEM members could play a role in influencing the uptake and understanding of sustainable development. It was felt that in order to spread a message effectively, the best strategy was always to present a simple, straightforward message with an agreed meaning, and then spread the message by engaging with business using concepts that they are familiar with. It was also felt that there was still a need to influence different groups such as academics, legislators, regulators and business at a high level and that IEEM was well placed to achieve this.

For more information on the Scottish Section please contact the Convenor, Sally Monks MIEEM, at sally.monks@erm.com, or visit www.ieem.net/geographicsections.asp.

Red deer
Photo: Scottish Natural Heritage

Society for the Environment

SocEnv is continuing to expand at an encouraging rate and four new constituent bodies have been admitted: the Chartered Institute of Architectural Technologists; the Energy Institute; the Institute of Materials, Minerals and Mining; and the Society of Environmental Engineers. This means that SocEnv's 21 Member Bodies now represent a total of more than 300,000 practitioners. For a full list of members, visit www.socenv.org.uk/members. The Institution of Mechanical Engineers and the Association of Building Engineers, which have recently applied to join, will be awarded their license to award Chartered Environmentalist in the Spring.

The UK's new target of 15% renewable energy production by 2020, set by the EU in January, has been welcomed by SocEnv Member Bodies, the Chartered Institution of Wastes Management (CIWM) and the Institution of Mechanical Engineers (IMechE). In a joint statement, the Institutions said that the world must move 'purposefully' towards a sustainable energy supply, with developing countries leading the way. This new target must stimulate the 'big push' for renewables that Prime Minister Blair promised in July 2006.

Applications to become Chartered Environmentalists are being received at a steady rate from IEEM members and we would like to congratulate Mrs Rebecca Anderson, Mr Adrian Bliss, Mr Jonathan Kendrew, Miss Eleanor Seaborne, Mr Roland Stonex and Mrs Rosalind Willder as the six latest IEEM members who have qualified. Further applications are always welcome.

www.socenv.org.uk

European Federation of Associations of Environmental Professionals

EFAEP is continuing its impressive and promising growth with a new member in Switzerland (The Swiss Society for Environmental Engineering).

The Federation is also now in the process of appointing a permanent secretariat (and known as the EFAEP 'co-ordinator'), who will support the activities of EFAEP in a proactive way and will increase its ability to provide a better service to its members. The duties of the co-ordinator will include promotion, meetings, liaison, influencing, IT and other general duties.

The European Network of Environmental Professionals (ENEP) database also continues to grow with around 750 profiles now created, including nearly 80 IEEM members. Those Fellows and Full and Associate members who have not yet created a profile are encouraged to do so at www.environmentalprofessionals.eu. For more information on ENEP see the advert on page 33.

The next General Assembly of the Federation will take place in Florence, Italy on 12 September 2008.

www.efaep.org / www.environmentalprofessionals.eu

EUROPARC Federation

IEEM is now a member of the EUROPARC Federation, which is the umbrella organisation of Europe's protected areas. It unites national parks, regional parks, nature parks and biosphere reserves in 38 countries, with the common aim of protecting Europe's unique variety of wildlife, habitats and landscapes.

We are also now a member of the Atlantic Isles Section of the Federation, which covers Iceland, Ireland and Britain.

Forthcoming meetings of the Federation include:

- 27-28 March 2008.
  Protected Areas in the 21st Century - What Does the Future Hold? (EUROPARC Atlantic Isles Section Seminar).
  Wales Millennium Centre, Cardiff.
- 24-28 September 2008.
  High Conservation Values, High Management Standards (EUROPARC Federation Annual Conference and AGM).
  Poiana Brasov, Romania.

It is hoped that our membership of EUROPARC will help to broaden our appeal to those ecologists and environmental managers working within parks and protected areas, and also to add to our influence in Europe.

www.europarc.org / www.europarc-ai.org

IUCN - The World Conservation Union

At the last AGM in January the IUCN-UK Committee launched the Reintroductions Information and Guidelines and made a start on the preparations for the World Congress.

For more information on the reintroductions guidance please visit www.iucn-uk.org/Default.aspx?page=6873.

IEEM will also be attending the World Congress as we will be presenting three papers:

- Ecological and Environmental Management Skills to Fulfill the Barcelona Legacy - are they available?;
- Professional Issues for Ecologists and Environmental Managers; and
- Ecological Aspects of Environmental Impact Analysis.

It has been requested, however, that the latter two papers be combined into a single presentation.

The IUCN World Conservation Congress will be held in Barcelona, Spain from 5-14 October 2008.

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

In the Journals

Jim Thompson CEnv MIEEM and Jason Reeves AIEEM

STA Pickett and ML Cadenasso.
Linking ecological and built components of urban mosaics: an open cycle of ecological design.
Journal of Ecology 2008, **96**: 8-12.

The sentiments in this paper would strike a chord with many IEEM members though whether they would agree with the statement '*Plant ecology has largely ignored cities, or has primarily focused on the discrete urban green spaces within cities*' would be one for debate.

The paper advocates linking plant ecology with urban design (architecture, landscape architecture, civil engineering and urban planning) to help to integrate research and understanding of plants into the structure of cities, and to make use of urban design projects as ecological research tools.

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AT Moles, MAM Gruber and SP Bonser.
A new framework for predicting invasive plant species.
Journal of Ecology 2008, **96**: 3-17.

Many studies have searched for traits that characterize successful invaders but very few generalizations have emerged from this work. It seems that the traits of successful invaders are idiosyncratic and context-dependent.

The authors introduce a framework for predicting traits that are likely to confer success in a given ecosystem which considers the prevailing environmental conditions, the traits of resident species, and the traits of potentially invading species.

The approach can be applied to ecosystems where the environmental conditions and/or disturbance regime have recently changed, to predict the range of trait space occupied by (i) native species at risk of local extinction, (ii) native species that can persist under the present conditions, and (iii) successful invaders. It can also be used to identify unoccupied viable trait space (*i.e.* vacant niches) that might be at risk of invasion. The approach is also not limited to plant invasions but could apply to other organisms.

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M Søndergaard and E Jeppesen.
Anthropogenic impacts on lake and stream ecosystems, and approaches to restoration.
Journal of Applied Ecology 2007, **44**: 1089-1094.

This edition of the journal includes a special profile of seven papers on freshwater ecosystems. The papers cover a broad range of research areas and methods, but are all centred on the relationship between dispersal barriers, the connectivity of waterways and the restoration of rivers and lakes. This paper synthesizes and links the findings, focusing on the effects of anthropogenic stressors on freshwater ecosystems and on how to maintain and restore ecological quality.

The construction of dams and reservoirs disturbs the natural functioning of many streams and rivers and shore-line development around lakes may reduce habitat complexity. New methods demonstrate how reservoirs may have a severe impact on the distribution and connectivity of fish populations, and new techniques illustrate the potential of using graph theory and connectivity models to illustrate the ecological implications. Hydromorphologically degraded rivers and streams can be restored by addition of wood debris, but 'passive' restoration via natural wood recruitment may be preferable. The most cost-effective way to restore streams may also include information campaigns to farmers on best management practices. Removal of zooplanktivorous fish often has marked positive effects on trophic structure in lakes, but there is a tendency to return to turbid conditions after 8–10 years or less unless fish removal is repeated.

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SD Albon, MJ Brewer, S O'Brien, AJ Nolan and D Cope.
Quantifying the grazing impacts associated with different herbivores on rangelands.
Journal of Applied Ecology 2007, **44**: 1176–1187.

The degradation of heather in upland Scotland *Calluna vulgaris*-dominated habitats, has been attributed to increasing sheep and red deer populations.

The authors quantified the grazing and trampling impact of sheep, cattle, red deer *Cervus elaphus*, rabbits *Oryctolagus cuniculus*, mountain hares *Lepus timidus* and red grouse *Lagopus lagopus* on open-hill habitats in 11 areas of upland Scotland.

Overall, the presence of sheep was associated with the largest increase in grazing and trampling impact of all herbivores. Cattle had the second largest impact but generally this was restricted to fewer areas and habitats than sheep. Impacts associated with wild herbivores tended to be small and only significant locally.

The higher impact associated with sheep presence probably reflects their greater aggregation because of their limited ranging behaviour, exacerbated by sheep being herded in places convenient for land managers. Consequently, future reductions in sheep numbers as a result of reform of European Union farming policies may limit the extent of their impact, but not necessarily the local magnitude.

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N Reid, R. Mcdonald and WI Montgomery.
Mammals and agri-environment schemes: hare haven or pest paradise?
Journal of Applied Ecology 2007, **44**: 1200–1208.

Agri-environment schemes (AESs) are designed to create landscape-scale improvements in biodiversity. To evaluate the effects of the Environmentally Sensitive Area (ESA) scheme, a widespread AES in Northern Ireland, a survey of the relative abundance of Irish hare *Lepus timidus hibernicus*, European rabbit *Oryctolagus cuniculus* and red fox *Vulpes vulpes*, was conducted. Of these, the Irish hare is a priority species for conservation action and the focus of a Species Action Plan. The effects of ESA designation and habitat on each species were assessed at 150 ESA and 50 non-ESA sites, matched for landscape characteristics.

The ESA scheme had no effect on the abundance of Irish hares. The abundance of rabbits and foxes suggests AESs may benefit common species but cannot be relied upon to encourage rarer species. The Irish hare Species Action Plan relies on agri-environment schemes to enhance the species' status and

realize the target of increasing the hare population by 2010 by promoting suitable habitat. However, the ESA scheme is unlikely to help in achieving these objectives.

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BV Purse *et al.*
Incriminating bluetongue virus vectors with climate envelope models.
Journal of Applied Ecology 2007, **44**: 1231–1242.

The spread of vector-borne diseases into new areas, commonly attributed to environmental change or increased trade and travel, could be exacerbated if novel vector species in newly invaded areas spread infection beyond the range of traditional vectors.

The traditional vector of bluetongue virus, the Afro-Asian midge *Culicoides imicola*, is found to occur in warm locations that are dry in summer. The palearctic *C. obsoletus* and *C. pulicaris* complexes are both found to occur in cooler and wetter locations.

Of 501 recorded outbreaks from the 1998–2004 bluetongue epidemic in southern Europe, 40% fall outside the climate envelope of *C. imicola*, but within the species' envelopes of the *C. obsoletus* and *C. pulicaris* complexes. This suggests that Palearctic vectors now play a substantial role in transmission and have facilitated the spread of bluetongue into cooler, wetter regions of Europe.

The risk to Northern Europe now depends on how much of the distributions of the widespread, abundant Palearctic midge vectors (the *C. obsoletus* and *C. pulicaris* complexes) bluetongue can occupy, perhaps determined by thermal constraints on viral replication. This was highlighted by the sudden appearance in summer 2006 of bluetongue virus at latitudes of more than 50° North – approximately 6° further North than previous outbreaks in southern Europe. Future surveillance for bluetongue and for related *Culicoides*-borne pathogens should include studies to record and explain the distributional patterns of all potential Palearctic vector species.

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JAA Swart and J van Andel.
Rethinking the interface between ecology and society. The case of the cockle controversy in the Dutch Wadden Sea.
Journal of Applied Ecology 2008, **45**: 82–90.

The authors analysed the 15-year controversy on the ecological effects of cockle fishing in the Dutch Wadden Sea, which began around 1990 and involved nature protection and shellfish organizations, as well as several leading Dutch ecologists, in a heated debate.

During this controversy, research on the ecological effects of cockle fishing was undertaken by a consortium of institutes in order to contribute to the process of political decision-making by the Dutch government on cockle fishery in this area. In addition to conservation and commercial interests, ecological research itself became part of the controversy.

The research projects on the effects of cockle fishing during this controversy are examples of where interests and societal disputes are intertwined with scientific arguments. Not only is there a need for sound science, but also for a sound way of interacting and communicating with the societal environment.

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RL McGregor, DJ Bender and L Fahrig.
Do small mammals avoid roads because of the traffic?
Journal of Applied Ecology 2008, **45**: 117–123.

Roads can act as barriers to animal movement, which may reduce population persistence by reducing recolonization of empty habitats and limiting immigration. Appropriate mitigation of this barrier effect depends upon whether the animals avoid the road itself or the traffic on the road.

The authors conducted short- and long-distance translocations and trapping studies of white-footed mice *Peromyscus leucopus* and eastern chipmunks *Tamias striatus* near two-lane paved roads, which differed widely in traffic amount, from 47 to 15,433 vehicles per day.

There was no significant effects of traffic level on return rates in either the short-distance or the long-distance translocations studies. The results suggest that small mammals avoid the road itself implying that mitigation would require measures such as wildlife passages.

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HJ van der Windt and JAA Swart.
Ecological corridors, connecting science and politics: the case of the Green River in the Netherlands.
Journal of Applied Ecology 2008, **45**: 124–132.

During recent decades, the ecological corridor has become a popular concept among ecologists, politicians and nature conservationists. In this paper the authors question why this concept has been accepted so readily in policy and practice. They studied the Dutch literature from the period 1980–2005.

Many actors, including politicians, stakeholders and scientists, were involved in the development of the ecological corridor and the related National Ecological Network at the national and regional levels. The involvement of these actors changed the character of the concept into the multifunctional 'robust corridor'.

The ecological corridor was probably so influential because its vague and flexible character facilitated the coming together of various stakeholders and scientists. Finally, scientists from the policy-orientated research centre were able to link the concept to fundamental science, policy and practice.

To make ecological concepts both scientifically sound and socially robust, several changes must take place in current interactions between ecology and society. First, during concept development there need to be extensive peer groups with clearly defined relationships between scientists and non-scientists. Secondly, the concepts should be flexible and relatable to relevant knowledge, insights, values and practices. Thirdly, several feedback loops between science and non-science should be set up during the various stages of concept development and implementation.

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R Billeter *et al.*
Indicators for biodiversity in agricultural landscapes: a pan-European study.
Journal of Applied Ecology 2008, **45**: 141–150.

In many European agricultural landscapes, species richness is declining considerably. In a large-scale study of 25 agricultural landscapes in seven European countries, the authors investigated relationships between species richness in several taxa, and the links between biodiversity and landscape structure and management.

They estimated the total species richness of vascular plants, birds and five arthropod groups in each 16 km^2 landscape, and

recorded various measures of both landscape structure and intensity of agricultural land use.

No single species group emerged as a good predictor of all other species groups. Species richness of all groups increased with the area of semi-natural habitats in the landscape. Species richness of birds and vascular plants was negatively associated with fertilizer use.

They conclude that indicator taxa are unlikely to provide an effective means of predicting biodiversity at a large spatial scale, especially where there is large biogeographical variation in species richness.

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MJO Pocock and N Jennings.
Testing biotic indicator taxa: the sensitivity of insectivorous mammals and their prey to the intensification of lowland agriculture.
Journal of Applied Ecology 2008, **45**: 151–160.

Changes to agricultural policy aim to extensify agriculture and increase biodiversity. However, it is not known how sensitive many taxa are to intensification. Sensitive taxa could be used as biotic indicators, to assess changes over time and the effectiveness of policy changes.

Shrews, bats and their prey (beetles, flies and moths) were sampled and the response in their abundance to aspects of intensification assessed: increased agrochemical inputs, the switch from hay to silage and boundary loss.

There was substantial variation in the sensitivity of taxa to the three aspects of intensification. Most estimates (51%) of sensitivity to boundary loss were significant, but only 8% for increased agrochemical inputs and 16% for the switch from hay to silage. Insectivorous mammals were relatively insensitive to increased agrochemical inputs and the switch from hay to silage, but strongly sensitive to boundary loss.

Taxa with significant sensitivity to increased agrochemical inputs included some Carabidae and Diptera.

The switch from hay to silage had a positive effect on some Coleoptera and Diptera but a substantial negative effect on Hepialidae (Lepidoptera).

The results show that the sensitivity of taxa to changes in agricultural practices is highly variable and so the selection of biotic indicator taxa of agricultural intensification is not straightforward.

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M Vellend, PL Lilley and BM Starzomski.
Using subsets of species in biodiversity surveys.
Journal of Applied Ecology 2008, **45**: 161–169.

In many biodiversity surveys, a small proportion of species require a disproportionate amount of a researcher's time and effort to detect or identify. In the context of predicting species diversity or composition, what are the consequences for statistical power of ignoring difficult species – that is, of surveying only a subset of the full suite of species?

The authors analysed 10 data sets on a variety of taxa, at different spatial scales, to assess correlations for species richness and species composition between a full data set and subsets of data with different numbers of species deleted at random, or according to the time investment required for inclusion.

They conclude that in biological surveys, ignoring a relatively small proportion of species (*e.g.* <10%), and often a much larger proportion, results in very little loss of information on patterns of biodiversity. As such, statistical power in many biodiversity studies may be maximized by eliminating difficult species from a survey in order to increase the number of sites surveyed.

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J Smith, SG Potts, BA Woodcock and P Eggleton.
Can arable field margins be managed to enhance their biodiversity, conservation and functional value for soil macrofauna?
Journal of Applied Ecology 2008, **45**: 269–278.

The establishment of grassy strips at the margins of arable fields is an agri-environment scheme that aims to provide resources for native flora and fauna and thus increase farmland biodiversity. This study assessed the effect of seed mix and management on the biodiversity, conservation and functional value of field margins for soil macrofauna.

Experimental margin plots were established in 2001 in a winter wheat field in Cambridgeshire, UK, using three seed mixes and three management practices [spring cut, herbicide application and soil disturbance (scarification)].

Diversity in the field margins was generally higher than in the crop, with the Lumbricidae, Isopoda and Coleoptera having significantly more species and/or higher abundances in the margins. Within the margins, management had a significant effect on the soil macrofauna, with scarified plots containing lower abundances and fewer species of Isopods. The species composition of the scarified plots was similar to that of the crop.

Scarification also reduced soil- and litter-feeder abundances and predator species densities, although populations appeared to recover by the autumn, probably as a result of dispersal from neighbouring plots and boundary features.

This study shows that the management of agri-environment schemes can significantly influence their value for soil macrofauna.

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P Dennis, J Skartveit, DI McCracken, RJ Pakeman, K Beaton, A Kunaver and DM Evans.
The effects of livestock grazing on foliar arthropods associated with bird diet in upland grasslands of Scotland.
Journal of Applied Ecology 2008, **45**: 279–287.

Upland biotopes have conservation importance for their typical plant and animal species. Recently, the condition of upland habitats has deteriorated with associated declines in many upland birds. Grazing by increased densities of sheep has been implicated in these changes. Studies in lowland agricultural land have shown a link between declines in bird populations and the availability of arthropod prey.

The authors studied the effect of three grazing regimes and an ungrazed control on the numbers and overall biomass of foliar arthropods in upland grassland in the Southern Highlands.

Estimated total biomass of foliar arthropods increased significantly with decreasing grazing intensity in years 2 and 3 and biomass in the ungrazed treatment was approximately twice that in the commercially grazed treatment. This was related to the stocking density of sheep and both the stocking density of sheep and of cattle in an interaction with year.

Grazing management is important not only for the conservation of arthropods per se but also as food for insectivorous birds of conservation concern.

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RAH Draycott, AN Hoodless and RB Sage.
Effects of pheasant management on vegetation and birds in lowland woodlands.
Journal of Applied Ecology 2008, **45**: 334–341.

Releasing pheasants in woodlands for game shooting is a widespread practice in the British countryside.

The authors surveyed 159 lowland broad-leaved woods in southern and eastern England during spring–summer 2004 to determine the impact of pheasant management on vegetation structure and composition and on bird populations.

They recorded approximately 40% more birds in woods in southern England and between 22% and 32% more birds were observed in pheasant-managed woods than control woods. Woodpigeons and warblers were more abundant in pheasant-managed woods.

This study demonstrates that some aspects of woodland management for pheasants, including reducing the extent of canopy cover can encourage growth of understorey vegetation which helps create favourable conditions for some woodland bird species.

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CJ Ellis, BJ Coppins, TP Dawson, and MRD Seaward.
Response of British lichens to climate change scenarios: Trends and uncertainties in the projected impact for contrasting biogeographic groups.
Biological Conservation 2007, **140**: 217-235.

Projection of species-response to climate change scenarios is a key tool in conservation strategy. Previous studies have projected climate change impacts for animal and vascular plant species using the 'bioclimatic envelope' approach. In this study the authors apply the principles of the bioclimatic envelope approach to examine the response of 26 lichen species whose distributions are well characterised within the British Isles. Lichen species were subjectively selected based on their contrasting distributions, and their ecological traits, which fulfilled as closely as possible the assumptions of the bioclimatic envelope method. They used a split-sampling approach to model the species-response to present-day climate using confirmed records and pseudo-absences as input data, and testing each model against an 'independent' calibration dataset. Predictive models were projected using standard climate change scenarios comprising the UKCIP02 data. Projections indicate broad trends in the response of species placed into contrasting biogeographic groups, and point to the potential for significant change in the spatial distribution of the British lichen flora.

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Y Jiang, SK Swallow, and PWC Paton.
Designing a spatially-explicit nature reserve network based on ecological functions: An integer programming approach.
Biological Conservation 2007, **140**: 236-249.

An effective nature reserve network design should reflect the ecological requirements of target species, whilst also considering costs. Here the authors propose a design method that considers the ecological role of the spatial arrangement of reserve sites in relation to the long-term persistence of metapopulations of the target species, an amphibian.

Comparisons among reserve design methods show that considering the ecological function, rather than generic spatial rules, of the spatial location of reserve sites may be more likely to support species survival. A piecemeal treatment or mechanistic application of spatial rules in reserve design may be subject to the risk of not producing the most effective reserve network, and in some cases may even compromise the conservation objective which could be achieved otherwise.

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A Klimkowska, R Van Diggelen, JP Bakker and AP Grootjans.
Wet meadow restoration in Western Europe: A quantitative assessment of the effectiveness of several techniques.
Biological Conservation 2007, **140**: 318-328.

Techniques such as rewetting, topsoil removal, diaspore transfer or combinations of these are increasingly applied in fen meadow and flood meadow restoration in Western Europe. In this paper, the authors present a quantitative assessment of the effectiveness of the commonly used meadow restoration methods. They use the change in 'saturation index' to evaluate the degree of success. The index reflects the completeness of restored communities in comparison to regional target communities. Meadow restoration has limited success in most cases, with an average increase in species richness below 10% of the regional species pool. Restoration success was partly determined by the starting situation. The more species-rich the starting situation, the higher the saturation index after restoration but, at the same time, the smaller the increase in the number of target species due to restoration. Top soil removal and diaspore transfer were found to contribute most to restoration success. A combination of top soil removal and diaspore transfer and a combination of all three techniques appeared to be the most effective measure and resulted in an increase in the saturation index of up to 16%. Rewetting alone had no measurable effect on restoration success.

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F Götmark.
Careful partial harvesting in conservation stands and retention of large oaks favour oak regeneration.
Biological Conservation 2007, **140**: 349-358.

Many semi-open pasture woodlands with oaks in Europe have been invaded by other trees. The management alternatives for such stands are often debated. The authors studied protection versus partial harvest to favour oak regeneration in two matched plots in 25 forests in Sweden. A mast year produced on average 45,000 oak seedlings/ha in 2001. On average 26% of the tree basal area, but no large oaks, was harvested in experimental plots in the winter 2002/03. In 2005, seedling densities were on average 3,900 per ha in control plots (protected) and 11,600 in experimental plots. Seedling survival and growth rate from 2003 to 2005 were higher in experimental than cutting plots. Survival and growth were positively related to canopy openness; other vegetation, pH, and oak basal area had no or little effect. Seedling height before cutting was also a positive predictor of survival. The plots contained many more intermediate and large oaks than small oak trees. The number of small oak trees was positively related to canopy openness, but unrelated to other measured factors. Thus, minor partial cutting increases seedling densities, and adequate light favours seedlings/small trees. When oak regeneration is important for mixed closed canopy stands with high biodiversity values, such partial cutting is useful but needs careful evaluation.

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Erratum: In the last edition of *In Practice* the review (by JRT) of the Biological Flora *Cirsium dissectum* suggested that this species was a control issue for conservationists. This remark should have referred to the creeping thistle *C. arvense* and not the meadow thistle *C. dissectum* which is of conservation value. Thanks are due to a diligent reader of *In Practice* who kindly pointed this out.

Recent Publications

A Manual of Nature Conservation Law (Second Edition)

Editor: Michael Fry
Available from: www.wildlaw.co.uk
Price: £60 plus p&p

If ever a second edition of a book was urgently needed by those of us who have to apply the laws of nature conservation on a daily basis, it is this one. No longer will we have the tiresome task of checking our hand-written annotations, in dog-eared copies of Acts and Regulations, in order to ensure that we have the latest amendments. We now have a copy of the legislation in which we will have confidence.

It is comprehensive of the nature conservation law, importantly including those Directives that may have direct effect, as well as providing the context for domestic regulations. It includes the now increasing law relating to biodiversity conservation in the marine environment and, since 2007, off-shore. Although not legislation as such, I would have liked to see the Ramsar Convention as well as the Biodiversity Convention included, but I guess the line has to be drawn somewhere.

Following the recent 60th anniversary of the Huxley Report, I was pleased to see, in the introduction, that we have not lost our appreciation for the influence of early visionaries in shaping our wildlife legislation. We may grumble about loopholes and inadequacies of transposition, but the legislation of today would have been beyond our wildest expectations when I first became involved in this fascinating and crucial work, some 25 years ago. The complexity of amendments to primary and secondary legislation, brought together in this volume and previously a nightmare for the practitioner, illustrates how difficult it has been to make the legislation more effective.

The referenced footnotes will also save time by directing the reader to the source of definitions, amendments *etc*.

I don't think I have looked forward to using an eight hundred page book quite so much before!

Review by David Tyldesley MIEEM

Thomson's Wildlife on Site Handbook

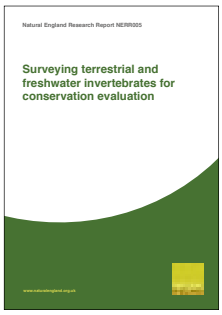
Editor: Richard Arnold CEnv MIEEM
Available from: www.thomsonecology.com
Price: £14

Thomson Ecology has now produced a single comprehensive resource for dealing with wildlife on development sites.

This Handbook is designed for civil engineers, developers and anyone else interested in wildlife, development and the law. It contains all the information you need regarding: wildlife law; current mitigation strategies for key protected species and habitats; and best practice regarding the protection of wildlife on development sites.

The Handbook is arranged into a number of accessible and informative sections that give advice and guidance on subjects such as the law on wildlife, designated sites and environmental impact assessments. In addition, the Handbook contains chapters on survey techniques and mitigation measures relevant to the most frequently encountered protected species.

This new 2008 edition also includes: updated legislation section; and discussion of PAS2010, the NERC Act (2006), updates to the UKBAP, the 2007 amendment to the Conservation Habitats (etc) Regulations 1994, and the Good Practice Guide and Circular accompanying PPS9.



Surveying terrestrial and freshwater invertebrates for conservation evaluation (NERR005)

Authors: CM Drake, DA Lott, KNA Alexander CEnv MIEEM and J Webb MIEEM
ISSN: 1754-1956
Available from: www.naturalengland.org.uk
Price: Free download

The aim of this Natural England Research Report is to provide guidance to surveyors, and those hiring and contracting them, on how to undertake invertebrate surveillance. It gives both specific guidance for direct surveys (rather than proxy habitat surveys) carried out in accordance with Common Standards Monitoring guidelines (in England), as well as generic guidance for a variety of other situations, such as environmental impact assessments, single day visits, regional projects and more. Single-species surveys are not covered.

This Research Report does not aim to give an exhaustive account of sampling, nor to provide a detailed resume of analytical methods. Rather, the authors have attempted to provide a framework that shows how invertebrate surveying can be carried out, using pragmatic techniques, in situations where time and resources might be limited. For those undertaking Common Standards Monitoring, the information in this book should be adequate to quickly determine the exact needs of any field work and subsequent analysis. For other invertebrate surveys, this book should facilitate the planning, survey and evaluation of any programme of works by providing useful and clear guidance.

This first edition is to be produced as a working document, the aim being to update and amend a subsequent edition that will be produced as a stand alone book rather than a research report.

New Naturalist: A History of Ornithology

Author: Peter Bircham
ISBN: 9780007199709
Available from: www.harpercollins.co.uk
Price: £25 paperback (£45 hardback)

Today there is a huge interest in birdwatching as a hobby and over the years amateur birdwatchers have contributed enormously to our understanding of the birds around us. At the same time, ornithology has developed as a science – in the field, in the laboratory, and in academia – and birds have played their part in pushing forward the frontiers of biological knowledge.

Peter Bircham looks at the history of British ornithology, spanning a millennium and exploring along the way the first bird book, the earliest British lists, various notable scientists, collectors and artists, the first studies of migration, and the challenges presented by classification. He traces the development of the British Ornithologists' Union and other organisations, and finishes with a review of the current state of ornithology in Britain.

A History of Ornithology is an authoritative and engrossing account, full of fascinating stories – not only about the birds but also about the many colourful characters who have studied them through the ages. This beautifully illustrated book will hold great appeal both for the student of ornithology and for the enthusiastic amateur naturalist.

News in Brief

Important environmental case concludes

A North Yorkshire company has been fined £50,000 by Durham Crown Court for causing damage to part of Lune Forest Site of Special Scientific Interest (SSSI) in Durham. The company has been ordered to pay Natural England's full costs of £237,548.99 in bringing the prosecution. Together with the costs of restoration and other measures, the total cost to the defendant exceeds £500,000. More information can be found at www.naturalengland.org.uk.

RSPB unveils its latest reserve

More than 700 acres of wetland in the north of Scotland have become RSPB Scotland's newest nature reserve. Broubster Leans on the floodplain of Forss Water, south-west of Thurso, provides habitat for wading birds, insects and water vole. RSPB Scotland hopes its work on the reserve will help reverse a decline in wild bird numbers.

Rainforest plans for South Wales

Wales could have its own rainforest next to the M4 within the next few years. Would-be developers say that the project will involve a hotel encased in a glass bubble surrounded by tropical plants, animals, streams and waterfalls.

Dimas calls for more nature conservation in the fight against climate change

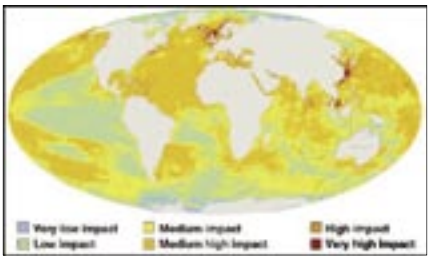
At a recent event at the European Commission in Brussels, Commissioner for the Environment Mr Stavros Dimas gave a keynote speech, in which he underlined the need for a higher priority for wildlife conservation and emphasized that healthy and diverse ecosystems are essential for any climate change strategy. Commissioner Dimas concluded his speech by stressing that efforts to reduce greenhouse gases should not come at the expense of wildlife. Referring to renewable energy sources, he is convinced that we need to be careful about how and where they are developed, he stated that we need to make sure that when promoting biofuels we are not encouraging the destruction of habitats.

Urban trees improve air quality

Planting trees in urban areas could cut particulate pollution in cities by as much as a quarter, according to a new study. Small air particles, especially those less than 10µm in diameter (PM10) pose a long-term threat to human health. These can originate from human activities, including exhaust fumes or smoke, or from natural causes, such as dust. The study, conducted in Glagow and the West Midlands, shows that trees are particularly good at capturing PM10 on their leaf surfaces.

Map shows toll on world's oceans

A study in the journal *Science* says climate change, fishing, pollution and other human factors have exacted a heavy toll on almost half of marine waters. Only about 4% of the world's oceans remain undamaged by human activity, according to the first detailed global map of human impacts on the seas. Sadly, British waters are amongst the worst affected on the planet.



Impacts of climate change on the marine environment

According to the Marine Climate Change Impacts Partnership (MCCIP) 2007-2008 report card, climate change is having a significant impact on the marine environment. The key findings show that seven of the last 10 years were the warmest on record with 2006 being the second warmest year for UK coastal waters since the records began in 1870. The warmer winters we are now experiencing are being strongly linked to reduced breeding successes and survival in seabird populations. It is not only the natural environment that will suffer either; impacts on the commercial services provided by our seas will be significant. Ports, shipping and building structures will all be affected by increases to sea level, coastal flooding, storm severity and bigger waves.

Changes made to Irish forest protection scheme

Irish government chiefs have announced changes to a scheme to protect the country's woodland. They announced new incentives that would be introduced under the country's Forest Environment Protection Scheme (FEPS). Landowners planting a minimum of eight hectares of woodland will receive a FEPS premium of €200 per hectare, regardless of their farm size. Also, those farm owners with plantations of between five and eight hectares will receive a premium of €150 per hectare. These premiums are in addition to the existing Afforestation Scheme grants and premium.

Conservation Assessments

Ireland, like all European Union Member states, is required to report at six-yearly intervals on the implementation of the Habitats Directive. The latest report by the National Parks and Wildlife Service (NPWS) in the Republic of Ireland details progress with the implementation of the Directive including advancements in management plans for protected areas; conservation measures undertaken in protected areas and developments in monitoring and surveillance of protected species and habitats. The report also includes the first baseline assessment of the conservation status of habitats and species that are afforded protection under the Directive. Each assessment includes an evaluation of the range, habitat area, habitat structure and functions, species population estimates, area of suitable habitat for species and future prospects and concludes with an overall verdict of 'good-green', 'inadequate-amber' or 'bad-red'. The assessments were derived following strict EU guidelines by NPWS scientific staff and ecological experts in the scientific community. A report entitled *Summary Results from the 2007 Conservation Assessments* can be downloaded from www.npws.ie.

Climate change and Irish plant diversity

Dr Peter Wyse Jackson, Director of the National Botanic Gardens of Ireland, has published a short paper outlining the potential effects of climate change on native Irish plants. His assessments reveal that, conservatively, there are at least 170 native plant species (20% of the total Irish native flora) that are particularly vulnerable to climate change during the period up to 2050. Of a total of 143 threatened species currently included in the Irish threatened plants list, 74 species (52%) may have their situation made potentially worse due to climate change. In addition, 28 (3%) of species that are currently not threatened in Ireland are likely to become so due to climate change. He suggests that plant species most at risk from climate change are: those already threatened in Ireland due to a variety of factors; those that occur in restricted or vulnerable habitats; those particularly prone to loss due to competition from invasive alien plants; and those that may be adversely affected by related changes to the biodiversity in their ecosystems.

Bank voles

The origin of Ireland's introduced bank voles has long been a source of curiosity to naturalists. Now a paper in the *Irish Naturalists' Journal* (Vol 28, No 11) throws some light on the mystery with the help of DNA analysis. Using samples of mitochondrial DNA from individual voles captured in Ireland, Britain and Germany, the researchers found a close relationship between the Irish and German sequences, supporting the theory that the species was introduced in the 1920s with equipment imported from southern Germany for a hydroelectric scheme on the River Shannon. The bank vole, first reported in 1964 in Co. Kerry, had by 2001 colonised a wide area to the south-west of a line from Galway to Waterford. The low levels of DNA variation in the Irish bank vole samples suggest that the founder population consisted of only a few individuals.

National vegetation database for Ireland

A National Vegetation Database has been established and hosted by the National Biodiversity Data Centre in partnership with the National Parks and Wildlife Service, National Botanic Gardens, and Botanical Society of the British Isles. The aim is to collate all of the relevés (the vegetation sampling units) data that has been collected over years onto a single database, which ultimately could lead to the development of a national vegetation classification for Ireland. A national vegetation classification would be an invaluable tool in accurately describing the vegetation resource of the country and provide a baseline against which large-scale changes due to, for example, climate change could be detected. Further information from www.biodiversityireland.ie.

Mapping the Irish lichen flora

A new project has been launched as a four-year study to determine the status and distribution of lichen species throughout the island of Ireland. LichenIreland is supported by National Parks and Wildlife Service; National Botanic Gardens, Glasnevin; Environment and Heritage Service and the Ulster Museum. In order to raise the profile of the group, this project will: engage new and existing lichen recorders (training, where appropriate, will be given); collate the existing lichen data set on the Recorder database; and undertake field recording from sites and habitats throughout Ireland. Further details of the project can be found at www.habitas.org.uk/lichenireland.

BurrenLIFE Project

The BurrenLIFE Project is the first major farming for conservation project in Ireland. To protect the Burren, the best way is to continue farming it. Traditional farming - tight winter grazing by hardy old store cattle and with little in the way of supplementary feeding - is no longer sustainable and this has been replaced by farming which involves continental cattle breeds, silage feeding and slatted houses. This has resulted in many winterages being under-grazed and herbage and flowers are losing out to tough grasses and scrub. Silage feeding is contributing to the problem and may also be causing some enrichment and pollution. Under the Habitats Directive, Ireland is obliged to maintain the listed habitats in the Burren in 'favourable conservation status'. Consequently, different land use practices are being examined and introduced in order to ensure that these habitats are not lost. This requires research and development of new, integrated, systems for the agricultural management of the Burren, to secure a bright future for its people and their heritage. The BurrenLIFE Project is addressing these concerns by working closely with farmers and drawing on their knowledge and skills. Further information on www.burrenlife.com.

Northern Ireland Coast

A new magazine, *EHS Coast,* was launched in 2007 by the Environment and Heritage Service (Northern Ireland). The aim of the magazine is to celebrate and promote the coastal wildlife, maritime heritage and marine environments of Northern Ireland. The first issue contains much interesting material including articles on the diversity of marine fish, monitoring of seals in Strangford Lough, marine survey results from the EHS Aquatic Science team and maritime archaeology on Rathlin Island. The magazine can be viewed at www.ehsni.gov.uk/coast.

Whales in winter

The Irish Whale and Dolphin Group (IWDG) reports that large whales can still be seen in mid winter off the Irish coast. Cetaceans were observed on all three watches off Loop Head, Co. Clare, Castlepoint, Roaringwater Bay, Co. Cork and Galley Head, Co. Cork. For more information see www.iwdg.ie.

Butterflies on the bog

The Irish Peatland Conservation Council's Marsh Fritillary Butterfly Conservation Project at Lullymore Bog in Co. Kildare has been awarded €20,000 by a European network of businesses involved in the outdoor industry. The marsh fritillary is a European butterfly that is very much in decline. It is protected in many countries and given protected status under the Habitats Directive. In Leinster, Lullymore West Bog is a stronghold for this species. The award winning project of the IPCC aims to protect, enhance and conserve the species. For more information visit www.ipcc.ie.

Pine martens on the move in Northern Ireland

Once classified as the rarest of Ireland's mammals, the pine marten has been steadily recolonising some of its former haunts. An analysis of records from 1850 to 2004 together with a survey of signs in 57 forests has demonstrated that the species is now found in four of the six counties in Northern Ireland. The forests of Fermanagh and Tyrone are a stronghold for the species but it also occurs as far east as the Mourne Mountains in County Down. Threats to the species have altered since the nineteenth century when trapping by gamekeepers was one of the main sources of records. Now one of the main causes of death of the pine marten is road casualties.

Red kites In Ireland

Following the first reintroduction of red kites to Co. Wicklow in 2007, the RSPB hopes to reintroduce this once common species to Northern Ireland in 2008. This project would be the first ever species reintroduction to take place in Northern Ireland. RSPB NI is hoping to release up to 70 red kites over a three-year period in the south Down area, beginning in Summer 2008. They propose to re-introduce kites to south Down as the mixed woodland, farmland and rough grassland will provide the perfect home for this bird. Red kites are opportunistic scavengers and are not designed to feed on mobile prey, so they are not a threat to livestock, game birds or songbirds. Records suggest that red kites probably disappeared from Ireland after being driven to extinction by centuries of persecution. Globally, the red kite is a bird of conservation concern and is declining across much of Europe, which contains virtually all the world population.

A total of 30 red kites, from the Welsh population, were released in Co. Wicklow in July 2007 and they have adapted well to the surrounding countryside since then. Local farmers, landowners and members of the shooting fraternity have been extremely supportive of the project to date. Unfortunately, one of the young birds was recovered dead in late August. The dead kite was x-rayed and the bird contained 5-6 shotgun pellets alongside the obvious entry wound in its chest.

Tauro-Scatology and New Directives (Part 2)

In this issue of *In Practice*, Basil O'Saurus, our very own Professor of Tauro-Scatology continues to explain the implications of the EU's Piss-Up in a Brewery Directive for IEEM members.

That's right. In the last issue, I explained about the delicate negotiations that took place before the Directive was completed. Now I want to tell you how the UK's government departments and agencies will be implementing the Directive once it has been transposed into national legislation.

A challenge, obviously, as most of us believe that the average government department or agency is completely incapable of organising a piss-up in a brewery. So what is the Government planning to do?

Obviously, the topic touches on the responsibilities of many different stakeholders and the Government recognise that a co-ordinated response is needed. So the first thing that they do is set up a technical advisory group, with members drawn from all those stakeholders with an interest in the Directive. They, then, sit around for ages discussing suitable acronyms.

Is this necessary?

But of course. One of the oldest rules of public administration is that any new initiative must generate an opaque vocabulary so that only initiates know what is going on. Acronyms are one of the quickest ways of achieving this. In this case, they decided that Piss-Up in a Brewery lent itself to the acronym PUB, so we now have PUB TAG.

What happens next?

PUB TAG then have a few meetings without getting anywhere. No-one, obviously, is prepared to admit this publicly. However, eventually someone will make the bright observation that the UK shares a land border with the Republic of Ireland and, therefore, the Piss-Up in a Brewery Directive has some transboundary issues. This means that they can invite representatives from Ireland along too. As the Irish are renowned for their conviviality and craic, PUB TAG suddenly generates its own momentum plus the ideal excuse to spend a couple of nights in Dublin. PUB TAG is still not getting anywhere, but everyone is having too good a time to mind.

How long does this state last?

As long as possible. Eventually, however, PUB TAG will produce the Piss-Up Implementation Strategy which will then go out for public consultation. However, we must not forget that, like all EU Directives, the Piss-Up in a Brewery Directive has a strict timetable. The UK has to demonstrate that it has implemented the Directive in time, otherwise it will be hauled in front of the European Court. So, each organisation now has to appoint some individuals to handle day-to-day aspects of implementation.

Let me guess, each organisation appoints someone who is an expert on the technical aspects of piss-ups in breweries?

Wrong. Utterly and completely wrong. Have you ever noticed how the middle management of all public bodies is stuffed with people who seem to flit from one desk job to the next, who have grandiose titles and who litter presentations with flow charts and phrases such as 'delivered on budget and on time'?

I can think of many examples.

One beneficial side-effect of Directives like this is that it provides another slot in the organisation for people like these, all of whom need to be kept well away from hands-on work. We let them think that they are 'getting experience' prior to an inevitable rise to senior management but, in truth, they are in the middle management vortex. We decide on an impressive title: Piss-up Implementation Strategy Support Officer, for example, then advertise internally and … bingo.

… someone, somewhere is about to be known as PISS OFF.

Exactly. A job title which matches exactly what their colleagues think they should do. Their first job, then, is to invent enough activities to keep themselves busy until the next game of middle management musical chairs. Their second job is to find and justify appointing an assistant.

Why is that?

Mainly so that they can add 'team leader' to their CVs, but also because they will become so tied up with the health and safety aspects of piss-ups that they won't have time to do anything else …

You're not going to start one of your rants about the excessive zeal of health and safety officers are you?

Not at all. The prospect of breweries full of outrageously drunk people careering around dangerous machinery fills me with a sense of dread and horror. I think that this is one case where careful attention to trip hazards, safety barriers and the like is a good thing.

I think that you've just about convinced us all that organising a piss up in a brewery is more difficult than it may seem.

That's not to say, of course, that a government department or agency couldn't organise a piss-up in a brewery. They would just need a lot of time and effort to make sure that it is done properly. And when they've done this, they'll adopt a supercilious attitude to the half-hearted attempts of other EU Member States to implement the Directive and make bold pronouncements about the UK leading the world in piss-up facilitation.

Undoubtably. But then it takes a tauro-scatologist to know a tauro-scatologist. Thanks, again, for your time.

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 2008. 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:

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APPLICATIONS FOR ASSOCIATE MEMBERSHIP

Mr Jonathan P. Ayres, Miss Abigail V.L. Bridge, Mr Frank Daly, Mr Adam G. Ellis, Miss Joanna Ferguson, Miss Sarah Gooch, Miss Gemma Harding, Miss Gale Hodges, Miss Laurie Jackson, Miss Rosalyn A. Kaye, Mr Stuart B. Livesey, Miss Ruth Morton, Miss Annie Porter, Miss Jennifer P. Stillwell, Mr Matthew Sullivan, Mr Michael P. Symes, Mr Jonathan J. Taylor, Ms Ly F. Vaillancourt, Mr David G. Watson

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IEEM is very pleased to welcome the following new Members:

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Miss Alison L. Appleby, Mr David Arscott, Miss Lisa Blezzard, Miss Melanie J. Brown, Miss Megan J. Butler, Miss Emily Carroll, Miss Hannah Chard, Miss Rachel E. Chesterton, Miss Jemma Crawshaw, Ms Trudi M. Dorr, Miss Johanna Elwell, Miss Kristen Furley, Miss Cheryl L. Gogin, Miss Emma Grubb, Mr Matthew Guest, Miss Charlotte E. Harris, Mr Paul Hiscocks, Mr Bijana Hitan Magar, Mr Jonathan Hudson, Ms Sonia Johal, Miss Elizabeth L. Jones, Ms Johanna R. Jones, Miss Aleksandra E. Kazmierczak, Ms Crystal Leung, Mr Timothy P. Mann, Miss Anna L. McGrath, Miss Sarah L. Muddell, Miss Alice Ramsay, Mr James Segar, Miss Teresa D. Shelly, Miss Beth Sidaway, Miss Naomi E.A. Smith, Miss Victoria F. Smith, Mr Jeffrey Taylor, Mr Andrew R.W. Thorne, Miss Suzanne Tompkinson, Miss Catherine Turner, Mr Darren Valentine, Mr Mark A. Vivian, Miss Anni J. Vuohelainen, Mr Matthew S. Williams

UPGRADES

The following have successfully upgraded their Membership:

ASSOCIATE to FULL MEMBERSHIP

Mr Derek Allan, Mr Andrew J. Charles, Miss Nadine L. Clark, Dr James Cook, Miss Karen Couper, Dr Anne Danby, Miss Katherine Degenaar, Dr Joanne L. Denyer, Miss Emma K. Fawcett, Mr Luke M. Gorman, Mr Richard C. Harris, Dr Barbra Harvie, Mr Leslie Hatton, Mrs Kelly Hollings, Miss Claire Hopkins, Miss Katie Jones, Dr Katherine M. Kelleher, Miss Melanie Knight, Mrs Tanya Parker, Miss Clare Pugh, Miss Catarina Rei, Mr Jeremy A. Sabel, Mr Craig Sandham, Miss Laura S. Smith, Dr Liat P. Wickramasinghe, Dr Sarah Yarwood-Buchanan

What's on April – June 2008

1 April 2008
Badger ecology and survey methodology.
Gosforth Park, Newcastle.
NE England Section event.
www.ieem.net/nesection.asp.

2-3 April 2008.
Inspirational Nature: Harnessing passion, inspiration and creativity for nature conservation.
Lancaster University.
www.ieem.net/otherevents.asp.

3 April 2008.
Countryside Management Conference: Future of Upland Management.
Manchester Metropolitan University.
IEEM NW Section Event.
www.ieem.net/nwsection.asp.

4-6 April 2008.
Bat survey, mitigation and management techniques.
Stokesay Castle.
www.ieem.net/otherevents.asp.

5-6 April 2008.
Living Ecosystems - An Introduction to GCN Survey and Mitigation.
The Ashley Activity Centre Mobberley North Cheshire.
www.ieem.net/otherevents.asp.

9 April 2008.
Discussion of climate change adaptation of the natural environment using information gained from the Cumbria High Fells Climate Change Project.
Keswick area.
IEEM NW Section Event.
www.ieem.net/nwsection.asp.

9 April - 9 May 2008.
Environmental Conservation, Energy and Climate Change short courses.
University of Oxford, Continuing Professional Development.
cpd.conted.ox.ac.uk/env.

16 April 2008.
IEEM Spring Conference – Environmental Liability Directive.
London.
www.ieem.net/conferences.asp.

25-27 April 2008.
Bat survey, mitigation and management techniques.
Goodrich Castle.
www.ieem.net/otherevents.asp.

30 April 2008.
IEEM NW Section Committee Meeting.
Slaidburn TBC.
www.ieem.net/nwsection.asp.

30 April 2008.
NW Section Bat Event.
Slaidburn Village Hall, Forest of Bowland.
www.ieem.net/nwsection.asp.

9-11 May 2008.
Remote recording techniques.
Margam Abbey.
www.ieem.net/otherevents.asp.

12 May 2008
Water vole ecology and survey methodology.
South Tyneside.
NE England Section event.
www.ieem.net/nesection.asp.

21-23 May 2008.
Bat Echolocation Workshop.
Epping Forest, Loughton.
www.ieem.net/otherevents.asp.

3 June 2008.
IEEM Summer Conference – Ecological Economics.
London.
www.ieem.net/conferences.asp.

6 June 2008
Grassland and species identification for Phase 1 survey.
Venue TBC
NE England Section event.
www.ieem.net/nesection.asp.

10 June 2008.
IEEM Ecological Impact Assessment Guidelines – Practitioners' Seminar.
Birmingham.
www.ieem.net/ecia.asp.

16-19 June 2008.
Bats in Woodlands Course.
The Holnicote Estate, Somerset.
www.ieem.net/otherevents.asp.

19-20 June 2008.
Transect Bat Survey and Sound Analysis Course.
The Holnicote Estate, Somerset.
www.ieem.net/otherevents.asp.

22 June 2008.
BioBank: recording and use of data.
Liverpool.
IEEM NW Section Event.
www.ieem.net/nwsection.asp.

26 June 2008.
Management of four tip sites around Bidston.
Bidston.
IEEM NW Section Event.
www.ieem.net/nwsection.asp.

18-20 November 2008.
IEEM Autumn Conference – Mitigation.
Glasgow, Scotland.
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
Centre for Alternative Technology, Machynlleth, Powys, SY20 9AZ.
01654 705950
www.cat.org.uk

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

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

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