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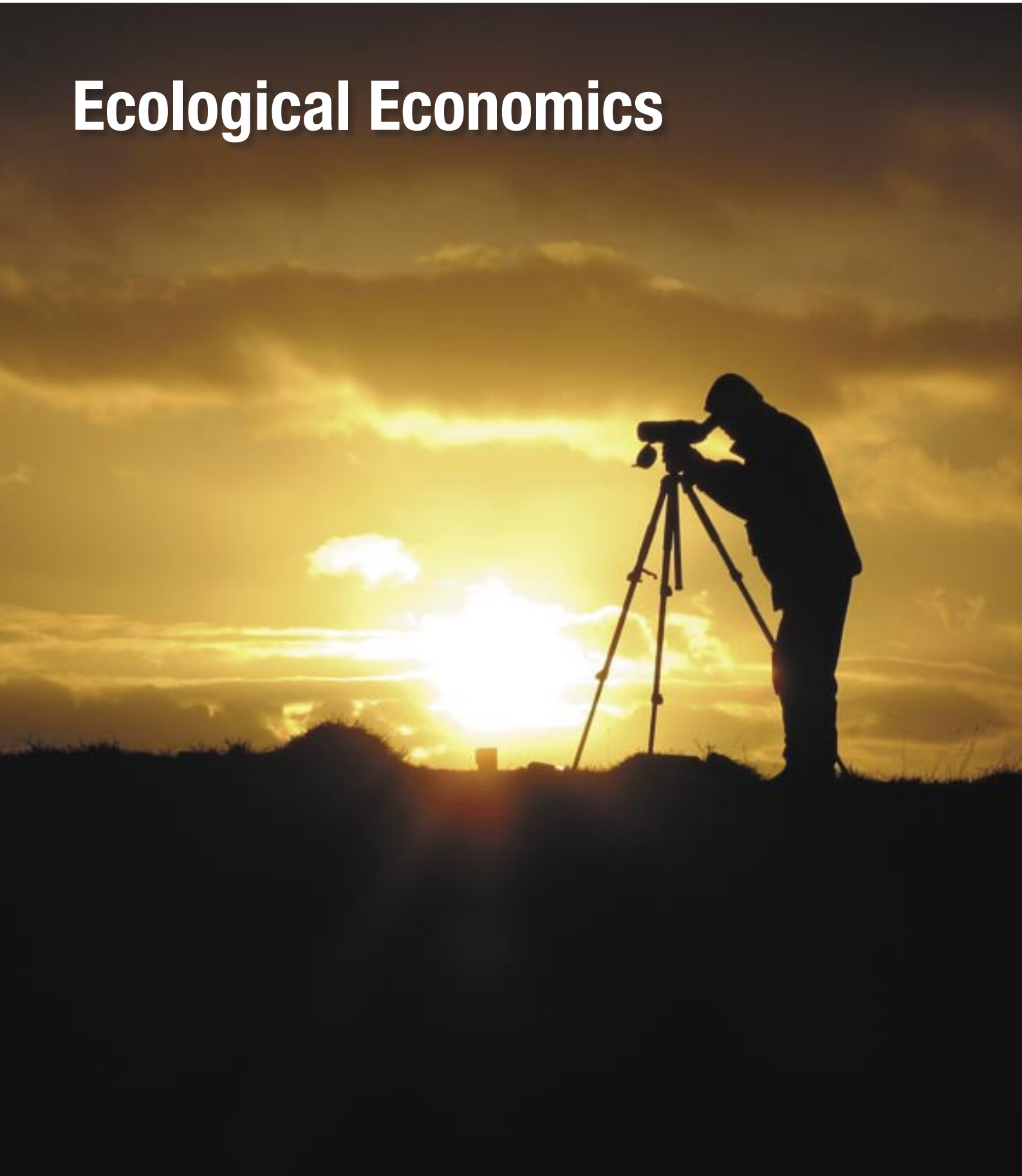
Ecological Economics



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British Ecological Society

Editorial

A Thieving Magpie's Take on 'Ecological Economics'

Oikos (Greek) – the root of both the words ecology and economy – the study and lore of the home respectively. I am no classicist, but judging by the long list of applications of '_oikos_' in the Greek dictionary, I imagine that money was only one of many values encompassed by this concept in classical Greece.

'Climate change presents a unique challenge for economics: it is the greatest and widest-ranging market failure ever seen.' When Sir Nicholas Stern wrote those words in his 2006 Review on *The Economics of Climate Change*, was he aware of all the other values that I suspect a Greek would have read into this assertion, or was he just focused on money?

JK Galbraith opens his book *The Affluent Society* (1958) with the thesis that the vast majority of people throughout history have lived in grinding poverty and this has shaped society's attitudes and reactions to affluence:

- 'As a result, we are guided, in part, by ideas that are relevant to another world; and as a further result, we do many things that are unnecessary, some that are unwise, and a few that are insane. Some are a threat to affluence itself.'
- '…wealth is the relentless enemy of understanding…'
- 'These are days when men of all social disciplines and all political faiths seek the comfortable and the accepted…'
- 'The affluent country which conducts its affairs in accordance with rules of another and poorer age… will in any time of difficulty, implacably prescribe for itself the wrong remedies. This… is, to a disturbing degree, our present tendency.'

A quick visit to the New Economics Foundation website produces: 'what gets counted, counts'. If we are going to redefine progress we have to 'make the invisible value of things visible and measurable'. What value, for instance, do we attach to the opportunities that will be available to future generations? The law makes no provision for rights of, or responsibility towards, people who are not yet born. Future generations have no legal rights and no legal representation. Would an official advocate for their interests be an effective way to begin to restore a broader foundation of value to our current society?

Little has really changed in 50 years since Galbraith published *The Affluent Society* other than our certain knowledge of the consequences of applying the wrong remedies. What, as ecologists, can and must we do? We have our own specialisms and personal aptitudes and on the whole we are not a strongly political community. It is hard to escape the conclusion that we either have to change this or stand accused of being complicit in a return to grinding poverty of future generations. Do we want to be included in the growing list of professionals tarred with the jibe that they 'know the cost of everything and the value of nothing' (Oscar Wilde), which seems to be a fair appraisal of most government processes?

Robin Buxton MBE CEnv FIEEM
Chair, The Northmoor Trust

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Cover image: Tourism, including bird watching, contributes enormously to many economies.

Photography: Claire Hopkins MIEEM

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

Economics, Business and Biodiversity – Can Ecology Help?

Paul Goriup CEnv FIEEM
Managing Director, Fieldfare International Ecological Development plc

Economics and economic prescriptions exert an enormous influence on society and thus government policies (and vice versa). Standard or 'neo-classical' economic models treat natural resources like any other form of capital, seeing them as expendable and easily substitutable. When large areas of wilderness remained and natural resources were plentiful the environmental implications of this view were not immediately evident. But with the economy so much bigger than it was when economic theory was being developed, the failure to adequately take account of the impact of economic activity on the natural heritage is highly detrimental (Blaney *in litt.* 2006). This problem is being increasingly recognised, and surely the time has come for ecologists and economists to combine forces, not just in theory but also in practice, to come up with sustainable solutions.

Gross Domestic Problem

One of the standard economic axims states that a continued increase in wealth will remedy any environmental degradation as all problems are easier if we are richer. The way to get richer is assumed to be by economic growth, usually as measured at a national scale by GDP (gross domestic product). Yet, the use of GDP alone to calculate prosperity is misleading if only because it counts environmental disasters positively. For example, the estimated US$80-100 billion loss of property caused when Hurricane Katrina struck New Orleans in 2005 was not deducted from American GDP; on the other hand, the massive (insurance and compensation funded) rebuilding effort that rippled through all the construction, equipment, service, and industrial supply industries, was counted as additions to economic output amounting to perhaps 0.1 to 0.2% per quarter for all of 2006 (Englund 2005). A similar situation applies to oil spills, acid rain and carbon emissions: the damage done to ecosystems is not counted; the cost of treating the consequences appears to make us grow richer.

Clearly, the value of ecosystem services should be incorporated into decision-making processes. The standard economics approach has difficulty in doing this. For standard economists, nature is not a containing envelope, but just a sub-sector of the economy: 'croplands', 'grasslands', 'forests' and 'fisheries'. When the economy grows, in this view, it expands into a 'void' encroaching on nothing (so having no down-side). But of course the real economy does not grow into nothingness, but into ecosystems and so environmental losses arise (Blaney *in litt.* 2006).

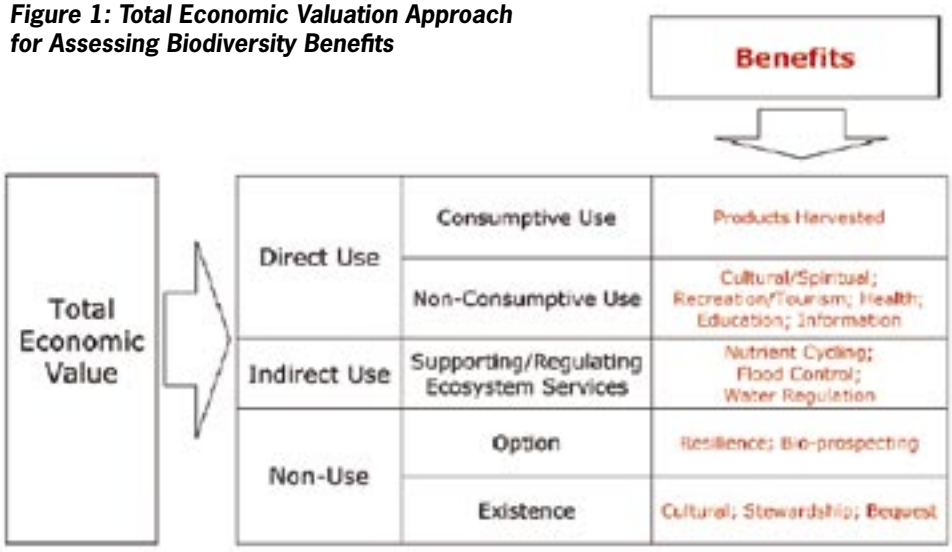
For the last couple of decades, some economists have attempted to recognise environmental problems, developing the field of 'environmental' economics, where environmental costs (termed 'externalities') are weighed against the benefits of resource use. A recent review of valuation methods (*e.g.* willingness to pay, contingent valuation, replacement cost) and case studies was published by Defra (2007) which recommended the use of the Total Economic Valuation (TEV) approach for assessing benefits from biodiversity (Figure 1). However, as useful as this may be in identifying options in particular circumstances, there remain many drawbacks with giving an absolute monetary value to biodiversity, such as:

- insufficient public appreciation of concepts such as ecosystem services (these are not put on the same level as *e.g.* health care or education or terrorism);
- different public perceptions concerning the aspects of biodiversity they actually value;
- the setting of discount rates and the period over which they should be applied.

These flaws become apparent in the case studies presented in the Defra review that came up with widely differing monetary values for rather similar biodiversity benefits. Furthermore, all the studies had cost large sums, which would pose a significant barrier to undertaking them on a regular nationwide basis in the same way that economic statistics are gathered. In any case, environmental externalities involve risks of irreversible ecosystem damage and impacts on future generations which can hardly be expressed adequately in monetary terms.

The message about the drawbacks of using standard economics and its core indicator of GDP as a paradigm for

Figure 1: Total Economic Valuation Approach for Assessing Biodiversity Benefits



Small groups of high value nature tourists generate incomes for local communities and protected areas

human development is gaining political recognition. Addressing the European Parliament in November 2007, EU Environment Commissioner Stavros Dimas called for better measures of progress. I have paraphrased his speech as follows: GDP is the most successful and best known indicator that we have. It is simple, it is clear, and it has stood the test of time. There is general agreement that GDP is a rigorous indicator for economic purposes and that it should continue to play a role in economic decision making. But GDP is not sufficient to guide modern policy making that covers social, environmental and economic objectives. It is not a good indicator of wellbeing and this becomes a problem when GDP is understood by public, press and politicians as the unique yardstick for progress. It is quite possible for something that is good for GDP to be bad for society. And it follows that, if boosting GDP is the only measure of success, we could easily end up doing more harm than good. We need a set of indicators – but a very limited one – that can complement GDP. We certainly need to work on headline, composite indicators that can measure social and environmental progress. We have to speed up and improve the development of integrated accounting in the social and environmental spheres. In this regard, timely data is important. We have stock market information every minute of the day. We have quarterly reports of GDP. But information on environmental trends is often years old by the time it reaches policy makers. Using new technologies for collecting and processing data in almost real time is something that we should be aiming for. The more up to date indicators are, the more useful they are.

Towards an Ecologically Sustainable Economy

But if we are going to really challenge economic orthodoxy and perceptions of what increasing personal wellbeing means, I believe we need more than hypotheses and policies and sustainability indicators. We need the physical proof that moving to an ecological economy is going to work. We need to change the ways that society at large, governments, and the private financial and business sectors interact such that goals and incentives are redirected for maintaining and restoring ecosystem services. Recent initiatives in 'Payments for Ecosystem Services' (PES) by WWF and others is a positive step in this direction.

Another area that needs attention is the production process itself, encapsulated by the vast array of micro, small and medium enterprises (SMEs) that have a direct link with biodiversity use (SMEs constitute over 99% of all economic activity in the EU25). In 1995, I was researching the possibility of setting up a pension scheme for IEEM members. Obviously, we intended to set up a scheme with one of the then emerging 'ethical funds' that would invest in businesses screened for their operational compliance with environmental and ethical criteria. What I discovered, among other things, was that all the criteria for selecting companies for investment were negative (companies don't do this or that) rather than positive, and that despite the pretty pictures of wildlife and woodlands used to promote their ethical funds, all the companies in the fund managers' portfolios operated in the 'grey' or 'brown' areas, especially waste management. Nothing wrong with that, of course, but what caught my attention was the absence of any company listed on the London Stock Exchange with a truly green profile. There were no criteria to positively encourage biodiversity-friendly companies, and no companies that could benefit even if the criteria existed. Could this be changed – and if not, why not? Was business and biodiversity maintenance really incompatible as many said, or were there structural reasons that impeded sustainable biodiversity use and which could be addressed?

The question seemed worthwhile investigating, so in 1996 some colleagues and I launched Fieldfare International Ecological Development as a testing bed for a new kind of shareholding company that would have biodiversity conservation at its core. It started as a private company and became a public limited company (plc) in September 1999. It aims to harness the resources of the ethical investment movement in Western Europe for promoting ecologically sustainable development and wise use of natural resources, especially in Eastern Europe. The company is perhaps unique in having environmental and ethical objectives in its statutory objectives, namely:

- To promote ecologically sustainable development and the maintenance of ecological processes through wise use of natural resources, restoration of damaged ecosystems, conservation of genetic diversity, and increasing human understanding of and capabilities to protect global biodiversity.
- To adhere to an ethic of environmental care which strives to ensure that the operations of the company shall not result in unsustainable use of natural resources, emission of environmental pollutants, or wastage of materials, or lead to the destruction of the social fabric of local communities.

In order to identify and pursue suitable investments, Fieldfare has devised the concept of delivering net ecological benefit, which is defined as: 'the difference in ecological state of a geographically determined area from the present time projected forward to a specified future date, which can be considered as an improvement in ecological conditions and functions for habitats and/or species.'

As of April 2008, Fieldfare has 21 shareholders and a subscribed capital of some £160,000; it has made a net profit in each of the last three years. The company has employed its resources mainly through a joint stock subsidiary registered in Odessa, Ukraine, through which it coordinates investments in ecotourism, organic farming, biomass from reedbeds and organic fisheries. Of course, many enterprises are engaged in similar business activities; what marks Fieldfare apart is its integrated multi-sector investment approach focused on a particular region (the Lower Danube wetlands and steppe), and its ambition in due course to make a public offering of its shares and seek a listing on a stock exchange such as the Alternative Investment Market (AIM). There is nothing in British company law that says resources must be over-exploited. Rather, over-exploitation results from a mis-perceived logic of competitive forces of market economies driven by the perceived need to deliver more, quicker, cheaper and let tomorrow take care of itself. To overcome this logic requires a change in attitude by all economic actors: consumers, shareholders and regulators. Having a company like Fieldfare listed like other 'normal' companies would not only send a clear signal that biodiversity and business can co-exist, but act as a practical demonstration

of how biodiversity conservation and its sustainable use is actually a long-term viable business opportunity.

Since Fieldfare was formed, there has been increasing interest and research on 'innovative' financial mechanisms for supporting biodiversity conservation in Europe as awareness has grown of the size of the sector (from medicinal plants to biomass, and ecotourism to organic fisheries) and its potential for growth. Recent estimates by IUCN – The World Conservation Union put the expenditure on wild natural resources in Europe in the region of €40 billion annually, and growing (Kenward *in litt.* 2008; Governance and Ecosystems Management for the Conservation of Biodiversity - www.gemconbio.eu). Some of this work has focused on the 'operational' level of the economy *i.e.* the role of financial institutions (particularly banks) and making business practice 'greener'.

The European Commission itself has recently funded various projects on 'pro-biodiversity' businesses (PBBs), including a research study by Fauna and Flora International (Dickson *et al.* 2007) and started a pilot project on creating a pipeline of biodiversity-friendly investments in Poland, Hungary and Bulgaria (led by RSPB). The European Centre for Nature Conservation (Tilburg, Netherlands) has been funded by the Dutch government to investigate pro-biodiversity businesses in Bulgaria and Croatia, and the problems they face in obtaining finance for their operations from the current banking system. During 2007, the European Bank for Reconstruction and Development started further studies to support pro-biodiversity businesses in the steppe zone of Moldova, Ukraine, Russia and Kazakhstan.

Such initiatives, and the growing interest of the EU in the subject as a way of implementing the new Rural Development Programme 2007–2013, led the Portuguese Presidency to convene a high level conference on business and biodiversity in Lisbon (12–13 November 2007). The conference gathered business leaders, biodiversity experts, NGOs and policy makers to explore how European business can improve performance through biodiversity responsibility. The conference approved the 'Lisbon Message on Business and Biodiversity', which highlights the competitive advantages gained from conserving biodiversity and using biological resources sustainably, and provides guidance to the European Commission's new initiative on business and biodiversity.

A PBB strives to generate positive financial and biodiversity returns. They pursue four objectives:

- conservation of biodiversity;
- sustainable use of biological resources;
- positive financial returns; and
- equitable sharing of the benefits arising from the use of biological resources.

It is important to distinguish between enterprises that are engaged in pro-biodiversity activities, and those which could become PBBs, at least to the extent that they generate an ongoing 'net ecological benefit', through modification of their business models. Clearly, the former group is today in a very small minority compared with the latter, and it would be a good thing for biodiversity conservation if the situation were reversed. To encourage such a switch requires a change in economic incentive systems, particularly financial services and tax regimes, so that they explicitly recognise the public benefits in terms of ecosystem services flowing from conducting business in a pro-biodiversity manner.

The experience gained by Fieldfare and other PBBs shows that there is little reward from managing biodiversity-relevant investments. Relying on the current market conditions are not sufficient to maintain and restore ecosystem services because

Silver carp* Hypophthalmichthys molitrix*, an Asian cyprinid fish, are widely farmed in the Lower Danube. Moving to an organic fishery based on native species would improve water quality and increase profit margins.

many aspects of conservation relate to the public good aspects of biodiversity, to the time horizon one needs to appreciate the economic attributes and value of biodiversity, and to the uncertainties associated with its importance. It remains very difficult to identify economic value in public goods.

However, if the question is 'can we use the market to provide some incentives for the conservation of biodiversity?', the answer is positive. There are aspects of biodiversity that are marketable and currently being marketed. Furthermore, proponents of the 'eco-social market' (see http://www.oesfo.at/osf/?pid=/Root/root04) say that markets can be used to preserve biodiversity if the right regulations / framework are put in place by governments. Environmental markets have already been successfully created by states through a conducive regulatory framework that was able to accelerate the efficiency of markets. The European Carbon Trading Scheme set up by the European Commission would be a case in point.

The development of biodiversity business depends on having an appropriate enabling environment, namely the framework of laws, regulations, taxes, incentives, social norms and voluntary agreements within which companies operate. Governments must take the lead in kick-starting this environment. Another of the sticking points is the monitoring and certification of the biodiversity benefits to be delivered by business – a role perhaps for professional (chartered) ecologists just as chartered accountants certify company financial statements.

For businesses to value biodiversity, then, it must ultimately become more profitable to conserve biodiversity than to ignore or destroy it. A combination of increased rewards for conservation, increased penalties for biodiversity loss and increased information on the biodiversity performance of business will help to create a biodiversity-friendly economy.

References

Defra: Economics and Funding Special Interest Group (2007) Valuing the Benefits of Biodiversity. 48 pp. Access: http://www.defra.gov.uk/wildlife-countryside/pdfs/biodiversity/econ-bene-biodiversity.pdf

Dickson B, Watkins D and Foxall J (2007). *The Working Partnership: SMEs and Biodiversity*. Fauna and Flora International, Cambridge, UK

Englund M (2005). Katrina's "Unique" Economic Impact. *BusinessWeek Magazine*, 7 September 2005

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Environmental and Nature Conservation Economic Impacts

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Introduction

In the last 20 years there has been a revolution in attitudes to economics and accounting, and this applies to environmental fields as elsewhere.

In nature conservation there is increasing reliance on grant aid from both government and sources like the National Lottery. In all these cases, demonstration of positive economic impacts and transparency of process and accounting are now the norm. Furthermore, the arena in which much nature conservation is played out, especially in rural areas, is often subject to strategies for economic and social regeneration. The impacts of the foot-and-mouth disease crisis on rural economies sharply focused attention on the values and contributions of rural sectors other than just farming. It is in this context, and with evermore ambitious and costly conservation projects, that economics moves from peripheral to central in environmental dialogues. Yet environmental and nature conservation professionals have been reluctant to address this. Indeed, failure to engage effectively with economic planning and processes has been a major reason for serious failure in environmental attainment over the last twenty years. Working with a team of economists and researchers in land management, and in leisure and tourism, we set out to address some key issues. A first step was to assess likely scales of economic impacts and also the tools available for their assessment, with pioneering work by researchers for RSPB, the National Trust, and the Ramblers' Association a good starting point. The initial phase of a 10-year programme involved: scoping studies; literature reviews; development of database; testing of methodologies; establishing baseline and argument; case studies; context; and then a questionnaire to individuals and organisations. This scoping research suggested that:

- Impacts are very big and growing but many are disguised, and there is a lack of recognition ***within*** the sector. There is a lack of awareness or recognition of the value of environmental and nature conservation to rural economies, and almost zero recognition beyond the sector itself. Much tourism is often parasitic not synergistic, and there is little acknowledgement of wildlife-, heritage- or eco-tourism in driving rural economies.
- This is an argument and an issue that we cannot ignore; with issues that cannot be allowed to pass by, or funding and support will do likewise. Increasingly, funding bodies and agencies require economic impact assessments and appropriate monitoring to be in place. Currently, in most cases they are not.
- Environment is at the centre of ***sustainable development*** (however understood or defined), of quality of life, and of long-term economic stability. Yet it seems environmental professionals are often not very good at saying so.
- The impacts of this situation run deep through the sector even to the point of very poor recruitment levels to the environmental industry.
- Assessments of economic impacts and worth are not embedded in national economic accounting.
- When evaluations are carried out the limitations of approaches are often not appreciated.
- Most assessments are site-, project-, or organisation-focused and do not give total impacts. None address core impacts or wider context, for example, the total economic impacts of wildlife watching and wildlife leisure on rural economies.

The research highlighted some important issues that need to be addressed:

1. There are good case studies and assessments of some impacts at site-specific, local and regional levels. The general aspects in these cases are often pretty well understood, and the RSPB and National Trust have pioneered approaches. There have also been regional initiatives, often sponsored by Regional Development Agencies, to provide economic overviews of the environmental sector in particular regions, such as the North-West or the East Midlands of England. However, these mostly omit some of the largest economic impacts of the environmental and conservation sector.
2. In terms of economic assessment there is no accepted standard practice within the environmental industry for data collection and collation, or for their assessment. This is a big problem which disadvantages the sector; a major barrier to effective prediction and monitoring of impacts.
3. There is a serious lack of specific urban case studies, and a need to relate these to other issues such as regeneration and health agendas.
4. Even where case studies have been undertaken they lack depth and under-estimate total effects or impacts.
5. There has been a failure to co-ordinate and seek synergies and no accepted approach to collection or collation of data. What information is available does not relate to National Accounting Methods and impacts are dissipated into other areas of economic activity. This may seem trivial, but these impacts are used politically to justify funding. If they are not effectively claimed by environmental and conservation sectors then it will be to our serious long-term disadvantage in terms of funding.
6. Failure and reluctance to engage with other players in areas with shared economic impacts, such as countryside recreation, outdoor leisure and sport, and tourism, is a serious problem. Not only this, but work with key players in these sectors indicates competition and suspicion, not synergy. This is driven by competition for political recognition and grant aid from government and charitable sources like the National Lottery. Increasingly, inability to effectively monitor social and economic impacts will lead to grant qualification failure.
7. There is a further issue of direct relevance to nature conservation and land management. In most cases,

the economic benefits of, say, tourism or countryside recreation, do not feed back into managing the resource, the infrastructure, or the land. The costs are picked up by conservation NGOs, individual landowners, and sometimes by a shrinking public purse via grant aid or agencies. Funding could probably be enhanced if there were full recognition of wider economic benefits, and direct revenue consequences to the Exchequer, of such conservation work. This is not presently the case.

8. Not only is there a lack of guidance on best practice for evaluation and monitoring, but there is little on maximising positive impacts and benefits. Most conservation bodies have no guidance for project implementation to ensure maximum impacts and their visibility.

Approaches and Values

A serious problem is the failure by environmental professionals to understand or to engage with the process or language of economic assessment. When external consultants are engaged, the environmental client such as a Wildlife Trust has little understanding of methods and, importantly, caveats and limitations of data and findings. In this context it is hugely important to understand what economic assessment is and also what it is not. At one level, if data are collected effectively, we can derive real financial inputs, outputs and impacts in a local or regional economy. This depends on book-keeping and transparency/reliability of information. However, when you look closely, data are often not available or not useable. But what the economist will want to do next is to assess the impact or likely value of your organisation or activities on local, regional or national economies. For this type of assessment there are well-established methodologies as applied extensively and effectively in tourism and sports sectors; but often all is not what it seems. The figures generated are not real but assumed impacts dependent on key assumptions. If the assumptions are flawed, as they often are, then your final figure is questionable. The best that can be hoped for is that, by using a reliable and tested approach, the limitations are known and built into final evaluations. We often place boundaries of an upper band and a lower band for likely economic impact of activities, and it is also usual to test the 'sensitivity' and 'robustness' of derived data. Much of this analysis relies on the idea that if, say, a Wildlife Trust spends £100,000 in a local economy, the money circulates around, some goes out into the wider economy, but much is retained and re-spent. It then has further rounds of impacts and re-circulating until it is totally dissipated. At all these levels the money has impacts on the local economy and also via taxes on the National Exchequer. We can then claim a beneficial impact and this varies with how much we spend and how it is retained in the economy or lost from it by 'leakage'. Furthermore, if you want to improve your performance in this way you need to generate 'opportunities to spend' and to reduce economic leakage. The retention and impact can be calculated by means of 'multipliers' that are derived from long-term studies of economic performance elsewhere and may be nationally acceptable. However, as soon as a multiplier is applied we move into assumption and guesswork. This may be valid but may be debated. Many commercial economic assessments have confidential methodologies and assumptions not open to scrutiny.

Our studies to date suggest that the economic impacts of nature conservation organisations and their work are massive. On occasions when they have been calculated, they seriously and significantly underplay real contributions to economic wellbeing.

However, the other question often asked is not the real financial impact of what we do, but the 'value' of an asset such as a nature reserve, a woodland, and moorland, a landscape, a rare bird *etc.* There are some well-used and tested approaches seeking to place a market value on non-market commodities; including 'willingness to pay', 'travel-cost', 'consumer observation' (or hedonic pricing), and 'willingness to accept'. These provide useful insights but it is important to understand that they are not real assessments of value or of economics. They give a guide as to how people might place a nominal valuation, often expressed as money, on the protection or loss of a particular asset; or, for example, how far they would travel to see a wildlife site or a rare species. The whole issue of 'value' in this sense is debatable and contentious, and beyond this short discussion. Willingness to pay, for example, is okay, except that in the real world the person is not actually putting their cash on the table. If they were asked to do that, then their response would, I suspect, be rather different. So again this is useful guidance as long as we understand and accept what the limitations of the methodologies are.

Ecosystem Functions

Finally, there is an approach that has gained credence and respectability in recent years of placing an economic figure on economically 'unused' land to help guide planning processes. This evolved through awareness that such functions and values have been overlooked and ignored in planning considerations. This is an immense and complex topic, but in essence it relates to functions such as the provision of greenspace and health benefits, to carbon sequestration, to local climatic balance, to water and flood control *etc.* Obviously we once again look at nominal values and assumed worth, but these are real functions and they have real values, which is to a degree possible to calculate. The main source for the accepted figures in the UK was that produced for the former Office of the Deputy Prime Minister (ODPM). With an increasing literature addressing issues of land values, the guidance from the former Office of the Deputy Prime Minister is useful. The ***Green Book*** gives detailed guidance useful in attempting to give economic and functional values to undeveloped land, either as open countryside unaffected by industry or as land from reclamation projects; monetary figures allow comparisons and evaluations. The values differ with the habitat-type considered; those below were used by our team assessing the RSPB Dearne Valley Nature Reserve in South Yorkshire.

A recent review of the literature on the value of greenfield land suggests a range for different types of undeveloped land in £/ha:

Urban core public space (city park)	£10.8 million
Urban fringe (greenbelt)	£0.2 million
Urban fringe (forested land)	£0.5 million
Rural (forested land, amenity)	£1.3 million
Agricultural land (extensive)	£0.6 million
Agricultural land (intensive)	£0.02 million
Natural and semi-natural land (wetlands)	£1.3 million

ODPM (2002). *Valuing the External Benefits of Undeveloped Land - A Review of the Literature.*

The logic is that changes in the provision of environmental goods and services may arise in a number of contexts resulting from a '3R intervention' (regeneration, renewal and regional development). Projects that remediate contaminated land need to consider the environmental benefits (amenity, ecological *etc.*) that might arise from soft end-use restoration (*e.g.* parkland),

and which could be lost with a hard end-use option (*e.g.* commercial development). Similarly, such issues are relevant in considering, for example, the impact of liveability and quality of environments and the role these factors play in encouraging or discouraging private investment. Using this approach we can place a value on, for example, habitat creation at such as at the Old Moor Centre at RSPB Dearne Valley (75 ha x £1.3 million = £97.5 million for Old Moor, and ultimately for RSPB Dearne Valley 200 ha x £1.3 million = £260 million). The Heritage Lottery Fund support to RSPB and partners for this project therefore generated an ecological service value of around £98 million, ultimately rising to around £350 million.

Conclusions

The social and economic impacts and benefits associated with nature conservation and the environment embrace a wide range of people and organisations. They impinge on and engage with many players who do not recognise their effects or identify with the other organisations. Yet the impacts through, say, leisure or tourism of wildlife related activities are huge. Furthermore, these effects do not happen within a vacuum, but as part of a much broader leisure or countryside experience. There are obvious synergies between ecology and archaeology, between nature and heritage, and increasingly between wildlife and gardening, or garden visiting and nature reserves. The British public currently spends £3-4 billion per year on gardening at around 2,500 garden centres. A significant proportion of this is spent on bird feeders and food, and this is seasonally important for many garden centres. Add visitors to historic parks and gardens and the impacts are even more. A proportion of these hobby gardeners (31.6 million adults in the UK in 2004) are members of conservation organisations such as Wildlife Trusts, RSPB, National Trust *etc.*, and many more could be. Other examples include participants in many outdoor sports and other recreational activities. Most of the organisations involved do not identify with, or seek dialogue with, the other actors; indeed why should they? Their interests and scope are already mapped out and targets set. Ecologists generally don't understand tourism, and tourism organisations often have little understanding of nature or conservation. With countryside sports and other recreations the divide is greater still. But for social and economic renewal and sustainability, for urban and rural renaissance, then the sum of all these activities is important. In lobbying government for support, a strong synergy and an awareness of this bigger picture may also be critical.

Competition and Politics

Published literature on tourism, sports and leisure suggests that these sectors are way ahead of wildlife conservation and the broader environmental sector in establishing their case. They offer potential synergy, but are chasing the same grail of government and Heritage Lottery funding; competitors as well as collaborators. Egan and Nield (2003) note the importance of the development and use of tourist multipliers in the education of policy makers in the importance of tourism at the national and international levels. This has catalysed the belief that tourism is central to urban and rural regeneration programmes. Similarly, sports and sports events are streaking ahead in the race for hearts, minds and money in public health and quality of life. To embrace this does not mean diverting from established goals and objectives, but often both improving practice and impacts, and importantly simply getting credit for what we do. Historically, environmentalists have been sceptical about placing economic values on key assets; but one consequence is that our arguments from the moral high ground have too often been ignored. If we are to win political support for necessary change, to improve the world and the environment, and to grow our professional standing, then it is important to engage and to understand the process. Too often the economic argument is used to steamroller environmental objections, or when it is applied to conservation projects, is done so clumsily and unknowingly. It is important to recognise that some environmental assets have value beyond price and worth that cannot be bought, but at the same time we should give credit where credit is due. Neglect this at your peril.

Select Bibliography

Beard C, Egan D and Rotherham I D (2000). *The changing role of outdoor leisure: a critical review of countryside tourism*. In: *Reflections on International Tourism. Environmental Management and Pathways to Sustainable Tourism*. Robinson M, Swarbrooke J, Evans N, Long P and Shapley R (Eds). Centre for Travel and Tourism, University of Northumbria, Sunderland, 1-19

Egan D and Rotherham I D (2001). *An initial assessment of the economic impact of the Wildlife Trusts in the English East Midlands Region*. Unpublished technical report, Sheffield Hallam University

Egan D J and Nield K (2003). The Economic Impact of Tourism – A Critical Review. *Hospitality and Tourism Management*, **10**: 170-177

Rotherham I D, Doncaster S and Egan D (2005). Nature-based Leisure and Tourism in England's Humberhead Levels. *Annals of Tourism Research*, **8**: 214-230

Rotherham I D, Doncaster S and Egan D (2004). *Issues and Approaches in Valuing Wildlife Recreation and Leisure - in the context of countryside recreation*. In: *Demonstrating the Economic Value of Countryside Recreation*. 2004 Countryside Recreation Network Seminar Proceedings, Bristol, 11 March 2004, Bull M (Ed) 59-66

Rotherham I D, Doncaster S and Egan D (2004). Valuing Wildlife Recreation and Leisure. *Countryside Recreation* **12**: 12-19

Rotherham I D, Doncaster S and Egan D (2002). *Nature-based leisure and tourism as drivers for change in England's Humberhead Levels*. In: Ritchie B and Burns P (Eds) *Tourism and the Natural Environment: Inter-relationships, impacts and management issues*. Proceedings of the international symposium, Eastbourne, 23-25 October 2002. Published University of Brighton, UK

Rotherham I D, Rose J C and Egan D (2000). *A critical evaluation of the wildlife leisure industry: an emerging component of leisure and tourism*. In: *Reflections on International Tourism. Environmental Management and Pathways to Sustainable Tourism*. Robinson M, Swarbrooke J, Evans N, Long P and Shapley R (Eds). Centre for Travel and Tourism, University of Northumbria, Sunderland, 229-245

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ComCoast: Socio-Economic Assessment of Multifunctional Coastal Schemes

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Introduction

ComCoast (COMbined function in COASTal defence zones) was a European Union project that was undertaken to promote and implement an integrated approach to improving coastal defence systems. ComCoast is part funded by the Interreg IIIB Community Initiative Programme in which the Netherlands (lead partner), the United Kingdom, Germany, Belgium and Denmark are participating.

The ComCoast project ran from April 1, 2004 to December 31, 2007. The aim of the project was to develop, demonstrate and share knowledge on innovative solutions for flood protection in coastal areas. The project was carried out through co-operation between the following ten partners:

- Rijkswaterstaat, Ministry of Transport, Public Works and Water Management (NL)
- Province of Zeeland (NL)
- Province of Groningen (NL)
- Universität von Oldenburg (D)
- Environment Agency (UK)
- Sea Scheldt Department of the Flemish Government (B)
- Danish Coastal Authority (DK)
- Municipality of Hulst (NL)
- Water Board of Zeeland Islands (NL)
- Water Board of Zeeland Flanders (NL)

The ComCoast project deals with the identification and understanding of social, economic and technical opportunities and constraints of innovative coastal and flood risk management techniques and the delivery of a more sustainable environment. The over-arching objective of ComCoast is to share knowledge and expertise on:

- improvement of coastal defence infrastructure and sustainable development;
- stakeholder participation; and
- set up, implementation, monitoring and evaluation of Pilot Projects.

ComCoast also complements the Environment Agency's development of a more strategic approach to flood risk and Shoreline Management Plans. The principal objective is to make recommendations on the economic valuation of innovative techniques involving the constructive use of coastal and estuarine wetlands using the EU Habitats and Water Framework Directives as the main legislative drivers.

The project contributes towards our 'Creating a Better Place' targets under the themes of:

- Reducing Flood Risk;
- Limiting and Adapting to Climate Change;
- Improved and Protected Inland and Coastal Waters; and
- Enhanced Environment for Wildlife.

There are several themes within the ComCoast project, which are divided into 6 work packages:

- Work Package 1 - Spatial Sensing
- Work Package 2 - Socio-Economic Evaluation
- Work Package 3 - Civil Engineering
- Work Package 4 - Participatory Action
- Work Package 5 - Pilot Projects
- Work Package 6 - Project Management and Knowledge Dissemination

This paper focuses on Work Package 2 (Socio-Economic Evaluation), which was led by the Environment Agency (UK), with assistance from Halcrow.

The goal of Work Package 2 was to examine and make recommendations on the socio-economic evaluation of wetlands, in order to arrive at a framework for societal acceptance and at a practical overall cost-benefit assessment, taking into account all functional benefits, including maintenance, sustainable issues and environmental assets of wetlands. The societal values of the anticipated wetland ecosystems to be valued are many. Key drivers for wetland restoration are, amongst others, the EU Habitats and the Water Framework Directives, which require the wetlands to be brought into or maintained at favourable conservation or good ecological status.

Approach to Work Package 2

The Environment Agency led Work Package 2 of the project included the following tasks:

- trans-national review of approaches to socio-economic evaluation;
- review of socio-economic appraisal techniques used for the Pilot site projects;
- sponsorship of three PhD studentships studying:
    - the fish nursery function of managed realignment sites;
    - the carbon and nutrient burial potential of inter-tidal habitats;

    - methods of evaluation of these and of people's willingness to pay for managed realignment/ regulated tidal exchange sites; and
- development of guidance for appraisal of multi-functional coastal schemes.

Drawing on this work, as well as other farm business diversification research and pilot projects in the five partner countries, a study was conducted into the benefits provided by multifunctional coastal schemes. The physical characteristics of the resulting sites and the habitats that could develop were considered, and the welfare effects resulting from these determined. These can include fish production, other benefits of clean water, many forms of recreation, saline agriculture crops, farmed shellfish, existence and bequest values of biodiversity and cultural heritage, and climate protection effects due to carbon sequestration. In addition, sites can be used for energy generation and raised housing, which generate further economic and social benefits.

Trans-National Review of Approaches to Socio-Economic Evaluation

The UK, the Netherlands and Belgium appear to have very similar approaches to cost benefit analysis. The German and Danish approaches seem to be somewhat different, with methods varying from project to project and no single national approach.

All countries undertake valuation methods to assess the monetary value of intangible goods, although the extent to which this is done varies. Every country listed the contingent valuation method as one of its methods for doing this. Once intangible goods have been valued, they can be incorporated into a cost benefit analysis.

The cost benefit analysis assesses the economic viability of the scheme. However, as part of the overall socio-economic appraisal other aspects need to be considered including the environment and social impacts. Multi-criteria analysis can be used to merge all the information to determine whether or not a scheme is feasible. Germany, the Netherlands and parts of the UK use a form of multi criteria analysis, whereas Belgium and Denmark consider the other aspects as part of an extended cost benefit analysis.

Development of Guidance for Appraisal of Multi-Functional Coastal Schemes

Guidance was produced advocating the valuation of the welfare effects and outlining the trade-offs that arise between benefits and the success factors for benefit realisation. The general approach was to include values for the welfare effects in a Social Cost Benefit Analysis; however Multi Criteria Analysis can also be used.

The project demonstrated that, historically, a number of benefits of coastal schemes have been overlooked in conventional cost benefit assessments.

Review of EU Partner Approaches to Socio-Economic Evaluation

Overall Approach

In the UK, Belgium and Denmark, the governments only have permissive powers with regard to flood defence, whereas the German and Dutch Governments have statutory obligations to maintain safety levels. In Belgium, the government makes the decision to invest in flood defence and this is translated into the programme and budget of the Department of Public Works. The Environment Agency carries out a similar process in England and Wales. By itself, this decision has no legal status. However, the Flemish government and the Environment Agency do have permissive powers to enter land and carry out flood defence works when necessary.

In the UK the socio-economic approach relies heavily on the cost benefit analysis and the valuation of non-tangible goods is not widespread. This results in decisions that are naturally weighted towards the economically preferred option. In the Netherlands, joint consideration of economics, environment and emotion (human responses) underpins all scheme appraisals. In comparison, in Germany there is a wide variation in the use of cost benefit analysis and valuation of non-market goods, which depends on the driver for the project in question.

All countries except Belgium and Germany have governmental guidance documents, although Germany does refer to a number of papers and guidance provided by groups in other countries, including Defra, and Belgium has adopted a practice similar to that taken in the Netherlands and the UK. In the Netherlands and the UK, the guidance offers advice on both cost-benefit analysis and valuation methods and in Denmark the guidance only covers valuation methods.

Climate Change

In the UK, Belgium, and Germany, an allowance for the influence of climate change is included in project appraisals, mainly through consideration of sea level rise. In the UK this is subject to regional and temporal variation but is estimated to be 95-114 cm in England and Wales by the year 2115. Belgium and Germany allow for sea level rise of up to 60 cm by 2100. In Belgium, the impact of climate change is included as a sensitivity analysis and options were appraised with and without the impacts of sea level rise. There is no mention of climate change within the reports from the Netherlands or Denmark. The Dutch Office of Environmental Information guidelines do not mention climate change because they are primarily intended for transportation projects. However, in the cost benefit analyses of flood defence projects, such as the 'Room for Rivers' project, climate change is taken into account using the official scenarios issued by the national meteorological institute.

Cost-Benefit Analysis

All the partner countries undertake some form of cost-benefit analysis.

The scheme costs considered by the UK, Netherlands and Belgium include capital works, operation and maintenance costs. It appears (from the Skjern River project) that Denmark also includes these factors. In Belgium, Denmark and the UK these costs are based on similar projects and historical costs (maintenance and operation). In the Netherlands the costs are sourced from project team members involved in the technical aspects of the scheme design. In Germany the approach can be different, depending on the project. Operation and maintenance costs are not always included.

In the UK, Belgium and the Netherlands, the benefits are calculated as the difference between the benefits of an option and a baseline scenario, which in the UK (except Northern Ireland) and Denmark is currently the 'Do Nothing' scenario. However, in the Netherlands the baseline scenario is the 'base case'. This is a combination of the best alternative application of the available investment resources and the best possible other solution for the problem that the project addresses.

The UK and Belgium use various modelling software to calculate damages for a number of combinations of scenarios and flood events. The annual damages are then discounted over the scheme life.

In the UK, the appraisal period is generally assumed to be between 50 and 100 years and it is determined by the life of the longest-lasting asset of the proposed scheme. In Belgium, the scheme life is similar (in the case study given, the scheme was assumed to last until 2100). The approach in the Netherlands is also similar to the UK.

In Denmark, the calculation of benefits appears to be based on the valuation of non-market goods and intangible benefits, in contrast with UK projects, in which intangible goods are rarely included in the cost benefit analysis.

Discounting is used in all countries except Germany, where whole life costs and benefits are not used. The discount rates used vary between 2.5 and 7%. In the UK the discount rate varies throughout the scheme life from 3.5% in year 0 to 2.5% after year 75. In Denmark, the Netherlands and Belgium, it is recommended that the discount rate of 4% is used, which remains constant throughout the scheme life. Other discount rates of 3 and 7% are used as part of the sensitivity analysis in Denmark and Belgium.

Option Selection

The method of choosing the economically preferred option once the cost-benefit appraisal has been carried out differs between the Netherlands, Belgium and UK. In Belgium, the approach is to eliminate options in a stepwise process. The UK method compares all the options and selection of the economically preferred option is predominantly based on the cost-benefit ratio. In the Netherlands, option selection is carried out on the basis of social profitability. However the decision-making processes for all three countries rely on economic criteria such as net present value.

Valuation of Benefits

Each country employs a number of valuation methods. In most cases, these are similar from country to country. For example, all countries use the contingent valuation method.

In the UK, intangible goods are rarely included in the cost benefit analysis due to the complexity of the task. Similarly in Germany it would appear that the idea of valuing non-tangible goods is reasonably new and it is hoped that ongoing research will result in better valuation of non-tangible goods.

Each country relies heavily on an input from local stakeholders and the public gained through various consultation exercises, for example interviews and workshops, to enable the values of certain goods to be calculated.

Assessment of Options

In England, Germany and the Netherlands, a multi-criteria approach is used to determine whether or not the scheme is feasible. In England, the priority score is built up using economic, social and environmental factors. In Germany categories include socio economic, location, administrative, ecological and economic interests. Similarly in the Netherlands the factors included are referred to as green and financial issues and opinions.

Scoring, weighting and ranking of the options are used in all three countries. Generally the options are scored against each criterion, which may be weighted (in England the weighting is biased towards the economic criterion), and ranked.

In England a target for the overall score is set by Defra in each financial year and this must be reached before approval for government funding is given. This process is soon to be replaced by a new system of outcome measures. In Germany and the Netherlands the options are ranked.

A second multi-criteria approach is currently being researched in the UK, Appraisal Summary Tables. As with the Defra priority score the approach considers economic, social and environmental impacts whilst incorporating scoring and weighing. A similar method has been used on projects in the Netherlands.

Germany employs a further two assessment methods: the strength-weakness and opportunities-threats analysis and the integrative methodical approach.

Multi-criteria assessment methods are not undertaken in Belgium or Denmark in addition to the cost benefit analysis. However, their cost benefit analyses are extended to include more of the intangible social and environmental benefits as monetary values.

Review of Socio-Economic Evaluation of Pilot Sites

In order to share knowledge of the evaluation of multifunctional coastal and estuarine wetland sites between the partner countries, an inter-comparison was undertaken of pilot sites put forward by the partners. The location of the sites included is illustrated in the figure above.

Conclusions and Recommendations

The research studies carried out as part of Work Package 2 have indicated some areas of good practice on which to build in the future.

In the Biogeochemistry research, innovative ways of estimating a carbon sequestration budget for natural and realigned inter-

tidal habitats were developed.

In the Fisheries research, new techniques for determining the numbers of fish of different species on sites were developed and tested. The work highlighted that a site design for optimising the benefits resulting from the fish nursery function would include foreshore recharge, regulated tidal exchange (RTE), a dendritic creek system, semi-permanent ponds and a mosaic of microhabitats. The influence of existing site conditions for vegetation establishment and fish production (over a range of spatial and temporal scales) was also emphasised.

The Economics research study used an ecosystem services approach to provide a framework for the cost-benefit analysis of multifunctional coastal schemes. This method allowed a wide range of welfare impacts to be considered on a common monetary scale. The valuation of ecological services such as carbon storage, fish nurseries, and recreation and amenity can be encompassed in this method. Within the valuation work, face-to-face questionnaire-based interviews (known as choice experiments) were used to elicit both use and non-use values associated with coastal wetlands.

Farm Business Diversification work carried out in conjunction with ComCoast resulted in the production of fact sheets to provide information about alternative forms of coastal land use to landowners, to allow them to begin to consider these options. This work also began to investigate the commercial potentials of shell fisheries and samphire cropping on managed realignment sites.

The ComCoast pilot projects have highlighted areas of best practice and a number of lessons learnt.

The pilot projects of Kruibeke, Perkpolder and Nessmersiel show how multifunctional coastal sites can be, and include facilities for a wide range of user groups. This maximises the number of benefit streams for the projects and hence the total benefit value. These schemes also encourage co-operation between stakeholders.

The UK pilot sites of Abbotts Hall and Wallasea used ComCoast solutions appropriately in order to maximise benefits. Abbotts Hall benefited from use of RTE in advance of managed realignment, and the site was well chosen for managed realignment because no set-back defence was needed. Recharge was used at Wallasea to raise ground levels and encourage salt marsh formation in certain areas of the site.

Experience in the Netherlands, Belgium and Denmark has shown that welfare effects calculated on the basis of contingent valuation method studies are often disputed and even eliminated from the social cost benefit analysis before a policy decision is taken, the only exception to this being the price tag for travel time. The reason for this is that contingent valuation method studies are based on stated preferences, which reflect people's intentions rather than their real behaviour. It is therefore currently recommended that revealed preference or pricing methods be used wherever possible, and care is taken when it is necessary to use stated preference techniques.

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Countryside Survey: The Largest Ever 'Audit' of the UK's Natural Resources Nears Completion

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Countryside Survey is a world leading study of change in the UK's natural resources. It was established in 1978 and has since been carried out at regular intervals in 1984, 1990, 1998 and currently 2007/08.

Countryside Survey 2007/08

The project samples and studies the countryside using rigorous scientific methods, allowing comparison of recent results with those from previous surveys. In this way, the survey provides a unique means of detecting the gradual and subtle changes that occur in the UK's countryside over time.

Countryside Survey comprises two parts: the Field Survey and the Land Cover Map. The Field Survey involves an in-depth study of a sample of 1-km squares in the countryside, recording information on Broad and Priority habitats; linear and point features; vegetation cover; freshwaters and soils. The Land Cover Map is a digital dataset, showing the stock and distribution of land cover and Broad Habitats across the UK at a 'field-by-field' scale (features larger than 0.5 ha, or 50m square). It is produced using a combination of Earth Observation data (*i.e.* satellite imagery), digital cartography and other information – including, for the first time, Ordnance Survey MasterMap®.

The current round of the project (2007/08) is nearing completion, with the final results due for publication later this year. To date, this has been the biggest Countryside Survey ever completed, involving more than 9,000 days of surveyor effort alone. Fieldwork was undertaken in 94% of all sites originally targeted - an outstanding achievement in light of the unforeseen challenges that arose during the summer of 2007; notably flooding and the outbreak of foot and mouth disease, which meant that some sites could not be accessed.

In total, 591 1-km squares were surveyed across Great Britain, representing all major habitat types. The location of the study squares is kept confidential to avoid any deliberate influences that could affect them or the features within them – thereby providing a reliable reflection of changes in the wider countryside.

The 2007 Survey has been funded by a range of partners, led by the Natural Environment Research Council (NERC) and Defra. Fieldwork in England, Scotland and Wales was carried out by the Centre for Ecology and Hydrology (CEH), involving 90 field staff, supported by co-ordinators and data specialists. All of the surveyors underwent an intensive four-week training course to ensure the highest possible level of quality assurance. In addition, a team was responsible for visiting the survey squares and repeating aspects of the survey as a quality assurance check. This alone involved a total of roughly 350 days on site.

One of the biggest successes of the recent survey was use of digital data capture which involved, for the first time, use of portable tablet PCs to record information in the field. Data was backed-up daily to avoid accidental loss and overall the process proved much more efficient and reliable than using paper survey forms, which can be spoiled by wet weather.

Facts and figures from the 2007/08 field survey include:

- Of the 591 1-km sample squares, 289 were surveyed in England, 195 in Scotland and 107 in Wales. A complementary study in Northern Ireland involved the surveying of approximately 270 sample squares.
- Over 9,000 days of surveyor effort were invested – roughly 25 years' worth of study in total (undertaken between May and November 2007).
- One surveyor, based in Scotland, calculated that she walked 234 km, involving over 12,000 m of ascent, just getting to the squares!

The findings of Countryside Survey 2007 will be published in November 2008 and used to support a range of objectives – from monitoring climate change and Government policy, to improving scientific understanding of the countryside. The new Land Cover Map dataset is due for publication in 2009.

A History of Countryside Survey

Countryside Survey has evolved since 1978 to become a world-leader in the study of change in our natural resources. Today it represents the forefront of such research; yet the 2007 Survey is only the most recent in a long history of study into how the countryside is changing.

Early Approaches to Measuring Countryside Change

Ever since the first vegetation maps at the turn of the 20th Century, there have been many attempts to develop a system for measuring change in the countryside. Early approaches include the first UK land use survey, undertaken by Dudley Stamp in the early 1930s, which along with other studies formed the basis for the initial selection of National Nature Reserves from the 1940s onwards.

In 1948 the Nature Conservancy was created in Britain and charged with establishing and managing National Nature Reserves. Its first research station was opened at Merlewood in Cumbria in 1954, at a time of increasing awareness among ecologists of the need to place ecological science on a more

exact or quantitative basis – ie. involving analysis of statistical amounts, rather than relying on expert judgements alone.

1971: National Woodland Classification

The need for a National Woodland Classification provided an opportunity to encourage a more quantitative approach to vegetation survey. A pilot study of some 200 woods in the Lake District proved sufficiently encouraging to prompt statistical analysis of data for the whole of England. Data was be punched onto tape at Merlewood and transferred by the Atlas Computer at Cambridge University into a card format suitable for the computer at Southampton University, the only one capable at that time of handling such large datasets.

1974: The Cumbria Survey

In 1974 the Cumbria Survey was launched as the first major project in the UK to test the full methodology of environmental classification, as the basis for assessing the vegetation resources of a region. Following visits to a random sample of 1-km squares, analysis showed that the vegetation classes were strongly and significantly correlated with the land classes. The high correlations meant it was possible to predict the vegetation composition of squares which had not been visited, but where the land class was known.

1978: The first Countryside Survey

A visit to Merlewood by Martin Holdgate (Director of the Institute of Terrestrial Ecology, ITE) in May 1975 proved of pivotal importance in using the Cumbrian experience to embark upon an Ecological Survey of Great Britain.

A total of 256 1-km square samples were taken at random across the UK. A field survey of land use, land cover type, landscape and linear features within each square was completed in 1978 (the first Countryside Survey). Statistical analysis of the data collected enabled the production of estimates for the whole of the UK.

The 1984 Survey

Despite considerable funding difficulties, the ITE concluded in March 1984 that a further Ecological Survey of Great Britain should be carried out. A comparative study of the scale and nature of change since the 1978 survey, and the establishment of a more comprehensive dataset with which to measure future change, were deemed of strategic importance.

The number of 1-km sample squares was extended from 256 to 384, with the field survey undertaken by teams from each of the six ITE research stations. Not only did the survey largely confirm trends already recorded by the annual Agricultural Census, but also it further demonstrated how changes in such attributes as hedgerow length could be detected, even with such a small sample size.

1985: The ECOLUC Project – Birth of the Countryside Information System (CIS)

The Ecological Consequences of Land Use Change (ECOLUC) project was established to help develop predictive models required by policymakers to better understand the implications of countryside change. A sketch of an 'ideal' landscape was published for each land class, providing policymakers with a visual representation of the landscape consequences of different land-use strategies.

A further module of the project, focussing on expert systems and their application in ecology, concluded that information systems were more appropriate in the policy context. A further contract was awarded to ITE in order to develop a pilot information system, which quickly became known as the Countryside Information System (CIS).

1990 Survey

The UK government's first Environment White Paper included a commitment to provide a statistical report on the state of the environment. As part of the process, the 1990 Survey was intended to help monitor the impacts of policy initiatives. It would also contribute to the Biodiversity Action Plan being developed by the Department of Environment as part of the UK commitment to the Convention on Biological Diversity, signed at the Rio de Janiero Earth Summit in June 1992.

Drawing heavily on the insights gained from ECOLUC, the ITE was able to develop a Countryside Survey in the widest sense, which focused on those common features and habitats most likely to influence the public perception of rural Britain. The 1990 Survey represented a first attempt to integrate satellite mapping with detailed field survey of vegetation, soils and freshwaters at a national scale. The Land Cover Map of Great Britain was itself the first to provide a national coverage.

The 1990 Survey involved a total of 509 sample squares. Results showed a continuation of habitat loss, but at a slower rate than previously. The most striking result was, however, the species loss of up to 20–30% recorded in some habitats, which provided the basis for an overall policy review of the results.

The 2000 Survey

Countryside Survey 2000 was carried out by the Centre for Ecology and Hydrology, ITE's successor. The sample was further extended to 569 1-km squares, so as to obtain sufficient samples to treat Scotland separately from England and Wales. For the first time the results from the Northern Ireland Countryside Survey (NICS) were included to provide a first estimate for the total extent of UK habitats. A new version of the Land Cover Map was again included.

The results showed a further stabilisation of habitat decline, with improvement in some categories.

The 2007 Survey and Beyond...

The 2007 Survey is nearing completion and due to report in November of this year. Recent work has also demonstrated how principles established in the UK might be extended to a European scale: not only to examine the implications of climate change, but also to link them with land use. Several European countries have already undertaken programmes of work using comparable principles, with many further studies planned.

References

Sheail J and Bunce R G H (2003). *The development and scientific principles of an environmental classification for strategic ecological survey in the United Kingdom*. Centre for Ecology and Hydrology

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The Scottish Wildcat Survey 2006-2008

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Scottish wildcat

Scottish Natural Heritage (SNH) has recently launched the Scottish Wildcat Survey and is calling on visitors and workers in the outdoors to be on the alert for any sightings of our most elusive predator, the Scottish wildcat *Felis silvestris*. SNH believes people using the countryside for work or leisure in 2008 can play a key role in helping the plight of one of Scotland's rarest and most secretive mammals.

For the 2006-2008 Scottish Wildcat Survey we are encouraging public participation to help chart the current health and number of the native population across Scotland. Throughout 2008, SNH will be working to build up a picture of the wildcat population distribution to assess its current survival prospects as a distinct Scottish species. The Scottish Wildcat Survey is a three-year project to systematically survey wildcats throughout Scotland and is funded by Scottish Natural Heritage under the Species Action Framework (a five-year programme prioritising 32 species for active management intervention). The Scottish Wildcat is the only native cat in the British Isles. Although originally distributed throughout Britain, the species suffered a marked decline in numbers in the 19th Century due to deforestation and persecution, and is now restricted in its range. Scottish wildcats are now one of Britain's rarest mammals and may be in serious danger of extinction.

Why is the Wildcat on the Species Action List?

The Scottish wildcat meets criterion 1a of the Species Action Framework as a species for conservation action by virtue of its decline in range and abundance over the past 100 years. The results of an ongoing survey will enable suitable management action to be targeted in particular areas. It is a top predator in the Scottish context, and a species which is likely to increase the profile of species management work and benefits to biodiversity. It was added to the UKBAP Priority Species list at the 2007 Priority Species and Habitats Review (www.ukbap.org.uk/NewPriorityList.aspx). It is included on the Scottish Biodiversity List. It is also listed on Annex IV of the Habitats Directive. It is protected under the Wildlife and Countryside Act 1981, as amended, and is identified as a European Protected Species on the Conservation (Natural Habitats, &c.) Regulations 1994, as amended.

Habitat, Distribution and Abundance

In general, the Scottish wildcat prefers to live in the margins of mountains and moorlands with rough grazing, often combined with forests and some crops. However, research suggests that animals in the east of Scotland prefer marginal agricultural areas with moorlands, pastureland and woodlands, whereas animals in the west favour rough grazing and moorland with limited pastures. They avoid high mountain areas, exposed coasts and fertile lowlands with intensive agriculture. They also avoid man wherever possible and their distribution is likely to be influenced by past persecution.

Formerly distributed across Europe, Asia and Africa, the species became extinct in Austria and the Netherlands in the first half of the 20th Century. They are thought to have declined in the Czech and Slovak Republics and are confined to three major areas of the former Soviet Union: the Carpathian Mountains of the Ukraine, the Kodry region of Moldova and the Caucasus mountain region between the Black and Caspian seas. Elsewhere, in Europe, isolated populations are limited to the Iberian peninsula, Italy, north-east France-Luxembourg, Belgium, north-west Germany, eastern central Germany and the Balkans.

The current UK status of the Scottish wildcat is unclear. A questionnaire survey by the Nature Conservancy Council for Scotland in 1983-87 suggested that the species was restricted to an area north of the central belt. A subsequent survey based on live-trapping and road kill/carcass records in the 1990s suggested that the distribution was limited to the north-east of Scotland (primarily Perthshire, Angus, Grampian and the eastern Highlands), with a small residual population in Argyll and Lochaber. There are only two density estimates available for Scotland. These are Glen Tanar, Deeside with 30 wildcats per 100 km^2 and Ardnamurchan with an estimated 8 wildcats per 100 km^2. A 1995 study resulted in an estimate of 3,500 pre-breeding animals of independent age (over 5 months old) across Scotland.

General Ecology

Wildcats have a dispersed, solitary social system and live alone for most of the year. They associate only during mating and rearing of kittens. Wildcats scent-mark to maintain the exclusivity of their home ranges, which are larger for males than females. Male ranges will overlap with females but the ranges of each gender are exclusive. Females have only one litter in May and give birth to an average of four kittens, but they may come into oestrus again if they lose the litter early. The diet varies markedly across the country, with rabbits making up the majority of prey in the east (up to 70%) but only a minimal proportion in the west (34%). Animals in the west prey primarily on voles and mice. Wildcats are active mainly at dawn and dusk but can be active during the day and at night, although they can be inactive for 24 hours in winter if the weather is inclement.

History of Decline, Contributory Factors and Current Threats

The wildcat began to decline in Britain in the early 1800s and was lost from England and Wales by 1862. The decline in Scotland continued into the 20th Century and the range was confined to the north-east by the 1920s. There was a small expansion in range, considered to be a reflection of increased numbers, over the following 20 years and the range has been stable since the 1940s, despite suggestions that numbers were increasing. The threats to the Scottish wildcat have been identified as:

- hybridisation with feral cats;
- predator control and incidental capture;
- disease; and
- habitat fragmentation and degradation.

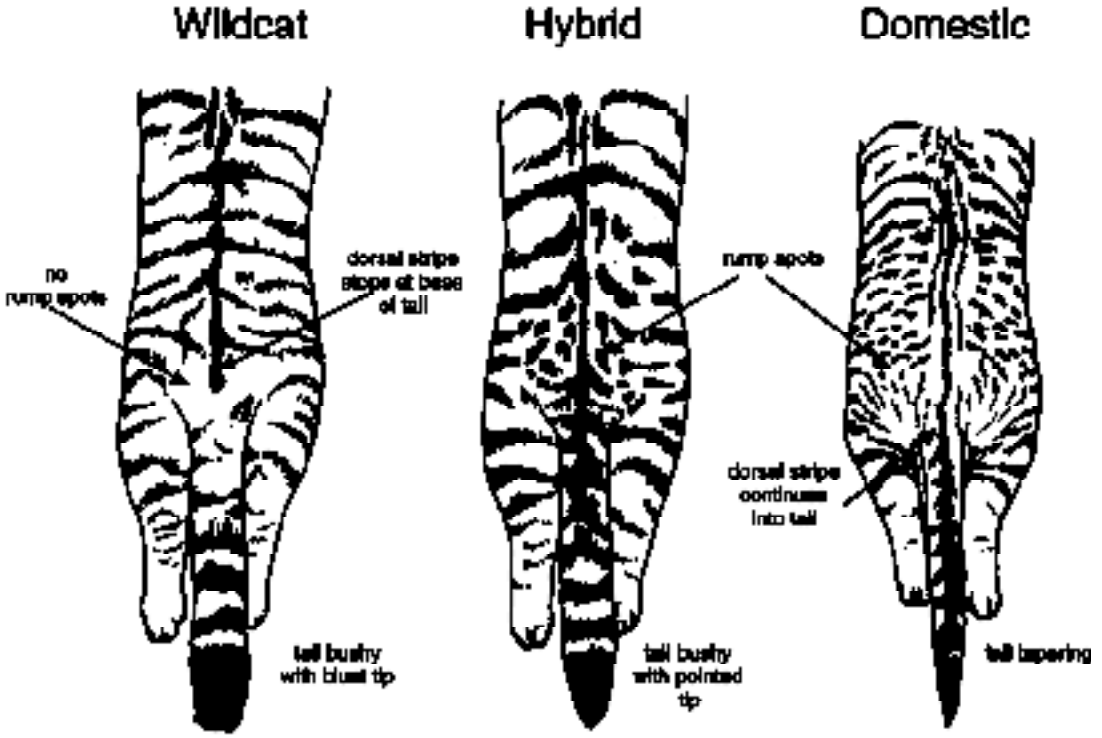
Wildcat Identification

One of the major problems for wildcats is their ability to interbreed with feral and domestic cats (which were originally introduced to Britain more than 2,000 years ago). This dilutes their genes and creates hybrid animals whose appearance can be confused with that of the wildcat. In many cases, there is little distinction between these animals but research has identified the following as helpful points to distinguish between them:

- length of dorsal line;
- shape of tail tip;
- appearance of tail bands;
- broken stripes on flanks and hindquarters;
- spots on flanks and hindquarters;
- stripes on nape; and
- stripes on shoulder.

Research by Beaumont *et al.* (2001) described pelage characteristics of wild-living cats, and the cats were grouped into five separate categories depending on the degree to which they conformed to the characteristics attributed to *Felis silvestris* Schreber 1775. This assumes that all wildcats will be genetically similar to this animal but naturally there will be some genetic variation throughout a natural population. Ordination of the genetic distances suggests two main groups of wild-living cats, with intermediates, and one group is genetically very similar to the house cats, while the other group contains all cats taxonomically identified as wildcat based on morphology.

Diagram showing the key markings, which distinguish the wildcat from the hybrid and domestic cat.



We need your help to determine the current status of wildcats in Scotland.

- Have you seen a wildcat?
- Where have you seen or heard about wildcats?
- Do you know anyone that has seen a wildcat?
- Are there feral (*i.e.* wild-living domestic) cats and domestic cats in your area?

We are also interested in your sightings of feral cats that are living in your area.

If you can help, please download a copy of the Scottish Wildcat Survey leaflet at: www.snh.org.uk/pdfs/species/wildcat%20survey%20leaflet%20.pdf

References

Beaumont M A, Barratt E M, Gottelli D, Kitchener A C, Daniels M J, Pritchard J K and Bruford M W (2001). Genetic diversity and introgression in the Scottish wildcat. *Molecular Ecology* **10**: 319-336

Kitchener A C, Yamaguchi N, Ward J M and Macdonald D W (2005). A diagnosis for the Scottish wildcat (*Felis silvestris*): a tool for conservation action for a critically-endangered felid. *Animal Conservation* **8**: 223-237

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More information: www.snh.org.uk/speciesactionframework

Protecting Species and Maximising Biodiversity Gain: Making Sense of the New Regulations

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The amendments to the Conservation (Natural Habitats &c.) Regulations 1994 (the Habitats Regulations) came into force in England and Wales on the 21 August 2007. Nine months on we now have an opportunity to reflect on success of the changes in helping us to fulfil the primary purpose of the parent Directive, namely, restoring (and maintaining) listed species and habitats to 'favourable conservation status'. Working within the law has undoubtedly become more complicated and the changes now mean that protected species need to be considered in a wider variety of circumstances. Natural England has devoted considerable effort to developing pragmatic advice and advocates a risk based approach to maximise biodiversity gain, minimise harm and avoid unproductive and burdensome regulation. This paper focuses on the situation in England.

Background

The European Commission required the government to amend the Regulations to be more compliant with the terms of the Directive. The judgements in the European Court of Justice found that the transposition of the Habitats Directive had been inaccurate in some respects, including species protection. The amended Habitat Regulations are now much more Directive compliant, but does that automatically guarantee gains for conservation? This paper is focused on terrestrial species conservation as it is mainly concerned with issues concerning the strict system of protection for listed species. It emphasises that appropriate and proportionate application of the law can safeguard biodiversity.

An article in the December 2007 issue of *In Practice* by Penny Simpson, a lawyer working for DLA Piper UK LLP, highlighted the impacts of the legislation on work undertaken by consultant ecologists. The article stressed the risks in terms of legal liability and emphasised the increased opportunities for ecological work, including a greater need for licence applications. While most people are naturally risk averse, and more licence applications are expected, it does not necessarily follow that more licences are always needed. Confused? Read on, and I will attempt to clarify the main issues in the following sections. First, it is important to consider the purpose of the legislation to set the impact of the law in context.

Where Does the Legislation Originate?

We need to look at the background to the Habitats Regulations to explain why the government was required to amend the legislation. Conservation law applied by member states is based on the EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna, 1992 (Habitats Directive). The Conservation (Natural Habitats &c) Regulations 1994 (as amended) transpose the requirements of the Habitats Directive into UK legislation. Throughout the European Union, Directives are legally binding. Member states must use domestic legislation to meet the obligations in the Directive. Member states that do not do so will be required to amend their legislation and may face infraction proceedings if domestic legislation does not accurately reflect the terms of the parent Directive. Few member states so far have managed to avoid criticism from the European Commission following their implementation of the Directive.

What is the Overall Aim of the Directive?

The purpose of the parent Directive is to halt the loss of biodiversity. The Directive seeks to safeguard and where necessary restore European biodiversity, with some of the most important requirements covering site designation and management, appropriate assessments, species protection outside of protected sites, and monitoring. Different schedules (representing differing types of protection) were created, listing species and habitats with the aim of restoring them to and maintaining at 'favourable conservation status'. As a quick and rough explanation, this simply means that species and habitats at 'favourable conservation status' should thrive across their natural range, their populations are and will continue to be viable, supported by sufficient habitat and are not under threat. Across Europe, land usage and development are recognised as some of the greatest

threats to achieving this aim. The Directive provides a legal framework that integrates nature conservation in land use and the planning process.

What are the Impacts of Amending the Legislation?

The Habitats Regulations were imperfect but with a system of offences, defences and derogations, they did allow people to apply a certain level of flexibility while remaining within the law. Amending the legislation has been interpreted as strengthening the law. The wording of the offence relating to damaging or destroying a breeding site or resting place of a European protected species remains unchanged. However, the European Court of Justice argued that the strict system of protection for species as envisaged by the Directive was undermined by existence of defences in UK law that do not appear as derogations in the Directive. The removal of the defence covering activities that were classed as 'the incidental result of an otherwise lawful operation and could not reasonably have been avoided' does now mean that the legislative regime is more strict. The options open to people undertaking activities which may have an impact on protected species are more limited. Guidance available from Natural England recommends that where this is likely, people should follow good practice to minimise the possibility of committing an offence. If they cannot find ways of avoiding harm to protected species they may need to apply for a licence to act lawfully.

What is the Function of the Licensing System?

Licences derogate (or put aside) the law and allow a person to carry out lawfully something that would otherwise be an offence. Because licences permit activities that would otherwise be illegal, the issue of licences is necessarily a very thorough and detailed process, with careful controls. In the case of the Habitats Regulations, to issue a licence the activity must satisfy one of the purposes for which the law allows derogations (*e.g.* public health and public safety, *etc.*) and it must also satisfy two tests:

- the activity will not be detrimental to maintaining the population of the European protected species concerned at 'favourable conservation status' in their natural range; and
- there are no satisfactory alternatives to the proposed activity.

The UK government is accountable to Europe for the derogations that it issues. In England, the licensing system is administered by Natural England on behalf of the Secretary of State.

Why Might Licence Applications be More Common Now?

Prior to the amendments last year, people may have chosen to rely on a defence, particularly for ongoing management or maintenance. While this did apply particularly to forestry and farming operations, there was widespread concern that more licences would be likely following the removal of the defences.

The decision to apply for a licence therefore needs careful thought. In fully considering the three pre-conditions, it becomes clear that a licence should only be applied for as a last resort. The process outlined below may be helpful:

1. Is it likely an offence may be committed?
2. What can be done to avoid causing harm? Consider whether any of the following can be altered:
   - timing of activities;
   - location; and
   - methodologies.
3. If offences are still likely, consider all best practice that can be followed to minimise the likelihood of doing so.

A licence should be applied for only if offences are likely and unavoidable, the activity is licensable, there are no satisfactory alternatives, and there will be no net loss in population size, viability and connectivity locally.

Licences should not be applied for on a precautionary basis, just in case an offence might be committed. Consultants and their clients in such situations should take a risk-based approach to assess the overall impact of the work, against the contribution to conservation.

In cases where licences are necessary, it is useful that a licence legally binds mitigation and compensation work. However, where offences are avoidable, licences should not be used solely to ensure clients carry out necessary work. Where offences are avoidable, such work should be secured through planning conditions and obligations (where applicable), or through client-consultant agreements.

Developers' and Consultants' Attitudes to Risk

The law is complicated and regardless of role, there are difficulties for anyone attempting to interpret the law. In implementing the Directive in domestic legislation, the prohibitions contained in it have been made criminal offences. In one sense, this shows that the law has teeth, and can bite, where people do not work within the law. The difficulty lies historically with the way the legal system operates. Only the Crown court or above in England (and Wales) can decide how to interpret the law and set a precedent which establishes case law. (The majority of species cases are heard in the Magistrates courts. While magistrate courts can decide, their decisions cannot set a precedent.) Given the lack of case law, no one wants the risk of being criminalised or being used as a test case. This clearly highlights why people are likely to prefer to be risk averse. As no-one is rushing to be a test case, we are unlikely to ever have much in the way of legal precedent. In the absence of case law, there is no authoritative interpretation, and we must base decisions on the wording of the legislation. When we go back to the legislation to assist in making such decisions, we can help the process by considering the text in light of the overall purpose of the Directive. It is helpful for consultants and their clients to consider what is the purpose of the work, and what are the outcomes for conservation.

We do need to show that environmental law is strong. Conservation interests are best supported when prosecutions are brought against those who show no regard for the law, and have no evidence to demonstrate that they have taken the presence of protected species into account. However, whilst it would remain a matter for the Crown Prosecution Service in any case, it seems unlikely to be in the public interest to prosecute those who can provide evidence showing they followed good practice. The law must be strong, but not completely inflexible. Conservation is very much also about persuasion and attitudes. A very strict regime may generate so much negative publicity that although the law is upheld, conserving biodiversity in the long run does not benefit. It is always worth re-emphasising that the purpose of the

Directive (and therefore the Regulations) is to safeguard biodiversity.

It is worthwhile looking at guidance issued by the European Commission to assist member states to consistently and appropriately implement the legislation. Although it is guidance and not law, much of it is based on experiences of member states who needed to amend domestic legislation to become more Directive compliant. One of the strictest offences is that of damaging or destroying a breeding site or resting place. Breeding sites and resting places can be identified in both a narrow and a very broad sense. It is quite useful to consider the thinking at the time of writing the Directive. The purpose of the Directive is to halt the loss of biodiversity. To ensure this, species and the parts of their habitat that are absolutely essential to their survival are safeguarded, so that ecological functionality is maintained. Applying the concept of continuing ecological functionality is not something new. It simply means we need to look at a situation from the species' point of view. The concept of ecological functionality can be used to develop appropriate and proportionate responses. By ensuring that ecological functionality can be maintained, we can safeguard biodiversity.

Conclusion

Application of the law and derogations must be proportionate and in keeping with the objective of the Habitats Directive. It is implicit in their nature that derogations from the Directive (licences in UK) should only be relied upon in exceptional circumstances. In talking to many people involved in the ecological world, it is clear that we do need a shift of attitudes. Rather than assume a licence is necessary and will be obtained, we need to consider whether we can avoid harm, and thus the need for a licence. Our first approach must always be to follow good practice within the law. Applying for a licence should be viewed as a last resort.

Overall, there are opportunities for biodiversity gain, as protected species need to be considered in a wider range of circumstances. Countering that is a real risk that the stricter legislation will lead to risk aversion, less beneficial management for species conservation because of the fear of prosecution. If it becomes apparent that species conservation is losing out then we will need to revisit this in future. However, by working together I believe that we can ensure that conserving biodiversity is everyone's business.

Links to guidance referred to in the article:

European Protected Species Guidance
http://forum.europa.eu.int/Public/irc/env/species_protection/library?l=/commission_guidance/final-completepdf/_EN_1.0_&a=d

Disturbance and Protected Species: Understanding and Applying the Law in England and Wales
http://www.naturalengland.org.uk/conservation/wildlife-management-licensing/docs/Disturbance_of_protected_species.pdf

Wildlife Management and Licensing: European Protected Species
http://www.naturalengland.org.uk/conservation/wildlife-management-licensing/habsregs.htm#advice

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Bringing Aggregates Sites to Life

Andrew Whitehouse
Buglife - The Invertebrate Conservation Trust

The aggregates extraction industry can, and does, play an important role in nature conservation. Many of the UK's best wildlife sites are on old extraction sites (such as quarries and pits), and as active sites come to the end of their working lives, they present great opportunities for creating habitats of high value for bees, butterflies, beetles, spiders and other invertebrates. A whole range of birds, plants, amphibians, reptiles and other wildlife can also benefit. There are many circumstances where there can be a biodiversity gain by the activities of the aggregates industry, positives rather than negatives, and perhaps none more so than for invertebrates.

There are two main ways in which the industry has a direct impact on wildlife. Firstly in the development of new sites for aggregate extraction; here attention is focused on what habitats and species are likely to be lost if extraction takes place. It is well known that, if established in the wrong place, aggregate extraction sites can have a considerable negative impact on wildlife. Secondly, where new opportunities for wildlife can be created as a result of the extraction process. The purpose of this article is not to discuss the development of new sites, but to provide an introduction on how to maximise the opportunities for wildlife through both site restoration and the management of active sites.

Through careful planning, aggregates sites can support an amazing diversity of invertebrates both during and after extraction activities. Habitat creation and site restoration projects have the potential to make a considerable contribution to conserving invertebrates and delivering UK Biodiversity Action Plan (BAP) targets. There are at least 26 UKBAP priority invertebrates for which the aggregates industry can make a significant contribution, plus many more that can also benefit.

There are many examples of good practice in site management and habitat creation; however, these are rarely focused on invertebrate conservation. Much more can be done to maximise the benefits for invertebrate biodiversity. Managing for invertebrates is often a simpler, lower cost option than for other taxa, and can easily be incorporated into existing site restoration plans.

***Banded weevil wasp* Cerceris quinquefasciata**
Photo: Mike Edwar

Why are Aggregates Sites Good for Invertebrates?

The extraction process itself creates useful invertebrate habitat, which can be enhanced or maintained through appropriate management. Intrinsic or naturally establishing features of extraction sites that are of value to invertebrate conservation include:

1. **Disturbance**
   The extraction process creates and maintains open patches of bare ground and early successional stages of vegetation – features that are increasingly rare in the wider countryside.
2. **Bare ground**
   Bare ground heats up quickly in the sun to provide ideal conditions for thermophilic (warmth-loving) invertebrates. It also provides nesting sites for burrowing species such as solitary mining bees and wasps.
3. **Abundant wildflowers**
   These provide nectar and pollen sources for bees and butterflies, habitat for phytophagous (plant-eating) species and foraging sites for wasps and other predators. A greater variety of plant species is likely to support a higher number of invertebrate species. When large patches of wildflowers set seed they provide a locally important food source for birds.
4. **Delayed succession**
   Harsh environmental conditions such as dry, low-nutrient mineral soils can delay vegetation succession providing a long temporal continuity of early successional habitats, bare ground and open habitat mosaics.
5. **Varied topography**
   Quarrying, filling, and other operations create a wide range of topographical features from the macro (*e.g.* sand cliffs) to the micro (*e.g.* wheel ruts). Habitat diversity can promote species diversity and provides niche habitats for some specialist invertebrates.
6. **Water**
   Operations below the water table can create water bodies and opportunities for wetland habitats of high biodiversity potential to develop.
7. **Opportunity**
   Through appropriate habitat creation and restoration work aggregates sites offer enormous opportunity to deliver UKBAP targets and other nature conservation goals.

Some Principles of Site Restoration

Aggregates sites present fantastic opportunities for habitat creation and site restoration projects that can contribute substantially to halting the loss of invertebrates and delivering UKBAP targets. However, invertebrates are rarely taken into account when decisions are made about the future of sites. In the worst

cases, inappropriate restoration schemes and site management regimes (often characterised by invertebrate conservationists as top-soiling and tree-planting) have destroyed important invertebrate habitat and the species have been lost.

The intensified use of the UK countryside has led to a gradual loss of semi-natural habitats. The remaining patches have become increasingly isolated and fragmented, and surrounded by hostile land uses. Aggregate site restoration provides an opportunity to address some of this loss by creating new habitats, and enlarging existing patches; and to re-instate habitat linkages, connecting remaining patches to form sustainable ecological networks.

The intrinsic invertebrate interest of aggregates sites is largely a result of disturbance created by the extraction process. Operations provide bare ground and pioneer ecological conditions, with complex mosaics of other habitats that alone, and in combination, provide ideal conditions for a range of invertebrates. Species which were once widespread such as the brown-banded carder bee *Bombus humilis* and dingy skipper *Erynnis tages* have become increasingly rare in the countryside due to intensive land use, and disused quarries have become vital to their conservation. The ecological value of this habitat mosaic has recently been recognised by the UKBAP process: 'Open habitat mosaics on previously developed land' is now a Priority Habitat.

There seems to be a perception amongst industry, minerals planning, and the general public that site restoration should be intensive and provide instant results. But nature takes time, the best results for biodiversity are achieved when working with nature, not forcing it or attempting to leapfrog stages of habitat succession.

Natural regeneration from bare mineral soils can provide habitat of high ecological value, and which is often more appropriate and suited to the site. This is also a lower cost option; restoring a site by regrading slopes, adding topsoil, seeding or tree-planting, requires considerable investment of time, effort and money. From a nature conservation perspective, there is no justification expending scarce resources on restoration unless the outcome is going to be significantly more advantageous for biodiversity than if a site is left to natural regeneration.

Of course, total abandonment is not a realistic option - some restoration work and landforming may be necessary, for example to mitigate for health and safety risks. Nevertheless, quarry restoration plans should identify and retain features of interest that have already established on site, and species that have colonised. Plans should aim to retain 'untidy' topographical features like cliffs, hummocks and hollows, and provide continuity of the early-successional habitat conditions for invertebrates at the same time as managing landscape and safety issues.

Funds allocated for site restoration are often better employed in ongoing management: maintaining the open nature of a site, to guide natural regeneration towards a target habitat, to control non-native or invasive plants. The key is to work with natural processes rather than forcing them.

Integrating Invertebrates

The most effective restoration schemes for biodiversity are those where the primary target end use is nature conservation. Large scale restoration schemes allow for habitat heterogeneity and mosaics. They are likely to support a greater range of species and at more viable population levels (including those which require large areas of habitat). They are easier to manage and are more sustainable in the long term.

However, where multiple land uses such as public amenity, recreation and agriculture are a requirement for after-use of a site they can be integrated with nature conservation if planned correctly. The most effective schemes produce the right conditions for biodiversity to thrive, then fit other end uses within this context. Good site design can focus activities that are less compatible with nature conservation away from sensitive or fragile habitats and species. Of course there are win-win situations, for example management for geodiversity and invertebrate biodiversity is often complimentary – both frequently call for the retention of bare ground and features such as exposed cliffs.

Invertebrates in general can be very accommodating of other end uses. Relatively small areas of suitable habitat within sites can support high invertebrate biodiversity. There are none of the disturbance issues associated with birds, and some disturbance (*e.g.* path trampling) can be of benefit. Metapopulations of more mobile species such as the dingy skipper butterfly can thrive within networks of relatively small patches of suitable habitat.

***Brown-banded carder bee* Bombus humilis**
Photo: Steven Falk

The sowing of native wildflower seed mixes to create flower-rich grassland can provide colour and amenity to sites where public access and recreation is a target end use. Generalist invertebrates such as some of the more common bumblebees and butterflies will take advantage of the habitat and the nectar and pollen resource it provides, although more specialist species are unlikely to colonise if their more exacting needs are not provided for. Similarly, the creation of new ponds is a straightforward way of boosting the wildlife potential of a public amenity site.

Many restored sites are used by schools and community groups for educational activities related to the environment, such as bird watching and pond dipping. In areas where access to wildlife is poor they can be an important resource for reconnecting people with the natural world. Access to natural green space can also have positive benefits to physical and mental well-being.

Combining public amenity, education and nature conservation can yield benefits for local communities and be a useful tool for demonstrating the industry's commitment to sustainability and nature conservation.

Making Space for Wildlife Within Active Sites

Perhaps a less recognised opportunity for biodiversity is within active sites. Working quarries and other extraction sites are often thought of as noisy, dusty and ecologically sterile places; however, despite the disturbance created by the extraction process, much wildlife can survive on working aggregates sites. Some specialist species even thrive and can be dependant on the disturbance created by the operations for their conservation.

Through careful management, quarries can significantly enhance the biodiversity of an area and provide much needed habitats and refuges for wildlife. There are plenty of opportunities to accommodate wildlife within active sites. Many invertebrates readily colonise, especially if areas are left undisturbed for sufficient periods. Invertebrates can benefit from relatively small patches of suitable habitat within sites where these are part of larger networks of habitat patches.

Making space for wildlife need not be high cost nor inconvenience normal operations. Awareness of a site's most valuable wildlife features or areas and a flexible approach can enable biodiversity to be integrated within the operation. Colonising plants and animals can provide a solid ecological base for eventual restoration, and can be encouraged with the final scheme in mind. Most operations feature small areas of original habitat that will remain undisturbed, these can act as a refuge for species and a source population for recolonisation.

High quality habitats for invertebrates that can be managed in active quarries include: temporary and early stage ponds and pools, ditches and other drainage features, groundwater seepages, bare ground, sparsely vegetated wildflower-rich grassland, and south-facing cliffs and slopes. On sites where these features have developed effort should be made to retain them somewhere on site throughout its operation. Sand martins frequently colonise sand cliffs in active quarries and are accommodated within working operations. The same cliffs are also utilised by mining bees for digging nest burrows – they are behaving in a similar way just on a smaller scale. Encouraging the development of patches of wildflower-rich grassland in the vicinity will provide a nectar and pollen source. A species which readily colonises active extraction sites is the scarce blue-tailed damselfly *Ischnua pumilio*; this species can utilise spring-fed seepage lines, small shallow pools, and even water-filled wheel ruts as breeding sites.

Many invertebrates of early successional or ephemeral habitats are efficient at dispersal and colonisation and may be able to persist on site despite periodic habitat disturbance. As such, some flexibility may be acceptable on the actual location of the features, *i.e.* as long as there is continuity of suitable habitat somewhere on site populations may continue to exist. Where possible, these features should be retained and incorporated within the eventual restoration scheme.

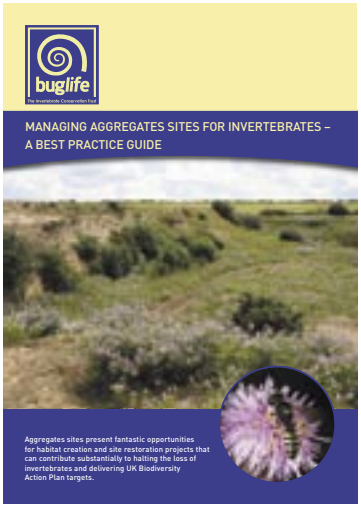
During most operations a small proportion of the site will always be undisturbed for a time, useful habitat can establish in these areas even if the undisturbed period is temporary. Interim site restoration presents further biodiversity opportunities for areas inactive over longer periods and can be an opportunity for testing out more experimental restoration techniques or studying what habitats and species may colonise the larger site. Other opportunities include phased operations and 'mothballed' sites.

Opportunities for making space for invertebrates and other wildlife can be incorporated into site BAPs and can be used to demonstrate sustainable working practices.

Bringing Aggregates Sites to Life

Buglife has recently published *Managing Aggregate Sites for Invertebrates: A Best Practice Guide* (see above right). This best practice guide aims to highlight the contribution of the aggregates industry to invertebrate conservation, and to help site and estates managers, minerals planners and ecological consultants make the most of the biodiversity opportunities that aggregate sites present, with a focus on invertebrates. The guide is intended as a brief summary of some of the most ecologically valuable naturally regenerating habitats on aggregate sites and those habitats that, for one reason or another, have been neglected or under-appreciated in the past. Notes are also included on some of the terrestrial and freshwater habitats more commonly targeted by restoration plans.

Managing Aggregate Sites for Invertebrates: A Best Practice Guide can be ordered through the Buglife website (www.buglife.org.uk) or by contacting the author. The report is also available for download along with additional resources including a list of UKBAP invertebrates associated with aggregates sites.



The Buglife 'Bringing Aggregates Sites to Life' project is funded by Natural England through Defra's Aggregates Levy Sustainability Fund. We would like to thank all our contributors, and our conservation partners at Butterfly Conservation and Pond Conservation, for their input.

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M. Alexander, Conservation Management System Consortium, UK

Mike Alexander's **Management Planning for Nature Conservation** brings a new dimension to the modern literature on conservation management. Combining key theories with real practice it fills a critical gap which has often hindered in-depth understanding of the planning process. The book provides historical and rational background which helps to explain what makes a really effective management plan, and it presents a detailed practical guide to developing such a plan. It concludes with a series of case studies which clearly illustrate the underlying principles drawn out in the text, while highlighting the different approaches demanded by very different sites.

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Conservation Biology

Foundations, Concepts, Applications

F. Van Dyke, Wheaton College, IL, USA

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Monitoring Nature Conservation in Cultural Habitats

A Practical Guide and Case Studies

C. Hurford, Countryside Council for Wales, Bangor, UK; **M. Schneider**, Västerbotten County Administration, Umeå, Sweden (Eds.)

Monitoring Nature Conservation in Cultural Habitats presents monitoring as an integral component of responsible conservation management and as a catalyst for decision making. The early sections of the book cover key areas in the development of a monitoring project, including:
► The roles of survey and surveillance ► Incorporating knowledge from existing research ► Identifying the conservation priority on sites ► Minimising observer error ► Identifying site-specific condition indicators for habitats ► Collecting monitoring data.

The later sections of the book comprise a series of case studies covering a wide range of habitats and species. These case studies focus mostly, though not exclusively, on sites that form part of the Natura 2000 series in Europe.

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Great Crested Newts and Their Protection: Are We Getting It All Wrong?

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There is a special place up on the Northumbrian moors that I go to when I want to commune with great crested newts. It's not the usual sort of setting for encounters with this species, I reflect, as I pick my way through the heather late on a fine May evening, with only the bleating of sheep and the drumming of snipe to be heard; but limestone was quarried here in the 19th Century, and now there is a scatter of ponds in sheltered hollows. Although the smallest ones are almost choked with stonewort (*Chara* sp.), most are vegetated with *Potamogeton* pondweeds, which at that time of year have only just begun to unfurl their leaves, and there is plenty of open water between the stems and even more over the patches of bare lime spoil, clear as only water over limestone or chalk can be, and perfect for great crested newts to strut their stuff.

I have been coming here off and on since 1991, when English Nature asked me to do a baseline count of the newt population (I was the proud holder of one of the earliest great crested newt survey licences, an object of wonder and delight to friends and family, for I was 007 no less, licensed to disturb and capture newts in the name of science). In recent years I have found it a good place to bring junior staff to show them how to tell the different newt species apart, watch their courtship displays (the newts' that is) and egg-laying, and learn survey methodologies.

The numbers of great crested newts and their relative distribution between the different ponds have remained broadly similar over most of the last 17 years, all the ponds but one supporting great crested newts, the exception being the largest. As it appeared every bit as suitable as the others, their absence was at first a puzzle, and it wasn't till my second torchlight survey that I found the answer. At the far end of the pond, what had been the quarry face, a low cliff plunged straight down into deep water. Angling my torch beam into the depths, I was startled when it picked out the heads of first one and then two enormous eels protruding from crevices, slowly gulping. Although most of their bodies were hidden, from comparison with my memories of conger eels I reckoned they must have been well over a metre in length. The fisherman in me briefly contemplated trying to catch these possible record-breaking, newt-fed monsters, but eels tend to swallow baited hooks straight down, and I really didn't wish them any harm. I could have borrowed some fish traps from the local river keeper, but to be honest I thought the eels were of greater scientific interest than the newts, and in the end I decided to leave them be.

I never saw the eels again on subsequent visits, though sometimes there would be a swirl of something large in the pondweeds as I approached with my torch, and over the years the pond remained resolutely newt-free. Until, that is, 2006 – the first time I had visited since 2002. This time, there was a scattering of great crested newts around the pond, but no swirls in the pondweed.

So, it seems that sometime between 2002 and 2006 the Sisters (as I thought of them) had felt it was time to leave the pond and return to their birthplace in the Sargasso Sea. It must have been quite a sight as one wet November night they left the pond and squirmed their way through the rushes and over the road to the nearest burn, heaven knows how many years since their extraordinary arrival as elvers up some seasonal runnel[1].

Anyway, the point of this reminiscence is threefold. Firstly, to note how a population of great crested newts can persist despite the sustained culling of what may have been substantial numbers of individuals that must have wandered or dispersed into the Sisters' pond over the years. Secondly, to note how readily great crested newts can colonise good habitat if there is a reasonable source population. Thirdly, to ask whether this has anything to tell us about how we treat great crested newts in relation to development and land management activities. Before exploring this question, let me take two, I would suggest typical, case studies of great crested newts and development projects.

A Pipeline

In order to meet tougher standards for discharges to freshwaters, one of our clients, a major utility company with a good reputation for supporting biodiversity conservation projects on its own landholdings and in the wider community, wanted to construct a pipeline extending 7 km through an area of mixed industry and agriculture. We therefore did a standard great crested newt survey exercise within the 1 km wide corridor centred on the pipeline route, and ultimately established that there were six ponds (out of 21 surveyed) with breeding great crested newts that were likely to make use of the terrestrial habitat through which the pipeline would be laid. A mitigation package was duly agreed and licensed, requiring the construction of over 5 km of newt exclusion fencing with associated pitfall traps and refuges for clearing about 9 ha of the pipeline construction corridor of newts and capturing others in transit so they could be helped on their way to and from these ponds. In all, the operation cost the client about £250,000 (about 6% of the overall scheme cost), for which 25 great crested newts were definitely rescued by us, and an unknown number of others were unofficially helped on their way by workers from one of the factories whose compound the pipeline crossed and who found newt-rescuing a congenial way of spending their lunch breaks. Not to mention the probably considerably greater numbers that

Great crested newt
Photo: Barry Kemp Conservation

were preserved through being turned back by the fencing. So far so good, but the breeding ponds were not in very good condition, fed as they were by poor quality surface water run off from the industrial sites, and would have benefited from some positive management. We suggested this to the client, and pointed out how a modest additional expenditure would benefit the newts. However, he was unwilling to incur any further delay in negotiating such a course with the landowners, feeling too that his customers and shareholders had done enough through simple compliance with legal requirements and could not reasonably be expected to foot the bill for yet more when they didn't have to, especially when the development's whole purpose was environmental improvement.

A School

In this case we were approached one June by the principal of a primary school who was planning to extend the school buildings. She was hoping to get the bulk of the work done during the summer holidays, time was tight and she had just been told by the council planning department that they had discovered that the school nature pond supported great crested newts and she would need to get a derogation licence before she would be allowed to undertake the work. The pond was about 100 m away from the school buildings across the mown grass playing field, in a substantial nature area of woodland, nettles, grassland and marsh, and when it had first been dug about 15 years previously it had probably provided excellent great crested newt breeding habitat. However, the banks of the pond had been planted with alders which now cast a dense shade, and the pond bed was a black layer of dead leaves and there were no pond plants. Defra was persuaded that there was no need to defer the work for another year to gather further newt population data (there was some available from a local enthusiast for previous years), and that exclusion fencing around the building works was all that was required to mitigate the low risk to wandering newts, and duly granted the licence. However, by this time it was August, and too late to get the building works started before the new school year. The principal was bitterly disappointed and incredulous that the interests of the newts had been given precedence over those of the children, and while we did our best to persuade her to have the trees around the pond felled for the newts' benefit, her response was unenthusiastic (to say the least) and the glint in her eye did not encourage further diplomatic efforts.

What I find striking about both these case studies is that the developers involved are representative of the types of organisations that are inherently supportive of biodiversity conservation, and yet the measures that have been put in place to protect great crested newts have deterred them from taking steps to contribute to their long-term conservation. Nowadays great crested newts have become, in planning terminology, 'a constraint' to development – and that is a double-edged sword. On the one hand it is right and proper that the prospects of local great crested newt populations are taken into account in planning decisions; on the other hand, if taking them into account introduces significant delay into the development programme and necessitates the expenditure of substantial sums of money, then landowners are likely to be increasingly reluctant to have great crested newts on their land (particularly in the brownfield areas that support many great crested newt populations and where government policy focuses redevelopment effort) – or, as familiarity with the default 500 m dispersal distance grows, anywhere near their land. Great crested newt ponds, and by extension all ponds, are in danger of becoming serious liabilities (both real and imagined), and instead of becoming the havens for great crested newts that they could be, the grounds of our public buildings, our suburbs and our business parks are more likely to become pondless newt deserts.

Not, I hasten to add, because landowners are deliberately killing off great crested newt populations. Personally I am not aware of any evidence that this is happening, although rumours abound. What concerns me more is that in the long term one doesn't need to take active steps to get rid of great crested newts, simple neglect will do the trick. Most ponds are doing their best to silt up, vegetate over and revert to dry land, and this is well recognised as the main cause of decline in great crested newt populations. Failure to manage existing ponds and failure to maintain a supply of new ones are probably all that would be required over the next few decades to vastly reduce the distribution, number and size of great crested newt populations – and no law would be broken in the process. True, Article 12(1d) of the Habitats Directive does require Member States to take the measures necessary to 'prohibit… deterioration or destruction of breeding sites or resting places', which taken literally suggests the EU might be trying to ban the process of natural succession, an endeavour worthy of King Canute. However, EU interpretive guidance[2] says that the prohibition does not cover natural succession arising from '…the abandonment of certain human land uses…'. This is much more sensible, but it does mean that the Habitats Directive has no real relevance

in countering the main cause of great crested newt decline.

Is there any evidence that these processes of pond loss and great crested newt decline have been slowed by the overall package of nature conservation policies and legal protection measures that are now in place? Well, even though the great crested newt, as well as having such a high level of legal protection, is a UKBAP priority species with its own action plan since 1995, our understanding of its population size and trends is decidedly weak. The 1995 BAP estimated that there were 18,000 ponds with colonies of great crested newts, while according to the Biodiversity Action Reporting System[3] there were an estimated 23,500 sites/populations in the UK in 2005, accuracy being described as 'best guess'. Now, the UK's latest report to the EU on the conservation status of European protected species, prepared by JNCC[4], estimates that great crested newts were to be found at 75,000 'localities' in 2006. Nobody, however, believes that these figures represent an actual increase in great crested newt populations – rather, the consensus is that they are still declining and that the wide range in estimates simply reflects our ignorance of the true baseline position (plus inconsistency in the units used to measure newt populations). I find it difficult to see how the UK government can reconcile this situation with its obligations under Article 11 of the Habitats Directive requiring surveillance of the conservation status of great crested newts; after all, without a decent grasp of the baseline position, how will we ever gauge the effectiveness at national level of our mitigation and conservation actions?

Regardless of the actual numbers, why are great crested newts still declining? It should not, after all, be difficult to maintain them at Favourable Conservation Status - an animal that will lay its eggs on wind-blown crisp packets in a concrete fire tank on an old airfield as readily as it will on rare pondweeds in an East Anglian pingo is one that is showing a healthy level of ecological adaptability. If we can't look after them properly, then heaven help the trembling sea mat, the narrow-headed wood ant and all the other truly demanding species on the UKBAP lists. Great crested newts must have been among the prime beneficiaries of firstly the agricultural revolution and then the industrial revolution, both of which generated large numbers of ponds, pits, pools and other water bodies. Plus that wonderful nationwide network of newt refugia otherwise known as the railways. As with most species, if you give them enough of the right kind of habitat they should be able to look after themselves. The challenge for us, surely, is how best to do that in a post-industrial economy with an intensive farming system, neither of which are generating and maintaining great crested newt habitat as a by-product of their activities any more. Countryside Stewardship and other agri-environment schemes do not seem to have been sufficient to reverse the trend. Perhaps now that ponds are a UK BAP habitat type in their own right we will see this challenge addressed, but it will take real commitment - and perhaps also a change in how the 'strict protection' requirements of the Habitats Directive are interpreted.

Back in the 1980s, when I was a wildlife trust conservation officer and wildlife legislation was not so strictly enforced, if a great crested newt pond was about to be destroyed we were lucky if the developers graciously allowed us to turn up for half a day with a gang of volunteers wielding nets and buckets to rescue as many amphibians as we could and spread them around suitable receptor ponds – many of them in the gardens of Wildlife Trust members or on the land of conservation-conscious farmers[5]. Not all of these translocations were successful, but quite a lot were and the newts are there to this day.

I don't want a return to that situation, but in some respects it offered greater scope for long-term newt conservation than the current protective regime does. The licensed mitigation system as applied at present cannot protect the main areas of aquatic and terrestrial habitat of a great crested newt population where these are not in the control of the applicant (which is often, maybe usually, the case in most development situations). Adjoining landowners cannot be obliged to undertake positive management works, so often all that can be done, through expensive fencing exercises, is to reduce the numbers of individual newts that are killed or disturbed. Whether, in themselves, such animal welfare actions can make any real sustainable contribution to maintaining the conservation status of great crested newts is debatable.

What is certain, though, is that the constant trickle of headlines of the '*Meet the £1.5 million Newt*' variety adds up to a PR disaster for newts that further reduces the incentives for landowners to take up pond management and creation schemes, and chips away at the public support that has underpinned 150 years of advances in nature conservation.

The emphasis in the official Natural England guidance documents on the 2007 amendments to the Habitats Regulations and in the derogation licence application process[6] on the importance of populations rather than individuals is welcome, but the form itself remains highly precautionary. It does not suggest the fundamental change in interpretation of the law that would make it possible to have an explicit trade-off between risks to individual newts and measures for long-term enhancement of newt populations through habitat management and creation. In practice, surely we could develop a tariff of 'predicted benefit to newt population through habitat management' versus 'predicted number of newts lost due to the development'. This, I suggest, is essential if the Habitats Directive is to be turned into a functional device for conserving great crested newt populations, and it would enable a more productive use of the many millions of pounds currently being spent on newt mitigation every year.

Would it be legal? Well, in principle I don't see why not. Article 16 of the Habitats Directive explicitly permits derogation from the strict protection measures set out in Article 12 'provided that there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range…'. To the best of my knowledge there is no case law constraining how populations should be maintained, or requiring them to be retained in exactly the same place. Nor does the EC's own guidance document appear to rule such an approach out (although it does suggest that some fairly convoluted mental gymnastics may be required to justify it!)[7]. It would therefore seem to be within the gift of Natural England and the other statutory nature conservation organisations (SNCOs) to licence imaginative and creative approaches to newt conservation on the back of development proposals.

If the SNCOs and the courts cannot accept this interpretation, and it is confirmed that the way in which the law has been drafted and interpreted is defeating its own purpose in relation to great crested newts, then it seems inevitable that we would either have to change the law, or remove great crested newts from its coverage.

So, I hope I have demonstrated that at the very least there is a need to review whether for great crested newts a system of strict protection of individuals may not only be ineffectual as a means of maintaining or enhancing the conservation status of the species, it may actually be making things worse. I therefore hope we can modify the

way in which we apply the Habitats Directive to get around this problem, and that we can concentrate on putting in place a more robust, coherent and properly monitored set of policies and incentives to protect, restore, enhance, manage and extend suitable networks of breeding ponds and terrestrial habitat.

Acknowledgements: While this is a personal view, I am grateful for the input of many of my Entec colleagues, especially Caroline Gettinby with whom I have explored most of these thoughts, and also Graham Burt-Smith, Robin Cox, Rachel Forsyth, Toby Gibbs, Ruth Jones, Alan Kirby, Richard Knightbridge, John Pomfret and Paul Reaston, who all commented on various drafts.

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Notes

[1] Although it is true that female eels grow much larger than males, thinking of these eels as Sisters is not only ridiculously anthropomorphic, it is also vanishingly improbable. The European freshwater eel *Anguilla anguilla* has one of the most remarkable life histories of any fish. Adult eels from all over the continent swim 5,000 km and more right across the Atlantic Ocean to the Sargasso Sea off Bermuda, where they spawn and die. The Gulf Stream carries the developing eggs and larvae on a long drifting journey north and east back to the shores of Europe where the young eels (elvers) head into the rivers. Thus the chances of two siblings completing that journey together are laughably remote!

[2] http://circa.europa.eu/Public/irc/env/species_protection/library?l=/commission_guidance/english/final-completepdf/_EN_1.0_&a=d

[3] http://www.ukbap-reporting.org.uk/status/species_habitat_nat_status.asp?C=1&X=%7B5B13297D%2D0FE3%2D4B31%2DAD05%2D323BD7C25B95%7D

[4] http://www.jncc.gov.uk/pdf/Article17/FCS2007-S1166-Final.pdf

[5] Farmers were keen on creating new ponds and on great crested newts – the biggest problem was convincing them not to dig new ponds on those little bits of what they regarded as boggy waste ground, and what we classed as species-rich unimproved wet grasslands and fens!

[6] http://www.naturalengland.org.uk/conservation/wildlife-management-licensing/forms.htm#newts

[7] http://circa.europa.eu/Public/irc/env/species_protection/library?l=/commission_guidance/english/final-completepdf/_EN_1.0_&a=d

Best Practice Awards 2008

The Institute of Ecology and Environmental Management is pleased to announce the call for entries for its 2008 Best Practice Awards.

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

Entrants will be expected to submit an entry form and then, if short-listed, to produce a poster for the IEEM Conference in Glasgow in November 2008.

The short-list will be announced in September 2008.
A representative for each short-listed entry must be available for the IEEM conference in Glasgow on 19 November 2008. The awards will be presented at the conference dinner later that day.

The deadline for entries is 31 July 2008.

For more information please visit www.ieem.net/awards.asp or contact Jason Reeves (jasonreeves@ieem.net or 01962 868 626).

What Kind of Profession Is This?

Cameron S Crook MIEEM
Consultant Ecologist, Cameron S Crook and Associates

Let me ask you this. Is there any other profession where:

- The possession of a particular licence is deemed enough to qualify an amateur enthusiast as a professional consultant?
- Amateurs holding such a licence feel quite justified in charging more per hour than many professionals?
- To obtain a licence, a qualified professional is expected to join an amateur organisation and be trained by said amateurs?
- A local authority will readily consult the amateur organisation and accept their opinion in preference to that of a professional consultant?
- Amateur enthusiasts seemingly feel quite empowered to lambaste professional consultants on the one hand, whilst themselves carrying out freelance work on the other?

I am, of course, talking of bat work and am aware of no other profession where anything like this occurs. This list above has not been made up to stimulate debate: it is based on both what I have directly experienced myself and from anecdotal evidence gleaned from colleagues. This bizarre situation has both puzzled and frustrated me for quite some time. Talking to other (non-bat worker) consultants from different parts of the country, it seems I may not be alone.

So let's examine the evidence in a bit more detail. How many professions are there where to get a 'required qualification' one needs to join a local group of enthusiasts, serve one's time for at least two years, then wait for your 'trainer' to 'sign you off' for your qualification? There are none that I know of. To put this into perspective, would a paramedic be expected to join their local St John's Ambulance team in order to be trained and authorised to crew an ambulance? Would a mechanical engineer be expected to get his or her Chartered Engineer status by first joining a model railway engineering club? Would we expect a police officer to have served as a neighbourhood watch co-ordinator before he or she could walk the beat? Need I go on?

As flippant as all this may sound, it is a sad fact that a crucial part of our profession is caught in a voluntary sector stranglehold (this doesn't just apply to bats either, but this is where it is most noticeable). That's not to say that the voluntary sector or indeed bat groups have no role to play. Nor is it to say that the voluntary sector or bat groups don't operate in a professional manner. Most of us are members of some society or other with a specialist interest and carry out ecological work in our 'spare' time. But, the difference is, we are not normally beholden to our chosen society. And we do not need to keep 'well in' with the trainer so that our training doesn't drag on too long.

The role of a bat group is not, and never has been, to train bat consultants. There is no dispute there. So what is the alternative? Most of us 'professionals' train as ecologists by going to a university or college. And we may gain extra experience by doing voluntary work or carrying out private research into our pet subject. Even so, it shouldn't be unreasonable to expect to obtain further professional training, after we have left university, whilst on the job, in order to improve our knowledge and learn new specialisms. Most people are quite happy to pay for this and for the most part, we can do this with schemes such as IEEM's excellent and affordable professional training series. But can we get a bat licence that way? No, we can't!

The Bat Conservation Trust (BCT) has for several years now been running a series of courses aimed at environmental professionals. One might be forgiven for thinking that this would ultimately lead to our obtaining a bat licence. But again, sadly, the answer is no: BCT will train you all right; in fact, their courses are very comprehensive and interesting (if a little expensive), but it will not get you a licence. Ask how you get a licence and it's the same old story. You have got to serve your time with your local bat group and ingratiate yourself to your trainer (they don't actually say that… but that is what happens in practice).

Now, this may seem cynical, verging on paranoia even or maybe just the product of a troubled mind. But unfortunately, I fear it isn't. Firstly, I do have a bat licence (and didn't buy if off eBay as I have often jested with colleagues) so I have no vested interest in improving the chances of getting a licence. Secondly, I have heard many first-hand stories that substantiate the views I have expressed above. For example, a trusted colleague of mine was told by a trainer in her bat group that he (the trainer) would 'never train a consultant' and that all consultants were incompetent (by which he meant professional, non-bat-group consultants). After eighteen months of 'training' and many hours of voluntary work with the bat group in order to gain the necessary experience, with no sign of her licence being 'signed off' and despite repeatedly asking her trainer for a timescale, she gave up and left the training scheme. In the end she got her licence by an alternative, less conventional route, proving she had the necessary knowledge and experience, despite her original trainer's reluctance (incidentally, she still does voluntary bat work, but for a different bat group).

Greater horseshoe bats
Photo: English Nature

This is not the only instance of this that I know of, but I am only aware of it happening to professional consultants.

So who are these bat workers and trainers to whom we mere consultants seem to be beholden? Most are just ordinary people, from all walks of life, with a keen interest in bats and who, in fairness, do a lot of good practical work for bat conservation. And there's nothing wrong with that. In fact, it is to be applauded. But others, and here is the rub, have discovered the joys, not to mention monetary reward, of bat consultancy work.

For my sins, I admit to knowing a number of bat workers from both categories. And of those I know, most of whom have a licence, already do or have expressed an interest in doing paid bat work. Of the 'full-time' bat consultants I know, their backgrounds are as varied as their qualifications. Amazingly, I know of only three professional bat workers in this region (northwest England) who are qualified ecologists (by which I mean those with degree level qualifications in a biological/natural sciences discipline).

By contrast, virtually all the professional ecologists I know, covering other specialisms such as botany, birds, amphibians, mammals, invertebrates, *etc.*, do have recognised professional qualifications and are nearly all Full members of IEEM.

Is it right then that one significant section of our profession should be dominated by amateurs? And I stress the word profession. My contention is not with amateurs who do voluntary conservation work or even funded research. Rather, my contention is with unqualified amateurs working as professionals. Many bat workers (and possibly as many Local Government Ecologists, come to that) claim that no-one without a licence should carry out professional bat work. Whilst this isn't actually true (read English Nature's Bat Mitigation Guidelines), if we assumed it was, then surely the reverse should also be true. In other words, licensed bat workers should not carry out 'professional' bat work until or unless they hold a recognised professional qualification (*i.e.* something that would qualify them for full IEEM membership).

Perhaps I am wide of the mark here, and certainly don't expect many bat workers to agree with me, but I can't help thinking that if IEEM is to present its members as true professionals, we should look into this and produce some specific guidance. I think it is also high time that training schemes are established for the training of environmental professionals that actually lead to or qualify one for a Science, Education and Conservation Licence for bats, without the need to join a bat group. That said, I understand that Natural England plan to introduce a 'surveyors licence' in the near future but have yet to see any details or any indication of what training (if any) would be required. Here too, IEEM should perhaps exert more influence. That, in my opinion, is the only way to put an end to what is currently a ridiculous and archaic situation.

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The Environmental Sector: Fact v Fiction

Nick Jackson AIEEM
Education and Professional Development Officer, IEEM

The increasing volume and complexity of European legislation, together with new environmental laws and regulations in the UK, have resulted in a corresponding growth in the environmental sector.

Around 400,000 people are employed within the environmental sector and over 17,000 companies identify themselves as operating within it. The sector currently has an annual turnover of around £25 billion[1]; however, most businesses are still expanding with greatest growth seen in the environmental management/consultancy fields. This puts the environmental industry on a par with the aerospace and defence sectors, but with one important difference – it is still growing significantly year-on-year.

There are many misconceptions across society about working in the 'ecological part' of the environmental sector, and I challenge some of these below:

Myth 1. Ecology is not a profession and is not taken seriously…

This is probably the most common misconception. Many people have the view that it is not possible to earn a living, and indeed have a career in ecology. 20-30 years ago when the sector was in its infancy, this may have been the case, but now there is a plethora of careers available for those who are passionate about the environment. Opportunities for ecologists are diverse with employers ranging from local authorities, government agencies, industry, consultancy, teaching/research, to NGOs. Competition for employment in ecology is intense and the profession demands high levels of skills and commitment, but the rewards that come with this work provide great job satisfaction.

Myth 2. Ecologists do not get paid very much…

Historically, salaries in the ecological sector were very low, but this has changed. With the current growth and recognition of ecology as a profession, salaries now fall in line with many other similar professions. Table 1 shows the average salaries given by age group[1].

Myth 3. Ecologists are all volunteers who count butterflies at the weekend…

As well as paid positions, a large amount of biological recording in the UK is carried out by volunteers (of which there are around 200,000[2]). These volunteers are for the most part enthusiastic amateurs, and in some cases, are the country's leading experts on certain species. Field/practical skills are essential for entering the profession and volunteering can provide this experience. These practical skills are rarely gained through university courses so volunteering has become the means of gaining this essential experience. Most professional ecologists have initially done a period of volunteering to gain the necessary level of field skills before finding paid employment.

Myth 4. Ecology is a male dominated industry…

Contrary to popular belief, there is a fairly even male to female ratio throughout the sector. In a 2007 survey of our membership[3], IEEM found that 55% of respondents were male and 45% were female. Table 2 shows the age to sex breakdown of the respondents.

Table 1: Comparison of Average Salaries with Age

Age (Yrs)	Average Salaries
20-29	£23,000
30-39	£32,000
40-49	£36,000
50+	£41,000

Myth 5. Ecology is not a real science…

Ecology is most definitely a science. Ecologists have to use sound scientific methodologies and techniques to gather data and analyse and present their findings/advice in a clear and understandable manner.

There is currently a major concern within the sector that a skills gap has arisen and is widening. This is especially noticeable with ecological field skills but also basic skills such as numeracy, and the ability to write a clear and precise report seems to be lacking in many job applicants. Field ecology has to be taught in the field by experts, many of whom are now nearing retirement. When this expertise disappears, some subjects (lower plants for instance) will be difficult to teach.

There are a huge number of colleges and universities running ecology/environmental management courses which can be quite baffling to students wanting to choose a relevant course to enter the profession. IEEM has produced guidance[4] that outlines the field skills that an employer would expect a new ecology graduate to have. Students can compare course curricula with this guidance to identify those courses that will provide them with the necessary level of training in field survey skills. This guidance may also be used by course providers when developing new courses or when updating existing courses.

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Notes

[1] Threw L (2006). *Skills shortage keeps employers on their toes, Salary and Careers survey.* The ENDS directory. www.endsdirectory.com/index.cfm?action=articles.view&articleid=200601

[2] Lantra (2006). Environment Conservation Sector Skills Agreement. www.lantra.co.uk/employees-and-volunteers/environmental-conservation/info

[3] IEEM (2007). *Membership Survey 2007.* www.ieem.net/members.asp

[4] IEEM (2007). *What A Graduate Should Know: Field Skills.* www.ieem.net/studentpublications.asp

Table 2: The IEEM membership survey response broken down by age and sex

Age (Yrs)	Number of responses			Percentage (%)		
	Total	Male	Female	Total	Male	Female
17 - 21	7	2	5	0.6	0.2	0.4
22 - 25	112	30	82	10	2.7	7.3
26 - 29	180	69	111	15.9	6.1	9.8
30 - 39	354	195	158	31.3	17.3	14
40 - 49	277	191	85	24.5	16.9	7.5
50 - 59	167	105	61	14.8	9.3	5.4
60+	35	31	4	3.1	2.7	0.4
Total	**1129**	**623**	**506**	**100**	**55.2**	**44.8**

IEEM Spring Conference 2008

Nick Jackson AIEEM
Education and Professional Development Officer, IEEM

IEEM's spring conference took place on 16 April 2008 in London and was a first for IEEM: a conference about a European Directive that has not yet been implemented in the UK.

The title was 'Environmental Liability Directive: Helping Towards 2010?' and the aim of the conference was to introduce ecologists and environmental managers to the Environmental Liability Directive (ELD). The conference explained how the Directive will work, gave the wider European picture and illustrated how those in enforcement and restoration work are likely to be involved.

For those of you who are not aware of the ELD, it is an application of the 'polluter pays principle' and is being put in place to prevent and remedy environmental accidents, soil/water pollution and accelerated biodiversity loss. The Directive makes businesses responsible for the environmental costs they cause by requiring them to prevent and restore environmental damage for which they are responsible. The ELD is concerned with damage to Natura 2000 sites and species. In the UK context (except Scotland), the Directive may also extend to Sites of Special Scientific Interest (SSSIs) and Ramsar sites but there was initial resistance to this by the Government.

Sandy Luk began the day by introducing the Directive and giving some general background information. The timeline of the Directive including the crucial dates was given; the environmental rationale was outlined as were the different political pressures. The terms 'operator' (businesses and business-based activities) and 'competent authority' (Natural England, the Environment Agency, local authorities and others) were explained with guidance on where the Directive applies and who is responsible for enforcing it. Examples were given of the types of restoration of environmental damage: primary, complementary and compensatory.

Caroline O'Connell from Defra spoke about implementing the ELD in the UK. Delegates were informed that the ELD was currently at the second consultation stage and the final regulations were likely to be made around December 2008. Caroline outlined some particular areas of controversy such as the eventual inclusion of SSSIs and the potential extension of liability beyond Annex III.

The next three speakers were all from competent authorities and gave their views on how the ELD would affect their work.

Paul Horswill from Natural England outlined two case studies of historic damage, in the South Pennine Moors and on the River Camel, and explained how the ELD would be used in those situations to make operators restore the damage. Paul said that some of the main challenges would be in the marine environment (where baseline data is limited) and getting partnership working between enforcing authorities.

Tony Warn gave the Environment Agency's views and spoke about how the ELD would link to the Water Framework Directive using 'favourable conservation status'. He then gave an example of species recovery times after an incident in a river and the potential costs involved in the remediation.

Mary Christie CEnv MIEEM gave the views of Scottish Natural Heritage (SNH). As the draft Scottish regulations were not published at the time of the conference, Mary explained the likely role(s) of SNH as a competent authority, which were: investigating the nature of the damage, identifying the responsible operator, determining the prevention or remediation measures, and ensuring they are carried out.

Richard Foreman from the Confederation of British Industry (CBI) gave the next talk entitled 'The View from Industry'. The CBI represents some 240,000 businesses, employing around a third of the private sector workforce. Richard noted that the European Commission were due to report on the effectiveness and conditions of insurance and financial security for Annex III of the Directive by 30 April 2010. He also spoke about another EC Directive, the Integrated Pollution Prevention and Control Directive (IPPC), which applies an integrated environmental approach to the regulation of certain industrial activities (emissions to air, water and land).

Jonny Hughes from the Scottish Wildlife Trusts gave an NGO perspective and spoke about the role of the Wildlife Trusts in the whole process - informing the competent authorities of any damage, monitoring ELD implementation and providing input on the effectiveness of the ELD in terms of actual remediation.

Toby Roxburgh from Jacobs explored the implications of the ELD for the marine environment, outlined key issues using a case study (Dublin Port Company in Ireland) and highlighted where the ELD could make a material difference to liability exposure.

Jonathan Cox MIEEM gave an overview of the REMEDE project. REMEDE aims to develop, test and disseminate methods for determining the scale and financial costs of remedial measures necessary to adequately offset environmental damage. Case studies of *Ranunculus* and salmon populations in the River Itchen in Hampshire were given.

Samantha Deacon (ENVIRON) was the final speaker of the day and talked about the assessment of environmental damage. Samantha defined what damage actually is, explained what tools are used to measure damage and looked at the immediate and long-term actions required.

The presentations from this conference are now available on the IEEM website (www.ieem.net/confieem2008springeld.asp). I would like to thank all the speakers for their time and presentations and hope that the delegates found it a useful and interesting day. The closing date for comments on the second ELD consultation will have passed when this issue of *In Practice* has been published (closing date 27 May 2008) but for further information about the ELD please visit the Defra website (www.defra.gov.uk/environment/liability).

IEEM's next conference is taking place on 18-20 November 2008 in Glasgow and will be on the subject of Mitigation. A draft programme will be available on the IEEM website shortly and a new online booking service will be introduced for this event. A report on the 'Moving to an Ecological Economy' conference which took place on 3 June 2008 will be in the September issue of *In Practice*.

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Institute News

Membership Applications

In the last edition of Institute News we reported on the buoyant situation for membership applications and urged further recruitment from various employment sectors. The list of new members at the end of this edition is testament to just how many have recently been admitted.

Committees

Several members of the various Committees will be retiring soon, having served their term. So we need offers to join the Committees, **especially the Membership Admissions Commitee**. For more information see www.ieem.net/governance.asp.

L-R: Steve Ormerod, Jason Reeves, Gemma Langdon-Saunders, Jennifer Austin, Anna Thompson, Andy Tasker, Linda Yost and Jim Thompson

President and President-Elect visit Winchester HQ

On April 29 the President, Andy Tasker, and the President-Elect, Steve Ormerod, visited the Winchester offices for a general update and discussion on IEEM progress and they also took the opportunity to meet the IEEM staff (see image above). This was Steve's first visit to the offices.

IEEM Autumn Conference, 18-20 November 2008

Final touches are being put to the two-day conference programme on Mitigation – our main conference in Glasgow this autumn. We just about have a full programme but there may be some scope to include further last minute papers where they deal with practical examples. For more information contact Nick Jackson (nickjackson@ieem.net).

Membership Renewals 2008-2009

Membership renewals are fast approaching and now would be an ideal time to make arrangements to pay your next subscription by Direct Debit. Direct Debit forms are downloadable from www.ieem.net/members.asp.

Memorandum of Understanding with Sri Lanka

As an example of our developing worldwide contacts, we are developing a MoU with the Institute of Environmental Professionals – Sri Lanka. Hopefully this will be the first such initiative, the key agenda being helping the development of Environmental Professionalism on a broader international scale.

Staff Changes

We are pleased to welcome **Jill Sutcliffe** as the newly appointed Skills Gap Project Officer. Jill has a PhD from Imperial College and worked for English Nature for nine years. This project is a major development for IEEM and has been of concern for a number of years. If members have any particular experience in this area, please contact Jill (jillsutcliffe@ieem.net) as this will be useful in developing the evidence base.

Harry Earle has recently left IEEM after a having made a very useful contribution to administration including the Geographic Sections, conferences and building up our marketing intelligence. Harry is planning to start a higher degree in the future and we wish him well.

Jennifer Austin has been appointed on a temporary contract to fill the administration gap. She joins us after having completed an MSc in Environmental Pollution and Protection.

Jason Reeves has taken on the additional responsibility of Co-ordinator for EFAEP with effect from 1 May. This was achieved in competition with several others across Europe. It will help to boost the development of this important environmental organisation within Europe and increase the contacts with key players in Brussels.

New Position Statement

Following on from the conference in Nottingham last November, Council has now approved a new Position Statement on Ecological Networks and Connectivity. This is posted on the website at www.ieem.net/positionpapers.asp.

Consultations

IEEM has responded to two consultations since the last edition of *In Practice*: Invasive Alien Species – A European Concern (European Commission); and Proposals for a Scottish Climate Change Bill (Scottish Government). Both forthcoming consultations and past responses can be found at www.ieem.net/members.asp.

Fellowship Applications

We are pleased to report that at Council's last meeting four new Fellows were approved, bringing the total to 29.

Robin Buxton has served in various capacities on IEEM Committees and has also been Company Secretary. Robin has made an outstanding contribution to the development of NGOs locally and nationally. He has worked in a variety of locations including the Tsavo National Park in Kenya, in Parma, Italy, and for many years has been involved with the Northmoor Trust. He was awarded an MBE for services to nature conservation and the environment in 2006.

Keith Kirby is currently the Forestry and Woodland Officer for Natural England, having joined the Nature Conservancy Council (NCC) in 1978. He has published extensively and held many diverse positions related to his subject area. He is much respected in forestry circles both in the UK and internationally, for his views on woodland assessment and management for nature conservation.

Roger Morris is Senior Specialist (Ports and Estuaries) for Natural England, having joined the NCC in 1988. His outstanding contribution includes safeguarding species and habitats in England, especially coastal habitats, maintaining and enhancing entomological recording and significantly contributing to improving the knowledge on the ecology of Diptera and Hymenoptera.

Fred Slater is Director of the Llysdinam Field Centre in the School of Biosciences, University of Cardiff and has taken a particular interest in courses and field skills. He has published on a wide range of conservation issues. He is the originator of several key national survey methods on aquatic ecology.

Don't forget that there are many other members who would make worthy Fellows. The forms are now downloadable from the website (www.ieem.net/forms.asp). Do you have colleagues who you think might be potential Fellows? If so, get them to take the plunge, if necessary (and it may well be) put the forms on their desk and offer to write the testimonial for them!

Irish Section News

Forthcoming Events

On 25 July 2008 the Irish Geographic Section, together with the National Biodiversity Data Centre (NBDC), will host a morning field outing to Fenor Bog Nature Reserve in Co. Waterford, with a light lunch at the centre and some short talks in the afternoon. Fenor Bog was conserved and promoted for designation as a nature reserve by the local community with the Irish Peatland Conservation Council. The NBDC are using it as a site for butterfly monitoring and water beetle sampling, to which Eugenie Regan will give an introduction on site. The afternoon talks will feature an introduction to the Centre and its objectives (Liam Lysaght); a demonstration of the mapping system (Una Fitzpatrick and Eugenie); and an overview of the main projects (Una and Eugenie). We will be meeting at the NBDC in Carriganore at 10 am, directions available at www.biodiversityireland.ie, or contact Mieke Muyllaert (mieke@eircom.net). Anyone travelling by public transport to Waterford contact Mieke to arrange collection.

The 2008 Irish Section conference will be on the theme of 'Coastal and Marine Environment: Biodiversity, Management and Protection', and will be held on Monday, 13 October 2008 at the Marine Institute headquarters in Oranmore, Galway. The morning session will focus on coastal and marine biodiversity around Ireland, while the afternoon session will examine management and protection issues. Posters on a relevant topic are welcome, please contact Norma O'Hea (nmohea@yahoo.com) if you wish to offer one.

A two-day international conference 'Green Infrastructure - Connecting Nature, People and Places' hosted by Fingal County Council and The Heritage Council will take place on 4-5 November 2008 in the Grand Hotel, Malahide, Co. Dublin, Ireland. The conference will appeal to a wide audience and will be attended by elected councillors, planners, architects, engineers, ecologists, parks professionals and all those interested in exploring the development of networks of multifunctional green spaces in their locality, and is being supported by the IEEM Irish Section. For further information contact Fingal County Council's Heritage Officer, Dr Gerry Clabby (gerry.clabby@fingalcoco.ie).

Organising Events

The Committee would like to hear from anyone with ideas for informal events, for example a field outing, evening talk or informal workshop on a topic of interest, where members can meet and share ideas and experience. Please contact the committee CPD co-ordinator Janet Slattery (jslattery@jbbarry.ie).

Sessile oak, Ireland
Photo: Pascal Sweeney

Committee for 2008-2009

The 2008 Irish Section AGM will be held on 13 October 2008, at the Marine Institute in Galway. A call for nominations for the 2009 Committee will be issued later in the summer. We meet about four times per year and members can take on as much or as little as they feel able; many of the current Committee have been serving since the Shadow Section was set up and would welcome fresh input.

Response to Consultations

IEEM responds to consultations on issues relating to ecology and environmental management through its External Affairs Committee. Please pass on details of any consultations in Ireland to which you think IEEM should be responding to the External Relations Officer, Jason Reeves (jasonreeves@ieem.net).

Alien Species in Ireland

During the Irish Section conference in October 2007 there was a discussion about the threat posed to Irish biodiversity through the spread of invasive alien plant species, and it was suggested that the Section write to the Minister for the Environment on this issue. The Section Committee have been in discussions with IEEM head office about how we can go about this and hope to draft a letter for approval by head office. Separately, the IEEM External Affairs Committee hopes to progress a Position Statement on invasive species and this would be global in nature and therefore applicable in Ireland. In the intervening period, the new Invasive Species Ireland Initiative has launched a website (www.invasivespeciesireland.com) and produced a consultation document on a Horticulture Code of Practice, as well as hosting a steering group on tackling the issue on the island of Ireland.

Commercial Directory

Members will be aware that the rules for being included on the Commercial Directory changed last year. Currently a small number of members in Ireland are listed on the Directory. Anyone who wishes to be included on it can access the registration form in the members' section of the website (www.ieem.net/members.asp).

EcIA (Terrestrial) Guidelines for Ireland

IEEM Council has approved a project proposal to make the current guidelines more appropriately tailored to requirements in Ireland. This will involve reviewing the body of the document to reflect the working and legislative environment in Ireland. IEEM hope to send out a letter to stakeholders this summer, with a view to holding a kick-off meeting in Ireland in September to set up a steering group to oversee the review of the document and to liaise with head office in producing the guidelines. Anyone interested in contributing to the process or who thinks their organisation should be included in the list of stakeholders should contact Linda Yost (lindayost@ieem.net).

North East England Section News

Scottish and North East England members discuss options for breaching the sea defences at a site where tidal inflow is currently via a small bore pipe through the seawall
Photo: Andrew Cherrill

Natural England's National Strategy

On 6 February 2008, North East England Section members met at the regional office of the Environment Agency to hear Prof David Hill CEnv FIEEM give a presentation about Natural England and his role on their Executive Board. David described the formation of Natural England from English Nature, the Rural Development Service of Defra and the Countryside Agency. He explained that, as a new organisation, Natural England faced many challenges, including establishing its key strategic priorities, which are:

- a healthy natural environment;
- enjoyment of the natural environment;
- sustainable use of the natural environment;
- a secure environmental future; and
- being a distinctive and campaigning public body.

David discussed these priorities giving examples of their potential implementation in the North East through Natural England's five campaigns: Breathing Places, Health, Climate Change, Marine Environment, and Sustainable Land Management.

The overall objective of the Breathing Places campaign (2005-09) is to inspire a million people who are currently interested in the environment sector to get actively involved by transforming or creating tens of thousands of local wildlife friendly greenspaces across the UK. Green space is critical to people's well-being and links to the Health campaign. The Health campaign will involve talking to health officials and convincing them of the benefits of using the great outdoors in dealing with issues like obesity and mental illness. Obesity and physical inactivity are estimated to cost £11 billion per year. Research shows that experiencing nature and participating in physical activity in a natural environment can make a huge contribution to the state of the nation's health. Surely this must be a win for all!

The other three Natural England campaigns are also critical and David gave his views on these important issues. With regard to Sustainable Land Management, David advocated the ecosystem services approach to establish and promote recognition of the links between economic and human well-being on one hand, and the health of the environment and biodiversity on the other.

The evening finished with a series of questions from the floor. A positive attitude towards Natural England, especially here in the North East was very evident. Members appreciated the value of David as a voice for IEEM at the highest levels of Natural England.

The 4shores Project and Managed Coastal Realignment at Lindisfarne, Northumberland

The first field meeting of 2008 was held on 6 March 2008 on the Northumberland coast at Lindisfarne National Nature Reserve (NNR). Around 25 members from the North East and Scotland attended; the location being equally accessible to IEEM members in southern Scotland and those of the host Section. The focus of the meeting was the Northumberland 4shores project – a partnership led by the Environment Agency and including Natural England, FWAG, and the Northumberland Coast AONB. We were fortunate to have Maria Hardy (Environment Agency), Steve Pullan (Natural England) and George Dodds (FWAG) to act as facilitators, and expert guides. The project area abutted the Lindisfarne NNR and included arable fields and grazing land behind the sea walls. However, the work was intimately linked to management of the NNR beyond and in particular the pale light-bellied brent geese that feed on the farmland. Farmers receive funding through the higher level stewardship (HLS) agri-environment scheme to provide enhanced stubble for goose foraging in winter because, unlike other geese, the pale light-bellied brent geese prefer winter-drilled barley to grassland. Monitoring is in progress to assess the effectiveness of this approach, although it is too early to judge the success. In addition to their feeding preferences it was noted that the geese were also faithful to specific fields, whilst ignoring those adjacent even where the crop was otherwise appropriate. Disturbance from predators (and dog walkers) is thought to be an important aspect of this behaviour.

The second major theme of the meeting was management of coastal flooding. The sea defences along this stretch of

A man-made breach in the seawall on the coast at Lindisfarne, Northumberland
Photo: Steve Pullan

Light-bellied brent geese in flight
Photo: Steve Pullan

coast are recognised as being in a poor state of repair and are inadequate to protect low lying land from extreme 200-year flooding caused by high tides and storm surges. It is not economic to reinforce, or even maintain, sea defences where no dwellings are at risk. Flooding is seen as inevitable at certain locations. The Environment Agency is therefore promoting a programme of managed realignment in specific areas where sea defences are weak, no dwellings are at risk, and there are benefits to nature conservation. In practice this means permitting flooding behind the sea walls by breaching the defences either by removing earth embankments or allowing unimpeded tidal flow through sluices and pipes that were traditionally managed to prevent ingress at high tides. Farmers receive HLS funding for this work leading to creation of new areas of grazing marsh and salt marsh. Farmers and land owners were initially resistant to the concept of managed realignment – but an important aspect of the work has been modelling of the flood levels. This has shown that the areas that will be subject to tidal inundation are relatively limited and that more serious flooding will occur only on occasions when the existing sea defences would in any case be overtopped. The breaches therefore do not pose a significant flood risk beyond what already exists. Modelling has included scenarios based on the effects of global warming. These show that a long term strategy is required to accommodate the predicted rises in sea level. The 4shores project is a first step; a major outcome being to draw coastal farmers and land owners into the debate.

The meeting was based at Beal Farm located on the road between the A1 and Holy Island causeway. The farm has a new visitor and education centre, 20% funded by Natural England. The centre has fantastic views of Lindisfarne and the causeway to Holy Island. Funding was provided as part of a wider scheme to manage visitor pressure on the NNR. The centre provides environmental interpretation, parking and a café/restaurant; thereby helping prevent a build up of traffic (and associated disturbance) at the causeway when the tide prevents crossing to Holy Island. Rather than waiting at the edge of the NNR it is hoped that visitors will wait for the tide to turn whilst using the centre's facilities. Overall the meeting was a great success and provided an opportunity for members to get out in the fresh air and remind themselves of the special qualities of the Northumberland coast.

Details of future meetings of the NE Section can be obtained from the Section webpage (www.ieem.net/nesection.asp) or the convenor, Andrew Cherrill (andrew.cherrill@sunderland.ac.uk).

Scottish Section News

IEEM Careers Event – Breaking into the Environment

Strathclyde University, 26 March 2008, 5:30 pm - 7:30 pm

A successful careers presentation was organised by IEEM at Strathclyde University, Glasgow. Attended by approximately 50 students, a range of speakers discussed their career paths from leaving university to their present day occupations within the environmental sector. Speakers included Rachel Hirst and Kate Wigley (Land Use Consultants), Brian Miller (Scottish Environment Protection Agency), Lis Norberg (Airtricity) and Toby Wilson (Royal Society for the Protection of Birds). The speakers were introduced by IEEM Scottish Section Convenor, Sally Monks.

Rachel and Kate gave an intriguing insight into the lives of an Ecological Consultant and an Environmental Impact Assessment specialist based within a multidisciplinary consultancy. Rachel and Kate discussed the advantages and disadvantages of working within a consultancy environment. They also discussed the range of skills that they seek in potential employees and what students could do now to enhance their skills, should this be a career path they wish to follow.

The next speaker, Brian Miller, discussed his career path within a statutory body, the Scottish Environment Protection Agency (SEPA). Brian has worked within SEPA for several years and discussed the advantages of working within SEPA and the variety of career paths that have been open to him over the years. He discussed what skills are required and how students could apply for positions.

From a different perspective, Lis Norberg introduced life in a commercial company, working as a Development Projects Manager for a renewable energy company. Lis discussed her path to her current position and the transferable skills she gained from her masters degree. Lis again discussed the importance of thinking carefully about what career path you'd like to follow and the importance in developing a network of contacts.

Finally, Toby Wilson introduced working for a non-government organisation, the Royal Society for the Protection of Birds (RSPB). Toby, who is a Conservation Officer based in Glasgow, discussed his day to day duties and his path through various jobs to his present day position. Toby stressed the importance of volunteering to gain transferable skills and also the importance of carrying out a job that you enjoy.

All the speakers gave an interesting insight into their careers and career paths to date, with hints and tips for future employees. A question and answer session followed with students asking for more information on how to get experience in these types of organisations and some more detail on what the roles involve. The event was a great success with a good diversity of speakers from different environmental backgrounds. The University was delighted to host this event and was grateful to IEEM for organising it.

Partnership News

Society for the Environment

SocEnv is currently considering the way forward following the recent departure of its Chief Executive, Dr David Hickie. A replacement will be sought shortly who can take the Society forward and build on the momentum of the last few years.

The SocEnv concept continues to be worthy of support although I am aware of some concerns expressed by IEEM members that its achievements in terms of benefits to members and the relation to the annual fee are limited. A fair point perhaps but IEEM members in particular will recognise that such organizations cannot really be built overnight. Solid progress has been made – SocEnv has a robust set of rules on admission and standards thereby giving credence to the CEnv designation. Through the growing number of constituent bodies it now has the critical mass to move forward. We need to bear in mind that the original reasons why SocEnv was formed – influencing governments, co-ordinating the views of the Professions on environmental issues rather than those of the pressure groups remain as important now as they always were.

It is however likely that the annual membership fee will rise from £30 to £35 for 2009 but Eirene Williams and myself as Board Members will be carefully watching that this new start with some extra resources will really make the investment in SocEnv worthwhile.

www.socenv.org.uk

European Federation of Associations of Environmental Professionals

We are continuing to play an active part in EFAEP and it continues to expand. It has nearly completed its work on the new statutes and is moving forward actively - with meetings with EU officials, a presence at European Green Week, the enlargement of the European Network of Environmental Professionals database (see page 28 for more details on this), and with its new website. It has also appointed its first salaried Secretariat Officer, Jason Reeves. This is a crucial step in its development and is vital to achieving its objectives:

- to be the representative organization for all Environmental Professionals across Europe;
- to promote and co-ordinate environmental work and environmental professionals while recognizing the separate identities of its member organizations;
- to promote adherence to environmental professional standards as one of the essential prerequisites for achieving sustainability;
- to influence and implement the environmental policy, science and education agenda throughout Europe.

www.efaep.org / www.environmentalprofessionals.eu

Europarc Federation

The Atlantic Isles Section of the Europarc Federation recently held a seminar on 'Protected areas in the 21st Century - what does the future hold?' in a wet and windy Cardiff. Speakers at the seminar included David Coleman (Defra), Marta Mugica (Europarc Federation Spain), Olaf Ostermann (Europarc Federation Germany), Gudridur Thornovardardottir (Unhverfisstofnun, Iceland), Andrew Wilson (North York Moors) and Howard Sutcliffe (Clwydian AONB).

The overall outcomes from the seminar were that protected areas need to:

- promote sustainable living values;
- create a unified systemic approach;
- promote greater public engagement;
- collaborate more with each other; and
- create a more effective evidence base.

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

Eurosite

Eurosite's mission is to exchange, enhance and promote expertise in the management of sites for nature throughout Europe, and is now the largest network of organisations devoted to nature conservation management across Europe. 27 countries are represented by more than 100 member organisations including public bodies, private organisations and Non-Government Organisations. For the benefit of nature and the human enjoyment of it, the goal of Eurosite is to enhance European nature conservation, through both the management of land and water and through the dissemination of practical information and working directly with site managers. Eurosite was created in 1989 in response to a clear demand for the exchange of practical nature management information within Europe.

IEEM has become as Associate Member of Eurosite in order to facilitate the dissemination of knowledge and experience of protected area management.

www.eurosite-nature.org

IUCN - The World Conservation Union

The focus of IUCN activities is now shifting towards the World Conservation Congress to be held in Barcelona on 5-14 October of this year. It promises to be the largest gathering of the ecology and conservation movement that the world has possibly ever seen and about 9,000 delegates are expected. All delegates are being urged to use sustainable transport to get there with much enthusiasm for arriving by boat. There are clear questions about the carbon footprint of the meeting but these are countered by the argument that this is a four yearly event. Mind you, the printed Agenda, which arrived at the office this week, at 291 pages long would suggest that reality may differ significantly from carbon neutral aspirations.

IEEM has been represented at the last two congresses – in Amman, Jordan and in Bangkok, Thailand. IEEM will be increasing its contribution significantly at Barcelona and will be hosting a knowledge café on 'Ecological and Environmental Management Skills to fulfill the Barcelona legacy – are they available?' We shall also be offering two workshops – 'Ecological Aspects of Environmental Impact Analysis' and 'Professional Issues for Ecologists and Environmental Managers'. These are but three of the 1,000 others to choose from! We are aiming to promote the professional aspects as well as the scientific, and are hoping to have a joint stand with the British Ecological Society.

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

In the Journals

Jim Thompson CEnv MIEEM and Jason Reeves AIEEM

T W Donath and R L Eckstein
Grass and oak litter exert different effects on seedling emergence of herbaceous perennials from grasslands and woodlands
Journal of Ecology 2008, **96**: 272–280

The authors tested the effect of litter types, litter cover and soil moisture on the emergence of grassland and woodland species. They used litter and species from two habitats (grassland vs woodland), three levels of litter cover (low, medium, high) and two levels of water-addition (leading to constantly humid or intermittently dry substrate). Amounts of litter were adjusted to result in the same relative light reduction for both litter types. Seedling emergence of woodland species was significantly lower from beneath grass litter than from beneath oak litter but grassland species emerged equally well from beneath both litter types. The data provides evidence that ecosystem specific litter effects slow down succession from grassland to woodland and that the effect size is controlled by the litter amount present and the environmental conditions.

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R G Jefferson
Biological Flora of the British Isles: *Mercurialis perennis* L.
Journal of Ecology 2008, **96**: 386–412

Undertaken by an IEEM Fellow, this is a further addition to this well established series and follows the standard format. *Mercurialis perennis*, dog's mercury, is a dioecious, clonal, perennial forb of woodland, hedgerows, limestone pavement, screes and tall-herb communities. It is very tolerant of low light; it can also grow in unshaded conditions. It occurs throughout temperate areas of Europe as far east as the Russian border. The species occurs on a wide variety of soil types over a pH range from 4.3 to 8.5, although it is most abundant on more base-rich clay or loam soils with a low organic content. It seldom occurs on peat or very sandy soils. It can grow in soils with low availability of macronutrients but it responds positively to nutrient addition from atmospheric or agricultural sources. It is intolerant of waterlogging. It is predominantly wind-pollinated. Ants are the main dispersal agents but establishment from seed is uncommon and vegetative propagation is the main means of expansion, often leading to dense clonal stands of aerial shoots. The persistence of its clones and slow dispersal have led to it being regarded an as indicator of ancient, semi-natural woodland.

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Dog's mercury
Photo: Jim Thompson

A Gurnell *et al.*
Propagule deposition along river margins: linking hydrology and ecology
Journal of Ecology 2008, **96**: 553–565

The importance of buoyancy for hydrochorous propagule dispersal has been recognised but the river bed is also a significant store of viable propagules. Over four consecutive 4-month periods, deposited propagules (predominantly seeds) and sediment were sampled at 78 river bed, bank face and bank top sites within three river reaches in two catchments. Species of deposited propagules were compared with the propagule bank and standing vegetation. Riparian connectivity of river flows, varying hydraulic conditions and temporary storage of propagules are all components of hydrochorous propagule dispersal. Flood flows can transfer sediment particles and non-buoyant, viable propagules from the river into the riparian zone. Propagules can pass in and out of storage within the channel bed and margins through a variety of dispersal processes and can then settle out of the water in suitable depositional environments generating distinct spatial and temporal patterns in total propagule deposition.

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J U Jepsen *et al.*
Climate change and outbreaks of the geometrids *Operophtera brumata* and *Epirrita autumnata* in subarctic birch forest: evidence of a recent outbreak range expansion
Journal of Animal Ecology 2008, **77**: 257–264

Range expansions associated with recent climate warming have been documented for many insect species, including some important forest pests. Whether this also influences the eruptive dynamics of forest pest insects, and hence the ecological and economic consequences of outbreaks, is unknown. Using historical outbreak records covering more than a century, the authors documented recent outbreak range expansions of two species of cyclic geometrid moth, *Operophtera brumata* Bkh. (winter moth) and *Epirrita autumnata* L. (autumnal moth), in subarctic birch forest of northern Fennoscandia. The two species differ with respect to cold tolerance, and show strikingly different patterns in their recent outbreak range expansion. During the past 15–20 years, the less cold-tolerant species *O. brumata* has experienced a pronounced north-eastern expansion into areas previously dominated by *E. autumnata* outbreaks. *E. autumnata* has expanded the region in which it exhibits regular outbreaks into the coldest, most continental areas. Recent climate warming has been suggested as the reason. The presence of *O. brumata* outbreaks in regions previously affected solely by *E. autumnata* outbreaks is likely to extend the effective lengths of outbreaks and have profound implications for the subarctic birch forest ecosystem. Certain regions in Norway have suffered 5-6 years of consecutive outbreaks and prolonged outbreaks are known to cause forest death over large areas.

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J L Osborne *et al.*
Bumblebee flight distances in relation to the forage landscape
Journal of Animal Ecology 2008, **77**: 406–415

Estimating how far bees fly under different circumstances is

essential for predicting colony success, and for estimating bee-mediated gene flow between plant populations. It is likely to be strongly influenced by forage distribution. The authors quantified the distribution of bumblebee *Bombus terrestris* L. foragers away from experimentally positioned colonies, in an agricultural landscape, using two methods. They mass-marked foragers as they left the colony, and analysed pollen from foragers returning to the colonies. The data were set within the context of the 'forage landscape': a map of the spatial distribution of forage as determined from remote-sensed data. The bees foraged at least 1.5 km from their colonies, and the proportion of foragers flying to one field declined, approximately linearly, with radial distance. The scale of *B. terrestris* foraging was large enough to buffer against effects of forage patch and flowering crop heterogeneity, but bee species with shorter foraging ranges may experience highly variable colony success according to location.

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The *Journal of Applied Ecology* has produced another of its useful special profiles – integrated management of invasives, which may be of particular interest to IEEM readers. It starts with an overview paper summarised below:

Y M Buckley
The role of research for integrated management of invasive species, invaded landscapes and communities
Journal of Applied Ecology 2008, **45**: 397–402

Applied research should be directed at providing decision support for managers throughout the management process and can be used to provide predictive tools for risk assessment of new invaders. The science of invasion ecology has much to contribute to the new challenge of natural or enhanced movement of organisms in relation to climate change. Methods and information from invasion ecology can be used to assess management goals, management actions and the risks of potential translocations before they are put in place.

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P E Hulme *et al.*
Grasping at the routes of biological invasions: a framework for integrating pathways into policy
Journal of Applied Ecology 2008, **45**: 403–414

This particularly useful paper proposes a framework to analyse invasion pathways by a wide range of taxa in both terrestrial and aquatic ecosystems. Alien species may arrive and enter a new region through three broad mechanisms: importation of a commodity, arrival of a transport vector, and/or natural spread from a neighbouring region where the species is itself alien. These three mechanisms result in six principal pathways: release, escape, contaminant, stowaway, corridor and unaided. Alien species transported as commodities may be introduced as a deliberate release or as an escape from captivity. Many species may arrive as a contaminant of a commodity, for example pathogens and pests. Stowaways are directly associated with human transport but arrive independently of a specific commodity, for example organisms transported in ballast water, cargo and airfreight. The corridor pathway highlights the role transport infrastructures play in the introduction of alien species. The unaided pathway describes situations where natural spread results in alien species arriving into a new region from a donor region where it is also alien. Vertebrate pathways tend to be characterized as deliberate releases - invertebrates as contaminants and plants as escapes. Pathogenic micro-organisms and fungi are generally introduced as contaminants of their hosts. Intentional releases and escapes should be straightforward to monitor and regulate but, in practice, developing legislation has proved difficult despite reference to the issues in several EC Directives. New introductions continue to occur through contaminant, stowaway, corridor and unaided pathways. These pathways represent special challenges for management and legislation. The present framework should enable these trends to be monitored more clearly and hopefully lead to the development of appropriate regulations or codes of practice to stem the number of future introductions.

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S Pivard *et al.*
Where do the feral oilseed rape populations come from? A large-scale study of their possible origin in a farmland area
Journal of Applied Ecology 2008, **45**: 476–485

Many cultivated species can escape from fields and colonize seminatural habitats as feral populations and feral oilseed rape is a widespread feature of field margins and roadside verges. It is unclear whether these annuals form transient populations resulting mainly from seed immigration (either from neighbouring fields or during seed transport), or whether they show real ability to persist (either through self-recruitment or seed banks). The authors conducted a four-year large-scale study of factors involved in the presence of feral oilseed rape populations in a typical open-field area of France. Many feral oilseed rape populations resulted from seed immigration from neighbouring fields (about 35–40% of the observed feral populations). Immigration occurred at harvest time rather than at sowing. Around 15% of such populations were attributed to immigration through seed transport. The other half resulted from processes of persistence, mainly through persistent seed banks (35–40% of the observed feral populations). In the current context of coexistence and management of transgenic with non-transgenic crops, feral persistence and, especially, the seed bank contribution to the dynamics of feral populations need to be considered seriously. The latter, combined with self-recruitment, indicates a high potential for the persistence of transgenes.

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Feral oilseed rape
Photo: Jim Thompson

M L Zapiola *et al.*
Escape and establishment of transgenic glyphosate-resistant creeping bentgrass *Agrostis stolonifera* in Oregon, USA: a 4-year study
Journal of Applied Ecology 2008, **45**: 486–494

Gene flow from transgenic crops to feral populations and naturalized compatible relatives is of current concern. Creeping bent, *Agrostis stolonifera* L., is a perennial, outcrossing grass that propagates by seeds and stolons. Transgenic Roundup Ready® glyphosate-resistant creeping bentgrass (GRCB), which is currently under USDA-APHIS regulated status, was planted in 2002 on 162 ha within a production control area in Oregon, USA. The authors conducted a survey to assess transgene flow within and around the production control area, performed during the year when the GRCB fields produced seed and for three years after the fields were taken out of production. Transgene flow was determined by testing the species and its relatives for expression of the glyphosate resistance transgene. While GRCB seed-production practices were strictly regulated, evidence of transgene flow was found in all years. In 2006, three years after the transgene source fields were taken out of production and a mitigation programme was initiated, 62% of the 585 plants tested in situ were glyphosate-resistant (GR). The results document not only the movement of the glyphosate resistance transgene from the fields, but also the establishment and persistence of high frequencies of GR plants in the area. Containment or eradication of GRCB could not be realistically accomplished and the findings highlight the potential for transgene escape and gene flow at a landscape level.

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I Matejusová *et al.*
Using quantitative real-time PCR to detect salmonid prey in scats of grey *Halichoerus grypus* and harbour *Phoca vitulina* seals in Scotland - an experimental and field study
Journal of Applied Ecology 2008, **45**: 632–640

There is considerable debate over the impact of seal predation on salmonid populations in both the Atlantic and Pacific oceans. Conventional hard-part analysis of scats has suggested that salmonids represent a minor component of the diet of grey seals *Halichoerus grypus* and harbour seals *Phoca vitulina* in the UK. To investigate whether this is an accurate reflection of the diet or due to methodological problems, the authors applied quantitative PCR (polymerase chain reaction) to examine the presence of salmonids in the diet of seals in the Moray Firth, UK, during the summers of 2003 and 2005. The results confirm previous studies indicating that salmonids are not common prey for seals in these Scottish estuaries and thus support current management practice, which focuses on control of the small number of seals that move into key salmonid rivers, rather than targeting the larger groups of animals that haul-out in nearby estuaries.

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F Bontadina *et al.*
Changes in prey abundance unlikely to explain the demography of a critically endangered Central European bat
Journal of Applied Ecology 2008, **45**: 641–648

Most European bat species have undergone dramatic declines over the past decades. The lesser horseshoe bat *Rhinolophus hipposideros* is now extinct in many regions. The authors suggest that this large scale massive decline is due to bioaccumulation from the past use of insecticides for agriculture, forestry or timber treatment in attics. Changes in the agricultural landscape have also been suggested as the major cause of decline but recent studies have shown that this bat forages almost exclusively in woodland, a habitat that has recently increased in area across continental Europe. This suggests that habitat eradication *per se* is unlikely to be the main cause of decline but there could be links to habitat quality. The authors looked at the abundance of insect prey in woodland in the vicinity of colonial roosts with diverging demographic status (extinct, declining or recovering populations), both in the Swiss lowlands and in the Alps to test whether population size correlates positively with prey abundance. Diet composition mirrored local insect prey abundance but this did not differ between sites harbouring extinct, declining or recovering populations. There was also no difference in food abundance between extinct populations in the lowlands and recovering populations in the Alps. The authors conclude that habitat deterioration is unlikely to preclude recolonization of abandoned areas by presently recovering populations. They suggest that sufficient areas of natural forest should be preserved or created around potential nursery roosts and that connectivity between forest patches is important.

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R S Smith *et al.*
Long-term change in vegetation and soil microbial communities during the phased restoration of traditional meadow grassland
Journal of Applied Ecology 2008, **45**: 670–679

The paper describes changes in vegetation and soil microbial community structure from the second phase of a 1990–2004 field trial that investigated the interacting effects of fertilizer and farmyard manure (FYM) treatments imposed after1998 following previous previous hay-cuts and seed-addition treatments. Hay-cut date was the main factor influencing plant species composition in phase 1, whereas FYM was the dominant factor in phase 2. *Poa trivialis* and *Lolium perenne* increased in abundance with FYM application, particularly in combination with mineral fertilizer. The highest plant species diversity in phase 2 was associated with seed addition and the absence of mineral fertilizer, an effect that had probably persisted from phase 1. Progressive development of the target traditional meadow vegetation occurred through phase 2. Fungal:bacterial (F:B) ratios, a measure of changes in the relative abundance of fungi and bacteria in the microbial community, generally increased from 1996 to 2004, and were particularly high in the seed-addition treatments and in the absence of fertilizer. Here the high F:B ratios were associated with species (including legumes) typical of traditionally managed mesotrophic grassland in northern England. These results demonstrate that biodiversity goals for upland meadows need to plan beyond the typical 5-10 year management agreement period of agri-environment schemes. Combination treatments, in which seed addition is vital, alongside appropriate fertilizer, FYM, hay-cut date and grazing regimes, are needed for grassland restoration. Even after 14 years the most effective treatment combinations had still not restored the target species composition and diversity.

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D Kleijn *et al.*
In search for key biogeochemical factors affecting plant species persistence in heathland and acidic grasslands: a comparison of common and rare species
Journal of Applied Ecology 2008, **45**: 680–687

During the last century, many plant species typical of heathland and nutrient-poor acidic grasslands have become rare whereas others have remained common. Habitat restoration often fails to enhance the rare species, which may in part be caused by the failure to restore the biogeochemical conditions suited to these species. The authors compiled a data set consisting of 300

vegetation samples and the associated soil chemical properties from a range of studies carried out across the Netherlands. They asked whether growth sites of rare and common species typical of heathland and acidic grasslands differed in their biogeochemical properties, and whether growth sites of rare species displayed less variation in soil biogeochemical variables (*e.g.* had narrower ecological amplitude). Regardless of rarity, the species' growth sites were most accurately described by a curvilinear relationship between pH and Al/Ca ratios – *i.e.* dependent on acidification. The soil ammonium (NH_4) concentration and ammonium/nitrate (NH_4/NO_3) ratio were 3.5 and 3 times higher, respectively, in growth sites of common species compared with those of rare species. On average, rare species had a significantly narrower ecological amplitude than common species for soil biogeochemical parameters. Conservation management should aim to restore low NH_4 concentrations and NH_4/NO_3 ratios. Experimental studies indicate that the most effective way to do this is through removal of the topsoil in combination with liming.

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N Klar *et al.*
Habitat selection models for European wildcat conservation
Biological Conservation 2008, **141**: 308-319

Populations of the European wildcat *Felis silvestris* are recovering slowly in Central Europe after a severe decline in the last centuries and require specific conservation plans in many areas. Detailed information on wildcat occurrence and habitat requirements is still scarce. The authors present a fine-scale habitat selection model for wildcats based on detailed species and land use information and evaluate its accuracy to predict habitat distribution in new areas. They analysed habitat use of 12 radio-tracked individuals from southwestern Germany. Several competing models were compared. Radio-tracking data of nine and 10 wildcats from two distant areas were used to evaluate the models. The selected model predicted habitat associated with a close distance to forest, watercourses and meadows, and a critical distance to villages, single houses and roads. To predict area suitable for home ranges the authors superimposed rules derived from home range attributes at a higher level of selection. Their predictions matched well with more than 2,000 wildcat observations in southwestern Germany. The authors discuss the application of the model in wildcat conservation for finding potential reintroduction sites, identifying small isolated populations and aiding in the evaluation of the needs of mitigation and compensation.

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E Valkama, S Lyytinen and J Koricheva
The impact of reed management on wildlife: A meta-analytical review of European studies
Biological Conservation 2008, **141**: 364-374

The authors reviewed European studies on the effect of reed management (harvesting, burning, mowing and grazing) on reedbed wildlife, and also on the performance of re-growing reed *Phragmites australis*. They found that reed management modifies the structure of re-growing reed stands: reed stems were shorter and denser in managed sites than in unmanaged sites. However, harvesting does not have an impact on above-ground biomass. Plant species richness increased by 90% in managed stands in fresh water marshes, but not in saline water marshes. Overall, reed management had a significant negative impact on invertebrate communities, but the duration of management was an important factor in determining the magnitude of the effect. Short-term management (1–2 years) had no effect on invertebrates, whereas management for longer periods significantly reduced invertebrate abundance. Reed harvesting and burning reduced abundance of passerine birds by about 60% and was probably associated with food limitation as the numbers of butterflies, beetles and some spiders were reduced. The authors suggest that the optimal reed management regime to preserve number of birds and invertebrates in reedbeds could be a rotation of short-term management (1–2 years), but that the optimal interval between management applications still needs to be determined.

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M Rundlöf, H Nilsson and H G Smith
Interacting effects of farming practice and landscape context on bumble bees
Biological Conservation 2008, **141**: 417-426

Organic farming has been suggested to counteract declines in farmland biodiversity. To examine whether this is due to the landscape farms are situated in, and the traits of the studied organisms, the authors surveyed bumble bees in cereal field borders and margins at matched pairs of organic and conventional farms, with half located in heterogeneous farmland and half in homogeneous plains. Species richness and abundance of bumble bees were significantly positively related to both organic farming and landscape heterogeneity. However, species richness and abundance were only significantly higher on organic farms in homogeneous landscapes. The higher abundance of bumble bees on organic farms was partly related to higher flower abundance on these sites. The effect of landscape context on bumble bee abundance was stronger for species with medium sized colonies than for those with smaller and larger colony sizes. The authors suggest that these patterns may reflect the fact that species with medium sized foraging ranges are most affected by fragmentation of foraging habitat. They conclude that both organic farming and landscape heterogeneity can be used to increase bumble bee species richness and abundance, and that organic farming has a larger effect in homogeneous landscapes and landscape heterogeneity a larger effect on conventional farms. The effects also differed between species, suggesting that a single prescription to increase pollinator abundance may not be valid.

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J Maes, C J M Musters and G R De Snoo
The effect of agri-environment schemes on amphibian diversity and abundance
Biological Conservation 2008, **141**: 635-645

The Western Peat District of The Netherlands consists mainly of meadows for dairy farming, criss-crossed by a dense network of ditches. Its biodiversity is regarded as of high national and international importance, but is declining as a result of intensive farming. Besides establishing reserves, measures to conserve and restore biodiversity have been implemented in the form of agri-environment schemes (AES). The authors investigated, first, whether the reserves, assuming these provide source populations, affect the distribution of amphibians and, second, whether AES in the form of nature-friendly ditch bank management benefits amphibian diversity and abundance and enhances distribution across the agricultural landscape. Species richness was high in AES ditches as compared to control ditches. The number of observed green frog *Rana esculenta* seemed to decline in the control ditches at large distances from the reserve. The other species studied did not show a declining trend across the farmland. However, all adult amphibians except green frogs together had significantly higher abundances in the AES ditches compared to the control ditches. These results illustrate the potential role of agricultural ditches, combined with reserves and nature-friendly ditch bank management, in the conservation of amphibian populations.

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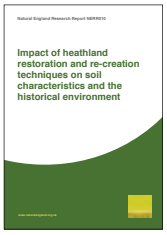
Recent Publications



NERR010: Impact of heathland restoration and re-creation techniques on soil characteristics and the historical environment

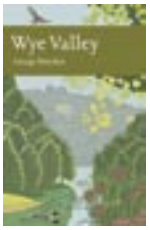
Authors: G Hawley MIEEM, P Anderson CEnv FIEEM, M Gash MIEEM, P Smith MIEEM, N Higham, I Alonso MIEEM, J Ede and J Holloway
ISSN: 1754-1956
Available from: naturalengland.communisis.com/naturalenglandshop/docs/NERR010.pdf
Price: free download

Lowland Heathland is a Priority Habitat for conservation under the UK Biodiversity Action Plan (BAP). This Habitat Action Plan (HAP) aims to arrest loss of lowland heathland habitat, improve the condition of existing heathlands and to create new areas of lowland heathland. Sites to be restored to favourable condition, from dense scrub or bracken cover for example, may require litter removal and/or soil disturbance. Furthermore, a significant percentage of the new HAP target for heathland expansion is likely to come from ex-arable land and conifer plantations, which will require more drastic intervention. Under the First Soil Action Plan for England, Natural England will have regard to the proper management of soil alongside other requirements. However, the conservation and restoration of habitats such as heathlands, supported and promoted by Natural England, involves widely-used techniques which could potentially pose a risk for the soil and archaeological interest of soils. A best-practice guidance based on the findings is proposed for future restoration and re-creation projects.

Giant Hogweed Management in the United Kingdom

Authors: Olaf Booy and Max Wade CEnv FIEEM
ISBN: 9780906269046
Available from: www.nhbs.com
Price: £19.99

This manual provides practical guidance for managers of giant hogweed and those who wish to prevent the invasion of this species. Key details include identification, survey techniques and the use of a variety of control methods. Also provided is guidance for developing a well-conceived and effective management strategy (including revegetation post control), consideration of UK legislation and policy, and advice on preventing an invasion.



New Naturalist: Wye Valley

Author: George Peterken
ISBN: 978-0007160686
Available from: www.harpercollins.co.uk
Price: £45 hardcover, £25 softcover

This is a definitive natural history of the Wye Valley covering the geology, geomorphology, conservation and ecological history of this diverse Area of Outstanding Natural Beauty (AONB). The spectacular landscape of the Wye Valley region has attracted visitors for over 250 years. Designated one of the few lowland AONBs in 1971, it is dominated by the river Wye, which has done much to form this varied ecological landscape. George Peterken (who has lived in the region for many years and helped to draft the AONB's Nature Conservation Strategy in 1999) skillfully examines the diverse ecology, natural history, landscape and history of this district defined mainly by the extraordinary evolution of the river Wye into a meandering mature river. With little previously published on the area, Peterken also explores the results of recent conservation efforts in the region, recognising that despite the protection afforded to the 'outstanding natural beauty' of natural habitats and wild species, these regions have continued to suffer substantial losses. Peterken goes on to chart the many initiatives that continue to promote effective conservation within the AONB and surrounding areas.

Otters and Development

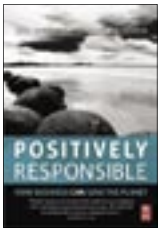
Author: Scottish Natural Heritage
Available from: www.snh.org.uk/publications/on-line/wildlife/otters/default.asp
Price: free online publication

The Eurasian otter *Lutra lutra* has its principal British stronghold in Scotland, with an estimated 90% of the total British population resident there. In view of the declines suffered by this species in many parts of Europe including much of Britain during the 1960s and 1970s, the Scottish population - which suffered only a relatively minor decline compared with England and Wales - is of international importance. In view of this, developers and planners need to be aware that this species is more likely to be present on potential development sites in Scotland compared with elsewhere in Britain. Development can take many forms ranging from large scale projects such as new transport infrastructure to individual house plots. Even apparently benign proposals such as the development of an area for outdoor recreation can have an impact on otters if dogs are permitted on site. This web-based publication provides an overview of the subject of otters and development. It is intended as a basic introduction and not as a substitute for expert advice, which should always be sought from an experienced otter specialist. Both developers and planners are encouraged to think about possible impacts on otters as an integral part of the planning process.

The Polecat Survey of Britain 2004-2006

Author: J D S Birks MIEEM
Available from: www.vwt.org.uk
Price: £12.00

This report by The Vincent Wildlife Trust (VWT) confirms that the polecat's recovery in Britain is continuing; it is now widely re-established across Wales, the Midlands and central southern England. The main areas of recent polecat range expansion are all in England, based on the counties of Derby, Bucks, Berks, Wilts, Hants and Dorset. A new population estimate suggests that there are now 46,784 polecats in Britain. The polecat *Mustela putorius* is of considerable conservation significance in Britain. This is particularly so because of its current recolonisation of many areas of lowland Britain from which it was trapped to extinction at the end of the 19th Century. The general lack of awareness and understanding of this recovery, and the paucity of information on the status, distribution and behaviour of polecats in the recently colonised areas, prompted the VWT to initiate a number of conservation-centred studies on the species. This included looking at the relationship between wild polecats and feral ferrets.



Positively Responsible: How Business Can Save the Planet

Authors: Erik Bichard and Cary L Cooper
ISBN: 978-0750684750
Available from: www.elsevier.com
Price: £15.99

This book shows how sustainable development can be achieved without having a negative influence on either corporate leaders or their employees, by using the forces of market advantage rather than opposing them. This approach examines the varying influences of incentives on human behaviour and how these can be used to chart a coherent and effective course of action within organisations. It provides a new strategy for corporate social responsibility, built on a market-based justification for change, and within the crucial timescales predicted by climate researchers. The authors combine a penetrating understanding of sustainable development issues with a comprehensive description of what motivates or de-motivates human beings.

News in Brief

Scientists to Introduce Alien to Kill Japanese Knotweed

Experts have urged caution following a plan by the Commonwealth Agricultural Bureaux International (CABI) to introduce an alien species to kill off Japanese knotweed *Reynoutria japonica*. Since its introduction to the UK, Japanese knotweed has quickly turned into a highly invasive, virtually unstoppable pest, with its stems able to break through concrete. Even when cut into pieces, parts of Japanese knotweed are able to regenerate into whole new plants. In the Swansea area, one of the worst affected parts of Britain, its total biomass is thought to exceed 62,000 tonnes. The alien species intended to control Japanese knotweed is a Japanese jumping plant louse, which attaches itself to plants and sucks out their sap, but fears have been raised that this solution could cause furhter problems for Wales' native species. Given the history of biological control disasters, this should be considered with the utmost caution.

Developer Fined £3,500 for Destroying Bat Roost

The Bat Conservation Trust (BCT) has welcomed the prosecution of a property developer, which pleaded guilty to illegally damaging a bat roost in Hertfordshire in the autumn of 2006. Crimes against bats and their roosts are incredibly damaging to the conservation of bats in the UK as the destruction of just one bat roost can lead to the loss of hundreds of bats, which can take many years to recover. The property developer was fined £3,500 and ordered to pay £2,000 costs.

Barrier Idea Angers Wildlife Groups

An entrepreneur has launched a plan to protect large swaths of Norfolk, Cambridgeshire and Lincolnshire from flooding with an 11 mile tidal barrier across the mouth of the Wash, which would protect the coastline and generate electricity from tidal currents. Conservationists have reacted angrily to the scheme, saying that it would cause considerable damage to an internationally recognised conservation site and add that the entrepreneur has not properly considered the impact on wildlife. During winter, the Wash is host to more than 350,000 wading birds and wildfowl, including oystercatcher and curlew.

Butterflies Hit by Washout Summer

Britain's butterflies suffered their worst year in more than 25 after a rain-soaked summer. Conservationists say that good weather is urgently needed to allow numbers to recover from 2007's damaging washout. The UK Butterfly Monitoring Scheme found eight butterfly species were at an all-time low. They included the common blue, the grayling, the Lulworth skipper, the small skipper, the small tortoiseshell, the speckled wood, the chalkhill blue and the wall. The data was collected by thousands of volunteers around the country. Butterflies do not fly in the rain, making it impossible for them to feed or breed. It is feared that the problems of 2007 and the impact on butterfly breeding could worsen the downward spiral of numbers and leave certain species at risk of extinction in parts of the country.

Phase 1 Habitat Survey and NVC Updated

The Joint Nature Conservation Council (JNCC) have recently updated and expanded the National Vegetation Classification (www.jncc.gov.uk/page-4259) and the Phase 1 Habitat Survey (www.jncc.gov.uk/page-4258).

Environmental Dilemmas

The rejection of the Lewis wind farm has highlighted the dilemmas for environmental professionals. Wind farms, biofuels and nuclear power have become some of the most controversial issues in British politics. The Lewis wind farm, rejected by the Scottish Executive, is the latest example. Environmental agencies welcomed the wind power project's demise, due to concerns about impacts on rare peat bog and birdlife habitat. Yet, according to the developers, the wind farm would have made a substantial contribution to reducing Britain's greenhouse gas emissions. With climate change at the top of the list of political priorities, most now agree that Britain desperately needs to expand its renewables sector. How this can be done without major negative impacts on wildlife and landscape remains one of today's toughest challenges.

Plans for Pilot Badger Cull in Wales

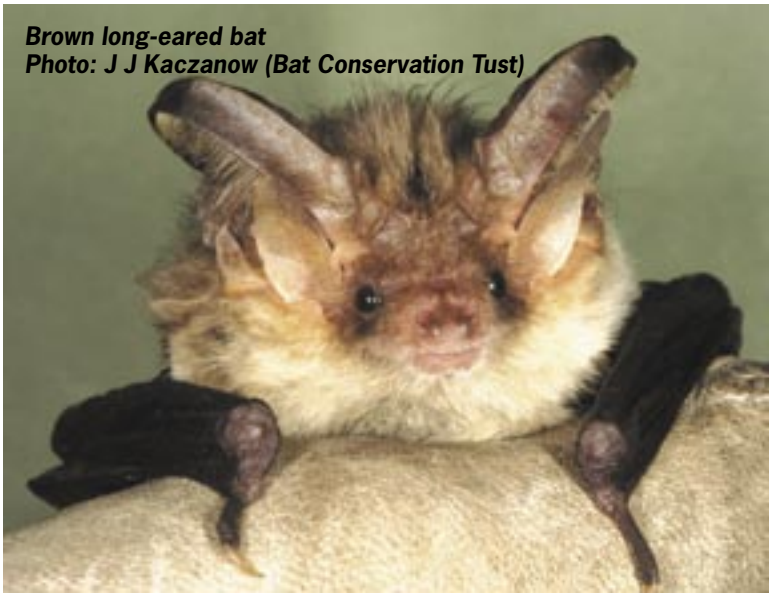
A targeted cull of badgers has been announced as part of a plan in Wales to eradicate tuberculosis in cattle. The location of the area and details of the cull have yet to be decided. The Welsh Assembly Government's plan includes a one-off test of all cattle and a review of the compensation system. There has been limited badger culling before but it will be the first time in Britain that such a wide-scale measure has been used to control the disease. Under the current policy, cattle are slaughtered if they fail routine tests and farmers are compensated for these lost animals.

Student Discovers New Irish Mammal

A new species of Irish mammal has been discovered by a student who was sorting through the contents of barn owls' stomachs. The greater white toothed shrew *Crocidura russula* is only the third new mammal to be found on the island of Ireland in almost 60 years. It is usually found in Africa, France and Germany. Before now, the nearest it has been spotted to Ireland is in the Channel Islands. In March 2008, seven of the live shrews were trapped in Tipperary. Their existence has just been recorded in the scientific journal, *Mammal Review*. However, while the shrew is providing food for threatened birds of prey like barn owls, it also poses a threat to smaller native mammals like the pygmy shrew.

Ireland's Multi-Million Euro Worms

According to a recent Irish government-commissioned study, earthworms



Brown long-eared bat
Photo: J J Kaczanow (Bat Conservation Tust)

provide services to Ireland worth over €700 million a year. The environment ministry's 197-page report, *Benefits and Costs of Biodiversity in Ireland*, investigates the social and economic aspects of biodiversity in the country. By drawing a comparison between the value of ecosystem services provided by biodiversity and the cost of implementing biodiversity protection policies, the authors established a marginal value of biodiversity to Ireland of at least €2.6 billion a year. The report estimated the value of the earthworm to Ireland based on its services in removing dead matter and releasing nutrients back to the soil. The report's authors also say that they could be undervaluing just how economically important Ireland's worms are.

Marine Reserves Increase Fishery Profits

New research suggests that establishing moderate areas of marine reserves along coastlines could benefit fisheries by providing greater profits and more flexible management policies. Previous research on reserve-based management, where protected areas are permanently closed to fishing, has suggested that fishery yield will increase through intensive fishing in the areas between the reserves. However, this strategy could end up being more costly because of the 'stock effect'. The stock effect is where fishing becomes expensive to carry out because over-fishing has led to low-density populations which require increased efforts to harvest. Increased yields would not compensate for the greater costs of fishing in over-fished areas and profits would therefore be a better measure of economic performance than yields. Even with the stock effect, the researchers suggest that the inclusion of marine reserves can increase fishery profit compared with that which can be attained using conventional management without reserves. Although the stock effect reduced fishery profit under both management strategies, reserve-based management could generate at least the same profits as, if not more than, conventional management.

Marine Bill Update

The announcement by Gordon Brown on 14 May 2008 that the Marine Bill is to be included in the Government's Draft Legislative Programme, and has therefore been allocated a slot in Parliament for the next session, has been welcomed by the Marine Conservation Society (MCS). In response to the announcement the MCS has stated that it has serious concerns that the measures proposed are not strong enough to actually deliver a network of Marine Conservation Zones. The MCS want to see a 'duty' put in place to designate such a network and timescales on when it would be delivered.

Marine Life Gasping for Breath?

New research shows that oxygen is vanishing from ever-larger areas of the oceans. If the trend continues it could disrupt marine ecosystems. Until now, most research has concentrated on oxygen levels in colder water, where much of the world's commercial fishing occurs, but very little was known about levels in tropical waters, which contain some of the world's most diverse marine ecosystems. An international team has brought together all available data collected since 1960. In some cases, such as the tropical Atlantic off the African coast, dissolved O_2 levels have dropped by more than 15% in the past five decades. Although models predict that the oxygen reduction is due to warming, ocean circulation may also play a role, perhaps by transporting oxygen away.

Europe's First Tourism Plan for Remote Coastal Communities

Europe's first tourism plan for remote coastal communities has been published. The publication follows a two-year EU-funded €465,000 project, which looked at the experiences of five communities across Europe including the Orkney Islands (Scotland), Whitby (England), the islands of Læsø (Denmark), Koster (Sweden) and Hvaler (Norway).The study's main finding is that remote European coastal communities, who have experienced decline in traditional industries such as farming, fishing or oil, need to develop sustainable tourism plans. The study found that coastal communities face common problems such as: the huge increase of visitors during the summer and drop in visitors during the winter; lack of affordable housing for local people; and the scarcity of year-round jobs, which leads to young people leaving in search of work.

Alpine Forest Restoration in Romania

Two seriously threatened alpine forest habitats have been successfully restored by a LIFE Nature project located on the slopes of Mount Pietrosul Rodnei in Romania, where a programme of manual and scientific actions has achieved sustainable results in conserving cembra pine *Pinus cembra* and mugo pine *Pinus mugo*. The 6,415 ha Pietrosul biosphere reserve is now also a proposed Natura 2000 site. This popular mountain area hosts a number of habitats and species of Community interest which have become increasingly threatened by tourism, logging and livestock grazing.

Malta's First Coastal Nature Reserve

Funding under the LIFE-Third Country strand has helped Maltese partners to establish the country's first fully functional coastal nature reserve. 800 ha of marine and terrestrial environment are now managed in a sustainable and controlled manner within a carefully prepared, inclusive and integrated programme of conservation actions. The nature reserve is now officially operational, encompassing eight square kilometers of marine and terrestrial area around the coast between Malta's two main islands.

EIANZ Ecology Group

The Environmental Institute of Australia and New Zealand (EIANZ, www.eianz.org) has recently set up an Ecology Group (www.eianzecology.blogspot.com). This will be the first time that ecologists have been properly represented in Australia and New Zealand under a national professional institute. The convenor of the new Ecology Group is Simon Mustoe MIEEM.

Biodiversity Loss Hurts Drug Discovery

According to a new book, *Sustaining Life*, a new generation of drugs may be lost unless biodiversity loss is halted. Species loss from climate change and pollution could affect the future of medicine and the pharmaceutical industry. For example, the southern gastric brooding frog, found in an Australian rainforest in the 1980s, raised their young in the female's stomach using enzymes that preliminary studies showed could be used to treat human ulcers, but the frogs have since become extinct. The book picks seven groups that could be particularly valuable to medicine: amphibians, bears, cone snails, sharks, primates, horseshoe crabs and gymnosperms. The authors say the book's conclusions should not be used as an excuse to harvest wildlife, but rather as a spur for greater conservation efforts.

Tauro-Scatology and McEcology

Good afternoon, Basil. Is that a Big Mac you're eating?

Absolutely. Every ecologist should eat a Big Mac once in a while. It's good for the soul.

Surely not. Explain yourself.

Whatever you think of McDonalds, you can't deny that their products are highly reproducible. Wherever you go in the world, a Big Mac tastes exactly the same. Which means that you know what you're getting or, for the bourgeois liberals amongst us, know what you are conspicuously avoiding.

So is your Big Mac consumption a gesture of solidarity with the proletariat then?

Nothing of the sort. This is a sort of ecological Eucharist: every mouthful reminds me of the ultimate, unattainable goal of perfect reproducibility, where every source of variation due to human fallibility has been purged and our analyses and surveys show only variation due to ecological factors.

Wow. I'd never thought of it like that. But why can't we bourgeois liberal ecologists substitute a Pizza Express Fiorentina for a Big Mac?

Think of it as an Opus Dei member thinks of his whip. We have to suffer for our science. But I've got one other issue to chew over while you're digesting your hamburger. Have you heard the term 'McJob'?

Isn't that the term for any low-status job – regardless of who the employer is – where little training is required, staff turnover is high, and where worker's activities are tightly regulated by managers?

That's right. McDonalds famously tried to stop its inclusion in Webster's Dictionary but these days they actually seem to include ironic references to McJobs in their careers blurb.

But what is the relevance to us?

It is slightly circuitous, I admit, but a few weeks ago I was thinking of how some of the tasks done by ecologists are now being highly regulated to ensure compliance with health and safety regulations and quality assurance protocols. Whereas a few years ago a biologist would go to a river, collect a kick sample, analyse it him- or herself and report the outcomes, now we might find different people involved in each step.

Absolutely. A biologist might collect a sample, but that sample might then be preserved and sent off to a contractor for analysis. The data are then fed into a computer and yet another person writes a report. That's the way of the modern world, Basil.

Ah but… at the risk of sounding nostalgic for a bygone era, the biologists of 20 years ago often had an encyclopaedic knowledge of their local area. They had seen rivers in wet years, dry years and everything in between, noticed other features of the ecology of a site and fed all of this into their subconscious to provide deeper and more informed insights for their reports.

A fair point, but I still can't see what this has to do with a hamburger.

Welcome, my friend, to McEcology. I have had a frightening near-future vision where, in the ceaseless drive for cost economies, professional biologists will be reduced to technicians. They will collect samples, pass them onto laboratories that focus on cost-effective sample processing, who then feed the data into sophisticated computer programs that automate most of the reporting process.

Surely this is a rather unlikely eventuality? Most IEEM members are involved in survey work of one kind or another that can't be adapted to this kind of production line.

Absolutely. But quite a lot of ecological work, in the aquatic environment in particular, does involve collecting samples for later analysis. My argument is that, as soon as management adopts the naïve bottom line mentality that makes perfect sense to a fast food outlet, then we are on the road to McEcology with all that that entails. And the worst of this is that…

Hang on, Prof, have you forgotten that you are *In Practice*'s humorous columnist? This column is becoming rather didactic.

Sorry about this… I promise I'll end with a joke. Where was I? The worst aspect of this trend towards McEcology is that it undermines the professionalism that the IEEM has been striving for over the past 15 or so years.

How is that?

Think of our senior applied ecologists as consultant surgeons. The analogy is reasonable: medical doctors deal with human health whilst environmental practitioners deal with ecosystem health. One thing that differentiates an applied ecologist from an academic one is that the former very often have to make do with imperfect data sets in order to answer a question rapidly. We have to go out on a limb in situations where an academic would normally throw up his or her hands and say they need more data. Medical doctors have to make this kind of judgement all the time.

My point is that the years we spend in the field, gaining experience of a whole range of situations and getting to know a few localities in extraordinary detail, is like the apprenticeship that a doctor serves in the years between qualifying and becoming a consultant. It is a period where we gain wisdom and experience, but only because we are getting our feet wet and our hands dirty on a regular basis. Compartmentalise the job, centralise laboratories, embrace any of the other business practices that a management consultant would recommend for most manufacturing or service industries, and you erode the professionalism of the individuals who will, in due course, be the consultant surgeons of the environment.

Is this another of your unsubtle pokes at our statutory agencies?

Call me a prophet of doom, if you wish. But the portents are not good. The bottom line usually wins out over common sense ecology these days.

Heavy stuff, Prof. I think we all need that joke you promised us.

OK. What's the most important thing that an oil company needs after it has had a spill?

I'm guessing that this doesn't have anything to do with oil spill remediation technology…

… a slick lawyer.

Ouch. Thanks again for your time, Prof.

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 7 July 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:

APPLICATIONS FOR FULL MEMBERSHIP

Dr Petronella J. Billings, Mr David Chadwick, Mr Hugh B. Dixon, Mr Jay S. Doyle, Dr Peter Foss, Mr Daniel Hardie, Dr Grace O'Donavan, Mr Gareth J. Wilson

APPLICATIONS FOR ASSOCIATE MEMBERSHIP

Miss Jennifer Fisher, Mrs Naomi R. Forbes, Miss Victoria Gilbey, Miss Rosie Pyper, Mr James Wrixton

ADMISSIONS

IEEM is very pleased to welcome the following new Members:

FULL MEMBERS

Mr Muhammad Amin Al-Amin, Mrs Andrea Ayres, Mr Michael J.C. Bailey, Mr Micklemus Blackman, Ms Nuala Carr, Miss Suzanne Coey, Mr Timothy J. Crabb, Professor Roger S. Crofts, Mr Stephen F. Dangerfield, Mrs Felicité S. Dodd, Dr Simon Duffield, Mr Jaspal Paul Gill, Miss Dawn Goodfellow, Dr Joanne M. Goodson, Dr Alistair D. Headley, Dr Pauline Holmes, Mr David P. Hunter, Dr Sarah F. Jackson, Dr Ross M. Jones, Miss Annette Kelly, Mr Seth Lambiase, Mr Vladimir Ledvina, Miss Rachael E. Lappage, Mr Robert K. Luxton, Miss Julia Massey, Miss M. Angeles Moragues Albacar, Dr Róisín Nash, Ms Helen E. O'Brien, Dr Fionnuala O'Neill, Mr Robert J. Parry, Miss Julie Powell, Mr Michael J. Raven, Dr Nicholas D. Ray, Mr Jason R. Reynolds, Miss Joanne B. Rockingham, Mr Justin H. Smith, Mr Josef Saunders, Ms Celia Spouncer, Mr Richard M. Tilzey, Mr Andy Warren, Miss Jenny Wheeldon, Ms Belinda C. Wiggs, Miss Joanne H. Wilson, Miss Lyndsey Yates

ASSOCIATE MEMBERS

Miss Amanda L. Bassett, Mr Andrew J. Brennan, Mr John E. Callaghan, Mr Alastair M.A. Campbell, Miss Sarah E. Connelly, Miss Kimberley Dawson, Miss Adele C. Devonshire, Mr Joris Driessen, Mr Adam G. Ellis, Mr Howard J. Fearn, Mr Edward Feetham, Mr Christopher N. Hall, Miss Gemma Harding, Dr Katherine S.E. Henson, Ms Vivien Heyes, Mr John N.Honeyman, Miss Laurie Jackson, Miss Rosalyn A. Kaye, Mr Benjamin J.R. Kite, Ms Katheryn J. Leggat, Mr Stuart B. Livesey, Miss Christine McClure, Miss Anja Nonnenmacher, Miss Niamh O'Connell, Ms Dervla O'Dowd, Dr Karen A. Reid, Dr Helen Simcox, Mr Kim G. Stewart, Mr Daniel Thomas, Miss Ly F. Vaillancourt, Miss Sarah E. Wakefield, Miss Gemma L. Waters, Miss Judith A. Weightman, Mr Anthony D. Wileman

GRADUATE MEMBERS

Ms Sara E. Adams, Miss Suzanne E. Allcock, Miss Trianna Angele, Miss Emma L. Ball, Miss Joanna Barker, Mr Robert A. Bell, Miss Adrienne Bennett, Mrs Marianne D. Bergin, Miss Hayley Bishop, Mr Michael Blackmore, mr Daniel W. Bound, Mr Mark W. Brice, Miss Clare Buchanan, Miss Kelly Burns, Miss Katie Burrough, Mr Andrew W.Burrows, Mr Alex Bush, Mr Adam Cave, Mr Mark Chambers, Miss Gemma J. Clark, Miss Jennifer Cliff, Miss Alanna Cooper, Dr Jonathan E. Crane, Miss Helen J. Davies, Mr Eamonn Delaney, Miss Laura Downton, Mrs Emma Dowson, Mr Harry Earle, Mr James E. Faulconbridge, Miss Lucy Fay, Mr Robert Fennelly, Miss Julia Ferguson, Mr Eugene Finnerty, Mr Harry Fox, Mr Leonard Griffiths, Mr Michael Haft, Miss Gemma Hannant, Mr James R. Horsfall, Miss Eszter Horvath, Miss Joanne Jameson, Ms Alex Johnson, Mr David P. Kelly, Miss Katherine M. Kennedy, Miss Sophie A. Milburn, Mr Muhammad S. Khan, Miss Louise M. Lowans, Miss Frances Lowe, Miss Flavia Moreschini, Miss Mairi J. Nicolson, Mrs Victoria Nightingale, Miss Georgina Palmer, Mr John W. Pemberton, Miss Sarah Proctor, Miss Elaine Rainey, Miss Eleri Randall, Miss Shelley Reed, Mr Daniel J. Reynolds, Miss Hazel V. Robson, Mr Matthew G. Scott-Campbell, Miss Kate Sharma, Miss Christine Singfield, Miss Bryony Stocking, Miss Susan Sweetman, Mr Mark Taylor, Mr Simon Thomas, Mr Philip Thorpe, Miss Helen L. Ward, Mr Charles A. Whittaker, Mr Mark R. Wingrove

AFFILIATE MEMBERS

Mrs Wendy Austin, Mr Barry E. Clarkson, Mr Andrew Higham, Mr Richard W. Hill, Miss Carla L. Holdstock, Mr Rhodri Kemp, Mr Martin G. Kerby, Miss Helen J. Medley, Mr Darren R. Pell, Miss Alison J. Sharkey, Miss Katie S. Shilcock, Mr Gerald E. Westmacott

STUDENT MEMBERS

Miss Beth Atkinson, Miss Philippa Aurett, Mr Antoine Baglan, Mr Mark Bartolini, Mr Andrew Bentley, Mr Charles N. Brooke-Smith, Mr Benjamin Callard, Mr Godfrey Chigona, Mr Tom Clare, Miss Lucy E. Clarke, Mr Adam D.P. Cross, Miss Mary Davies, Miss Louise Davis, Mr Mark D. Derham, Mr Mark W. Edwards, Miss Emily Fallows, Miss Katherine Finn, Miss Rachael Ford, Ms Simone Gentner, Mr William George, Mr Aaron S.M. Grainger, Mr Neal R. Haddaway, Mr Andrew J. Halcro-Johnston, Ms Jodi A. Handley, Miss Laura Hartley, Miss Victoria C. Hartley, Ms Karen Hatch, Mr Ian Hayes, Mr Andrew C. Hollis, Mr Alex Hudson, Miss Fiona Hutchings, Miss Kylie N. Jones, Ms Aliki Kaltsidou, Mrs Caroline J. Kelly, Mr David Letteney, Miss Jane Liddle, Mr Robert Lindley, Miss Erin Logan, Mr Aaron R. Matthews, Miss Rhia McBain, Miss Emma O'Neill, Miss Rachael Purdy, Miss Amy L. Roberts, Mr Tom Rogers, Mr Angus E. Rosenburgh, Miss Katherine H. Rushton, Mr Stuart J. Ryan, Mr Philip J. Silk, Miss Inge Smith, Miss Rebecca L. Smith, Miss Ruth E. Starr-Keddle, Miss Theresa Stewart, Miss Gemma Taylor, Miss Sarah E. Thornton, Miss Emma C. Tuckey, Mr Rudi Verspoor, Miss Rosie D. Vetter, Miss Charlene Watson, Mr Peter S. Watson, Miss Sam Warmley, Mr Andrew Weston, Mr Marc M. Woolnough

UPGRADES

The following have successfully upgraded their Membership:

ASSOCIATE to FULL MEMBERSHIP

Miss Joanne Atkinson, Mr Richard J. Belt, Mr Geoff Billington, Mr James M. R. Brock, Mr Henry Campbell-Ricketts, Miss Diana Clark, Miss Joanna Clarke, Mr Paul S. Fisher, Miss Catherine Greenhough, Dr Louise M. Hawley, Mr Eric Heath, Miss Rachel L.Hufton, Dr Kevin Hume, Miss Gail Ireland, Mr David R. Lewns, Mr Graham Jones, Mr Kris Long, Miss Nicola Marsland, Mr Stuart J. McAleese, Mr Peter J. McKeon, Mr Fraser A. Milne, Mrs C. Sian Mitchell, Dr Rebecca K. Morris, Mr Stuart Pankhurst, Miss Laura Penniston, Mr Andrew Perry, Mr David T. Price, Mr James Simpson, Dr Emilie Wadsworth, Mr Michael P.Walker, Mr Joseph W. Whittick

GRADUATE to ASSOCIATE MEMBERSHIP

Miss Abigail V.L. Bridge, Miss Sally Chadwick, Mr Timothy D. Foster, Miss Joanna Ferguson, Mr Benjamin T. Garnett, Miss Sarah Gooch, Miss Laura M. Hicks, Dr Paul Joyce, Mr Guillaume A.S. Marchais, Miss Georgina H. Starkie, Mr James Vafidis, Miss Heather J. Webb

STUDENT to GRADUATE MEMBERSHIP

Miss Katherine R. Allen, Miss Rachel Dobson, Mr Christopher J. Gaughan, Mr David P. Goddard, Miss Joanne Jasper, Mr Christopher L. Toop

What's on July – September 2008

5 July 2008
MSc/MRes open event
Nottingham Trent University
www.ieem.net/otherevents.asp

7 July 2008
Y&H Section Event – Dragonfly workshop
Leeds
www.ieem.net/yorkshire.asp

20 July 2008
Y&H Section Event - Starting Entomology
Leeds/York
www.ieem.net/yorkshire.asp

21-24 July 2008
Bats and Roads Course
Royal Victoria Hotel, Llanberis, Gwynedd
www.ieem.net/otherevents.asp

22 July 2008
Y&H Section Event – Green Drinks
Leeds
www.ieem.net/yorkshire.asp

22, 24 July 2008
Pond survey training courses
Oxford Brookes University
www.ieem.net/otherevents.asp

25 July 2008
Irish Section Field Outing
Fenor Bog Nature Reserve in Co. Waterford
www.ieem.net/irishsection.asp

6-8 August 2008
Bat Survey Techniques
NTS Threave Estate, Dumfries and Galloway
www.ieem.net/otherevents.asp

19, 21 August 2008
Pond survey training courses
Oxford Brookes University
www.ieem.net/otherevents.asp

27 August 2008
Y&H Section Event - Habitat Creation with Penny Anderson
Leeds/Sheffield
www.ieem.net/yorkshire.asp

3-5 September 2008
British Ecological Society Annual Conference
Imperial College London
www.ieem.net/otherevents.asp

8, 9 September 2008
Bats courses
Nottingham Trent University
www.ieem.net/otherevents.asp

8-12 September 2008
6th European Conference on Ecological Restoration
Ghent, Belgium
www.ieem.net/otherevents.asp

8-12 September 2008
Vertebrate Surveying 1 & 2
Nottingham Trent University
www.ieem.net/otherevents.asp

14 September 2008
Y&H Section Event - Starting Entomology
Leeds/York
www.ieem.net/yorkshire.asp

17-18 September 2008
World Green Roof Conference
London
www.ieem.net/otherevents.asp

17-24 September 2008
Surveying bats in France
Midi Pyrenees (in the Ariege region of France)
www.ieem.net/otherevents.asp

24-28 September 2008
Europarc Federation Annual Conference
Brasov, Romania
www.ieem.net/otherevents.asp

23 September 2008
Y&H Section Event – Green Drinks
Leeds
www.ieem.net/yorkshire.asp

24 September 2008
Y&H Section Event – Dearne Valley Green Heart
Dearne Valley
www.ieem.net/yorkshire.asp

25 September 2008
Communicating Convincing Environmental Messages
London
www.ieem.net/otherevents.asp

25-30 September 2008
7th International Dormouse Conference
Cheddar and Shipham, Somerset
www.ieem.net/otherevents.asp

13 October 2008
Irish Section Conference - Coastal and Marine Environment: Biodiversity, Management and Protection
Oranmore, Galway
www.ieem.net/irishsection.asp

4-5 November 2008
Joint Irish Section Event - Green Infrastructure: Connecting Nature, People and Places
Malahide, Co. Dublin, Ireland
www.ieem.net/irishsection.asp

18-20 November 2008
IEEM Autumn Conference - Mitigation
Glasgow
www.ieem.net/conferences.asp

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

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

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

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

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

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

Plas Tan-y-Bwlch, Maentwrog, Blaenau Ffestiniog, Gwynedd LL41 3YU
01766 590324
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BTCV Training Programmes Unit, Red House, Hill Lane, Great Barr, Birmingham B43 6LZ
0121 358 2155
info@btcv.org.uk
www.btcv.org