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Institute of Ecology and Environmental Management

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

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McParland Finn
British Ecological Society

Editorial

Greetings from the new IEEM President

Hello everyone, if you have been following your *In Practice*, you will know that I am now your President. So first, thank you for your support and secondly, we have an interesting and exciting journey to share over the next two years.

The year in the wings as President-elect has been very useful and interesting. What have I learnt in my apprenticeship? First, the organisation is you. It is financially dependant on you being members; you coming to conferences; you attending training courses. I am hoping to work with the Institute to provide added value for these – some of the services you most appreciate according to the recent membership survey.

The second lesson for me was seeing how much voluntary time people give the Institute to support something in which they believe passionately. These are all busy people, most have 'day' jobs as well, yet they sit on committees, write and re-write position statements, develop best practice guidance and discuss all the IEEM issues selflessly. IEEM depends on them for their creativity, time and commitment.

Then there is the Secretariat – small but committed and hard working. I am delighted to be working with your new CEO, Sally Hayns, in developing the next IEEM Strategy and Business Plan. More on that as it evolves early next year.

I suspect every new President comes to this job with great thoughts on what legacy they can leave after two years and how best to develop these grand ideas. So I will give you mine. I would like to:

- see an expansion and improvement in the Institute's services offered to members;
- see increasing recognition of the importance of IEEM membership and our professional status;
- diversify the income streams for improved financial stability;
- work towards developing our own chartered status (which also means an increase in membership);
- develop more best practice guidance/position statements on various ecological matters such as habitat creation, offsetting and living landscapes in line with the recent Lawton Report (have you read it yet? You should);
- increase the recognition of the environmental management part of our name; and
- develop a green strategy/guidance for IEEM.

There will be more every day things where I will be representing IEEM - press releases, workshops and meetings, letters to write and awards to present. I suspect that I have not appreciated the full scale of the job yet!

One of the most important things for my Presidency though is that IEEM is 21 in 2012. We are looking to develop a programme of events. If you have any ideas for your region or any national activities – let us know. Don't worry if they sound crazy – they should be fun, they should celebrate IEEM and our vision/mission, but they could be cricket matches or quizzes, field events or competitions, collaborative pond-digging events or gentle visits – you choose. Think about getting some sponsorship for IEEM as well.

This is me – but it is a two-way process. So what can you do to support me and IEEM? We want to provide more and better services to members but we do need to know what you want so you need to tell us. Come to conferences and attend training courses. Let us know if what we offer is not what you want and do get actively involved. What about running a workshop on your pet subject for us (assuming it is relevant!)?

The more volunteers we have to help run regional or national events/committees, the less responsibility there is on those already engaged. So offer your help to increase the robustness and representativeness of the Institute.

Come and talk to me and to the other Council and Committee members, e-mail us with your ideas, issues and solutions. We are interested in feedback. We can only take on board other issues if you tell us about them.

I look forward to meeting and talking to as many of you as possible during the next couple of years. I probably won't remember your names, but I will remember your faces!

Penny Anderson CEnv FIEEM
IEEM President

Wishing you all a happy Christmas and a prosperous New Year!
-- From everyone at IEEM --

CONTENTS

Cover image: Biodiversity Beyond 2010

Photography: Pete Johnstone CEnv MIEEM

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

New Maps of Reality

Morgan Parry
Chair, Countryside Council for Wales

Maps fulfil many different roles. They provide a visual representation of something that is difficult to explain in words. Historically they have been drawn by the victors to show new territories conquered. But they can also reveal very different things to people who don't share the same values, traditions or concepts of reality.

This latter point was beautifully captured by one broadcast from a Radio 4 series which, for me, was essential listening. Only the BBC – perhaps of any broadcaster in the world – could produce programmes as concise, captivating and educational as *A History of the World in 100 Objects*. On a Wednesday in early October this year, the object in question was a buckskin map of 1774, showing how Native Americans perceived the area we now know as the Mid-West. They had occupied this land 'since time immemorial' but were being forced to sell to European settlers, and the map reflected what the native Americans thought to be important – rivers, areas used for hunting, religious and cultural sites - all shared between co-operating tribes. The settlers saw the map only in terms of towns, boundaries of private ownership, and wealth.

That map is a perfect metaphor for the transition we need to make towards valuing our ecosystems, a concept that the Welsh Assembly Government is currently developing – a new framework for managing our environment called *A Living Wales*. The Government in England is developing a similar approach through its Natural Environment White Paper.

Our environment provides us with a wide range of vital services. It creates employment and income worth billions of pounds, offers us health, recreation, sport and learning, provides fresh water and prevents floods, absorbs our pollution, produces our food, energy and timber and sustains our wildlife. This is our life support system. It is a complex living biosphere made up of many inter-dependent systems – which need a healthy diversity of plants and animals to function.

The Native Americans understood this, and we now call it ecology. But we've separated it from that other eco-science: economics. Bringing our contemporary reality of land ownership, industrialisation and wealth creation back together with an appreciation of the value of our ecological and physical resources is the central challenge of our governments' new frameworks.

If we can map these new realities through our spatial and development planning processes, and manage them in a way that is meaningful and relevant to everyone, we can sustain our economic prosperity and conserve our environmental assets in a way we have failed to do in the past.

This is an urgent challenge. Globally, there is deep concern about the fast pace of biodiversity loss worldwide, and the increasing impact of climate change. Views on the success or otherwise of the Nagoya conference are mixed, but at least the concept of biodiversity has been anchored in international discussions even if the next steps are unclear.

Here is the other big difference between 1774 and 2010: we no longer live on the wild frontier, there are no new territories for us to move into, no new oceans to exploit and no undiscovered lands waiting to be colonised. Our proliferating global population and resource consumption has now exceeded the capacity of our natural systems to support us. If those systems collapse, so does our civilisation. 2010 is a turning point for us in the way that 1774 was for the future of America.

We need to look for a new contract between environmental managers and regulators, industry and commerce, marine stakeholders, landowners and the public. We need a radical new departure, not just simply another strategy. Our attempts to manage our natural resources have so far been focussed on the component parts of our environment, not the systems themselves. We've conserved attractive species here and threatened habitats there, but we can now see reality on a much broader scale. We have identified sites on their basis of their special *scientific* interest, without always recognising fully their economic and social importance. This way of managing and conserving the environment has had limited success, and limited support from the public.

In Wales, in contrast to England, spatial planning is still a live process. It is a good vehicle for expressing the ecosystem approach and for building the connections and relationships with economic and social infrastructure. The ecosystem approach could be the inspiration that reinvigorates a National Spatial Strategy or Infrastructure Plan. The maps they incorporate can help us agree new values, and concepts of reality.

As we rethink the way we manage the environment, we in Wales are also rethinking the institutions that do that work on our behalf. Minister Jane Davidson has set a clear direction of travel towards a new organisation to carry out the functions of the Countryside Council for Wales, the Environment Agency Wales and the Forestry Commission Wales, adapted for the new realities. It could be a major addition to the landscape of our national institutions.

Whatever the role of the new organisation, it will need to be given a special place in the debate about public spending priorities, and a recognition that the environment is the ultimate source of our wealth. This should be built into every departmental strategy: this is a challenge for the whole of government.

All governments need the advice of well-resourced, independent agencies, based on sound science. That advice will frequently be challenging. It is of course the Government's job to make policy, but the real strength of public agencies is that their advice is not moderated by the sometimes conflicting priorities of other departments of Government and is immune to the overtures of private lobbies and special interest groups. They do, in every sense, represent the public interest.

Respond to the Wales consultation at http://wales.gov.uk/consultations/environmentandcountryside/eshlivingwalescons/?lang=en

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European Biodiversity Indicators

Alan Feest MIEEM
Ecosulis and University of Bristol

Introduction

Living on an island means that it is very easy for us to forget that the UK is part of Europe and that we are part of initiatives relating to the whole continent. The EU has a strong commitment to biodiversity and the President of the Commission, José Manuel Barroso, (speech in Athens on 27 April 2009) has stated that the loss of biodiversity is of equal importance to global climate change and the Life+ programme shows how the Commission can provide very significant sums of money for biodiversity and habitat conservation.

The European Environment Agency (EEA) based in Copenhagen was tasked with setting up a system of indicators that could be used to show progress (or not) towards the 2010 international target (and EU commitment) to reduce the rate of loss of biodiversity and the results of this process and the final indicators are the subject of this report.

The Process of Setting the Indicators

The first indication of this process was an e-mail from Mr Martin Sharman from the EU Commission (Martin is the Policy Officer – Biodiversity and Ecosystems, at the European Commission) inviting people to Copenhagen for a preliminary meeting to set out working groups, following the headings set out by the Convention on Biological Diversity (CBD), which would report back in a year with recommendations for biodiversity indicators under the CBD headings (see Table 1). As I have been researching the measurement of biodiversity for a number of years I felt that I could contribute to this and attended this inaugural meeting. It was packed with about 200 scientists and bureaucrats from the whole of Europe (EU members and non-member countries). I had indicated that I would wish to be part of the status and trends of biodiversity group only to find that I was with about 25% of the whole cohort. Looking around I found Simon Bareham (Countryside Council for Wales) as a sole member of the nitrogen deposition group and transferred to increase his group to two. As it transpired this was a very lucky choice as I rapidly came to appreciate that in Northern Europe (and probably much of Europe) nitrogen deposition was a more severe threat to biodiversity than global climate change and probably as important as land use change.

Groups were tasked with producing a list of possible indicators with the proviso that they must already be in use so that: a) historic trends can be indicated and b) time was not wasted employing more scientists to come up with yet more indicators. As it transpired the assembled groups came up with more than a hundred ideas.

A series of meetings for each CBD group was set up through the next year where we were tasked to eliminate all but the most efficacious indicators. Fortunately for the nitrogen group the indicator was soon found and settled, nitrogen Critical Load Exceedance (nCLE). At a final plenary session a battle of advocacy ended with a list of 26 biodiversity indicators that followed the CBD headings and ranged from the direct measurement of organisms to pressure, state or response indicators.

The Indicators

Table 1 gives the final set of indicators and a preliminary report has been published by the EEA (EEA Report 4/2009; Progress towards the European 2010 biodiversity target) and I give below a review of how each of these indicators has been integrated with the others and how I see them relate to actual biodiversity measurement.

The first CBD focal area is **Status and Trends of the components of biodiversity:** trends in the abundance and distribution of selected species (SEBI 2010 indicator 1) where clearly only two specific groups of organisms are proposed for measurement: birds and butterflies. The basis of this decision is that they already have recognised and validated survey methods providing numerical data. Other organisms might have been chosen but the restriction that the indicator had to already be functioning left only these two. This is problematic because they are both limited as indicators of biodiversity; birds respond to vegetation architecture rather than other elements of biodiversity and butterflies are restricted in occurrence and number of species in many areas of Europe. The advantage that some countries have significant time series of data for these groups is helpful but most European countries do not. I advocated that a more ecosystem oriented approach might have resulted in different biodiversity indicators so that for the soil ecosystem and decomposition processes one could have used macrofungi, for air quality and precipitation one could have used bryophytes/lichens, for temperature influence and climate change beetles (poikilotherms) might have been used. This lack of validated biodiversity measurement methods for more sensitive indicators may well be the basis of the research outcomes of the process (see below).

Indicator 2 is the Red List Index for European species and utilises the well established systems for recording the populations of organisms that are considered rare and threatened. These rare organisms are often charismatic and of wide interest to the public so that data is often freely available. The problem occurs when dealing with the less glamorous organisms (slime moulds for example); how is the data to be obtained and used since one expert observer will influence the totality of results and the apparent status of an organism. That these Red List organisms might indicate the status of associated habitat and biodiversity elements is assumed and is coming to be backed by research data. For this indicator a reduction in the List indicates improving biodiversity *i.e.* a reduction in biodiversity loss so it has the complication that a counterintuitive reduction has to be interpreted.

Indicator 3 is Species of European Interest (those species which, within the territory of the European Union, are listed in Annexes II, IV and V of the Habitats Directive) and therefore fairly well defined. Each species is assessed for population trends and classified as: Unfavourable – bad, Unfavourable- inadequate, Not Assessed, Unknown, and Favourable. Preliminary results for bio-geographic regions show the lack of data for marine ecosystems and quite a lot of variation between systems. Amphibians (60% unfavourable) appear to be the most threatened group with marine species also showing poor status.

Table 1. SEBI 2010 indicators within CBD focal areas and headline indicators

CBD focal area	Headline indicator	SEBI 2010 specific indicator
Status and trends of the components of biological diversity	Trends in the abundance and distribution of selected species	1. Abundance and distribution of selected species a. birds b. butterflies
	Change in status of threatened and/or protected species	2. Red List Index for European species
		3. Species of European interest
	Trends in extent of selected biomes, ecosystems and habitats	4. Ecosystem coverage
		5. Habitats of European interest
	Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socio-economic importance	6. Livestock genetic diversity
	Coverage of protected areas	7. Nationally designated protected areas
		8. Sites designated under the EU Habitats and Birds Directives
Threats to biodiversity	Nitrogen deposition	9. Critical load exceedance for nitrogen
	Trends in invasive alien species (numbers and costs of invasive alien species)	10. Invasive alien species in Europe
	Impact of climate change on biodiversity	11. Impact of climatic change on bird populations
Ecosystem integrity and ecosystem goods and services	Marine Trophic Index	12. Marine Trophic Index of European seas
	Connectivity/fragmentation of ecosystems	13. Fragmentation of natural and semi-natural areas
		14. Fragmentation of river systems
	Water quality in aquatic ecosystems	15. Nutrients in transitional, coastal and marine waters
		16. Freshwater quality
Sustainable use	Area of forest, agricultural, fishery and aquaculture ecosystems under sustainable management	17. Forest: growing stock, increment and fellings
		18. Forest: deadwood
		19. Agriculture: nitrogen balance
		20. Agriculture: area under management practices potentially supporting biodiversity
		21. Fisheries: European commercial fish stocks
		22. Aquaculture: effluent water quality from finfish farms
	Ecological Footprint of European countries	23. Ecological Footprint of European countries
Status of access and benefits sharing	Percentage of European patent applications for inventions based on genetic resources	24. Patent applications based on genetic resources
Status of resource transfers	Funding to biodiversity	25. Financing biodiversity management
Public opinion (additional EU focal Area)	Public awareness and participation	26. Public awareness

Indicator 4 is Ecosystem coverage and this is assessed by percentage change and can be well observed by GIS methods. A preliminary result shows clearly that between 1990 and 2000 for example mires, bogs and fen habitats declined by over 3% whilst constructed, industrial and artificial habitats expanded by around 5%. This indicator also shows that for Europe woodland and forest has expanded by nearly 1%. This indicator shows strongly the threats to natural habitats and analysis of what ecosystem has converted to another shows that expansion of woodland and forest is larger than indicated since nearly one third of the urban expansion has been into forested land bringing the new forested land expansion to a 3% level.

Indicator 5 is Habitats of European Interest and the indicator classifies habitats in the range of Favourable to Unfavourable – Bad as in indicator 4. This indicator shows that between 40 and 80% of the habitats of Community interest (Annexe 1 of the Habitats Directive) have an unfavourable conservation status. Bio-geographic analysis shows that around 70% of Atlantic, continental, Macronesian and Pannonian habitats are unfavourable and a similar percentage of bogs, fresh water, grassland and dunes are unfavourable. As I will show below this is a critical indicator through its relationship with other indicators.

Indicator 6 is Livestock genetic diversity which is a clear interpretation of the definition of biodiversity (the variability of genes, species and ecosystems) but has also the implied recording of agricultural intensification. The analysis relates to an assessment of the number of native breeds that are endangered. This analysis shows that for countries like Greece and the Netherlands cattle native species are close to extinction which is the opposite of the situation in Poland. The use of this indicator carries the caution that the definition of what constitutes a native breed is not common to all countries!

Indicator 7 is Nationally designated protected areas which is measured by area and for 2007 had reached over 1 million km^2 and nearly 80,000 sites in 39 countries giving an average of 16% coverage as protected areas, but note the very large areas included in the Russian Federation and some other Eastern European countries. For Western Europe the figure is much lower. The trend for this indicator is for a continuing increase of sites but they are becoming smaller in extent.

Indicator 8 is Sites designated under the EU Habitats and Birds Directives. By mid-2008 most EU member states had designated enough Natura 2000 sites to protect habitats and species targeted by the Habitats Directive, thus around 10% of the terrestrial territory is designated under the Birds Directive and 13% under the Habitats Directive (there is overlap). Overall the net area continues to increase but this is largely due to the accession of new member states. Marine ecosystems have not yet showed the progress made for terrestrial ecosystems.

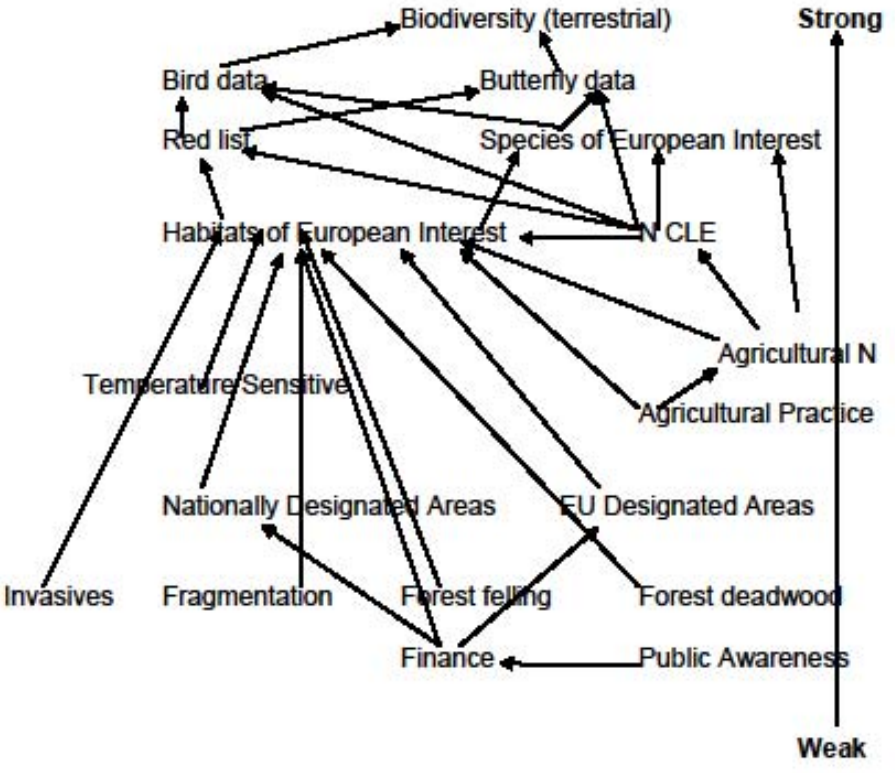
Thus the CBD focal area on status and trends of the components of biological biodiversity is represented by a number of indicators most of which are easy to compile but there is a clear deficiency in the measurement of species other than birds and butterflies.

The next CBD focal area is **Threats to biodiversity** and consists of three indicators of which Indicator 9 is Nitrogen Critical Load Exceedance. Nitrogen is an insidious pollutant causing eutrophication and acidification which, for the most part, is invisible and we only detect it when ammonia levels are high enough. The critical load exceedance level is a modelled level where the nitrogen deposition is above the ability of the vegetation and soil (geology) to absorb without harmful effect on ecosystems. Thus different habitats have different levels of nCLE. Any level of exceedance indicates ecosystem damage and the aim obviously is to achieve negative levels such as would exist in a natural situation. Agriculture (increasingly) and transport (decreasingly) are the main sources of nitrogen deposition. Ecosystem maps are overlain by remote sensing data of nitrogen levels to provide data that can be allocated to precise locations. This Indicator therefore combines the uncertainties of the need to accept a model with the precision of location. Generally the levels in Northern Europe are declining (sometimes sharply) but are still well above the threshold level for exceedance. In work commissioned by the EEA I have shown that this indicator has a strong relationship with butterfly biodiversity in the Netherlands and that whilst butterfly species richness for individual sites is not declining greatly there is a change from nitrophobic species to nitrophilic species. Overall species richness for the Netherlands is therefore continuing to decline as site butterfly species come to be dominated by the same nitrophilic species. On these data it is clear that butterflies in the Netherlands are being strongly influenced by nitrogen whilst there is not a detectable effect of global climate change.

Indicator 10 is Invasive Alien Species and clearly any alien species has an ecosystem effect. The aim therefore is reduce the number of alien species and, whilst the majority of around 10,000 alien species recorded in Europe have not (yet) been found to have major impacts, some are highly invasive. Currently the list of 'worst invasive alien species threatening biodiversity in Europe' consists of 163 species and many of the worst 'culprits' are marine/freshwater species. Nevertheless, 39 of the 163 species are vascular plants. This is an indicator which may become worse through time if current transport trends continue.

Indicator 11 is Occurrence of temperature-sensitive species which currently has been compiled for birds. Some birds are predicted to have declined in range (92

Figure 1. Linkages between biodiversity indicators and relationship to biodiversity



species) and others to have expanded (30) and change in extent of the ranges of these two groups of birds is calculated to provide a Climatic Impact Indicator. In 2005 this indicator was at a value of about 125, having started at a base value of 100 in 1980. Initially the indicator declined due to a series of cold years but since 1990 the trend is quite distinctly upwards. The methodology is said to be applicable to other taxonomic groups but apart from butterflies the data does not really exist. Birds are probably not good climate indicators and invertebrates should be better since they are poikilotherms. UK experience of a number of insects colonising and expanding their range is clear and a Climate Impact Indicator for Orthopterans for example would be very interesting to compile.

The next CBD focal area is **Ecosystem integrity and ecosystem goods and services** and Indicator 12 is the Marine Trophic Index and results from the tendency to selectively fish for those large species at the top if the trophic chain (tuna, cod, sea bass and swordfish) and as they decline through overfishing those species lower down the trophic chain increase. A mean trophic level of the abundance of species caught expresses therefore the intensity of fishing and the ecosystem impact. This seems to be a very well founded indicator and data from 1950 to date shows levels not to have declined (albeit that they were already heavily impacted in 1950).

Indicator 13 is Fragmentation of natural and semi-natural areas and relates to colonisation processes, minimum viable population levels and home territory size. This is a GIS (CORINE) based assessment with a grain of 1 ha elements located in 50 ha neighbourhoods. Much of the change registered is due to forestry operations (felling and planting) but the overall connectivity of, for example, woodland yields valuable information on the limitations to populations and colonisation.

Indicator 14 is Fragmentation of river systems and whilst the data has not yet been assembled it clearly relates to the previous indicator with the same implications. European rivers are highly modified and flood prevention activity might increase this along with hydro-electricity schemes which on a small scale are popular in the UK.

Indicator 15 is Nutrients in transitional, coastal and marine waters based on the concentrations of oxidised nitrogen and orthophosphate. Surprisingly over 80% of all recording stations indicate no increase or even a decline in levels (albeit they are much above natural levels). This indicator may become a very interesting one as the impact of the Water Framework Directive (WFD) affects nutrient levels in European rivers. This indicator is closely linked therefore to indicator 16 Freshwater Quality where the recorded levels of Biochemical Oxidation Demand (BOD), Nitrate and Orthophosphate are available for European rivers from 1992. All three show a downward trend and this should continue under the influence of the WFD.

The next CBD focal area is **Sustainable Use** and there are six indicators for this as follows:

17 Forest growing stock, increment and fellings, the balance of which shows a consistent increase in stock but this might not continue if timber demand continues to increase in Eastern Europe.

18 Forest deadwood which is encouraged in Northern Europe and strongly discouraged in Southern Europe (because of the fire risk). Overall the amount of deadwood has a positive influence on biodiversity by enlarging the decomposition biomass. Excessive tidiness in the UK for example results in there being only about 4 m^3/ha compared to 23 in Lithuania.

19 Agricultural nitrogen balance shows that the surplus nitrogen inputs to land are declining reducing pressure on soil, water and air. The current levels are still high for some countries such as Belgium.

20 Agricultural area under management practices potential supporting biodiversity has two elements: distribution of high nature value farmland and area under agri-environment and organic farming. The range of country percentage of agriculture under these headings is very wide ranging from 5% in the Netherlands to 80% in Austria. This indicator is obviously very susceptible to political decisions but currently is increasing.

21 and 22 concern Fisheries: European commercial stocks, 45% outside safe biological limits; and Aquaculture: effluent quality from fish farms, increasing intensity but the practice of feeding fish on fish protein may undermine the long-term sustainability of the industry. Both show there are serious problems if current trends continue.

23 Ecological Footprint of European countries has been increasing globally since 1961 whilst Europe's biocapacity has decreased. The assumption of economic growth indicates that this trend will increase.

CBD focal area **Status of access and benefits sharing** indicator 24 Patent applications based on genetic resources seems to me a cynical attempt to persuade industry and commerce that biodiversity has a money value. It does have a money value in the ecosystem services that are provided but the ethical and moral imperative to protect and conserve biodiversity should be a much stronger argument.

CBD focal area **Status of resource transfers and use** indicator 25 Financing Biodiversity Management measures the public funds committed to conservation of biodiversity. Despite the statement by President Barroso, the LIFE+ fund of the EU is still a very small proportion of the overall budget so the commitment of EU ministers can be easily tested. This could be the same test for each country.

Lastly, CBD focal area **Public Opinion** indicator 26 Public Awareness is a test of the impact of policies, decisions and actions. Currently, 35% of EU respondents have heard of and know what biodiversity is; 30% have heard of it and do not know what it is and 34% have never heard of it. This seems quite encouraging until the effect of the creation of the Natura 2000 Network is surveyed where 6% of respondents have heard of Natura 2000 and know what it is; 12% have heard of it and do not know what it is and 81% have never heard of it. Obviously some way to go.

The above 26 indicators form a complex set of direct and indirect indicators of which the value of some seems to be dubious (patents for example) although all of them carry some significance. Figure 1 shows how I conceive the linkage between the indicators and their strength as indicators of biodiversity could be viewed for terrestrial indicators. This shows a) that much of biodiversity is not being currently directly monitored in a standardised way, and b) the central importance of Habitats of European Interest and nCLE. This makes sense to an ecologist and assists in the targeting of resources.

What Next?

The results of this work will be published in full by the EEA in the near future and a re-assessment of the data in 2013. The next target of reducing the loss of biodiversity by 2020 will be tested using these indicators and the mixed picture of success (declining in level and expansion of forest stock) and failure (fishing impact) will hopefully be better.

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The Future of European Funding for Nature and Biodiversity

John Houston CEnv MIEEM
Astrale GEIE-HTSPE

Report of the European Commission conference 'LIFE Nature and Biodiversity – preparing the future', Brussels, 31 May - 1 June 2010

LIFE is the only dedicated EU fund for nature conservation. The current LIFE+ programme runs from 2007 to 2013 and so, as it reaches its mid-point, thoughts are turning to the development of the next financial instrument for the environment.

With over 50 LIFE nature projects completed or underway in the United Kingdom and Ireland, the EU fund for nature has made an important contribution, since its launch in 1992, to habitat restoration, species conservation and the development and dissemination of management techniques. These projects all make a contribution to the development of the Natura 2000 network. One of the special characteristics of the LIFE programme is that it has actively encouraged and supported projects which break down barriers between sectors and some of the best projects have involved partnerships with forestry, fishing, military, farming and field sports.

The current approach to funding the Natura 2000 network is based on the integration model which accepts that LIFE funding will only ever be a small component of the funding required to support the network and that the bulk of funding must come from existing measures such as the rural development programmes under the Common Agricultural Policy.

The future of LIFE Nature and Biodiversity was the theme of the conference organised by the European Commission. The event was well attended, with UK representation by Defra, the Country Agencies, Forestry Commission, Environment Agency and the NGO sector including RSPB, Plantlife, the Wildlife Trusts and National Trust.

The key question was whether there should still be a dedicated fund for nature? And if so, what should it look like? The meeting was also an opportunity for the Commission to listen to the ideas and suggestions from the LIFE community.

A short summary of the conference discussions is published by the Commission (see link below). The main conclusions were:

1. The best option for the next programme will probably be a continuation of a dedicated financial instrument, with a significantly increased budget, centrally managed by the Commission, along with stronger integration with other financial instruments. Although this 'integration model' has not been effective to date in halting the loss of EU biodiversity there is no real alternative at present but to try again. If this approach does not help meet the 2020 targets for biodiversity then there would undoubtedly be pressure to establish a fully dedicated nature and biodiversity fund.
2. The next financial instrument, whilst not losing its focus on Natura 2000, should also cover wider biodiversity. If Natura 2000 covers about 20% of the EU territory then through a further development of habitat networks it may be possible to see the influence of Natura 2000 spread to, say, 40% of the EU territory. In this way funding for biodiversity would complement and enhance the Natura 2000 network rather than compete with it.
3. A programme-based approach to the management of Natura 2000, with each Member State defining its needs and the different sources of funding that could match these needs, would be an effective way to promote complementarity between the use of EU and national funds. Better coordination within the European Commission between, for example, environment, agriculture, regional development and maritime affairs, would also help to support national programmes.

As well as these general conclusions on the best approach for the follow on instrument to LIFE+ the conference discussed a range of other issues.

Scientific input to LIFE projects has always been difficult. The LIFE regulation excludes 'research' yet in several projects science is helping develop the evidence base for long-term management. There was therefore a general call from the conference to recognise the role of research in projects and to welcome research publications as important outputs of LIFE projects. There is probably more opportunity for engaging with universities and research bodies in LIFE Biodiversity projects with their emphasis on monitoring, evaluation and dissemination of measures to protect biodiversity.

LIFE co-financing is usually 50% (up to 75% for projects focusing on priority species or habitats), a level which some consider too low compared to other instruments, at EU or national level. Potential applicants would welcome a more flexible approach to the application of higher co-financing rates taking into account the needs of the applicant organisation and the targeted habitats or species.

NGOs are an important sector for the delivery of nature conservation projects but several have expressed the

The LIFE+ project 'restoring alkaline and calcareous fens within the Anglesey and Lleyn Fens SACs in Wales', run by the Countryside Council for Wales, will restore over 750 ha of fen by the end of 2013
Photo: John Houston

view that the current LIFE rules are not 'NGO-friendly'. Suggestions for improvement would be the availability of project development funding, higher co-financing rates for NGOs and more options in the payment scheme. And, although the average value of LIFE projects has grown over the years there should still be opportunities for small projects.

Although LIFE Nature projects address the conservation of European habitats and species they also have wider biodiversity value and support ecosystem function and services. Almost all river projects, for example, whilst targeting a range of species, will aim to reduce pollution, remove obstructions and restore the natural function of the river system. The Commission hopes that LIFE projects will help to show the benefits to society of restoring nature.

The current restoration of the Anglesey and Lleyn Fens, for example, is supported by both Dwr Cymru (Welsh Water) and the Environment Agency Wales in recognition of the value of functioning wetland in improving catchment water quality.

Sometimes there is interest in developing projects with countries outside the EU. Although the Commission sees no need for a new 'LIFE Third Countries' strand it may consider a flexible approach when developing projects with countries outside the EU especially for migratory animals.

LIFE projects have attracted funding for charismatic species such as the bittern but there has been less attention and funding given to reptiles and amphibians, invertebrates, lower plants, *etc*. The Commission would welcome more proposals for projects addressing the needs of these 'forgotten species'. However, part of the problem may be a lack of knowledge of the habitat requirements of these species and also that LIFE projects might be too complicated for some species action plans.

The overall conclusion of the meeting is that the LIFE programme has been effective but it cannot operate on its own to complete the Natura 2000 network or halt the loss of biodiversity. For the immediate future and the next LIFE regulation we will probably have to try harder with the integration model to seek out the complementarities in EU funding streams. Member States also could do more to support a programme-based approach to help target funding to national priorities.

It is likely that many of the ideas and suggestions discussed at the conference and published in the EC summary note will be considered in either improving the quality of applications to the present LIFE+ programme or in developing the next regulation for the period beyond 2013.

Further information on the discussions can be found at http://ec.europa.eu/environment/life/news/newsarchive2010/july/index.htm#presentations

For further information about making an application to LIFE+ please contact Beta Technology at http://www.betaeurope.co.uk/. Beta Technology is contracted by Defra to assist applicants to LIFE+.

The Astrale GEIE consortium is contracted by the European Commission to assist with the monitoring and evaluation of LIFE projects.

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Biodiversity Offsets:

Testing a Possible Method for Measuring Biodiversity Losses and Gains at Bardon Hill Quarry, UK

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Introduction

Biodiversity offsets can be defined as 'measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken' (BBOP 2009). The goal of biodiversity offsets is to achieve no net loss (or preferably a net gain) of biodiversity on the ground. Biodiversity offsets are required by law in a number of countries (reviewed by Biodiversity Neutral Initiative 2005, McKenney and Kiesecker 2010), and have been adopted voluntarily by a small but growing set of private sector companies with 'no net loss' or 'net positive impact' policies (e.g. Rio Tinto 2004 and 2008, TEEB 2010). The potential for greater use of biodiversity offsets in the UK and the EU is currently being investigated (Defra 2009, EU 2010[1]).

A key aspect of biodiversity offsetting is the quantification of biodiversity losses and gains. This poses significant challenges because of the inherent complexity of biodiversity, and the variety of ways in which its components can be measured (*e.g.* area of a habitat, species diversity of an ecological community, population size of a species). Methods are needed that are transparent, rigorous, and that adequately capture the different aspects of biodiversity whilst remaining straightforward to apply in practice. In the last issue of *In Practice* (September 2010), Treweek *et al.* proposed a possible method for quantifying biodiversity losses and gains that might be appropriate for the UK context. This paper tests the proposed method on a real-world example – the proposed extension of Bardon Hill Quarry in Leicestershire.

In this particular case study, offsets were designed qualitatively through an Environmental Impact Assessment (EIA). The mitigation and compensation measures described below were presented in the planning application to reduce and offset predicted biodiversity impacts. Quantitative loss-gain measures following the Treweek *et al.* (2010) method were fitted to the data post-hoc, to test the method and to seek additional evidence that the offsets and other mitigation and compensation measures proposed were of an appropriate nature and magnitude to compensate for residual losses.

Case Study: Bardon Hill Quarry

The case study is a proposed extension to Bardon Hill Quarry, Leicestershire, owned by Aggregate Industries UK Ltd (Holcim Group). Application has been made for planning permission for a 66 ha extension, yielding 130 mT of pre-Cambrian rock over the next 50 years. The application has been submitted but not yet approved. Bardon Hill is a 500 ha estate consisting mainly of low-intensity pasture and arable, with woodland and lowland heath.

Ecological Baseline Conditions

Baseline ecological surveys undertaken in 2007-2009 identified a long list of valued ecological receptors, including:

- Bardon Hill Site of Special Scientific Interest (SSSI);
- semi-natural grassland habitats, including damp neutral grasslands (NVC MG4) and dry hay meadows (NVC MG5);
- species-rich hedgerows;
- uncommon lichens on acidic rock outcrops and dry-stone walls;
- wet woodlands, mature plantation and ancient woodland habitats;
- aquatic habitats of a tributary of the River Sence;
- ponds and *Sphagnum* pools (a Local Biodiversity Action Plan habitat);
- terrestrial invertebrate populations; and
- protected fauna, including badgers, six species of bats, breeding birds, reptiles, and amphibians, including a great crested newt population.

Predicted Impacts

Habitat loss, fragmentation and isolation through land-take was the major impact identified, with a total of 138 ha, approximately 27% of the site area, being lost or heavily disturbed by quarry operations. A total of five non-statutory proposed Local Wildlife Sites and five parish designated sites would be lost as a result of the proposals.

Other impacts identified included effects on flora and fauna through habitat loss, fragmentation and isolation; noise and visual disturbance; impacts resulting from changes in air quality caused by dust or pollutants; alterations to groundwater, surface water flow and quality and also impacts associated with the proposed restoration scheme.

Mitigation and Compensation (Offsets) Measures Proposed

Specific biodiversity mitigation and compensation measures proposed by the developer include commitments to habitat translocation for hedgerows, lichen-covered rocks and lowland wet grassland; mitigation for protected species, including amphibians, badgers and bats; restoration and land management of the Bardon Hill Estate under a more extensive Biodiversity Action Plan than the current version; and the commitment to manage a degraded lowland heathland site outside the estate.

The biodiversity mitigation and offsets for the project were designed by the EIA Team (SLR Landscape and Ecology, and Aggregate Industries) and identified three types of potential biodiversity gains at Bardon Hill Quarry:

- 'Restoration gains'; *i.e.* habitat re-created on areas totally cleared by quarrying and associated activities.
- 'On-site offset gains'; *i.e.* on-site areas not directly impacted by quarrying that will be brought under appropriate conservation management and that are subsequently predicted to improve in condition.
- 'Off-site offset gains', *i.e.* off-site areas (Ratchett Hill) that will be brought under appropriate conservation management and that are subsequently predicted to improve in condition.

Offsets for two particularly high value habitat types found on site, lowland wet grassland and lowland heath, are discussed in more detail below.

Offset for Lowland Wet Grassland

Approximately 1 ha (26%) of the total area of MG4 grassland identified would be lost as a result of the development. To offset for the loss of this habitat the following measures have been proposed:

- the creation of new neutral wet grassland habitats in the new stream corridor;
- restoration and enhancement of approximately 8 ha area of semi-natural grasslands throughout the study area; and
- enhancement, through spreading green hay, of retained existing wet grassland fields within the estate (this has already commenced).

The developer also proposes to minimise residual losses of lowland wet grassland by translocating damp neutral grassland (NVC MG4 community) turves from existing habitats to an agreed donor site, and by translocating soils of species-rich grassland types, including a small area of soil currently supporting a dry meadow (NVC MG5) community. This work would be undertaken several years prior to agreed extraction to ensure some success before loss.

Offset for Lowland Heath: Ratchett Hill

The like-for-not-like offset at Ratchett Hill became available following a review of the developer's other landholdings in the area and through stakeholder discussions. It is proposed to bring 7.5 ha of derelict lowland heathland into active management at Ratchett Hill. A 2009 survey identified less than one hectare of open heathland habitat remaining, with the majority of site supporting secondary birch woodland and bracken. The aim of management, principally the selected clearance of trees and a change in grazing patterns, would be to create a mosaic of lowland heathland, mature oak and birch woodland, and natural rock outcrops.

Table 1. Offset scoring matrix

		Biodiversity Distinctiveness			
		Very Low (0)	Low (2)	Medium (4)	High (6)
Condition	Optimum (4)	0	8 [0.33]	16 [0.67]	24 [1.00]
	Good (3)	0	6 [0.25]	12 [0.50]	18 [0.75]
	Moderate (2)	0	4[0.17]	8 [0.33]	12 [0.50]
	Poor (1)	0	2 [0.08]	4 [0.17]	6 [0.25]

Table 2. Biodiversity losses and offset credits required

Phase 1 code	Habitat type	IHS code	Total area (Ha) [1]	Area lost (Ha) [1]	Condition	Distinctiveness	Matrix score	Offset credits required
1. Phase 1 habitats								
A1.1.1	Broad-leaved Semi-natural Woodland	WB3	16.4	1.3 (8%)	Good	3	0.75	1.0
A1.1.2	Broad-leaved Plantation Woodland	WB0	53.9	0	Moderate	2	0.33	0
A1.3.2	Broad-leaved Mixed Plantation	WB1	26.8	0	Moderate	2	0.33	0
A2.1	Dense/Continuous Scrub	WB2	4.0	1.0 (25%)	Good	2	0.5	0.5
A2.2	Scattered Scrub	UH0	1.7	0.3 (18%)	Good	2	0.5	0.15
B1.1	Unimproved Acid Grassland	GA1	0.1	0.1 (100%)	Poor	3	0.25	0.02
B2.1	Un-improved Neutral Grassland	GN1	8.3	1.7 (20%)	Moderate	3	0.5	0.85
B2.2	Semi-improved Neutral Grassland	GNZ	1.0	0	Moderate	2	0.33	0
B4	Improved Grassland	GI0	60.0	26.4 (44%)	Poor	1	0.08	2.1
B5	Marsh/Marshy Grassland	GNZ	0.9	0.8 (89%)	Poor	2	0.17	0.14
B6	Poor Semi-improved Grassland	GI0	85.2	12.6 (15%)	Poor	1	0.08	1.1
C1.1	Bracken (Continuous)	BR0	0.1	0.1 (100%)	Moderate	1	0.17	0.02
C3.1	Tall Ruderal	UH0	12.7	0	Moderate	1	0.17	0
D1.1	Acidic Dry Dwarf Shrub Heath	HE1	1.4	0.1 (7%)	Moderate	3	0.5	0.05
F1	Swamp	EM1	0.2	0	Good	3	0.75	0
G1	Standing Water	AS41	2.0	0.2 (10%)	Moderate	3	0.5	0.1
I1.1.1	Acid/Neutral Natural Inland Cliff	RE111	0.2	0.1 (50%)	Good	3	0.75	0.07
2. Specific habitat types and other biodiversity features of conservation concern								
n/a	NVC MG4 Damp neutral grassland habitats of high conservation value	GN1	3.8	1 (26%)	Good	3	0.75	0.75
n/a	Continuous hedge	LF11	12651	7517	Moderate	2	0.33	2480
n/a	Important hedge (Hedge Regs 1997)	LF111	7678	4202	Good	3	0.75	3151
n/a	Ancient semi-natural woodland	WB3	11.6	0	Good	3	0.75	0
n/a	Plantation on ancient woodland sites	WB3	22.5	0	Poor	2	0.17	0

[1] Or length in metres for hedgerows

Quantifying Biodiversity Losses and Gains

Post-project offset analysis was undertaken by SLR Consulting and The Biodiversity Consultancy to explore the utility of a simple metric to quantify biodiversity losses and gains predicted in the EIA. The analysis seeks to answer the question of whether 'no net loss' would be reached within 25 years, the timeframe of the project's Biodiversity Action Plan management commitment.

In the Treweek *et al.* (2010) system, the main ways to generate measurable biodiversity gains are by improving the condition of a particular habitat (*e.g.* by bringing a degraded lowland heathland into appropriate management) or by elevating distinctiveness category (*e.g.* by converting a Category 1 habitat such as 'improved grassland' to a Category 3 habitat such as 'unimproved neutral grassland' habitat).

Losses and gains were projected for all major habitat types at the site (based on Phase 1 habitat classification (JNCC 2003), converted to standardised Integrated Habitat System categories[2]). Additionally, losses and gains were projected for specific habitats and biodiversity features of conservation importance, for example NVC MG4 grassland, ancient woodland and hedgerows. Losses and gains were measured using the Treweek *et al.* (2010) metric of *Area*[3] *x Condition x Distinctiveness* (Table 1).

Assessing Habitat Condition

Current habitat condition at Bardon Hill and Ratchett Hill was assessed based on expert judgement. It would in theory be possible to draw on established methods to assess habitat condition, such as those used on nationally designated sites (Natural England 2008), but for the purposes of the present analysis we concluded that expert judgement was

sufficient to classify areas of habitat into four broad condition categories – optimum, good, moderate and poor.

Assessing Habitat Distinctiveness

There are no universally agreed methods for assessing levels of biological distinctiveness in the UK. A consultation exercise is currently underway within the framework of the Natural Capital Initiative[4] to test the extent to which consensus can be reached if ecologists assign UK habitats to distinctiveness categories *a priori* and without in depth assessment on a case-by-case basis. The preliminary results from this consultation were used to assign different habitat types a distinctiveness score from 0 to 3, where for example a score of zero would be assigned to hard surfaces, or 'technotope' (*e.g.* as applied by Kyläkorpi *et al.* 2005) and a score of 3 to BAP and Annex 1 habitat categories (EU Habitats Directive[5]).

Balance Sheet: Losses and Gains

The area of habitat to be lost, multiplied by the score from the Treweek *et al.* matrix (Table 1) gives the credits, or 'habitat units' required for the offset. If several habitat types are present, the assessment must be repeated for each one and the results summed to give the overall offset requirement. To achieve 'No Net Loss', the offset must deliver an overall ratio of 1:1 (or better) when offset gains are compared with the predicted losses due to development. In some projects, the offset ratio is set to be greater than 1:1 to account for temporal loss and uncertainty.

There are different ways of setting the appropriate ratio, for example through the use of multipliers (*e.g.* three units of compensation are required for every one unit lost), or through the use of economic time discounting models. Multipliers are simpler to apply but can be somewhat arbitrary, whereas time discounting rates can in theory be set based on empirical data, although for biological systems these data are often lacking. An alternative solution for dealing with temporal loss and uncertainty, although one that would not apply for this particular case study, would be for the gains to already have been achieved through 'habitat banking' (*e.g.* Briggs *et al.* 2009). The results of the loss and gains analyses are shown in Tables 2-4. Table 4 gives the balance of losses versus gains, both for a standard 1:1 ratio and for a 3:1 ratio (which was arbitrarily set to test the consequences of using a multiplier).

Table 3. Restoration gains (habitat re-created on areas totally cleared by quarrying and associated activities)

Habitat type	Area to be restored (Ha)[1]	Estimated condition in +25 years	Distinctiveness	Matrix score	Offset credits gained
1. Phase 1 habitats					
Broad-leaved Plantation Woodland	64	Moderate	2	0.33	21.1
Unimproved Acid Grassland	10.6	Moderate	3	0.5	5.3
Un-improved Neutral Grassland	4	Moderate	3	0.5	2
Semi-improved Neutral Grassland	5.5	Moderate	2	0.33	1.8
Acidic Dry Dwarf Shrub Heath	10.6	Moderate	3	0.5	5.3
Standing Water	2	Moderate	3	0.5	1
2. Specific habitat types and other biodiversity features of conservation concern					
NVC MG4 Damp neutral grassland habitats of high conservation value	1.0	Moderate	3	0.5	0.5
Continuous hedge	3300	Moderate	2	0.33	1089

[1]Or length in metres for hedgerows

Table 4. 'Balance sheet' showing losses due to mining and predicted gains due to restoration and offsets that are predicted to accrue over 25 years (the management commitment of the Bardon Hill Biodiversity Action Plan)

Habitat type	Area lost[1] (Ha)	Losses (offset credits)	Restor-ation gains (offset credits)	On-site offset gains (offset credits)	Off-site offset gains (offset credits)	Net position (if 1:1 ratio req'd)	Net position (if 3:1 ratio req'd)
1. Phase 1 habitats							
Broad-leaved Semi-natural Woodland	1.3 (8%)	-1.0		3.8		**2.8**	0.9
Broad-leaved Plantation Woodland	0	0.0	21.1	9.2		**30.3**	30.3
Broad-leaved Mixed Plantation	0	0.0		4.6		**4.6**	4.6
Dense/Continuous Scrub	1.0 (25%)	-0.5				**-0.5**	-1.5
Scattered Scrub	0.3 (18%)	-0.2				**-0.2**	-0.5
1b. Phase 1 woodland habitats	2.6 (2.5%)	-1.6	21.1	17.5	0.0	**37.0**	33.7
Unimproved Acid Grassland	0.1 (100%)	0.0	5.3			**5.3**	5.2
Un-improved Neutral Grassland	1.7 (20%)	-0.9	2.0	1.7		**2.8**	1.1
Semi-improved Neutral Grassland	0	0.0	1.8	0.2		**2.0**	2.0
Improved Grassland	26.4 (44%)	-2.1		0.0		**-2.1**	-6.3
Marsh/Marshy Grassland	0.8 (89%)	-0.1		0.0		**-0.1**	-0.4
Poor Semi-improved Grassland	12.6 (15%)	-1.0		7.8		**6.8**	4.8
1c. Phase 1 grassland habitats	42 (26.8%)	-4.1	3.8	9.6	0.0	**14.6**	6.4
Bracken (Continuous)	0.1 (100%)	0.0				**0.0**	-0.1
Tall Ruderal	0	0.0				**0.0**	0.0
Acidic Dry Dwarf Shrub Heath	0.1 (7%)	0.1	5.3	0.3	3.8	**9.3**	9.2
Swamp	0	0.0				**0.0**	0.0
Standing Water	0.2 (10%)	0.1	1.0	0.0		**0.9**	0.7
Acid/Neutral Natural Inland Cliff	0.1 (50%)	0.1				**-0.1**	-0.2
1d. Total - all Phase 1 habitats	138 (27%)	0.2	6.3	0.3	3.8	**61.8**	49.8
2. Specific habitat types and other biodiversity features of conservation concern							
NVC MG4 Damp neutral grassland habitats of high conservation value	1 (26%)	0.75	0.5	0.7		**0.5**	-1.1
Continuous hedge	7517	2481	1089	873		**-519**	-5480
Important hedge	4202	3152		869		**-2282**	-8585
Ancient semi-natural woodland	0	0		2.9		**2.9**	2.9
Plantation on ancient woodland sites	0	0		3.024		**3.0**	3.0

[1]Or length in m for hedgerows

Discussion and Conclusions

The analysis showed that 'no net loss' would be achieved for most habitat types at Bardon Hill. In most cases where there are losses, these are outweighed by much larger gains in a similar but more 'valued' habitat type. For example, there is a small residual loss of 'improved grassland', but this is outweighed by gains in 'unimproved neutral grassland' and 'unimproved acid grassland'. The most obvious exception is for hedgerows. Assuming that a 1:1 offset ratio is required, there would be a residual loss of -2,282 'units' (condition x distinctiveness x length in metres) for important hedgerows and -519 units for other continuous hedgerows. In this case, it would in theory have been possible for the developer to propose a 'like for like' offset for the continuous hedgerows at least by increasing the length of new hedge to be planted (important hedgerows cannot be replanted from scratch). However, the developer and restoration design team decided upon a restoration principally to woodland and heathland habitats in response to local stakeholder consultation and landscape character assessment, *e.g.* The National Forest Landscape Strategy.

In order to compensate for predicted residual losses in hedgerows, gains in other habitats such as dwarf shrub heath

(a Biodiversity Action Plan habitat), broad-leaved woodland, unimproved grassland, and other compensation measures proposed, are considered a 'like for not like' offset.

This paper provides the first 'field test' of the Treweek *et al.* (2010) method for measuring biodiversity losses and gains in the context of biodiversity offsets and demonstrates that the method can be successfully applied to a real-world example. Several issues and points for discussion that the authors noted are briefly discussed below.

First, it is worth noting that the 'area x distinctiveness x condition' metric (or a similar metric) can be applied to other kinds of biodiversity features, not just habitats. In the present study, a similar metric 'length x distinctiveness x condition' was used for hedgerows.

Second, distinctiveness category scores broad-leaved semi-natural woodland with a higher value than broad-leaved plantation. This may be the case for long-established semi-natural woodland, but may be difficult to justify in terms of woodland creation. It is typical for created woodland in restoration schemes to be planted, usually using a mix of native species. However, the methodology suggests that higher scores for offsetting can be gained from woodland allowed to naturally regenerate, as it is a more distinctive habitat. Dependent upon individual situations, *e.g.* distance from existing semi-natural woodlands and proximity of seed sources of non-native invasive species, woodland creation using plantation may, in the 25-year term we are considering here, lead to a higher quality woodland than natural regeneration.

Third, when estimating habitat condition in the Bardon Hill Quarry example, several issues required careful thought to ensure a pragmatic outcome:

'Optimum' condition implies that the habitat is in the best possible state; a condition that rarely is achieved in the real world. For the example presented, we have interpreted this category pragmatically, using it where a habitat could be considered to be in favourable condition and is stable or improving (using terminology defined by Natural England for condition assessments of SSSIs).

In the UK, it is difficult to avoid 'condition' and 'distinctiveness' scores being conflated to a degree, because management is often the main factor determining distinctiveness. This was particularly apparent when considering condition scores for grassland habitats. We decided that the condition of heavily man-modified agricultural grasslands should use the semi-natural habitat equivalent as a reference mark; *i.e.* all semi-improved and improved neutral grasslands are compared to the unimproved neutral grassland type. In this way improved grassland is assessed as poor condition for the neutral grassland type; rather than assessing improved grassland as being habitat in optimum condition for fattening cows. In practice, our interpretation was such that improved grassland could only achieve a condition score of Poor–Moderate and semi-improved grassland Poor–Good. This approach avoided an apparent overstatement of the biodiversity value of agricultural grasslands.

Notes

[1] http://ec.europa.eu/environment/enveco/index.htm

[2] Integrated Habitat System (HIS) was used because it encompasses all UK terrestrial, freshwater and marine habitats, including European and BAP habitats (www.ihs.somerc.co.uk). It is also now widely used at local and regional scales for mapping and collating habitat data recorded in other classifications (*e.g.* Butcher 2008, SERC 2007).

[3] Or *length x condition x distinctiveness* in the case of hedgerows

[4] www.naturalcapitalinitiative.org.uk

[5] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

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This article represents the personal view of the authors, using data in the public realm collected by Aggregate Industries UK Ltd to support its current planning application. This article is not intended to influence or prejudge the outcome of this application.

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The Olympic Park – A Biodiversity Action Plan in Action

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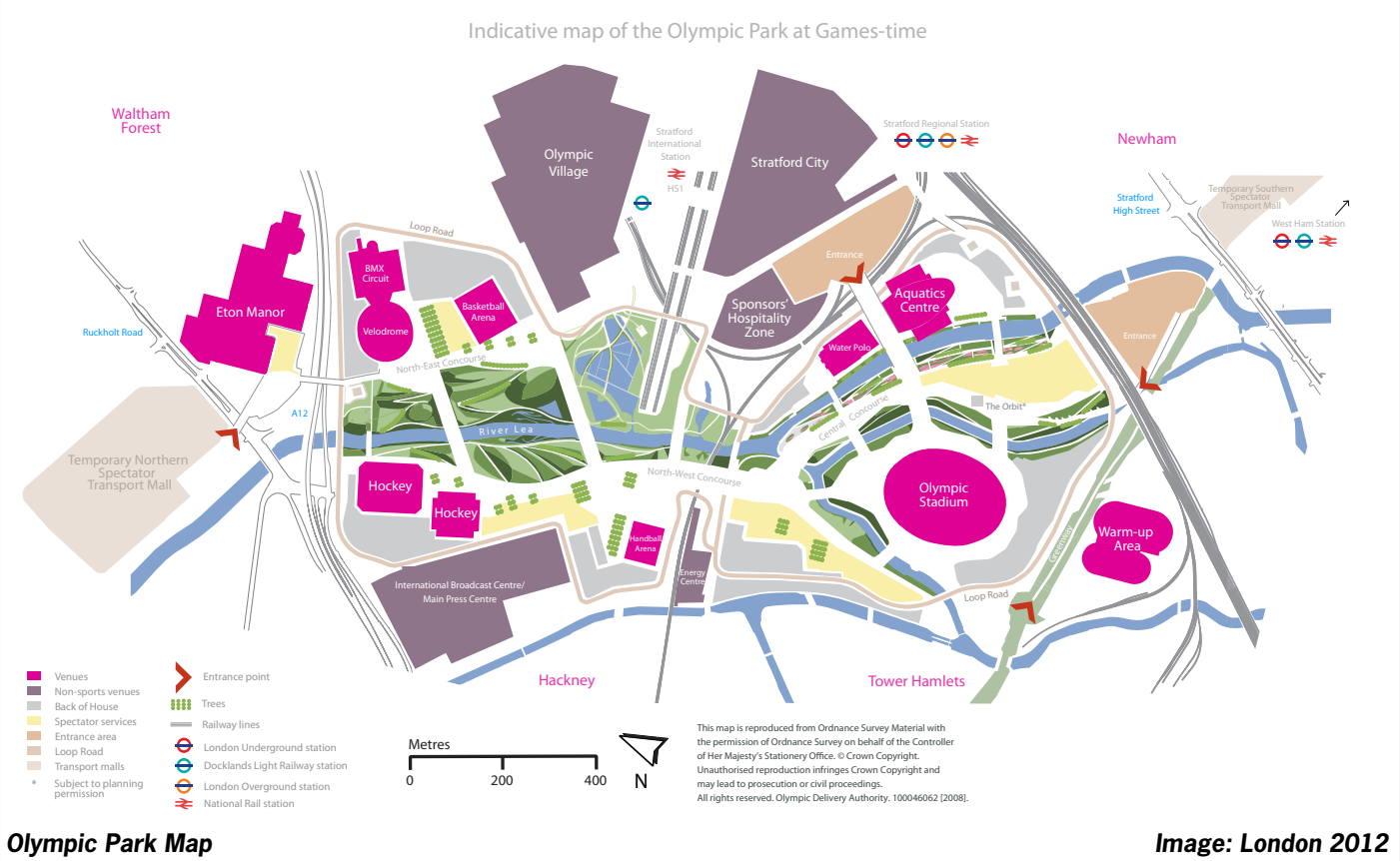
The London 2012 Games are styled as 'the green games', aiming to be the most sustainable Games ever held. The preparation of the Olympic Park site included clearance of large areas of industrial, and often contaminated, land across 246 hectares in East London. When working on such a vast project, with a non-negotiable deadline, there could always have been a risk that the promises made when planning permission was granted could have gradually fallen by the wayside as site clearance and construction progressed. This article explores the history of the project to date, and shows how the production of a scheme-specific Biodiversity Action Plan (BAP) has helped ensure that the opportunities provided by the transformation of the site were not missed.

Before site clearance began, the area that is being transformed into the Olympic Park was dominated by industrial development. Despite this, it was not an area devoid of biodiversity; a series of inter-linked waterways flow through the Park, eventually joining the Thames to the south, while patches of wetland, scrub, trees and brownfield habitat formed a series of wildlife 'islands' surrounded by the urban landscape. Whilst the intrinsic biodiversity of each patch may not have been of particular note in a different context, their urban setting increased their effective value. Some of the areas were covered by non-statutory designations, including water courses within two Sites of Metropolitan Importance, and wetland, woodland and wasteland within four Sites of Borough Importance (Grade I) and one Site of Borough Importance (Grade II).

The site spreads across the boundaries of four London Boroughs: Hackney, Newham, Tower Hamlets and Waltham Forest. In 2006 a new area-specific planning authority was created, the Olympic Delivery Authority (ODA). This body was created under the London Olympic Games and Paralympic Games Act 2006 and works in close consultation with the Local Planning Authorities and statutory and non-statutory consultees. The outline planning application for the Olympic Park was submitted in 2007.

It is difficult to envisage the Environmental Statement that would be required to assess the impacts of redevelopment across almost 250 hectares of land. In order to provide a meaningful assessment, the Park was divided into a series of fifteen 'Delivery Zones' so that baselines and impacts could be described for a series of individual areas, and then viewed cumulatively. Permission was granted in 2008. However, at that stage the detailed design of individual buildings, bridges, roads and parkland areas had not been prepared. The planning permission was therefore granted subject to numerous conditions, and the planning decision notice



Olympic Park Map ***Image: London 2012***

itself totals 168 pages in length. The conditions included one specifically for biodiversity:

Biodiversity Action Plan	
OD.0.11	Before 30 September 2008, the Biodiversity Action Plan, which shall be based on the Biodiversity Action Plan Framework submitted with the application, shall be submitted to the Local Planning Authority for approval. This shall clearly identify the areas of recognised wildlife habitat to be provided and the means by which these will be maintained.
Reason:	To help achieve biodiversity objectives and protect habitats and species.

The production of a scheme-specific BAP may not be justified in many small development projects, but for the Olympic Park the BAP was critical to ensure commitments made in the Environmental Statement are delivered on the ground. As detailed design progressed, the BAP, and supplementary guidance, provided clear targets, such as a specific number of bird and bat boxes to be incorporated into the design of individual bridges.

During site clearance, the requirements of the BAP meant that measures to protect wildlife were not limited to the familiar 'headline' legally protected species. For example:

- Four thousand smooth newts were translocated to new and existing ponds off site.
- Where existing habitat could be retained, clearly labelled fencing was used to demarcate protected areas. These protected areas were identified on a map as a requirement of a planning condition, so works could not impinge on them unless the ODA had given prior approval.
- At the start of site clearance a log wall was created in the north of the Park, helping to provide some temporal connectivity for the invertebrates displaced during the subsequent habitat clearance elsewhere across the site. These invertebrates should be able to spread again to colonise newly created habitat as the site matures.
- Experimental translocation of brownfield habitat was also undertaken at Thornton's Field railway sidings. Pre-clearance site surveys revealed a variety of invertebrates, such as the toadflax brocade moth. Ballast, soil and timber sleepers were carefully moved from this area to a part of the Park where they would not be disturbed.
- Across the site, a 'permit to clear' system was used, so that no area of habitat would be removed until site ecologists had confirmed in writing that any issues had been resolved.

The BAP set out commitments that had to be met as the detailed design of parkland areas evolved. It also ensured that key works were programmed in correctly, so that opportunities were not missed. One example is provided by the planting trials on the

New brownfield habitat provided by log wall
Photo: Atkins Ltd

The Olympic Park ***Photo: London 2012***

challenging riverside areas, described by Ian Morrissey of Atkins, London 2012's official engineering design provider, in another article. Among the terrestrial habitats, seed collection and sapling translocation were undertaken. The areas of wetland being created should be suitable for reintroduction of water voles once the habitats are well established; to prepare for this, mink monitoring is already being undertaken. As the range of otters continues to expand, occasional records are made in the London area. In order to help ensure that they can colonise the Lower Lea valley if and when they spread that far, two artificial holts are being installed in the north of the Park.

Overall, an impressive list of habitats will be created. The Park is one of the largest to be created in Europe for over a century with large areas, totalling 45 hectares, planned to support BAP priority habitats. The south park will be dominated by more ornamental planting, while the north park will have more 'natural' native planting, incorporating habitats that would once have been widespread in the Lower Thames Basin. The Park will include 10 hectares of native trees and shrubs, nearly two hectares of reedbeds and ponds and over 20 hectares of species-rich grassland. Room has been found for brownfield habitats, such as the extensive log walls created at East Marsh, resisting the temptation to only create 'tidy-looking' habitats. This habitat creation will be supplemented by other activities, such as the creation of living roofs on some buildings and the installation of 675 bird and bat boxes to provide roosting and nesting opportunities as the vegetation matures.

The success of these measures is not taken for granted. A BAP monitoring programme is ongoing during construction and the Games time phase of the site. After the London 2012 Olympic and Paralympic Games, the 'transformation' phase will convert the Park into the 'Legacy' site. Monitoring will then continue under a 10-year Maintenance and Management Plan for the Parkland and Public Realm. The overall target of the BAP for habitat creation is 45 hectares of BAP priority habitat. This will be monitored, with management adapted if needed. The aim is to reach a point where the habitats' quality is such that the 45 hectares is worthy of designation as at least a site of Borough Importance (Grade I) within the Greater London designation system.

In conclusion, while the client's and contractors' commitment to following biodiversity guidance is essential to the success of any project, another important factor is the mundane process of getting the paperwork right. On a large and complex scheme like the Olympic Park, a site-specific Biodiversity Action Plan can provide a consistent point of reference to guide design and site works. In this case, the production of the BAP has helped to ensure that the project will create an end product that provides genuine biodiversity benefits.

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Delivering Wetland Biodiversity in the London 2012 Olympic Park

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Appointed as the river edge engineers for the London 2012 Olympic and Paralympic Games, Atkins is responsible for the design of the wetland and river edge habitat enhancement works in the Olympic Park. Working alongside the Park's landscape architects (LDA – Hargreaves), and with the Olympic Park Biodiversity Action Plan (BAP) (ODA 2008) document providing the reference for biodiversity requirements, 2.3 ha of wetland habitat have been designed to provide ecological gains inside the Park's waterways. Although the wetland habitats equate to less than five percent of the overall 45 ha of BAP habitat to be created in the Park's landscape, when completed, they will form an area the size of three football pitches containing 40 wetland plant species and a total of approximately 300,000 wetland plants, making it one of Europe's largest urban river edge habitat enhancement programmes to date.

Located in East London's Lower Lea Valley, the River Lee and its associated waterways form an arterial route through the Park and as such will provide a significant focus during both the Games and following transformation into the legacy period. The landscape architect's vision to bring the once neglected river systems into the Park Landscape by opening up the river corridor and reducing bank slope angles will significantly improve access to the public, connecting visitors with the various wetland elements including reedbeds, wet woodlands, amphibian ponds and ecologically enhanced river edges.

Extents

From a wetland habitat diversity perspective the Olympic Park can be broadly divided in two. To the north lies the ecological park, containing the majority of the wetland features alongside the River Lee, and in the south, around the stadium island, there are smaller ecological gains for the Waterworks River and Bow Back canal systems. The focus in the North Park will be the wetland bowl area containing two online reedbeds in direct hydrological connectivity to the river. These will total over 5,000 m^2 and be composed mainly of common reed *Phragmites australis*. An additional reedbed to the north of the bowl will provide an extra 550 m^2 of this, a UK BAP priority habitat known to support an abundance of insect, amphibian and bird life. Within the reedbeds, wetland channels have been designed to increase habitat complexity, maximise reed edge extent and provide refuge for a range of fish species including eel *Anguilla anguilla*, a London 2012 BAP priority species.

'Soft' bio-engineered banks (2.5 km in total), planted with wetland species will maintain longitudinal ecological connectivity through the North Park, connecting the larger wetland features including two wet woodland habitats and a number of amphibian ponds. Two new wet woodlands, totalling 0.4 ha will provide off-river habitat, with excavated channels to maintain hydrological and ecological connectivity with the River Lee. These areas were designed to retain waters from the Lee during periods of impoundment as a result of the new water level control structures at Three Mills Island. The wet woodland habitats are being planted with a mix of shade tolerant sedge species and trees, with birch, alder and black poplar on raised features within the landform. Shallow depressions were also designed into the wet woodlands to hold standing water and provide a range of moisture gradients across the habitat. Marginal wetland flowering plants are being used in such areas adding species richness to the habitats.

Wetland planting is also being provided for three new amphibian ponds, summing 0.2 ha. All of the ponds are fed by drainage waters from the Park's concourse, with the largest having been designed with an adjustable feed from the River Lee to allow maintenance of a permanent water level. The maintained water body will be planted with a range of plants including oxygenating submerged aquatics *e.g.* rigid hornwort *Ceratophyllum demersum* and species such as water forget-me-not *Myosotis scorpioides* to provide suitable egg laying sites for newts. A series of log walls installed alongside the ponds will increase ecological value through the provision of habitat for invertebrates and hibernation sites for amphibians.

Planting Trial

In order to inform the wetland designs and reduce the risk of wetland plant failures in the final design an on-site riverside

Figure 1. View of planting trial following installation in 2008 ***Photo: Atkins Ltd***

planting trial was undertaken to investigate and advise on wetland plant species selection, plant installation techniques, species specific planting elevations and potential environmental constraints to wetland plant establishment and performance. Of particular concern to the designers were the effects of changing river levels arising from the impoundment of the River Lee, to the south of the Park. These flow control structures have changed the river regime from an inter-tidal habitat to a freshwater fluvial system experiencing a twice daily rise and fall in river level of typically 400 mm as the Lee becomes tide-locked at Three Mills Island. This was identified as presenting a potential constraint to the successful establishment of the wetland plants along the river edge as well as having implications for the range of species that were suitable for installation and hence overall wetland habitat biodiversity.

The planting trial was established in the north of the Olympic Park in September 2008 along a 50 m length of river bank extending from mean low water level (2.4 m AOD) to a top bank level of approximately 4.2 m AOD, an elevation of 1.8 m. The trial platform was divided into eight separate treatment areas across which a total of 15 species of wetland plant were trialled over a period of 12 months (see Figure 1). Of these, seven species were key to our conceptual designs for the river edges and large wetland features: common reed *Phragmites australis*, purple loosestrife *Lythrum salicaria*, reed canary-grass *Phalaris arundinacea*, lesser pond sedge *Carex acutiformis*, common club-rush *Schoenoplectus (Scirpus) lacustris*, reed sweet-grass *Glyceria maxima* and yellow iris *Iris pseudacorus*.

The relative success of the different planting techniques and approaches was investigated through the assessment of the performance of wetland plants installed on the river bank as either pre-established coir pallets, (plants established in a 2x1x0.1 m coir coconut fibre mattress pegged on to the planting platform, see Figure 2) or as plug plants (plants grown in root trainers and plugged directly into the river bank substrate). Plants were installed at a standard density of 20 m^{-2} across the trial area to ensure that comparative analysis between treatments could be undertaken. The influence of bank form was also qualified with the plants being installed on both sloped (1 in 2.5) and terraced platforms. But perhaps most importantly, the influence of the frequency and duration of inundation by the river was examined. This was achieved by running the planting trial in conjunction with a water level monitoring programme which, when combined with

Figure 2. Pre-established coir pallet ***Photo: Atkins Ltd***

planting trial area elevations, allowed the calculation of plant inundation depths and frequency of inundation in response to fluvial flow variability and the effects of tidal fluctuations. The performance of the plants was assessed through a combination of biometric monitoring undertaken seasonally and by monthly repeat fixed-point photography to assess plant establishment progress. Biometric monitoring included the calculation of percentage cover and the measurement of average height achieved by the installed species at different elevations to determine establishment success.

Moving Forward

In response to the trial findings, poor performing and failing species were removed from the final planting arrangements and replaced with those plants shown to have established successfully over the year-long monitoring period. The trial results were used to make informed decisions on the appropriate topographies across the larger wetland features and the need for fine adjustments to be made to the final planting arrangements. This took the form of relocating certain species to more appropriate river bank levels *e.g.* movement of reed canary grass to higher bank elevations.

The trial successfully validated our approach of using pre-established coir pallets as the preferred planting installation technique to be adopted along the river banks and larger wetland features. This was demonstrated by the greater success of plants when installed as pre-established coir pallets compared to the same species trialled as plug plants. For example, percentage cover and height achieved over the trial period by reed sweet-grass installed as pre-establish coir pallets was 75% and 425 mm respectively, compared to 2.5% and 250 mm for the same species when installed as a plug plant. The trial also provided some very useful pointers as to the potential effects that land contamination could have on the final planting arrangements with leachate causing plant failures in certain trial areas. This highlighted the value of the remediation programmed to be undertaken after the trial by the Enabling Works contractor along the river banks. The negative effects of wildfowl grazing on plant establishment were also observed at trial resulting in the incorporation of temporary wildfowl fencing into the landscaping programme to exclude bird grazing pressure up to the Games period.

The planting trial proved a vital tool in allowing us, as designers, to evolve and finalise the approach in the delivery of wetland biodiversity in the Olympic Park. As described in my colleague's (Claire Wansbury) article, the eventual aim is for the quality of the individual wetland habitat elements to meet appropriate criteria for their designation as a site of Borough Importance. The ethos of maximising opportunities and designing for wider ecology, coupled with the commitment to monitoring and undertaking appropriate management, will go a long way to achieving this goal. The environments created will provide a significant betterment to the habitat diversity and ecological connectivity of the waterways in the Lower Lea Valley, transforming a once neglected river corridor characterised by high levels of contamination and a prevalence of invasive species, into an area containing 2.3 ha of new wetland Olympic Park BAP habitat.

References

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Otters in Scotland: How Vulnerable Are They to Disturbance?

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The otter population in Scotland is increasing and their distribution is expanding; the fourth national Scottish survey confirmed that the species is present on all of Scotland's major watercourses (Strachan 2007). Otters are also expanding into rest of the UK, with the last England national otter survey recording positive evidence throughout England (Crawford 2003). This expansion in numbers, following improvements in water quality and subsequent increases in fish stocks, along with reduction in persecution and an increase in their level of legal protection has led to the species venturing more often into urban areas. In 2002, the Water for Wildlife Project found otters in over 100 towns and cities throughout the UK, with 13 urban areas having resident breeding populations (Wildlife Trusts 2002).

Strachan's 2007 study found that otters have moved into urban areas, such as Edinburgh and Glasgow, and reported that the species seemed unaffected by human activity. However, our experience of working in remote areas suggests that it is not just individuals living in urban environments that are tolerant of such disturbance. Through working on a variety of development schemes across Scotland, where otter resting sites of varying degrees of importance have been recorded, the author and colleagues within Atkins have established an appreciation of the susceptibility of otters to disturbance. This article presents these case studies and discusses to what degree otters are actually affected by human disturbance.

Observations by Kruuk and colleagues (Chanin 2003) indicate that otters will rest under roads, in industrial buildings, close to quarries, and at other sites close to high levels of human activity. These observations clearly indicate that otters are very flexible in their use of resting places and breeding sites and do not necessarily move away to avoid 'disturbance' from noise or the proximity of human activity (Kruuk 2007). Durbin (1998) studied otters on the Rivers Dee and Don (North East Scotland) but no evidence was found to suggest that otters actively avoid areas of human activity, either when foraging or when resting. This has been supported by the survey findings of Atkins' ecologists which have included otter resting sites immediately adjacent to roads, next to railway lines and in the middle of golf courses. Otters have also been seen passing under a railway bridge in broad daylight, whilst construction work was occurring directly above. All of these observations support the theory that otters are able to tolerate and become habituated to a degree of disturbance and noise.

Legislation

A summary of the legislation protecting otters in Scotland is given in Table 1. The legislation does not contain a definition of the term 'disturbance'. However, some guidance is provided by the European Commission (EC) (2007) and in a joint guidance note produced by Natural England and the Countryside Council for Wales (2007) on the interpretation of disturbance in relation to legally protected species. The EC guidance says that disturbance need not directly affect the physical integrity of a species but can nevertheless have a direct negative effect that is detrimental for a protected species, *e.g.* by reducing survival chances, breeding success or reproductive ability. For example, this could apply to anything that deters an otter from using its holt or anything that prevents an otter moving along a watercourse. The guidance goes on to define 'disturbance', in terms of Article 12, as any disturbing activity that affects the survival chances, the breeding success or the reproductive ability of a protected species or leads to a reduction in the occupied area. On the other hand, sporadic disturbances without any likely negative impact on the species should not be considered as disturbance under Article 12.

The EC recommends a species-by-species approach to be taken as different species will react differently to potentially disturbing activities. Therefore, the decision as to whether a project will cause disturbance that would result in an offence is left to the specialist otter consultant and the statutory nature conservation agency.

The legislation protects structures and sites that are used for shelter, protection, resting or breeding; these are referred to hereafter as resting sites. In Scotland, Scottish Natural Heritage's stance usually dictates that any resting site within 30 m of development of any scale and duration requires a European Protected Species (EPS) licence for 'disturbance' (and 100-200 m in the case of breeding sites, depending on the local circumstances). These licensing zones were agreed following consultation with a number of UK otter experts. While they may appear somewhat

Table 1. Legislation protecting otters in Scotland

Legislation	Offences
Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) Reg.39.	Deliberately or recklessly capture, kill, injure, harass or take an otter; Damage or destroy a breeding site or resting place of an otter (note this is a strict liability offence *i.e.* the act does not have to be deliberate or reckless) Deliberately or recklessly disturb an otter while it is occupying a structure or place it uses for shelter or protection Deliberately or recklessly disturb an otter while it is rearing or otherwise caring for its young Deliberately or recklessly obstruct access to a breeding site or resting place of an otter or to otherwise deny it the use of the breeding site or resting place Deliberately or recklessly disturb an otter in a manner that, or in circumstances which are likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young; and Deliberately or recklessly disturb such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs.

arbitrary, it is useful to have a standard basic distance defined within the guidance so that developers are clear about what is likely to be required. Having no such distance defined puts the onus heavily on the developer to demonstrate that works close to an otter shelter will not cause disturbance, which is unworkable in practice. However, in some cases, the effort and timescale involved in obtaining a licence seems disproportionate to the actual risk of 'disturbance' due to the scope or the timescale of the works, especially when having a precautionary method of working (PMW) in place could avoid any adverse effects. A PMW is a document that sets out how works will be undertaken where it is considered reasonably unlikely that the proposed works will result in an offence. It is a method statement that details reasonable precautionary measures to be adopted throughout the works to avoid negative effects on otters.

It is the status of the resting site which is crucial in the assessment of whether 'disturbance' will occur, together with a sound understanding of the nature of the proposed works. Standard survey guidance does not provide a methodology for assessing status; surveyors should use their knowledge of otter behaviour to assess the importance of a resting place and thus to determine the likely impact of any proposed development. A summary of guidance for assigning status of otter resting sites, produced internally within Atkins, is provided in Table 2. Once the status of a resting site has been determined, the scale and duration of the proposed works should be considered to determine potential impacts.

Table 3 presents information on sites in Scotland where EPS licences have been obtained to allow works to be undertaken within 30 m of a resting site. The table provides information on the type of resting site (holt, hover or couch) and its status (high, medium or low).

The nine project examples in Table 3 include works done in already highly disturbed locations (urban areas or sites subject to human disturbance, for example in close proximity to road or rail links) and works in remote locations (which are all relatively undisturbed by humans and are situated away from urban conurbations, roads and dwellings). All of the developments were relatively small scale

Table 2: Summary of guidance for assigning status of otter resting sites (Emma Roper, Atkins internal document)

Resting site status	Definition
Low	Feature with limited evidence of otter activity - low number of spraints, not all age classes present. Insufficient seclusion to be a breeding site or key resting site, unlikely to have links to the key otter requirements. Most likely to provide a temporary 'stop off' for otters when moving through their territory. Loss/disturbance of such a feature is unlikely to be significant in terms of the individual or population.
Moderate	Feature containing sprainting with a range of age classes, but not in significant quantities. Availability may be limited by season, tides or flow. Unlikely to be suitable as a breeding/natal site but will be a key resting site and may be linked to other important features within the territory. The impact arising from a loss or disturbance of such a feature will be determined by the availability of more suitable or well used sites within the otter's territory.
High	Feature has a high level of otter activity, including an abundance of sprainting of all age classes, large spraint mounds, well used grooming hollows, paths and slides. Affords a high degree of cover and is linked to key features such as fresh water and abundance of prey. May be suitable as a breeding area (spraints may be absent from natal holts). The site is usually available at all times of year and at high and low tide/ flow. The loss/ disturbance of such as feature will often be considered significant in terms of the individual or population.

but some of them had a long duration. Examples of works include pipeline installation, outfall installation, upgrades to treatment works and rail defence work. None of the schemes involved night working, nor did any of the works directly obstruct the entrance to the resting site or prevent otter passage. None of the schemes resulted in any long-term increases in the presence of humans or in increased levels of noise or other disturbance. Based on the evidence in Table 3, otters continue to use resting sites near development schemes during and immediately following the works period, with similar activity levels to those recorded prior to the works. Further details of three of the case studies are provided below.

Case Study 1: Glasgow Suburbs – Minor Works in an Urban Area

These works comprised an upgrade to an existing outfall to improve the water quality along a burn, which would ultimately enhance the burn for otters, through likely increases in fish. A low status hover, approximately 18 m from the works, provided limited shelter. Interpretation of the field evidence suggested that otters would not be disturbed by the works and that a legal offence under the Habitat Regulations was unlikely given the following factors:

- the hover only offered limited shelter and was not suitable for prolonged day time use;
- the burn formed a peripheral part of an otter's territory and was not regularly patrolled;
- all works would be conducted during daylight hours when otters would not be using the hover and commuting would not be disrupted;
- alternative shelters were present 140 m upstream and 150 m downstream;
- the site was located within a urban area, where otters would already be habituated to a degree of human disturbance; and
- the nature of the works did not require any vegetation removal immediately around the hover and the hover would not be directly affected as works were located 18 m from the structure.

However, following consultation with SNH, it was advised that an EPS licence would be required for the scheme as the hover was within 30 m of the works. The licence included conditions to prevent disturbance such as limiting works to daylight hours, supervision of works by an ecologist and setting up a 10 m exclusion zone around the resting site. Surveys were undertaken prior to, during and following the works to assess the use of the hover. These surveys located a fresh spraint during the construction period and following construction, indicating that otters had continued to use this reach of the burn. This suggests, in the absence of any legal definition of the term disturbance, that otters had not been 'disturbed' by the works or at the least, the disturbance caused by the works was minimal and not measureable.

Case Study 2: River Clyde - Major Excavations in an Urban Area

Even in urban locations, it is expected that otters would be disturbed by major works occurring very close to holts, but evidence has been recorded showing that otters continued to use holts close to major works. At a site along the River Clyde, adjacent to a railway station and heavily used by dog walkers, a holt was located close to proposed pipeline construction works. The year-long works involved major excavations and the use of large machinery within 5 m of the holt (Holt 1 in Photo 1). A second holt (Holt 2 in Photo 1) had been recorded 50 m from the nearest work, which was considered to provide an alternative resting site during the works. It was considered likely that the works would result in an offence under the Habitats Regulations because the noise and high level of human activity could result in the otter avoiding use of this moderate status holt for a year or longer, which was considered to constitute

Table 3. Sites in Scotland where EPS licences have been obtained to allow works to be undertaken within 30 m of a resting site

Location	Type and status of resting site	Distance from works to resting site	Duration of works	Activity levels		
				Pre construction	**During construction**	**Following construction**
Urban sites						
Glasgow suburb	Hover - Low	18 m	11 weeks	Spraints: 1 recent, 3 old	Spraints: 1 fresh and 4 old	Spraints: 1 recent (plus spraints recorded during previous surveys)
Loch Fyne (within 2 m of road)	Holt - High	15 m	1 week	Spraints: 2 fresh, 1 recent, 20 old	Check not undertaken due to short duration of works	Spraints: 4 fresh, 1 recent (plus spraints recorded during pre-construction survey)
Helensburgh	Holt - Moderate	5 m	1 year	Spraints: 1 fresh, 3 recent and 2 old	Visit 1: 2 recent Visit 2: 2 fresh, 2 recent, 4 old	Spraints: 1 fresh tar spot and 10 old
Remote sites						
Isle of Lewis	Holt -Moderate	15 m	2 weeks	Spraints: 10 fresh	Spraints: 1 very fresh	Spraints: 9 recent and 1 fresh
Scottish Boarders	Holt - High Hover - Moderate	10 m 20 m	1 week	Spraints: 9 old Very fresh spraint	Check not undertaken due to short duration of works	Spraints: 1 fresh Spraints: 4 old (as recorded during post construction) Abundant fresh and recent spraint was record along the river between the two resting sites
Inverclyde	Couch - High Couch - High	40 m	6 weeks	Spraints: 6 old Spraints: 4 fresh, 4 recent and 3 old	Spraints: 1 recent, 6 old As pre-construction with fresh feeding remains	None Spraints: 1 recent High levels of fresh and recent feeding remains recorded around water body
Kilmelford	Works adjacent to important commuting corridor. Licence for a holt within 15 m of works, but this naturally slumped prior to start of construction	15 m	37 weeks	Spraints: 1 old Large amount of sprainting round loch	Very fresh spraint	Spraints: 1 very fresh and 1 old
Howdon	low status, open air resting site and grooming hollow	30 m	8 weeks	No evidence – heavy rainfall had washed out much of the site	Not undertaken	Otters seen by site operatives, footprints were recorded
Stromeferry	Holt - low Couches - high	10 m	23 weeks	Not surveyed	Regular sighting of otter reported during construction period	Fresh and recent spraint recorded

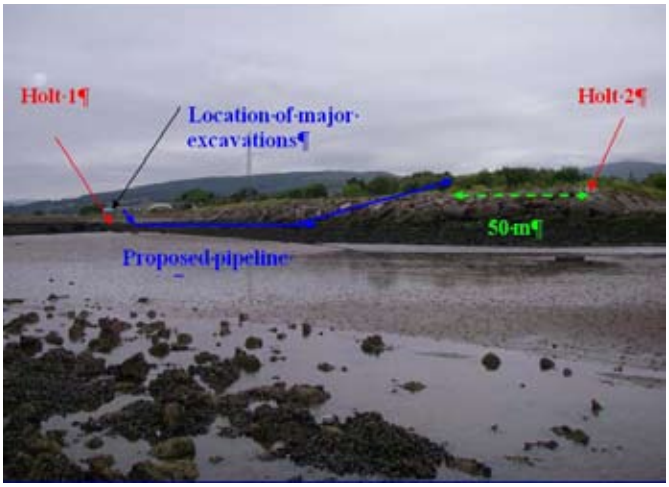

Photo 1. Case study 2 - works and holts along the River Clyde

disturbance. The EPS licence ensured that an exclusion zone was set up around Holt 1 and a tool box talk was provided to the site operatives to make them aware of the potential effects on otters.

Surveys undertaken during the construction period recorded fresh spraints on more than one occasion within Holt 1, along with a strong characteristic smell of otter. Despite having a similar holt available further away from the works, the otter chose to use its favoured resting site. Given the level of otter activity recorded it is considered that the otter was undisturbed by the works or at the least, the disturbance caused by the works were minimal and not measureable.

Case Study 3: Isle of Lewis – Minor Works in a Remote Area

It is not just in urban locations that otters have been found to be resilient to disturbance. For example, a site in a remote area of the Isle of Lewis, where a new section of waste water pipeline was

required across a remote peninsula (approximately one hour's walk to the nearest road!). Here a vast amount of otter evidence was recorded, along with various holt structures across the peninsula. Given the remoteness of the area, it was considered that any otters present would be highly sensitive to disturbance, especially as a suspected natal holt was recorded within 200 m of the new pipeline route. The nearest structure to the works, a moderate status peat burrow holt was located within 15 m of the new pipeline. The assessment considered that an offence would occur as a result of the works, as the otter was likely to be disturbed by the presence of humans at this remote site and would avoid using the resting site. An EPS licence was granted to allow the pipeline installation to take place in proximity to this holt. Immediately prior to the works a large amount of fresh spraining was recorded at the burrow (approximately 10 spraints). The works were supervised by an ecologist, with a tool box talk given to the contractors to make them aware of the site sensitivities and an exclusion zone was established around the resting site. A fresh spraint was recorded at the holt during the construction works.

Following the works, survey was undertaken; this found nine recent and fresh spraints at the entrance to the peat burrow demonstrating that otters were still highly active in the area despite the recent human disturbance. The evidence found during and following the construction works demonstrates that otters will continue to use favoured sites during and after works. This indicates that in this case at least, it was not adversely affected by short term human disturbance; in the absence of a legal definition, this suggests that otters were not 'disturbed' by the works or at the least, the disturbance was minimal.

Photo 2. Case study 3 - works on a remote peninsula of the Isle of Lewis

Summary

The case studies described above and in Table 3 indicate that otters often continue to use resting sites and watercourses throughout the duration of works, even works involving major excavations and over a long period of time. This indicates that, over the monitoring period, the local distribution of otters has not been significantly affected by the works. In terms of the other offences, the case studies show that, at worst, the effects of 'disturbance' were minimal and not significant and, at best, that otters were not 'disturbed'. These case studies can be set in the context of the EC (2007) guidance that sporadic disturbances without any likely negative impact on the species should not be considered as disturbance under Article 12. This leads on to the suggestion that if there are no likely negative impacts from specific works associated with development on the species, such works should not be considered as disturbance under the legislation. Longer-term monitoring studies are required to determine whether the works may have impaired the ability of an otter to successfully breed or have affected the abundance of the species.

It is clear that EPS licences are essential wherever an offence might occur, to ensure an appropriate degree of control over the construction process and protect the developer from potential prosecution. The licensing system and the agreed zones simplify the process of assessment and remove the need for lengthy debate about what does and does not constitute a disturbance offence. However, in some cases, the effort and timescale involved in obtaining a licence seems disproportionate to the actual risk of 'disturbance' due to the scope or the timescale of the works, especially when having a precautionary method of working in place could avoid any adverse effects. The case studies above suggest there may be some projects where a precautionary method of working rather than a licence is a more pragmatic approach to take. Such a decision should be taken following discussions between the Statutory Nature Conservation Organisation (SNCO) and a specialist otter ecologist, in the light of experiences such as those documented here. Longer-term monitoring would be useful, to check that populations are still present some years after construction. Collation of that information to get a country-wide picture, would allow such decisions to be made with a greater degree of confidence.

Acknowledgements

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Valuing Bats in Ecological Impact Assessment

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Since their publication in 2006, IEEM's *Guidelines on Ecological Impact Assessment in the UK* have provided a standard approach and structure for ecological impact assessments (EcIAs) which has been hugely beneficial. However, while the process of assessing impacts on habitats and species (receptors) is described in detail in the guidelines, the valuation of receptors, on which the rest of the assessment depends, was considered too complex to include. Valuation of receptors therefore remains entirely a matter of professional judgement for ecologists preparing EcIAs. This article provides a framework for valuing bat roosts, commuting routes and foraging areas which is, as far as possible, objective in the hope that increased consistency in this aspect of EcIA can also be achieved.

In our experience, bats can be amongst the hardest of receptors to value consistently. Their highly mobile nature, combined with a high level of legal protection and conservation concern (seven species are UK Biodiversity Action Plan priority species), means that roosting, commuting or foraging bats are likely to be a potential issue on almost any development site, but it does not follow that every site is necessarily valuable for bats.

It has been argued in some EcIAs that any valued ecological receptor (VER) relating to bats is of national or international importance due to their level of legal protection. This approach is erroneous, conflating legislative and policy matters with ecological principles.

This article is based on a paper (Wray *et al.* 2007) presented at the 'Advances in EcIA for Mammals' symposium run jointly by the Mammal Society, Zoological Society of London and IEEM.

Geographic Frames of Reference

In the EcIA guidelines, valuation involves assigning a receptor to a geographic frame of reference, *i.e.* International, UK/National, Regional, County, and District, Local or Parish so that the level of weight or importance attached to any impact can be appropriately assessed. Clearly, any robust approach to valuation needs to be underpinned by adequate survey data, as specified by the Bat Conservation Trust (2007) or other specific guidance, for example, for wind farms see Rodrigues *et al.* (2008) or Natural England (2009). In the case of bats as receptors, such data are not readily forthcoming and in this paper, we attempt to make a judgement as to the appropriate valuations.

Distribution and Rarity

One of the problems in assigning bat VERs to geographic frames of reference in EcIA is that the distribution and rarity of species varies greatly. A pipistrelle maternity colony and a grey long-eared maternity colony are not likely to be valuable at the same geographic scale, due the great difference in rarity of the two species. To overcome this, our first step is to define the relative rarity of each species as Common, Rarer, or Rarest based on the known distribution and population size in the UK. Table 1 shows this for each bat species for the UK regions. Accurate population figures are not available for all species even at this geographic scale and the data presented here are primarily estimates in Richardson (2000), Harris *et al.* (1995), and Harris and Yalden (2008).

Valuing Roosts

Bats use a range of different types of roost, and not all have the same level of importance in supporting a local population of bats. At one end of the scale, a night roost may be used by a single bat or small number of bats to rest during night-time feeding activities.

Table 1: Categorising bats by distribution and rarity

Rarity within range	England	Wales	Scotland	Northern Ireland
Rarest (popn. under 10,000)	greater horseshoe[1] Bechstein's[2] alcathoe?[3] greater mouse-eared[4] barbastelle[5] grey long-eared[6]	greater horseshoe whiskered[7] Brandt's[8] Bechstein's alcathoe? noctule[9] Nathusius' pipistrelle[10] serotine[11] barbastelle	whiskered Brandt's alcathoe? noctule Nathusisus' pipistrelle Leisler's[12]	whiskered
Rarer (popn. 10,000 – 100,000)	lesser horseshoe[13] whiskered Brandt's Daubenton's[14] Natterer's[15] Leisler's noctule Nathusius' pipistrelle serotine	lesser horseshoe Daubenton's Natterer's brown long-eared[16]	Daubenton's Natterer's brown long-eared	Daubenton's Natterer's Leisler's Nathusius' pipistrelle brown long-eared
Common (popn. over 100,000)	common pipistrelle[17] soprano pipistrelle[18] brown long-eared	common pipistrelle soprano pipistrelle	common pipistrelle soprano pipistrelle	common pipistrelle soprano pipistrelle

[1]*Rhinolophus ferrumequinum*; [2]*Myotis bechsteinii*; [3]*Myotis alcathoe*; [4]*Myotis myotis*; [5]*Barbastella barbastellus* ; [6]*Plecotus austriacus*; [7]*Myotis mystacinus*; [8]*Myotis brandtii*; [9]*Nyctalus noctula*; [10]*Pipistrellus nathusii*; [11]*Eptesicus serotinus*; [12]*Nyctalus leisleri*; [13]*Rhinolophus hipposideros*; [14]*Myotis daubentonii*; [15]*Myotis nattereri*; [16]*Plecotus auritus*; [17]*Pipistrellus pipistrellus*; [18]*Pipistrellus pygmaeus*

There may be limited fidelity to the roost structure and it could easily be replaced. At the other end of the scale, a large maternity roost or hibernation site where large numbers of bats gather from over a wide area and have used the same site over many years or generations. This type of roost is obviously of much greater significance.

Having categorised bat species by rarity and distribution above, different roost types can be assigned to a geographic frame of reference based on the rarity of the species concerned. Table 2 shows our proposed valuations for different roost types, for bats in each rarity category. So, for example, maternity sites of common species would be valued at County level, whereas maternity sites of the rarest species would be valued at National level. Conversely, feeding perches for even the rarest species would not be valued above County level, reflecting their lower importance for the integrity of bat populations.

Table 2: Valuing bat roosts

Geographic frame of reference	Roost types
District, Local or Parish	Feeding perches (common species) Individual bats (common species) Small numbers of non-breeding bats (common species) Mating sites (common species)
County	Maternity sites (common species) Small numbers of hibernating bats (common and rarer species) Feeding perches (rarer/rarest species) Individual bats (rarer/rarest species) Small numbers of non-breeding bats (rarer/rarest species)
Regional	Mating sites (rarer/rarest species) including well-used swarming sites Maternity sites (rarer species) Hibernation sites (rarest species) Significant hibernation sites for rarer/rarest species or all species assemblages
National/UK	Maternity sites (rarest species) Sites meeting SSSI guidelines
International	SAC sites

Valuing Commuting Routes and Foraging Areas

Two additional problems apply when assigning values to commuting and foraging bats. Firstly, rather than looking at different kinds of bat activity (*i.e.* different roost types), we are trying to distinguish between different intensities of use or bat behaviour. Secondly, these activities cannot be considered in isolation and need to be assessed in the context of surrounding roosting, commuting and foraging opportunities, which will often be outside the survey area for a project. For example, commuting bats close to a SSSI roost for that species should take that into account, even if the roost is not itself a receptor being considered in the EcIA. Similarly, valuation of bats foraging should take into account the availability of foraging habitat in the surrounding areas. In some situations, the type of foraging habitat available close to a roost can be critical to, for example, breeding success and recruitment and these factors must all be brought in to the analysis.

Table 3: Scoring system for valuing commuting and foraging bats

Geographic frame of reference	Score
International	>50
National	41 - 50
Regional	31 - 40
County	21 - 30
District, local or parish	11 - 20
Not important	1 - 10

For both commuting routes and foraging habitats, a scoring system has been developed to determine the appropriate geographic frame of reference (see Table 3). Usually several bat species are present on a site, in which case each species should be valued individually, and the highest value obtained (usually for the rarest species present) used in the EcIA.

Commuting Routes

When valuing commuting routes the rarity of the species involved, the approximate numbers of bats using them (based on survey data), the proximity of known roosts, and the nature and complexity of linear features in the landscape are all taken into account to put the bat activity recorded into context. Table 4 provides scores for each of these factors. One score is taken from each column, depending on the 'best fit' for the situation and they are added together in order to arrive at a total score.

For example, a soprano pipistrelle commuting route in England comprising small numbers of bats away from known roosts in a landscape of flailed hedgerows would score 2+10+4+3=19. Referring to Table 3 indicates that this commuting route would be of District value or below. However, large numbers of commuting barbastelle bats on the same site would score 20+20+4+3=47 indicating a commuting route of National value.

Foraging Areas

Similarly, when valuing foraging areas, the rarity of the species, the approximate number of bats using them (based on survey data), the proximity of known roosts, and the landscape-scale foraging opportunities available are all taken into account. Table 5 provides scores for each of these factors, using the same approach as described for commuting routes above.

For example, individual lesser horseshoe bats foraging in Wales, in an area with few potential roost sites and isolated woodland patches in an agricultural landscape, would score 5+5+3+3=16 indicating a foraging area of District value or below. Conversely, a small number of foraging serotine bats on the same site would score 20+10+3+3=36 indicating a foraging area of Regional value.

Using and Refining this Approach

One obvious refinement to the approach described would be further sub-division of the UK regions in Table 1, particularly for England and Scotland where the bat assemblages present in the south and north of the countries are very different. Currently, there are insufficient published data on regional bat population sizes to enable this, indeed even some of the national data are inferred or based on estimates of unknown accuracy.

Regular users of the IEEM guidelines will have noted that some of the geographic frames of reference have been combined in the tables. In our experience, National and UK value are rarely distinguishable when considering bat receptors. The does not mean that we fail to appreciate the regional distinctiveness of our bat populations, rather that a receptor of National value in any UK country will tend to be of UK value. The other geographic frames of reference combined are those at the lower end of the scale: District, Local and Parish. We have found it extremely difficult to provide a framework that can meaningfully distinguish between these, given that receptors falling into these categories are generally small numbers of common or individual rarer bats. However, the combining of these categories is less critical, given that the threshold for full consideration in the EcIA is usually set above this level.

Table 4: Valuing commuting routes

Species	Number of bats	Roosts/potential roosts nearby	Type and complexity of linear features
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
-	-	Small number (3)	Unvegetated fences and large field sizes (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Walls, gappy or flailed hedgerows, isolated well-grown hedgerows, and moderate field sizes (3)
-	-	Large number of roosts, or close to a SSSI for the species (5)	Well-grown and well-connected hedgerows, small field sizes (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Complex network of mature well-established hedgerows, small fields and rivers/streams (5)

Table 5: Valuing foraging areas

Species	Number of bats	Roosts/potential roosts nearby	Foraging habitat characteristics
Common (2)	Individual bats (5)	None (1)	Industrial or other site without established vegetation (1)
-	-	Small number (3)	Surburban areas or intensive arable land (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Isolated woodland patches, less intensive arable and/or small towns and villages (3)
-	-	Large number of roosts, or close to a SSSI for the species (5)	Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)

In our experience, using the approach outlined above for real situations we have been involved with generally produces a result which corresponds with our professional judgement on valuation of the receptor. But it would be counter-productive for ecologists to use this approach without a critical eye on the result produced: if there are factors not covered above that make a particular receptor valuable at a higher, or lower, geographic frame of reference. This is entirely appropriate if it can be adequately justified.

Consequently, this approach should be used as a framework rather than a rulebook, but one which could help all of us involved in preparing EcIAs to be more consistent and to better explain our rationale in the valuation of bats as receptors. We are aware that many ecologists have asked us for copies of this framework following our presentation in 2007, and we would be very interested to hear how well you have found it to work in practice, and any suggestions for improvement.

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Photo 1. Gas pipeline severing bat commuting routes

Photo 2. Lesser horseshoe bat Photo: David Wells

Photo 3. Example of bat commuting habitat in an intensively managed landscape

Photo 4. Example of bat foraging habitat in a 'patchy' landscape Photos 1,3,4: Cresswell Associates

Where is All the Data Going?

Roy Tapping
Manager, Cofnod – North Wales Environmental Information Service

Wales is lucky in many respects; fantastic scenery, a clean environment, albeit a bit wet at times, and a strong cultural heritage. It also boasts the first complete network of Local Records Centres (LRCs) anywhere in the UK. This is probably not as impressive as the scenery or culture, but for those who need access to high quality biodiversity information the Welsh LRC network, provides seamless coverage across Wales. For nearly a decade Welsh LRCs have offered data services to environmental consultants and over the past year and a half we have been working with IEEM's Welsh Section to better understand and cement our working relationship.

Initial engagement with IEEM was through workshops held in North and South Wales during 2009. This was followed earlier this year by a questionnaire sent out to 50 environmental consultancies and more recently a meeting held with government and private sector ecologists in North Wales. As well as generating better understanding between the complementary communities of ecological and data managers, these efforts helped us identify the key issue of data flow between consultants and LRCs from our discussions. This is the focus for this article and I hope to be able to put forward a perspective borne in Wales, but which is equally applicable throughout the UK.

The Local Records Centre I work for, Cofnod in North Wales, is relatively new to providing data to consultants. However in just three years we have built our customer base from zero to over 120 consultancies, many of which are repeat customers. Consultants appear to understand the charging model established through LRCs and in most cases their costs are recouped through their clients. I hear feedback from consultants saying they like the quality and speed of our service, the way the data are presented and they find it useful background to planning their own surveys and desktop assessment. Yet for the hundreds of requests for information we have dealt with over the past three years, I can count the amount of data we have received from consultancies on one hand. This is not entirely surprising as there is little compulsion to supply LRCs with data. However, the same cannot be said for data that comes from volunteers and public sector organisations, which continues to increase annually.

I hear with increasing regularity that the greatest source of new data, especially for protected species, is through the thousands of privately funded surveys carried out each year by environmental consultants. So why are we worried about this? You could say it is in our interest, as we are concerned with gathering as much relevant data as possible. However LRCs are not the end users of data, we merely manage it; try to improve its completeness, its uniformity and its quality. So it should be the end users who are most interested in making sure they have access to the most comprehensive relevant data. Environmental consultants are major end users, making it important that others, and for that matter themselves, can potentially access improving data. In most cases valuable studies end up forming part of paper archives. Take documents prepared for the planning process, there seems to be a common misconception that once a document reaches the 'public domain', it becomes automatically available for all to use and consume, including LRCs. Yet in truth much of this data ends up in various paper or electronic filing systems. These systems tend to be cumbersome, making the data virtually impossible to cross reference. Eventually the data gets lost under the weight of more recent information and all the valuable time and effort used to create it goes to waste.

LRCs offer an alternative to this, but why is data not being shared more fully? From the engagement with IEEM we have had in Wales some common reasons have started to emerge:

- Concerns over ownership of the data and in particular whether there would be a breach of client confidentiality.
- A lack of clarity about what data are required and how to share it.
- The extra time and possible expense involved in sharing data.

Data Ownership

The issue of data ownership seems to be the most misunderstood; I for one have wrongly believed that the owner of the data was whoever paid for its collection. Although this holds true under certain circumstances, the owner of the data is generally the one who created it. This is a clear principle under copyright law. There are two exceptions to this. Firstly, data collected whilst in someone's direct employ becomes the property of the employer. Secondly, where there is a legal transfer of ownership, usually through a signed contract between the collector and another party. So what does this mean? Well for most freelance consultants it means that, unless specified by the client, any data collected is theirs freely to share. For consultancies with employees, the data is owned by the consultancy and unless specified by the client, they in turn can freely share it. Given the legal position there seems to be two main reasons for not sharing data. Firstly, procedural difficulties in, for example, persuading a larger consultancy it can freely share its data. Secondly, concerns over whether the sharing of such data will damage customer relations and be a breach of client confidentiality. Neither of these issues seem insurmountable, however the first relies on organisational change, the second could be just a matter of clarifying intentions to share data. For some time we have been promoting the use of the following data sharing clause by consultants asking them to use these when setting up contracts with their clients:

'Unless you request otherwise, we intend to share all relevant biological survey data with the appropriate Local Records Centre.'

This clause and other similar ones we have discovered are widely used by environmental consultants. By doing

so they not only demonstrate their commitment to share data, but also make their intension clear to clients, thus potentially mitigating any damage it may have on consultant/client relations.

In certain cases the nature of the project is so sensitive it makes it very difficult to share data. As an LRC manager I would say only share data with us if you feel empowered to do so. Furthermore if you wish to share data but want to restrict access to that data, we can look at the best way of achieving this. For example some data may only be sensitive until it is in the public domain, at this point the data could be shared or the restrictions lifted.

What to Share and How to Share It

If environmental consultants are saying that they do not know what and how they should share their data, this must be an issue for LRCs to address, by providing better guidance on how and what they should receive. However once the guidance is prepared it may be difficult to promote and turn it into accepted practice. There may therefore be a role for collaborative guidance developed between IEEM and the body representing LRCs, the Association of Local Environmental Records Centres (ALERC). Such guidance could offer some practical assistance when following the IEEM's Code of Professional Conduct section 5, paragraph 5.7, which states:

'Wherever possible, make scientific data collected during the course of their professional duties available to others such as records centres.'

The Additional Time and Cost of Sharing

Very much linked to issue two, the final issue for not sharing data, the additional time and cost could also be looked at jointly by IEEM and ALERC. From the feedback that we have received it remains a major barrier to sharing, especially where contracts have tight financial margins. It should be our aim to make the sharing of biological data as painless as possible. In LRC circles we talk of collecting data once and using it many times. It makes little sense therefore that information which is already collected, copied and summarised is then reformatted for submission to LRCs. I think therefore we should initially look at ways to better share the data in its raw or summarised form, thus keeping extra time and cost to a minimum. There may be technical solutions to this and ones which I believe are in the interest of LRCs and IEEM to discuss.

The improved sharing of biological data gathered as part of privately funded surveys should not be outside our realms of possibility, especially in an age which relies so heavily on information exchange. It does however require some effort from both environmental and data managers. It is in our interest to encourage a much improved data flow, for until we do there is always the potential to duplicate effort and draw conclusions from incomplete data. I hope this article has stimulated some thoughts on how the sharing of biological data could be progressed with LRCs, I also hope that it will encourage IEEM and ALERC to look jointly at tackling this issue. I know there are some practical solutions, we just need a little help to make them happen.

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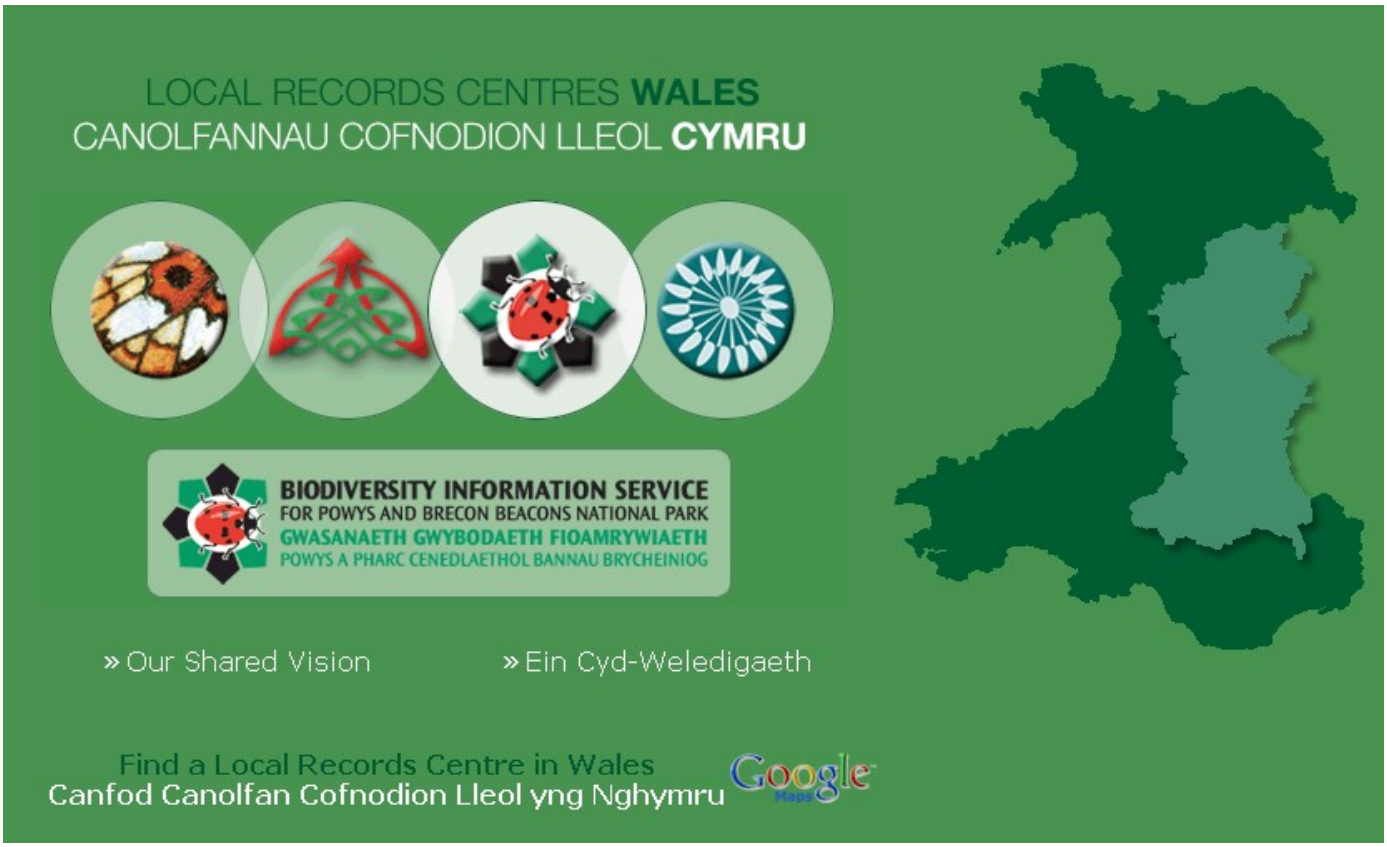

Welsh Local Records Centres web portal (www.lrcwales.org.uk) acts as a gateway to their individual websites. Its useful 'Find a Local Records Centre in Wales' tool, searches for a location then displays details of the appropriate LRC.

Where is All the Data Going? An Extra View

Andy Tasker CEnv MIEEM
Development Director, Middlemarch Environmental, and Consultant, Priority People

'Where is all the data going?' was a challenge that I raised at IEEM's Nottingham Conference in November 2007, so it is good to see from Roy Tapping's article that some progress has been made. I estimated then that somewhere between £100 million and £200 million was being spent annually on acquiring ecological data that was mostly lost in consultancy reports sitting on client's shelves[1] - and in the intervening three years, despite the recession, the figure must be about the same now. That is an awful lot of potentially useful ecological information that we continue to throw away.

IEEM has been actively involved in looking for solutions, from meetings that I and the Secretariat had with both NBN and ALERC in 2008 through to the Professional Affairs Committee more recently. And of the three headings that Roy describes – data ownership, methods of sharing, and paying for it – I think that the main problem remains the detail of formatting and sending data.

To me it seems slightly strange that a succession of Government-funded initiatives have failed to solve this apparently simple issue, but I suspect it is because until recently the custodians of the data, from Local and Regional Records Centres to the NBN, have not been talking to the potential providers of data in the private sector. So some of the more bizarre ideas have included all manner of complex forms that providers have been expected to fill in, then send to the appropriate local centre. In reality this has not happened simply because of the time and effort of doing it.

Surely what is needed is a simple nationally-agreed format for collecting data on both species and habitats. This needs to be designed not just by data custodians – who may want undue levels of complexity – but by data providers too. If data were collected to this agreed standard in the field, it would then be a simple process for consultants to copy and paste it into reports, and at the same time e-mail it to a common data entry gateway. The need for this central gateway, rather than the local, regional and national systems that currently exist, is to make the process achievable for consultants and other providers. Clearly the data recorder will know the gird reference and/or geo-reference for their data – but which vice-county is it in? To be honest, who cares, apart from the data custodians? Given that all the data will be electronic, an automated reposting to the appropriate LRC would make everything achievable.

Imagine a future where all the ecological information that is collected can be simply stored and accessed! Imagine the huge amounts of current data that would then be available for everyone to use! Clearly there would need to be some safeguards where commercial clients required total confidentiality for a period of time, but even here the issues are not insurmountable.

I hope that IEEM can continue working in partnership with data custodians, data providers, agencies and governments to make this happen. Soon would be good!

Freshwater survey

Notes

[1] See a summary report in the Amphibian and Reptile Group newsletter of Autumn 2007: http://www.arg-uk.org.uk/Downloads/ARG%20Today%203.pdf

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INVASIVE SPECIES:
New Natives in a Changing Climate?

IEEM Spring Conference
23 March 2011, London

Biological invasions by non-native species are currently one of the biggest threats to the ecology and economy of the planet, **costing an estimated £914 billion*** worldwide and being **the cause of 50% of all known extinctions.**

Invasive species can act as vectors for new diseases, alter ecosystem processes, change biodiversity, disrupt cultural landscapes, reduce the value of land and water for human activities and cause other socio-economic consequences. Our changing climate may force us to rethink some of our strategies for control and accept some species as new natives in our UK biodiversity.

Conference speakers will talk about the European picture, examine the recent changes to the Wildlife and Countryside Act (1981), as well as looking at the UK national non-native strategy.

Practical case studies for both terrestrial and aquatic species will be explored throughout the day. Examples will include research on the biological control of Japanese knotweed using *Aphalara itadori*, the implications of the Killer Shrimp *Dikerogammarus villosus* and the impacts of pathogens such as *Phytophthora ramorum* on plants and trees.

A draft programme, further information and booking is available from the IEEM website: www.ieem.net/conferences.asp.

*** Achim Steiner (UN Environment Programme's Executive Director, 2010)**

Photos: Rob Bowker (BTCV), Sean Hathaway, Jason Reeves, Environment Agency, www.wildstock.co.uk

Shaping the Future of the Profession: Ecology and Environmental Management in the 21st Century Technical Workshop, February 2011

Rebecca Freeman
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Ecological Skills - The Challenges

Ecologists and environmental managers are facing unprecedented challenges. Biodiversity loss, climate change, unsustainable use of natural resources, technological advances, changing ecosystems, societal, political and economic changes, the shocks of natural hazards and disasters – these macro drivers are already stretching our current skills sets to their limits. Future challenges will demand more ecologists and environmental managers with both more highly-developed generic skills and more advanced specialist skills, often in unchartered areas of knowledge.

The Ecological Skills Project was launched by the Institute of Ecology and Environmental Management (IEEM) in September 2010 to specify the skills required by the profession to meet these challenges, identify gaps and shortages in the skills available, and engage stakeholders in developing a strategy to ensure ecologists and environmental managers have the knowledge, skills and competence required to meet future demands within a recognised professional framework.

As the professional body, IEEM has responsibility for ensuring that the status of ecologists and environmental manager is on par with other professionals such as architects, surveyors and engineers. For the ecological and environmental management profession to be considered on par with other professions IEEM has to:

- set the standards for the profession;
- define a structured framework for the development in the profession; and
- support individuals to achieve Chartered status[1].

Anecdotal information has suggested that there is a skills gap relating to the provision of qualified ecologists and environmental managers for a wide range of posts across the ecological and environmental management sector. Employers such as the statutory government agencies (*e.g.* Natural England, Countryside Council for Wales, Environment Agency, Environmental Protection Agency (Ireland)), ecological consultancies, NGOs and local authorities have all expressed concerns. Furthermore, there are indications to suggest that core skills for ecological or environmental management practice are being lost from undergraduate and postgraduate degree courses. If validated, such skills erosion could seriously affect the profession's ability to meet the challenges of biodiversity loss, changing climate and other environmental pressures.

The policies of the coalition government have been made clear in the recent Comprehensive Spending Review. Both the scale and pace of change will be immense. Major cuts to the public sector and rationalisation of key bodies across the UK is having a severe impact on all sectors, not just ecology and environmental management, across the UK. It is imperative, therefore, to ensure that a coherent strategy is in place to develop the capacity and capability of the ecology and environmental management profession to 'safeguard biodiversity, deliver key ecosystem services, maintain key legislation, adapt to climate change and to foster the key skills for these purposes'[2].

In September 2010, IEEM appointed an external consultancy, The Management Standards Consultancy Ltd (TMSC), to complete a skills analysis within the ecology and environmental management profession. The project will conclude by the middle of June 2011. A broad definition of 'skill' has been adopted for this project which includes the concepts of knowledge (what the professional needs to know), skills (what the professional needs to be able to do) and competence (the ability of the professional to apply their knowledge and skills to achieve the outcomes required in their work context). The term skills gap has been adopted to include both what are usually known as skills gaps (*i.e.* deficiencies in the skills of individual professionals) and skills shortages (*i.e.* deficiencies of skills in the labour market).

The aims and objectives of the project are to:

- appraise the magnitude of any skills gap within the profession of ecology and environmental management relative to the needs of employers;
- appraise its nature and causes;
- raise awareness and understanding of the scale and significance of the skills gap;
- engage with stakeholders in identifying a strategy for closing the skills gap; and
- build partnerships amongst stakeholders in order to implement an agreed strategy.

Technical Workshop

To address the challenges in this project TMSC is using proven methodologies which have been tested and refined over the past 20 years. Research activities undertaken during autumn 2010 will lead to a Technical Workshop to be held in February 2011. **Facilitated by TMSC, the workshop will provide participants with the opportunity to 'Shape the Future' of the ecology and environmental management profession and to ensure that it is fit-for-purpose in the 21st century.**

There is a wealth of information and data, which has already been collected by IEEM, as well as reports and documentation published in recent years. One of the activities within this project is to review this information to answer key questions such as: What does this tell us about the skills needs of ecologists and environmental managers? What does this tell us about any skills gaps (where individuals do not have the full set of skills) or shortages (where there are insufficient people in the labour market with the required skills) in ecology and environmental management? How can this inform the development of the Framework of Knowledge, Skills and Competences for Ecology and Environmental Management?

In order to provide a robust and reliable analysis of skills gaps within the profession of ecology and environmental management, it is necessary, first of all, to agree what functions ecologists and environmental managers are required to carry out and, from that, develop a framework of the knowledge, skills and competences they need.

A questionnaire aimed at two separate audiences, employers and professional ecologists and environmental managers, has been distributed across the profession during November 2010. The questionnaire for employers asked respondents whether they have had, or anticipate having, any difficulty in finding professionals with the knowledge and skills necessary to carry out the various functions of ecology and environmental management effectively. This will identify any actual or potential skills shortages in ecology and environmental management. The parallel questionnaire for professionals asked them, using a sliding scale, how confident they felt about their knowledge and skills and their ability to carry out the various functions competently. This will identify the key skills gaps of professionals and the relative sizes of these gaps.

Interviews with key stakeholders will complement the quantitative data generated through the questionnaires. Key issues will be explored in the structured interviews covering the current and potential skills shortages in ecology and environmental management and the perceived gaps in the skills of professional ecologists and environmental managers.

The findings from these activities (data review, framework, questionnaire and interviews) will inform the agenda for the Technical Workshop with the objectives of:

- verifying the findings of the project;
- deliberating options for addressing skills gaps and skills shortages identified;
- disseminating the findings of the project; and
- communicating the importance of the work of IEEM to wider audiences.

At the workshop, there will be opportunities for participants to work in groups to discuss the framework, with recommendations on changes to the *framework* and how it can be used, *skills shortages* and *skills gaps*, and make recommendations how these should be addressed.

The project activities carried out to date include:

- Desk-based research (September 2010): analysing skills needs, skills gaps, and skills shortages within the profession of ecology and environmental management.
- Framework of knowledge, skills and competences (September 2010 - February 2011): identifying functions, knowledge, skills and competences (current and new) needed within the profession of ecology and environmental management.
- Questionnaires for employers and professionals (October 2010 - December 2010): identifying any actual or potential skills shortages and identifying key skills gaps of professionals.
- Interviews with key stakeholders (November 2010 - December 2010): complementing the employer questionnaire, identifying any actual or potential skills shortages and key skills gaps of professionals.

The Technical Workshop (February 2011) is a key opportunity for professionals within the ecology and environmental management sector to take part in this project to help ensure the profession is fit-for-purpose in the 21st century. **Participation in the Technical Workshop in February 2011 will be by invitation. If you would like to be considered as a participant to contribute to shaping the future of ecology and environmental management profession or would like further information about this project please contact Linda Yost (Deputy Chief Executive, IEEM) at lindayost@ieem.net.**

Notes

[1] Council 72 – 10.1 Agenda paper 24 May 2010

[2] IEEM Annual Review 2009-2010

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Continuing Professional Development

Nick Jackson AIEEM
Education and Professional Development Officer, IEEM

Continuing Professional Development (CPD) is the means by which you as ecologists and environmental managers maintain and improve your knowledge and skills to develop the personal qualities required in your professional life. IEEM aims to promote high professional standards and to ensure public confidence in the professional services offered by its members. CPD is an important part of this, both for individual members and for IEEM as a whole.

If you are a Fellow, Full, Associate or Graduate member of IEEM, you are required to undertake at least 20 hours of CPD every year and provide the Institute with your CPD record once a year[1]. There is no CPD requirement for Retired, Student or Affiliate members. You will also need a complete CPD record if you intend to upgrade your IEEM membership, apply for Chartered Status through the Society for the Environment; and/or register for the IEEM web-based Commercial Directory.

CPD can be 'structured' or 'unstructured'. Structured CPD includes attendance as a participant or speaker at short courses, conferences and seminars; project experience (where this is new to the member concerned and involves a structured learning process); formal home study such as with distance-learning; or participation on technical committees. Unstructured CPD includes private reading and study; technical research for practical work; 'on the job' project work which is consciously and systematically undertaken within the work environment; and some lecture preparation. Non-ecological training that is relevant to your job can be included.

Ecology is a rapidly advancing subject – make sure that you can show you are up to date. Updating your CPD record on a regular basis is really the answer. It is not too onerous – think about it and you will be amazed at how easy it is. Ask yourself – did you attend an IEEM or other relevant conference? Did you attend an IEEM workshop or other appropriate sessions? Did you read articles in *In Practice* or other publications?

As an extra incentive to submit your CPD record, the IEEM Training, Education and Career Development Committee have decided to award an annual prize (a free place on an IEEM conference or workshop) for the best CPD form submitted by a member. The winner each year will be the person whose form is laid out the best and covers a good range of both structured and unstructured CPD. Daniel Alder AIEEM was chosen as the winner from this year's CPD audit and his short biography (and a copy of his CPD form) is shown below and right.

If you want to be in with a chance of winning next year's CPD prize, please make sure that you complete and send in your 2009/10 CPD form along with your membership renewal if you haven't done so already!

Notes

[1] Under Clause 4.2.8 of IEEM's *Code of Professional Conduct*

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IEEM wasn't around when I started out in the world of work in 1981! As a Horticultural Trainee at Reading University I worked in the Botanic Gardens and my passion for natural history developed in the five years I was there, thanks to a mentor. Like many people at the time I decided that the best way to find a 'proper' job in nature conservation was to do lots of voluntary work. After several short stints with the RSPB, National Trust and local Wildlife Trust I landed a contract warden's post looking after monkey orchids in the Chilterns. These cosseted rarities enjoyed much attention from the botanical paparazzi and my role was to make sure that no one stepped on them (or dug them up) or their chalk grassland compatriots! These were happy days whiled away botanising or spent seeking out a club-tailed dragonfly along the nearby banks of the Thames. The world of academia passed me by then, but there was plenty to occupy a young naturalist even in that pre-red kite era.

A move to Dorset immediately followed, with six months as a volunteer at RSPB Arne and eventually a permanent practical conservation job with Dorset County Council. A decade of countryside management on Sites of Special Scientific Interest (SSSIs) and Country Parks culminated in a Senior Ranger and Local Nature Reserve (LNR) Officer role in the early 2000s. I was given a temporary secondment as an assistant ecologist in 2004 which evolved into the permanent full-time role I now have. My Associate IEEM membership in 2006 coincided with a part-time MSc in Countryside Management at Manchester Metropolitan University. The most interesting aspect of my work is its variety and it's pleasing to call upon past experience to help out from time to time, while learning new skills in ecology - long may that continue.

Danny Alder AIEEM
Nature Conservation Officer, Dorset County Council

OFFICE USE: DATE RECEIVED

Institute of Ecology and Environmental Management

CPD RECORD SHEET

OCTOBER 2009 TO SEPTEMBER 2010

NAME: Daniel Alder	**EMPLOYER:** Dorset County Council
EMAIL: dannyalder@dorsetcc.gov.uk	**MEMBERSHIP GRADE:** Associate

Date of Activity	CPD Activity (and Name of Provider for any Structured CPD)	Skill Developed	Hours
STRUCTURED CPD - including attendance at short courses, conferences and seminars; project experience (involving a structured learning process); and/or formal home study (distance learning). Don't forget to include non-ecological training that is relevant to your job.			
19/01/10	Safety on construction site: run by SKANSKA as part of the health & safety training	Update on current safe working practices on road scheme	3
25/03/10	The Future of Wildlife in Woodlands conference organised by Butterfly Conservation at University of Reading	Two main topic groups which updated current knowledge and best practice; 1. The changing state of British Woodlands; which introduced areas of research and conservation interest for different taxonomic groups and 2. Delivery of woodland conservation; which looked at the current grant mechanisms and future opportunities for woodland management delivery.	8
27/04/10	Organised and delivered Bats & Trees Training Day for Countryside Service Tree Surgeons & Consultancy.	To communicate & discuss bat ecology, bat law, surveying for bats in trees, best practice for working with trees with bat potential.	8
15/06/10	Woodlands, Woodfuel & Wildlife RSPB, Highnam Gloucestershire	Understanding the management principles for native broadleaf woodlands to meet multiple objectives with special regard to the suite of declining woodland birds	8
		SUB-TOTAL (NUMBER OF STRUCTURED CPD HOURS)	**27**
SELF DIRECTED (UNSTRUCTURED) CPD - including private reading and study; technical research for practical work; 'on the job' project work; and/or some lecture preparation. Don't forget to include non-ecological training that is relevant to your job.			
10/12/09 – 23-12-09	Desktop study into vehicle collisions with livestock on open grazing of the New Forest to provide evidence base for an open grazing scheme in Dorset. This was used to inform the committee report and risk assessment for the scheme to install cattle grids in the roads near Bovington.	Develop a better insight into the likely causes of accidents involving animals from an area of open grazing subject to varying traffic flows and speeds. Applying statistical analyses and offering interpretation of results through critical discussion with colleagues. Communication with colleagues in the New Forest National Park Authority and Hampshire County Council.	35
12/06/10 – 18/06/10	Preparation of sonograms from Black Woodpecker recordings as part of preparatory work for a book on this species by a colleague working in Hungary	Update knowledge of sound recording and editing software for use in bioacoustic studies and graphical production of sonograms to depict call elements related to bird behaviour	10
		SUB-TOTAL (NUMBER OF UNSTRUCTURED CPD HOURS)	**45**
		TOTAL NUMBER OF HOURS OF CPD	**72**

IEEM Marine Conference 2010: Ecological Issues in the Marine Environment

Laura Wilson
Operations Assistant – Geographic Sections and Education, IEEM

The first national IEEM Marine Conference was held at St Andrews University in Scotland on 21 October 2010, covering Ecological Issues in the Marine Environment. The conference drew in 112 delegates through the College Halls within the very scenic university grounds of St Andrews.

Early that Thursday morning I found myself awake and ready to travel at 05:30 (to students: this time does actually exist I'm afraid!), but I found it fairly easy to get up and about, whether it was due to the excitement to attend the first IEEM Marine conference and the first conference I had ever been to, or nerves as I had been tasked to organise the conference and wanted it to be a success!

I studied a BSc in Marine Biology and an MSc in Coastal and Marine Resource Management at Portsmouth University. So with my marine background I was very eager to get stuck into organising the conference. Working with the IEEM Scottish Section Committee and through my own research, we came up with relevant topics and an appropriate venue for the conference at St Andrews University in Scotland. We approached various potential speakers and invited them to give a presentation.

There was a range of interesting speakers all giving accounts from different perspectives. It showed the need to come to a compromise and find a balance between the different and ever increasing activities that share the marine environment.

Professor Colin Moffat, Project Director, Aquatic Environment, Marine Scotland, opened the conference by presenting the keynote speech on The State of the Marine Environment – Challenges and Opportunities. He set the scene of the conference by highlighting the ever increasing number of human activities as well as the impacts of climate change that our oceans are subject to.

St Andrews University

Bertie Armstrong, Chief Executive, Scottish Fishermen's Federation, gave a fishermen's perspective of the role they play to protect and enhance fish stocks in the context of the new Marine Directive. The main message he put across from the fishermen is that they need a regulatory revolution. Fishermen need and want sustainable fishing as much as scientists do as that is their livelihood. The industry employs 5,400 (4,400 on a regular basis) and has an annual value of £443 million pounds.

Dr Bernie McConnell, Senior Research Fellow at the Sea Mammal Research Unit (SMRU), enthusiastically presented a case study of the mapping of marine harbour seals that SMRU had been carrying out. The movements of the seals were random making it hard to predict their travels in order to study possible effects of marine renewables.

Professor Sarah Wanless, from the Centre of Ecology and Hydrology, has been working on the effects of climate change and fisheries management on North Sea seabird populations and the wider community. Until recently fisheries, particularly industrial fisheries for sand eels, were thought to pose the greatest threat to North Sea seabird populations. However, climate change is now also viewed as being of major concern. In addition, coastal and offshore areas are increasingly being used for a range of renewable energy developments which could potentially alter the marine habitat in which seabirds operate.

Dr Ian Davies, from Marine Scotland, considered what impacts the new Marine Directive will have on the marine environment. He described the vision to reach Good Environmental Status across EU marine waters by 2020, and where we are now and how we are moving towards it.

Calum Duncan, Scotland Conservation Manager, Marine Conservation Society, looked at the potential and implementation of Marine Protected Area Networks. He summarised how

Roger Morris launches the Marine and Coastal EcIA Guidelines

the provisions in the Marine (Scotland) Act were secured, the benefits of Marine Protected Areas and the Marine Conservation Society perspective on the way forward.

IEEM's *Guidelines for Ecological Impact Assessment in Britain and Ireland: Marine and Coastal*, were launched by the chair of the Working Group, **Roger Morris CEnv FIEEM**. Giving special thanks to the authors: Polly Couldrick, Mick Green CEnv FIEEM, Tom Mallows CEnv MIEEM, Tim Norman CEnv MIEEM, Graham Russell, Patricia Almada-Villela CEnv MIEEM, Sally Edmonds, Karen Nash, Albert Nottage MIEEM, Linda Yost CEnv MIEEM, and Diana Pound CEnv MIEEM.

Dr Graham Russell, illustrated the increasing emphasis on stakeholder involvement as he presented views on Effective Working with Stakeholders. Stakeholders are the beneficiaries of the ecosystem services provided by our seas and can possess knowledge that can help fill data gaps. When well managed, stakeholder engagement can help identify key problems and provide solutions. Indeed, there are examples where development, *e.g.* of marine renewables, can benefit all parties as well as the marine environment.

The Crown Estate's role as largest stakeholder in the seas was set out by **Tom Mallows CEnv MIEEM**. He explained how their proactive role is highly relevant to ecologists and environmental managers and how the work they undertake supports all of their sectors in the long-term, which includes ecological survey and related research. In February 2009, The Crown Estate awarded exclusivity to Beatrice Offshore Windfarm Limited to develop the project in Scottish territorial waters.

Stuart Szylak, from Environmental Resource Management, described the process and the potential impacts on marine mammals and ornithology in the area through the offshore wind farm case study of the Beatrice Project.

To finish off the day, **Frank Fortune MIEEM**, from Royal Haskoning, presented a case study on the SeaGen Project, Strangford Lough Marine Turbine. He outlined the work that has been carried out to assess the ecological impacts of the turbine for the porpoises and seals and the variety of seabirds.

I had many pre-conceptions as to what conferences would be like. In my mind they would be just like a day of standard lectures resembling university and struggling to stay awake. However, it could not be further from the truth. The variety of topics and contrasting opinions, made clear during question time, made it very interesting. The speakers were very passionate about their topic, keeping you engrossed. There were interesting characters reminding me of that one lecturer you would have at university who you always look forward to hearing from.

Conferences provide a great opportunity to network. From the IEEM student survey many of you said you had not attended events due to feeling intimidated by professionals, however there is no reason to be. Being surrounded by professionals should be seen as a great chance to ask questions, find out what their experiences are, how they came to be in the jobs they are in and if they know of any opportunities for you. All the delegates at the conference were keen to share and give advice and tips and answer any questions. Seeing as many job vacancies are found through networking, attending a conference like this is extremely helpful. Other benefits of attending conferences include receiving up to date information, for students and post-graduates this can then be referenced in your coursework showing extra research and thinking, and the discussions provide good arguments for critical analysis.

Despite the prompt exit by Linda Yost, Sally Hayns and myself at the end of the conference and having to run for the train in order to catch our flight back to Southampton Airport, I feel the day ran smoothly and I would like to take this opportunity to thank all the speakers for giving very interesting presentations and the Scottish Section Committee for all their help, as well as Linda Yost and Nick Jackson for guiding me through the organisation of IEEM's first Marine Conference. It was a great opportunity for me and I have found it a very informative and enjoyable experience. I hope those who attended found the day useful and informative.

Thank you for taking the time to fill out the feedback forms. Due to the high interest from our members in the marine environment we plan to run more marine-based conferences in the future.

The presentations from the Marine Conference are now available on the IEEM website (www.ieem.net/scottishconference2010.asp).

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The Graduate's View

Conferences provide great opportunities to meet a variety of professionals from a range of backgrounds allowing you access to so much information. You should take the opportunity to network creating contacts as this will become very useful when starting your career, many jobs you get are through who you know. I have always been very hesitant when it comes to speaking to professionals as you think it is very intimidating. However, this could not be further from the truth. They are willing to spend their time speaking to you and answering questions. Do not be afraid to approach them, you can get tips from inside the job, and they may even know of openings or opportunities within their place of work.

Being a recent graduate myself, I feel the conference was very useful and informative. I recommend more students and graduates attend events like this if they can. You can get up to date information and it is a great chance to network!

Biodiversity Beyond 2010: Missed Targets, New Opportunities - 2010 Annual Conference Report

Nick Jackson AIEEM
Education and Professional Development Officer, IEEM

With the International Year of Biodiversity coming to an end and the Convention on Biological Diversity's tenth meeting of the Conference of the Parties (CBD COP10) finishing in Nagoya, Japan, the week before, the IEEM's Annual Conference considered the theme of biodiversity and asked: What 2010 targets have not been met? What have we (as ecologists and environmental managers) achieved in terms of biodiversity conservation? And what does the future of biodiversity conservation look like… especially in light of the recent government spending cuts announcements?

The conference considered some of the big questions being faced by those involved in conserving biodiversity in both the terrestrial and marine environments, such as the reform of the Common Agricultural Policy (CAP), implementation of the Marine and Coastal Access Bill and issues related to European fisheries management. Speakers were drawn from politicians and policy-makers all the way down to practitioners helping to conserve biodiversity on the ground.

The conference took place on Tuesday 2 – Thursday 4 November 2010 at the Royal Marine Hotel in Dun Laoghaire (pronounced 'Dun Leary' for those not familiar with Irish spellings!). This was IEEM's first Annual Conference to be held in Ireland and attracted over 130 delegates; about half of which travelled from the UK to attend.

On the Tuesday evening, **John Cross**, a Woodland Specialist from the National Parks and Wildlife Service, gave an after dinner talk revealing an insight into the biodiversity conservation work that has taken place in Ireland over the last 10 years. Using examples of woodlands and agri-environment schemes he highlighted some of the positive achievements that had been made and finished by talking about how future targets should focus on landuse management to conserve biodiversity and how we should all be promoting the concept of ecosystem services.

The Royal Marine Hotel in Dun Laoghaire

Mairead McGuinness MEP

Mairead McGuinness, Member of European Parliament (MEP) for Ireland East, gave a keynote speech to open the conference on Wednesday morning. She spoke about some of the key themes to have come out of the COP10 conference, including the new 10-year plan that was agreed to protect areas of land and sea. She spoke about action needed at the EU level (the focus will remain on the most important habitats and species) and how trade policies and climate change also impact on biodiversity. Mairead also talked about The Economics of Ecosystems and Biodiversity (TEEB) report, *Mainstreaming the Economics of Nature*, which was unveiled in Nagoya and shows that it is cheaper to invest in conserving and even enhancing our natural assets than it is to pay for repairing the damage later. Mairead closed by saying "the message about biodiversity needs to be heard outside conference halls and committee rooms of the scientific community. It needs to penetrate right throughout society, so that it is part of everyday conversation. Without greater public awareness, you as ecologists and environmentalists face an almost impossible task in tackling biodiversity loss." The full text of her speech can be found on her website at www.maireadmcguinness.ie.

Damon Stanwell-Smith, from the 2010 Biodiversity Indicators Partnership (BIP), gave the second presentation of the day and talked about how the BIP works by tracking progress towards the 2010 biodiversity target and providing the most integrated and comprehensive analysis of global biodiversity trends. Damon gave examples of how the 2010 biodiversity target has helped to stimulate important actions to safeguard biodiversity in some areas (increase in areas of land now legally protected, invasive alien species policy adoption, and money spent on conserving biodiversity) but how some actions have not been on a sufficient scale to address the pressures on biodiversity (over-exploited fish stocks, nitrogen deposition and overall number of alien species). He worryingly also presented graphs that showed an increase in the loss of biodiversity in some areas, such as Red Data List species, forest cover and seagrass and mangrove extent.

Bob Bloomfield, Director of the International Year of Biodiversity UK Partnership (IYB-UK), gave the final presentation of the morning and talked about how the 400 partners (ranging from universities, media organisations and museums to theatre

companies and artists) have come together to promote the understanding of biodiversity during 2010. He summed up the outcomes from the COP10 conference in Nagoya (20 point Strategic Plan in five thematic sets of targets) and also spoke about the changing paradigm shifts when thinking about aesthetics vs the ecosystem services approach and species scale vs landscape scale responses.

The afternoon session saw the conference delegates either travelling to local field sites or taking part in the workshop sessions based at the conference hotel. One of the conference excursions was to **Lullybeg Wetlands, Lullymore** run by **Bord na Móna** to look at cutaway bogs used for peat fuel production, and the other was to **Brú na Bóinne Archaeological Park** and was run by the **Office of Public Works Ireland**.

At the indoor session, there were three separate workshops running – one on **Risk Assessment and EIA** run by **Conor Wall**, one on **Green Infrastructure** run by **Mary Tubridy MIEEM** and one on the soon to be launched **Online Bat Protocol Website**, run by **Mike Oxford MIEEM**. We also ran, in parallel to the workshops, a student careers forum which was attended by about 10 students where they found out about ecological careers and were able to quiz ecologists about their work.

The Institute's AGM took place on Wednesday evening – Please see *Institute News* on page 42 for further details.

The main conference dinner took place on the Wednesday night and was followed by the announcement of the winner of the 2010 IEEM Tony Bradshaw Best Practice Awards. Congratulations to the Environment Agency (EA) partnered with the Freshwater Biological Association (FBA) for their Freshwater Invertebrate Species Identification Modules Project. Pam Nolan CEnv MIEEM accepted the award on behalf of the EA and FBA. After the conference dinner, plenty of networking was done with a pint of Guinness in hand… which inevitably led to a few 'fuzzy' heads the next morning!

The second day of the conference started with a session on legislation, policy development and planning. The first presentation was from **John Finn**, who works for Teagasc (The Irish Agriculture and Food Development Authority). John talked about lessons learnt and future prospects for the Common Agricultural Policy (CAP) and how this key piece of policy is vital for biodiversity. He said that as part of reform of the CAP in 2013, biodiversity targets will feature prominently in environmental commitments and will shape the objectives of future agri-environment policies (along with climate change and water quality). The precise policy mechanisms and budget size for provision of public goods in the post-2013 CAP are not yet certain at either national or EU levels. Nevertheless, the future CAP is almost certain to require improved specification of policy targets for provision of public goods, a greater level of geographical targeting and improved implementation.

Next to give a presentation was a 'double act' from the Marine Management Organisation (MMO), **Patricia Almada-Villela CEnv MIEEM** (Head of Data and Knowledge Management) and **Neil Wellum** (Head of Marine Conservation Environment Team), who spoke about the role, responsibilities and work of the MMO in relation to marine biodiversity. The MMO is a new organisation which was set up to implement the new Marine and Coastal Access Act (2009). They also talked about the UK Marine Protected Areas (MPA) Network, the management measures that may be needed for the network, and related data and knowledge management issues.

Simon Jennings, from the Centre for Environmental Fisheries and Aquaculture Science (CEFAS), spoke next about addressing biodiversity conservation issues in European fisheries management. He said the reform of the Common Fisheries Policy (CFP) provides an opportunity to improve the

Brú na Bóinne Archaeological Park

management of those fisheries that have unwanted impacts on biodiversity and to hasten progress towards meeting national and international targets for biodiversity conservation. CFP reform will follow the adoption of the Marine Strategy Framework Directive (2008), which explicitly identifies the CFP as the primary instrument to manage the impacts of fishing with the aim of achieving Good Environmental Status (GES). Notwithstanding some necessary debate about targets for 'good' biological diversity, any management process stemming from the reformed CFP will need to be robust to the high transition costs of moving towards sustainability. He argued that prospects for effective biodiversity conservation will depend on societal pressure, the willingness and capacity of member states to meet transition costs and the extent of their support for transferring tactical decision-making to regional bodies.

The final speaker of this session was **Gerry Clabby**, from Fingal County Council, whose talk was focused on issues and opportunities for biodiversity within the planning system. Gerry outlined the structure of the Irish planning system, informed delegates of some of the key legislation related to planning, highlighted some case studies within Fingal County, and finished by talking specifically about the local Fingal Biodiversity Action Plan.

The second session of the day was all about biodiversity tools available to ecologists and environmental managers. The first speaker of the session, **Liam Lysaght**, spoke to delegates about the National Biodiversity Data Centre (NBDC), which was established in 2006 in Ireland. Liam is Director of the NBDC and provided delegates with an overview of the different components of the national data management infrastructure that have been built up by the Data Centre since its establishment, and introduced some of the specific aspects of the Centre's work. He explored the possibilities that now exist for production of national overviews of the state of Ireland's biodiversity through interrogation of suites of data across a range of taxonomic groups. He concluded with an outline of some of the strategic uses that the Centre has identified for biodiversity data, particularly as they relate to informing public policy.

Mike Oxford MIEEM spoke next about a recently developed web-based toolkit to support planners and developers in the vital task of conserving biodiversity and geodiversity in the UK. He explained that there is a lack of skills and knowledge to support planners and developers in the vital task of conserving biodiversity in the UK, and no single source from where they can obtain up-to-date information and guidance. The toolkit seeks to plug this gap and provide the tools to help ensure the planning community contributes to the conservation, enhancement and sustainable use of biodiversity. To do this, the toolkit provides a readily accessible one-stop shop for the planning community to help it navigate through relevant legislation, guidance and good

practice. As well the traditional web site format and content, the toolkit includes innovative interactive visual tools. Mike went through the first of these to be developed – an in interactive barn scenario and also an online bat protocol. The aim of these tools, as with the whole toolkit, is to make complex and/or lengthy information more accessible for those working within the planning system. Mike finished by saying that "hopefully a picture speaks a thousand words and may inspire where 'turgid' text fails!"

Matthew Jebb, Director of the National Botanical Gardens in Dublin, gave the final presentation in this session and outlined the role of botanical gardens in biodiversity conservation. He explained how the Gardens act as the focal point for the Global Strategy for Plant Conservation (GSPC) in Ireland and how they are currently compiling data on the status of vascular plants, towards an updated Red Data List. He said they are developing a large *ex situ* collection of taxa of conservation concern (both Irish and tropical), with systems to capture the horticultural knowledge being learnt. Matthew also spoke about the Target 8 project of PlantNetwork which is a British/Irish initiative to compile propagation and cultivation protocols on all threatened species in our floras - the National Botanic Gardens have been at the forefront of this work. The Gardens have also been involved with the active eradication/control of two invasive alien plants, Hottentot fig *Carpobrotus edulis* and giant rhubarb *Gunnera tinctoria*. Matthew used some extraordinary photos of these species taking over sites to show how damaging invasive species can be to the overall biodiversity of a site.

The session after lunch concentrated on some of the more practical biodiversity conservation work and delegates were treated to three different Irish case studies. **Catherine Farrell MIEEM**, Senior Ecologist with Bord na Móna (the Irish peat company) gave the first case study on peatland rehabilitation and restoration. Bord na Móna is a significant land owner in Ireland with up to 80,000 ha of peatlands and associated lands largely located in the Irish Midlands. Since the 1990s, enhancement of biodiversity has become closely linked with the cutaway bogs, as re-colonisation of the bogs following cessation of industrial scale peat production leads to establishment of a mosaic of habitats and species. Catherine said that the main habitats emerging are wetlands (open water, poor fen, reed-swamp) and woodland habitats (birch scrub tending towards bog woodland with margins of dry grassland). These 'new habitats' provide connectivity between existing smaller and isolated wetland and woodland areas as well as creating larger corridors between more extensive wetland sites. There are also considerable numbers of birds and other wildlife of nature conservation value using the recolonised cutaway bogs and projects are being initiated to further enhance habitats and to increase species diversity.

Sharon Parr, Project Scientist for the Burren Farming for Conservation Programme, spoke next about sustainable agriculture in the Burren. The Burren is one of Ireland's most important landscapes, both in terms of its archaeology and its biodiversity. However, like many other high nature value and cultural landscapes, the future well-being of the Burren's habitats, flora and fauna is uncertain due to changes in agricultural management. The BurrenLIFE project was established to try to find practical solutions to some of the problems besetting farming in the region and to encourage a return to traditional grazing practices. Farmers, scientists and conservationists worked together to develop a series of 'farming for conservation' activities, the outcomes of which were monitored in terms of their ecological, agricultural and socio-economic impact. The positive results and evidence gathered by the monitoring programme convinced many Burren farmers that the BurrenLIFE approach offered viable alternatives or improvements to their current farm management. Sharon said that the information gathered during BurrenLIFE went on to form the basis of a successful application for funding which saw Ireland's first locally tailored agri-environmental initiative, the Burren Farming for Conservation Programme (BFCP), get underway in 2010.

The final case study was given by **Evelyn Moorkens MIEEM**, consultant environmental scientist and malacologist, who spoke about the practical measures to conserve freshwater pearl mussels. The freshwater pearl mussel is protected under Annex II of the Habitats Directive and is endangered across its entire world range. In the EU, populations have been decimated through intensification of land use. From 2008 to 2010, sub-basin catchment management plans have been prepared in order to determine the sources and pathways of excessive sediment and nutrients, and to propose specific measures to remove these pressures where they are causing damage. Measures have been designed to benefit wider biodiversity conservation, where problems can be dealt with at source rather than intercepted along their pathway.

The conference concluded with a session looking to the future. **Heather Thompson**, Chief Executive of Ulster Wildlife Trust, and **Paul Wilkinson**, Head of 'A Living Landscape' at the Royal Society of Wildlife Trusts, gave the next presentation about the Wildlife Trust's *Living Landscapes* and *Living Seas* projects. These provide a way to understand what is needed to make the fundamental shift from a protectionism stance to begin the process of restoring, recreating and reconnecting our landscapes and seascapes. Heather and Paul identified some of the key areas of policy and management that are required to make this happen, and the need for greater collaboration in order to achieve a more fully functional ecosystem using nature's natural processes rather than looking for technologically engineered mechanisms. They concluded by saying that the Wildlife Trust's *Living Landscapes* and *Living Seas* will set the framework for how we can all be part of the solution for nature's recovery.

Morgan Parry, Chair of the Countryside Council for Wales, was the final speaker of the conference and gave his views on some of the new objectives and opportunities for nature in the future. Morgan spoke about the need to move towards valuing our ecosystems as well as just mapping them - a concept that the Welsh Assembly Government is currently developing through its new framework for managing the environment called *A Living Wales* (the Government in England are developing a similar approach through their Natural Environment White Paper). These new concepts bring our contemporary reality of land ownership, industrialisation and wealth creation back together with an appreciation of the value of our ecological and physical resources and this is the central challenge of our Governments' new frameworks. This is an urgent challenge. Morgan concluded by saying that globally, there is deep concern about the fast pace of biodiversity loss worldwide, and the increasing impact of climate change. Views on the success or otherwise of the Nagoya conference are mixed, but at least the concept of biodiversity has been anchored in international discussions - even if the next steps are unclear.

The speakers' slides will shortly be available from the IEEM website and the proceedings from this conference will be edited, compiled onto a CD-ROM and sent to all IEEM members in 2011. I would like to thank: all the speakers for a very thought-provoking and interesting conference; the chairs of each session; and the people who led the field excursions and indoor workshops for their time and effort. For details of IEEM conferences in 2011 please see the *Diary* on page 60.

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Tony Bradshaw Best Practice Awards

Jason Reeves AIEEM
External Relations Officer, IEEM

The IEEM Tony Bradshaw Best Practice Awards are an annual competition for projects displaying best practice whilst contributing to the five objectives of IEEM. The awards are named in memory of our first President, the late Professor Tony Bradshaw.

The three finalists for the 2010 IEEM Tony Bradshaw Best Practice Awards were:

- Environment Agency and Freshwater Biological Association - Freshwater Macro-invertebrate Species Level Identification Modular Training and Professional Development Programme
- Sand Dune and Shingle Network
- West Weald Landscape Project

The winner, the Environment Agency and Freshwater Biological Association training programme, and two runners-up were announced at the IEEM Annual Conference dinner on 3 November 2010. Below is more information on each of the three projects.

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L-R: Paul Rooney and Charlotte Durkin from the Sand Dune and Shingle Network, Pam Nolan from the Environment Agency (and on behalf of the Freshwater Biological Association), and Janyis Watson from Sussex Wildlife Trust on behalf of the West Weald Landscape project

Freshwater Invertebrate Species Identification Modules - A Training and Professional Development Programme Project

The IEEM Tony Bradshaw BEST PRACTICE AWARDS 2010 WINNER

The Environment Agency (EA) and the Freshwater Biological Association (FBA) have developed a modular course and training programme to develop and enhance ecological skills and expertise in identifying freshwater macro-invertebrate species. We have developed staged training, easily used by geographically dispersed ecologists going about their normal daily work.

The programme concept and methods of training were the original 'brainchild' of Richard Chadd and Chris Extence, operational ecologists within the EA and FBA members. Product development and delivery has been coordinated by the EA, advised by the FBA and module authors are national aquatic invertebrate experts.

The aims: to sustain and improve technical skills and professional standards for practising ecologists, through a recognised quality control process; and to create a standard of qualification for species level aquatic monitoring and assessment work that complements industry qualification standards.

The output: a series of 11 modules within a distance learning programme, each containig electronic workbooks and marked assessment exercises all held on one CD.

Basic modules: Basic principles of species identification (author: Richard Chadd); and Common and easily identified species (author: Richard Chadd).

The basic modules have been fully rolled out in the EA. They are mandatory and lead to a Basic Level Certificate for our ecologists. The nine advanced modules are intended to be individually completed, assessed and certificated. We have been piloting our implementation approach for their formal roll-out and certification. The FBA also run specialist training on the module species groups, available through their Professional Short Course programme.

Advanced modules: Flatworms and leeches (author: Richard Chadd); Mayflies and stoneflies (author: Craig Macadam); Caddisflies (author: Ian Wallace); Bugs (author: Sheila Brooke); Beetles (author: Garth Foster); Dragonflies and damselflies (author: Steve Brooks); Miscellaneous taxa including crustaceans and alderflies (author: Terry Gledhill); Snails and mussels (author: Ian Killeen); and True flies (author: Michael Dobson).

This project is best practice because: it raises professional standards and can be completed alongside normal daily work; ecologists can start as relative novices and become competent practitioners with high quality standards, they receive full feedback on their assessments, encouraging them to focus on ways to improve their identification skills; the programme is supported by national and international invertebrate experts and independently endorsed by the Freshwater Biological Association; and it provides consistent training, addressing a known skills gap that will improve our ability to meet future ecological monitoring and assessment programme requirements.

The future: we aim to make the programme available externally to other professionals, public bodies, academic institutes, *etc.* More advanced courses will lead to future formal accreditation by the FBA.

Correspondence: Pam.Nolan@environment-agency.gov.uk

Sand Dune and Shingle Network

The Sand Dune and Shingle Network has established itself as a leading influence in the world of sand dune and shingle habitats. IEEM and the Network share similar objectives, and many of the Network are members of IEEM.

The Network is based in the Geography Department at Liverpool Hope University and is staffed by Paul Rooney, Director, John Houston, Network Officer, and Charlotte Durkin, Network Assistant. The Network is now the habitat 'champion' for sand dunes in the England Biodiversity Strategy coastal Biodiversity Integration Group (BIG), and takes a lead in assisting Natural England in their responsibility for the UK Shingle Habitat Action Plan. In 2008 we secured a 3-year Memorandum of Agreement (MoA) with Natural England to support their work by delivering training, guidance and networking opportunities.

The Network seeks to support and promote the sustainable management of sand dune and shingle habitats. In these highly complex, multi-use and highly valued habitats the involvement of a wide range of professions in the Network is necessary. At present the Network members are mostly drawn from site managers, national policy-makers, researchers, biodiversity officers, ecologists, geomorphologists and hydrologists. We are seeking to expand the membership base to include more coastal engineers, golf course managers, tourism officers, foresters, military site managers and landscape historians, amongst others.

Currently we have more than 200 Network members and our newsletter is circulated to over 400 people worldwide. The newsletter is free and published three times a year with information on current research, news from practical projects, case studies of good conservation practice, reports on events and opportunities for Continuing Professional Development (CPD) training.

The IEEM Tony Bradshaw BEST PRACTICE AWARDS 2010 FINALIST

In 2010 we launched an 'Occasional Papers' series to disseminate results from our events and the 'grey literature' of research and professional reports. The intention is to help make relevant evidence more widely available.

We are aware of the economic and organisational context in which our work sits and know we cannot achieve biodiversity and ecosystem enhancement in isolation. Through the Network we make links to, and between, coastal stakeholders whose activities have an impact on sand dune and shingle habitats, such as the golf industry and coastal engineers.

The first Network 'thematic group' was created in 2010 on the theme of hydrology. The aim of the group is to provide a focus to the members' research interests and combine the skills and experience of various professionals to greater effect.

The primary geographical focus of the Network since 2006 has been the UK. However, in supporting the UK Sand Dune HAP action 'promoting the exchange of sand dune ecology and management among European states', the Network has secured agreement in 2010 from the Coastal and Marine Union (EUCC) and key European partners to develop a European Dune Network, which will concentrate on the conservation of the EU dune habitats and species which underpin the Natura 2000 network.

For more information on the Sand Dune and Shingle Network please visit www.hope.ac.uk/coast.

Correspondence: dunes@hope.ac.uk

West Weald Landscape Project

The West Weald Landscape Project (WWLP) works to conserve and enhance the special natural environment of an extensive area of West Sussex and Surrey. It focuses on four core forest areas to conserve Biodiversity Action Plan (BAP) habitats and species there, expand the natural habitats around them and encourage sympathetic management of neighbouring land. In this way we aim to strengthen ecological connectivity across the landscape and improve the permeability of the wider countryside for wildlife.

This landscape-scale approach helps to create an environment better able to cope with adverse impacts and adapt to the impacts of climate change. The involvement of farmers and landowners is crucial, for whom we offer: free farm visits; provide tailored management advice; deliver habitat creation and enhancement works; and support landowners with entry into statutory grant schemes such as Environmental Stewardship.

The WWLP runs a comprehensive programme of survey and monitoring to inform effective conservation measures. For example, surveys during 2010 have included condition assessment of hedgerows, traditional orchards and lowland meadows, as well as baseline surveys of wood white butterflies, woodland moths and saproxylic beetles. Meanwhile, computer modelling studies are used to inform spatial targeting of advice and the potential for habitat creation works.

The WWLP works with a wide range of people, from farmers, landowners and volunteer naturalists to parish groups, local schools and visitors to foster greater public understanding, enjoyment and access to a more natural landscape. Project information is made available through leaflets, articles, displays, events, dedicated talks and guided walks. The Project website - www.westweald.org.uk – is an important means of dissemination too.

A landscape view taken from a balloon
Photo: Rich Howorth

The IEEM Tony Bradshaw BEST PRACTICE AWARDS 2010 FINALIST

The Project is funded by The Tubney Charitable Trust, with additional funding from the BBC Wildlife Fund and others. It is based at the Sussex Wildlife Trust and delivered by a Project Manager, supported by a Landowner Advisor. An active partnership helps to oversee the project, including Natural England, Forestry Commission, Environment Agency, Butterfly Conservation, Surrey Wildlife Trust, South Downs Joint Committee, Farming and Wildlife Advisory Group, The National Trust, West Sussex County Council, Surrey County Council, Chichester District Council and Waverley Borough Council.

This project demonstrates best practice at all levels, from the strength of the underpinning scientific research, to community involvement through landowner liaison and the use of volunteers to carry out the practical works and surveys, to the advancement of environmental management for a range of BAP habitats and species.

Correspondence: westweald@sussexwt.org.uk

Working Towards our Royal Charter - An Update

Sally Hayns
Chief Executive Officer, IEEM

At the 2009 AGM members voted overwhelmingly in support of a proposal that IEEM should progress towards making an application to become a Chartered Institute. That view was confirmed by the responses to the same question posed in our Members' Survey earlier this year. This represents an exciting opportunity for IEEM to continue its work of promoting the profession of ecology and environmental management and we thought that it would be helpful to keep members informed of the application process and the progress we are making towards our goal.

The Application Process

In order to submit an application for Royal Charter, IEEM will first have to pass the 5,000 members mark. We currently have 4,139 so there is still a way to go but as we move towards that figure we will be working on producing a Memorandum that outlines:

1. the history of IEEM;
2. our role;
3. details of our membership;
4. details of the academic and other qualifications/experience that we require prospective members to have;
5. our achievements;
6. our educational role;
7. an indication of our dealings with Government;
8. evidence of our pre-eminence; and
9. our reasons for applying for Chartered status.

This Memorandum is the key document which justifies our application. In particular we will have to demonstrate our pre-eminence as the membership body for ecology and environmental management professionals. We will want to make some of our related professional membership bodies (*e.g.* CIWEM, IEMA) aware of our intention to proceed with an application for Royal Charter and work closely with them to ensure that we are complementing each other and working to our specialist areas of expertise rather than all trying to do the same thing. We will also need to work on our application and assessment processes - *i.e.* how we will accredit individuals to Chartered status, building on our existing licence to award Chartered Environmentalist accreditation.

In order to progress this work, Council has agreed to establish a Charter Working Group who will steer the preparation of the application, working closely with the Secretariat. The Charter Working Group will liaise with the Membership Admissions Committee (MAC), who have already given some thought to the application and assessment process, and other Committees as appropriate.

Broadly speaking the application process will look like Figure 1.

In terms of timescales, a key factor will be how quickly we can reach the 5,000 member mark. The other activities will be scheduled to be ready as soon as that particular milestone is reached. Accordingly, the Working Group's intensity of activity will increase the closer we get to the target.

How You Can Help

There are three ways in which IEEM members can help with the Charter application process.

Firstly, please do all you can to promote **IEEM membership** to colleagues and contacts within the profession. We do recognise that times are hard but by growing our membership we will genuinely be able to speak out more effectively on behalf of the profession as well as reaching the magic 5,000 figure.

Secondly, we are looking for **volunteers** to join the Working Group to help progress the Royal Charter application. Whilst initial involvement will be paced to match the growth in membership numbers it is likely that, as we get closer to the 5,000 figure and submitting an application, there will be the need for greater involvement. Membership of the Working Group will be largely consultative with members asked to comment on documents by e-mail although there may need to be the occasional meeting.

Thirdly, we would ask all members to look out for **requests for information** to support out Charter application. As we put our memorandum together we will be asking for members' suggestions as to how we can evidence some of the key criteria. Your help with this would be most appreciated.

If you would like to volunteer for the Working Group or require any further information about the Charter application process please do get in contact.

Correspondence: sallyhayns@ieem.net

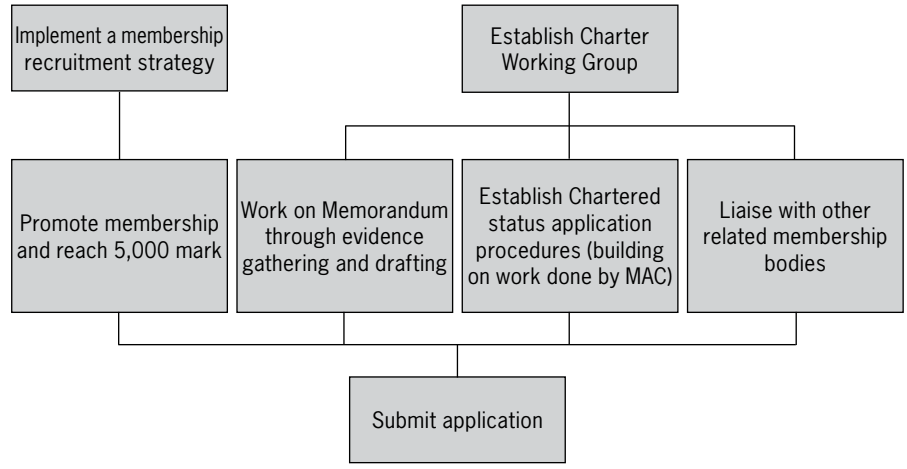


Figure 1. Working towards our application for Royal Charter

Institute News

2010 AGM

IEEM has a new President! **Professor Penny Anderson CEnv FIEEM** took over the role at the 2010 AGM in Dublin when **Professor Stephen Ormerod FIEEM** stepped down having served two years in the role. Penny paid warm tribute to Steve's hard work and energy whilst serving as IEEM's President, complimenting him for his political insight, incisiveness and ability to get to the heart of a problem and identify a solution. In his closing remarks, Steve thanked all the members who had served on Council and Committees for their time and expertise on behalf of the Institute. He went on to refer to the political context in which the Institute now finds itself and the need for IEEM to be a reasoned but vocal champion for the valuing of biodiversity.

The **Secretariat's Report** highlighted some of the key achievements of 2009/10 including a new joint position statement with BES on protected areas, two new additions to the Professional Guidance Series, successful conferences and new memoranda of understanding with the Freshwater Biological Association, Natur and the Institute of Environmental Professionals – Sri Lanka.

The **Financial Report** identified how the Institute had managed to produce a small surplus of just over £22,000 during the financial year but noted that this had in part been achieved through not replacing a member of staff that had left during the year and by managing to have two one-day Spring Conferences as well as the two-day Autumn Conference in Suffolk. Reserves still stand at only four months of expenditure compared with Council's target of six months. Members were warned that it was not clear as yet as to how the continuing economic climate will impact upon income (from both subscriptions and workshops/conferences) and therefore there was a need for the Institute to focus on additional income generation if it is to achieve its ambitions in relation to developing further services and benefits for its members.

Robin Buxton CEnv FIEEM was re-elected as Vice President whilst **Mike Barker CEnv MIEEM** and **Richard Graves CEnv MIEEM** were re-elected, as Company Secretary and Treasurer respectively.

Stepping down from Council at the AGM were **Jenny Neff CEnv FIEEM**, Past President **Andy Tasker CEnv MIEEM** and **Cathy Mordaunt CEnv MIEEM**, all of whom have given valuable and much appreciated service to IEEM. **Jan Swan CEnv MIEEM** also stepped down after many years on a number of different Committees. New members elected onto Council were **Paul Goriup CEnv FIEEM** and **Lisa Kerslake CEnv MIEEM** whilst **Paul Rooney CEnv MIEEM** was re-elected for a second term of three years.

The unadopted minutes of the AGM together with full lists of current Council and committee members are now available on the IEEM website.

Fellowship Presentations

During the AGM the outgoing President took the opportunity to present **Paul Doyle CEnv FIEEM** and **Peter Cosgrove FIEEM** with their Fellowship certificates, having been awarded them in April 2009. Paul is the Director of Alba Ecology with leading experience in Ecological Impact Assessment in relation to wind farms. Peter is Principal Ecologist at Alba Ecology and is one of the foremost authorities on the freshwater pearl mussel and its conservation.

Strategic Plan

Any organisation with limited resources and an ambitious agenda needs a Strategic Plan that can identify the key priorities for the years ahead. IEEM Council and Committee members, together with the Secretariat team, are currently working on producing a new Strategic Plan for the period 2011-2015. Inevitably this means making some difficult decisions about balancing different areas of work and identifying how we can generate sufficient resources to implement the Plan. We will publish more details in the June issue of *In Practice* but already we are excited about the opportunities that lie ahead and the potential for IEEM to continue to grow in influence on its members' behalf. We would like to take the opportunity to thank all those Graduate, Associate, Full members and Fellows who very recently responded to our member benefits survey as part of our strategic planning process.

L-R: Steve Ormerod, Peter Cosgrove, Jenny Neff, Penny Anderson, Jan Swan, Paul Doyle, and Andy Tasker

Spring Conference 2011

Invasive Species: New Natives in a Changing Climate?
23 March 2011, London

The programme for this timely and thought-provoking conference is now available on the website and bookings are open. This promises to be a popular day so please do book early as places will be limited by the size of the venue.

Annual Conference 2011

Rebuilding Biodiversity
2-3 November 2011, Liverpool

Please make a note in your diary of the dates for our 2011 Autumn Conference. Topics to be covered include biodiversity offsetting, habitat restoration and landscape-scale conservation. The programme is currently under construction and offers of papers on these themes are very welcome. Please contact Nick Jackson at nickjackson@ieem.net if you would like to contribute.

2011 Professional Development Programme

The 2011 programme of workshops and training courses is included in this *In Practice* mailing. We have tried to respond to ideas and suggestions for new courses as well as delivering those that are popular each year. We will be adding to the programme throughout the year so if you have further suggestions for suitable courses that you would like to see included in the programme please do get in touch with our Education Officer, Nick Jackson, by telephoning 01962 868626 or e-mailing nickjackson@ieem.net.

Consultations and Meetings

With the support of member contributions the Institute has recently been involved in a number of consultations including responding to the discussion paper 'Shaping the Nature of England', Natural England's Standing Advice for Protected Species and Preparing Forests for Climate Change. In October, then President-elect Penny Anderson and CEO Sally Hayns met with staff from DEFRA to discuss the growing Government agenda around biodiversity offsetting as a conservation tool. Shortly afterwards Sally Hayns attended one of the White Paper stakeholder consultation meetings in London. This was a useful opportunity to make some pertinent points regarding the importance of sourcing ecological advice from competent and experienced ecologists and environmental managers, about the need to ensure that the role of the Local Government Ecologists is recognized and valued as part of a localism agenda and the opportunity to transform the way that data is captured, managed and made available to others.

We have also been busy with a number of briefings for members. Please use the links below to see more:

- BREEAM
  www.ieem.net/docs/BREEAM_revisions_Oct2010.pdf
- Quangos
  www.ieem.net/docs/IEEM-Quango-News-Oct2010.pdf
- Spending Review
  www.ieem.net/docs/IEEM_Spending_Review_Oct2010.pdf

We would welcome further advice and support from members in producing consultation responses, especially if you have expertise in a particular area. Please do get in touch by contacting our External Relations Officer, Jason Reeves, on 01962 868626 or e-mail at jasonreeves@ieem.net.

Professional Affairs Projects

IEEM are currently undertaking a series of projects under the Professional Affairs Committee:

- The Competencies for Species Survey project is looking to establish guidance for skills, knowledge and experience required to survey, disturb or carry out research works for protected species.
- The Professional Guidance Series is being reviewed, to bring some of the older guidance documents up to date with legislation changes and changes in the profession.
- The Sources for Survey Methods section of the IEEM website is being revised and updated with new references for survey methodology and is planned to be completed by the end of 2010.

If you are able to help with any of these projects then please contact Simon Kain (simonkain@ieem.net).

Future Themes for *In Practice*

If you are interested in contributing to a future edition of *In Practice*, please note the themes and deadlines below.

Edition	Theme	Submission Deadline
71 - March 2011	Agri-environment and Ecology	24 January 2011
72 - June 2011	Invasive Species	25 April 2011

Obituaries

Tim Holzer MIEEM sadly and suddenly died at the end of April 2010. Tim was an Area Biodiversity Officer for the Environment Agency and based in Hampshire.

Barry Nicholson CEnv MIEEM sadly passed away in September 2010. Barry was Co Director of The Ecology Consultancy, which he helped to set up 10 years ago with fellow Director, John Newman.

Staff Changes and News

IEEM has been pleased to welcome **Simon Kain** who has joined us for six months on an internship following his graduation from the University of Southampton having recently completed an MSc in Biodiversity and Conservation. Simon joined us in September and is working on an update of IEEM's Sources of Survey Methods resource as well as reviewing and updating the Professional Guidance Series.

Kim Lipscombe joined us on another internship in October, this time assisting us with our marketing activities. Kim is a graduate of the University of Southampton.

We were joined for a few weeks in October and November by **Eleanor Stubbs**, who undertook a review of CPD returns from members. Eleanor, who had recently graduated from the University of Southampton, completed this work as part of the Ecological Skills Project.

West Midlands Section News

Inaugural AGM and Bat Event

The West Midlands Section was formally launched by Andy Tasker CEnv MIEEM at our first AGM on 15 September 2010 followed by stimulating presentations and discussions from Colin Raven, Director of Worcestershire Wildlife Trust on practical examples of delivering landscape scale projects and Professor Robbie McDonald Head of Wildlife and Emerging Diseases Programme at the Food and Environment Research Agency (FERA) on some of the current issues and problems around badgers and TB.

We were also able to gain some useful feedback from West Midlands Members and we will use this to guide our work over the forthcoming year.

The new committee had a thoughtful and productive meeting with IEEM's new Chief Executive, Sally Hayns, on the issues and opportunities for ecologists, environmental managers and IEEM, with a lively discussion on how the Institute might develop in the future and what it needs to focus on.

October 20 may have been the date of the Comprehensive Spending Review, but it didn't stop 90 people turning up to our first thematic conference on 'Bat Mitigation: Sharing Good Practice'. We were grateful to have talks and workshops presented by a number of national bat experts, focussing on practical ways to deliver successful mitigation and drawing upon a wide range of case studies. With glorious views of the Malverns, and perfect weather, we had a day of excellent presentations, challenging debate and a great deal to go home and think about.

Paul Cobbing CEnv MIEEM
Convenor, West Midlands Geographic Section

Members at the AGM

South East England Section News

Thames Basin Heaths Event

On 29 November 2010, over 60 South East England Section members met in Pirbright, Surrey for a masterclass on the Thames Basin Heaths (TBH) Special Protection Area (SPA) Delivery Framework.

John Eyre (2Js Ecology) started proceedings with a fascinating introduction to the three Annex 1 bird species for which the SPA is designated; the nightjar, the woodlark and the Dartford warbler, and their relative susceptibility to recreational and other environmental pressures. We then heard from Allison Potts MIEEM (Natural England) who explained what the TBH Delivery Framework is, why it is necessary, the process through which it was developed and the evidence upon which it was based. Next up was Phil Allen, from Hampshire County Council, with an insight into the financial and legal processes involved in establishing a Suitable Alternative Natural Space (SANG), including Phil's experiences in delivering a strategic SANG at Hawley Meadows, which stretches across three districts. After a brief break for coffee and cakes, Andy Glencross (Woking Borough Council) provided an entertaining account of the many trails and tribulations he encountered in the creation of the Rooks Nest SANG in Wokingham, including an informative discussion of the real costs associated with the SANG. Finally Karen Colbourn MIEEM (EPR Ltd) discussed the delivery of bespoke SANGs, describing how these differ from strategic SANGs and highlighting some of the potential issues that can be encountered during their design.

Nightjar ***Photo credit: John Eyre***

The day was highly informative, sparking many interesting debates and discussions and providing a great opportunity to put 'faces to names' within the Thames Basin Heaths area. We are grateful to all of our speakers and would like to thank Simon Newell for his help in putting the programme together. If you would like more information about the day, each of the presentations provided at the event are uploaded onto the South East England Shadow Section webpage at www.ieem.net/sesection.asp.

Angela Simmons MIEEM
Convenor, South East England Geographic Section

South East England Section News

Freshwater Event

The freshwater event was well attended, with 25 participants braving the weather to make an early start at Golder Associate's Wheatley office.

The morning started with an hour-long tutorial, introducing some of the basic concepts in freshwater ecology. The main focus was on invertebrate diversity and examination of the multitude of methods that have been developed to assess the water quality and habitat quality of our freshwaters. Some techniques were subsequently demonstrated in the field, including sampling of invertebrates with the mighty sieve! The field session was held at the River Thame, which turned out to have a reasonable diversity of aquatic invertebrates, including numerous families of mayfly, caddisfly and crustacean, including the alien invader, signal crayfish. Unsurprisingly, this stimulated interesting discussion on the health of the river, equipment cleaning/ disinfectant procedures and the best ways of killing humanely. After a swift lunch we then set about becoming more familiar with the captured invertebrates under the microscope. Five major orders: beetles, caddisflies, mayflies, stoneflies and dragonflies were separated out, and with a helping hand some of them were sorted to family level. The records will be submitted to the local records centre (Thames Valley Environmental Records Centre) in due course.

Participants at the freshwater event

Jim Fairclough MIEEM
Member, South East England Geographic Section

Are Local Records Centres Working For You?

At the Thames Valley Environmental Records Centre (TVERC) we strive to provide a quality service to all our users as well as insuring we adhere to all the data sharing agreements we hold with recording groups and individuals. And although we aim to hold a full dynamic database across all taxa and the full geographic range of our area there are gaps and appreciate that it can be time consuming and frustrating when this is not clear. So, with consultants in mind we are trialling a new free service.

If you are looking for single species records or just bat records on a given site in Berkshire or Oxfordshire we will endeavour to check this site and provide you with a free brief summary of the information available. **This will provide an idea of how many records there are, how close they are to the centre of the search and how old the records are.** Then on this basis you can decide for yourselves whether it is worthwhile proceeding with a full paid data search. In some instances we hold the data for additional sensitive groups but do not have permission to share this with consultants but we can advise who to approach to get the information you need.

For more information or to try out this free service visit www.tverc.org and click on 'Data Search Enquiries'. And if you think there are ways we can improve our service further please get in touch.

Melanie Hardie
Director,
Thames Valley Environmental Records Centre

Thames Valley
Environmental Records Centre

Partnership News

2010 International Year of Biodiversity

The outcomes material from the first Global Business of Biodiversity (GBOB) conference, which IEEM attended, have been provide in an interactive online magazine format, which can be found at www.globalbusinessofbiodiversity.com/GBOB_ebook_2802.html.

The GBOB outcomes were designed for the Convention on Biological Diversity (CBD) to share with the business segment meeting at the 10th Conference of the Parties (COP10). Contributions to this document came from the rapporteurs of the sessions, many individuals and from partner and stakeholder organisations involved.

Section One of the magazine is the outcomes component and is a summary of the feedback from delegates who offered their views, to be directed to the CBD, to Nagoya and to international Governments. They are summarised under seven high level themes which highlight the main issues and barriers to have emerged:

- Lack of understanding
- Communication
- Markets
- Regulatory frameworks
- Reporting and accountability
- Capacity development
- Wider integration - the overarching narrative

Section Two is an overview of GBOB - in particular, comments from the keynote elements in the main plenary sessions.

Plans are underway for GBOB2 in 2011, linked with the CBD and the International Year of Forests.

www.biodiversityislife.net | www.cbd.int/2010/welcome

European Network of Environmental Professionals

Attendance was less than perfect at the latest General Assembly, held on 26 October 2010 in Brussels, but nonetheless important steps were taken. Here is a brief overview of what the members present, including IEEM, discussed and decided.

Firstly, at this meeting not only was the Co-ordinator, Jason Reeves (IEEM External Relations Officer), present but for the first time also the new Project Officer, Simon Pascoe. Simon started adding value immediately by inviting a key EU official (DG Environment Unit Head Paulus Brouwer) over for an informative luncheon address. Read more about Simon at www.efaep.org/news/article/55/.

Regarding the ENEP database, which is continuously growing in membership but still under-exploited, we decided to further experiment with connections through LinkedIn, and to increase its attractiveness by making relevant news available first via this medium (job offers, EU News Flashes, *etc.*). And yes, the EU News Flash has been relaunched – the first issue was produced by Simon just before the meeting, and so this useful service to our members is available again! We will also reinstate an EU Legislation Update service soon – this too is a service highly appreciated by many professionals. Sign up at www.environmentalprofessionals.eu to make sure you receive these updates.

We also decided to make the name change from 'EFAEP' to 'ENEP' effective from 26 October 2010, following up on the decision made during the previous General Assembly in Porto. We will change letterheads, website, banners, brochures, *etc.* within the next few weeks. Although our legal name will remain 'EFAEP' (to avoid having to change our Statutes), we will only speak of ENEP from now on. And from now on too, we will call the members database that carried the name 'ENEP database' our 'ENEP platform'.

The Treasurer, Jim Thompson (former IEEM Executive Director), reported that ENEP is financially in good shape, with a substantial surplus expected in 2010. The budget for next year was fixed with increased funding for Working Group activities, and with higher personnel expenses - due to Simon's arrival. Jim was to step down as Treasurer at this Assembly, but IEEM has agreed to endorse him as Treasurer until the next General Assembly: no candidates were brought forward by any member for the Treasurer election that was supposed to take place in Brussels so there was no election.

It was also decided that from now on every second General Assembly will take place at our Headquarters, the Mundo-B office building in Brussels' government centre.

More good things happened – the day before the General Assembly there was a presentation from the Humboldt Project and then a very useful and intensive session going through the four Working Groups that are now active or starting their activities. The Biodiversity Working Group, chaired by Mike Barker (IEEM Company Secretary), has been very active and has recently issued a letter to the EU DG Environment on the role of Green Infrastructure in supporting post Countdown 2010 targets (read the letter at www.efaep.org/news/article/56/).

The minutes and appendices from the General Assembly and side events are available at www.efaep.org/documents/topic/97/.

www.efaep.org | www.environmentalprofessionals.eu

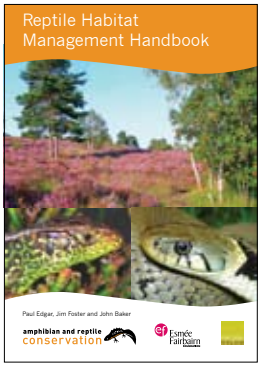
Countdown 2010

Countdown 2010 was officially closed at a dedicated event in Nagoya, Japan, at the United Nations Convention on Biological Diversity summit. The Countdown 2010 event took place on 20-10-2010 at 20:10 in the presence of partners and supporters, as well as senior representatives from IUCN, the CBD Secretariat and other biodiversity organizations.

A new initiative will start in 2011. Existing Countdown 2010 partners, including IEEM, will be invited to join the new initiative. More information on this will follow in future communication.

www.countdown2010.net

Recent Publications



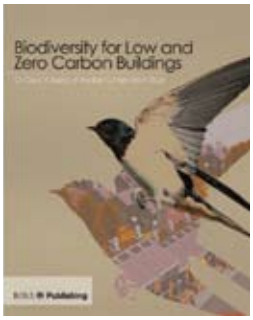
Reptile Habitat Management Handbook

Authors: Paul Edgar, Jim Foster and John Baker MIEEM
Available from: www.arc-trust.org
Price: free download
ISBN-13: 978-0-9566717-0-7

This handbook is the first attempt to bring together habitat management advice for all native UK reptiles. The six species have all experienced population declines, and are now all Biodiversity Action Plan priorities. The handbook is aimed at site managers, and those who advise on management. It gives advice for a range of settings, from dedicated nature reserves to farmland and includes a useful appendix of Environmental Stewardship options.

Along with the four more common species, the handbook advises on the specific management measures needed for the precious few sites supporting our two rarest reptiles, the sand lizard and smooth snake, both of which have very specific habitat requirements - lowland heath and coastal dunes respectively.

Species-focused management is sometimes dismissed as impractical, as differing species may have conflicting requirements. To address this, a section has been included on resolving perceived conflicting wildlife interests. Fortunately, reptile habitat requirements benefit a range of other species, especially invertebrates, and so management for reptiles is generally compatible with managing for wider biodiversity.



Biodiversity for Low and Zero Carbon Buildings: A Technical Guide for New Build

Author: Carol Williams
Available from: www.ribabookshops.com
Price: £30.00
ISBN-13: 9781859463536

The built environment has the potential to have a major impact on biodiversity, not least with the increasingly demanding requirements to design more energy efficient and airtight buildings, leaving less space for species to inhabit. This book has specially commissioned architects to produce some much needed model designs and practical guidance for the industry. The book also provides a useful summary of all the legislation and regulations relating to biodiversity and sustainable construction in the UK.

The Brown Hare

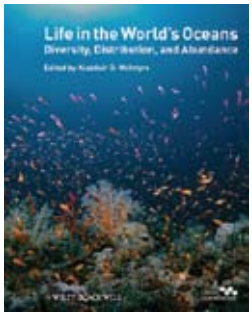
Authors: Stephen Tapper and Derek Yalden
Available from: www.mammal.org.uk
Price: £3.50 (plus P&P)
ISBN-13: 978-0-906282-68-7

This is the latest title in the well-known Mammal Society series. Written by experts, it describes the biology, ecology and conservation status of the brown hare *Lepus europaeus*, accompanied by numerous images and figures to illustrate the ecology of this elusive long-legged lagomorph. The publication covers everything from anatomy and appearance, field signs, distribution, and diet and feeding habits to farmland ecology, behaviour, reproduction, mortality, and conservation.

Woodland Creation for wildlife and people in a changing climate

Authors: David Blakesley CEnv MIEEM and Peter Buckley MIEEM
Available from: www.nhbs.com
Price: £24.95
ISBN-13: 9781874357445

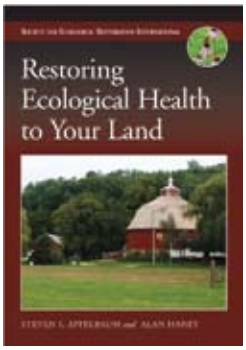
The call for increasing woodland cover in Britain is growing ever louder, and new woodland can make a real contribution to the conservation of wildlife characteristic of woodland and its associated habitats. New woodland also benefits people in a variety of ways, which include health and well-being. This book presents a comprehensive and extensively illustrated guide to the principles and practice of woodland creation for wildlife and people in a changing climate. The first part of the book looks at the issues underlying woodland creation and natural succession, and describes different woodland community types as model habitat targets. The variety of wildlife attracted to new woods, including birds, insects and plants, is described. The impact of climate change on woodland into the future is also explored, including coping strategies for biodiversity, and the planning and planting strategies for woodland habitat networks in the landscape. The second part presents practical information, covering topics from the planning and selection of sites, selecting tree species and sourcing of seeds to woodland design and management, including the role and design of woodland open space. The book is aimed at all with an interest in woodland creation, including landowners, advisors, national/local conservation organisations, foresters, consultants, planners, local authorities and community groups.



Life in the World's Ocean

Editor: Alasdair D McIntyre
Available from: http://eu.wiley.com
Price: £120.00
ISBN-13: 978-1-4051-9297-2

Comprising the synthesis and analysis of the results of the Census of Marine Life this most important book brings together 10 years of research by 2,000 scientists from 80 countries. The book is broadly divided into four sections, covering oceans past, oceans present, oceans future and a final section covering the utilisation of the data which has been gathered, and the coordination and communication of the results. This comprehensive book is aimed at marine scientists, ecologists, conservation biologists, oceanographers, fisheries scientists and environmental biologists.



Restoring Ecological Health to Your Land

Authors: Steven I Apfelbaum and Alan W Haney
Available from: www.nhbs.com
Price: £18.99
ISBN-13: 9781597265720

Although North American biased, this practical guidebook gives restorationists with little or no scientific training or background the 'how to' information and knowledge they need to plan and implement ecological restoration activities. The book sets out a step-by-step process for developing, implementing, monitoring, and refining on-the-ground restoration projects that is applicable to a wide range of landscapes and ecosystems.

In the Journals

Jason Reeves AIEEM and Laura Wilson

S Menezes, DJ Baird and AMVM Soares
Beyond taxonomy: a review of macroinvertebrate trait-based community descriptors as tools for freshwater biomonitoring
Journal of Applied Ecology 2010, **47**: 711–719

The authors review the support from ecological theory to employ species traits for biomonitoring purposes, and the subsequent studies that test the hypotheses arising from these theories, and apply this knowledge under real freshwater biomonitoring scenarios. They highlight the functional trait approach as one of the most promising tools emerging for biomonitoring freshwater ecosystems. Several technical issues are addressed and solutions are proposed. They discuss the need for: a broader unified trait biomonitoring tool; a more accurate understanding of the natural variation of community patterns of trait expression; approaches to diminish the effects of trait trade-offs and trait syndromes; additional life history and ecological requirement studies; and the detection of specific impacts under multiple stressor scenarios. This review provides biologists with the conceptual underpinning for the use of species traits as community descriptors and for freshwater biomonitoring and management.
Correspondence: salome@ua.pt

M-J Rochet *et al.*
Do changes in environmental and fishing pressures impact marine communities? An empirical assessment
Journal of Applied Ecology 2010, **47**: 741–750

This study looked at an exploited fish community as a three-level food chain in which the two upper levels, or functional groups, are targeted by fishing fleets, while the lowest level is subject to environmental variation. Qualitative modelling was used to predict changes at the two upper levels, *i.e.* top-down vs bottom-up perturbations, and used to evaluate the evidence for different causes of changes. A wide diversity of impacts was found to have equal evidence at the population level within each community. Consistency between the impacts identified and changes in pressures known from independent information was found at the functional group and community level. The results suggest that there is some compensation between species within functional groups.
Correspondence: mjrochet@ifremer.fr

SV Brückmann, J Krauss and I Steffan-Dewenter
Butterfly and plant specialists suffer from reduced connectivity in fragmented landscapes
Journal of Applied Ecology 2010, **47**: 799–809

The authors study the impact of habitat connectivity on both butterfly and plant species richness and compare a connectivity index, percentage habitat cover and distance to the next suitable habitat patch as alternative measures of connectivity. They found that total loss of grassland connectivity would reduce species richness of specialist butterflies (38-69%) and specialist plants (24-37%). A connectivity index combining patch size and distance in the surrounding landscape was a better measure of connectivity than percentage habitat cover or distance to the next suitable habitat. The authors conclude that connectivity is highly relevant for conservation of butterfly and plant species with specialized habitat requirements, but the decision as to which connectivity measure is most appropriate depends on patch configuration, landscape context and study design. They suggest that management strategies should aim to increase connectivity by active restoration of former calcareous grasslands to ensure long-term survival of habitat-specialist species.
Correspondence: sabrina.brueckmann@uni-bayreuth.de

A Rainho, AM Augusto and JM Palmeirim
Influence of vegetation clutter on the capacity of ground foraging bats to capture prey
Journal of Applied Ecology 2010, **47**: 850–858

Prey abundance is often used as a surrogate for availability, but this may be incorrect wherever habitat factors limit access to prey. Ground vegetation clutter is likely to be such a limiting factor for ground foraging insectivorous bats, and the authors investigated this possibility using *Myotis myotis* as a model. The authors performed captivity experiments to determine how ground vegetation density affects foraging. Bats were provided with crickets hidden in sparse, medium and dense grass cover. They also used bat radio tracking data, prey abundance measurements, and GIS modelling to determine if clutter influences how bats select foraging areas in a Mediterranean region. The experiments demonstrated that ground vegetation clutter greatly reduces access to prey, affecting both capture success and time to capture. Bats detected prey in the dense vegetation, but did not attempt to capture them or did so only after a prolonged delay. Their attempts often failed, because the bats landed over prey with open wings, presumably to increase the catching surface, and the dense vegetation prevented them from reaching the ground. In the study area, cover types with the densest ground vegetation harboured the most prey, but clutter made access to prey by *M. myotis* difficult. Corroborating this, the GIS models showed that bats avoided foraging in habitats with high prey abundance but in which availability was decreased by dense ground vegetation. Ungrazed grasslands reach vegetation densities that limit access to prey by ground foraging bats, as observed in the study area. However, grazing by cattle reduced clutter to levels equivalent to the sparse treatment in our captive experiments, in which bats captured prey easily.
Correspondence: amrainho@fc.ul.pt

A Harrison *et al.*
Culling wildlife hosts to control disease: mountain hares, red grouse and louping ill virus
Journal of Applied Ecology 2010, **47**: 926–930

This study assesses the evidence that culling mountain hares *Lepus timidus* is an effective and practical way to control louping ill virus in red grouse *Lagopus lagopus scoticus*. Evidence from the available literature is limited, restricting the authors' ability to reliably assess the effectiveness of culling mountain hares to control ticks, louping ill virus, or increase red grouse densities. Additionally, the information required to assess the cost-benefit of this management strategy is lacking. The population response of mountain hares to culling is not well understood and the possible effects on their conservation status and the upland ecosystem remain unexplored. The authors conclude that there is no compelling evidence base to suggest culling mountain hares might increase red grouse densities.
Correspondence: a.harrison@macaulay.ac.uk

WJ Sutherland *et al.*
REVIEW: The identification of priority policy options for UK nature conservation
Journal of Applied Ecology 2010, **47**: 955–965

A group of seven representatives from governmental organizations, 17 from non-governmental organizations and six academics provided an assessment of the priority issues for UK nature conservation. The representatives consulted widely and identified a long-list of 117 issues. These were reduced to a final list of 25 issues and their potential policy options and research needs were identified. Many of the policies related to recent changes in approaches to conservation, such as increased interest in ecosystem services, adaptation to climate change and landscape ecology. The

entire paper is freely available at http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2664.2010.01863.x/full.
Correspondence: w.sutherland@zoo.cam.ac.uk

RB Bradbury, C Stoate and JRB Tallowin
FORUM: Lowland farmland bird conservation in the context of wider ecosystem service delivery
Journal of Applied Ecology 2010, **47**: 986–993
With changes in the drivers of agricultural land management, farmland bird conservation now needs to be considered alongside provision of a range of ecosystem services (ES) indicative of environmentally sustainable land-management. The authors explore the extent to which land management for farmland bird conservation provides 'cultural' ES, before assessing the potential consistency between management for bird species conservation and for a suite of ES that relate to the regulation of ecosystem processes. They discuss the potential for co-delivery and trade-offs between farmland bird conservation and regulating ES, at a range of locations and spatial scales. The authors suggest that action to enhance regulating services could provide some co-benefits for farmland bird conservation, however, more targeted management will still be required for certain species.
Correspondence: richard.bradbury@rspb.org.uk

JC Dunn, KC Hamer and TG Benton
Fear for the family has negative consequences: indirect effects of nest predators on chick growth in a farmland bird
Journal of Applied Ecology 2010, **47**: 994–1002
Predation risk influences the behaviour of adults foraging for altricial young, so that they avoid disclosing the location of their offspring to predators. The consequences of these behavioural changes for offspring are unknown. This study investigates whether predator-induced changes in provisioning rates can have impacts upon avian nestlings through reductions in growth and condition, and whether this is influenced by resource availability, using the declining yellowhammer *Emberiza citrinella* as a model species. The authors show a sizeable negative impact of nest predator activity upon brood provisioning rate, indicating that parents can assess nest predation risk and adjust their behaviour accordingly. Chick condition and growth were both negatively influenced by corvid nest predator abundance and positively influenced by food abundance in large broods, suggesting that parents raising large broods in unfavourable conditions were unable to compensate fully for the effect of corvid activity on provisioning rate. The authors propose a mechanism by which two distinct trends linked with the intensification of agriculture, namely increasing corvid abundance combined with a decreasing food supply, may have indirectly precipitated population declines in farmland passerines through delayed life-history effects across generations. As the impacts of corvids are reduced where invertebrates are abundant, they suggest that management should concentrate on improving the quality of foraging habitat by creating mosaics of long and short vegetation, rather than on the control of corvids.
Correspondence: jenny.dunn@rspb.org.uk

U Sahlin *et al.*
Time to establishment success for introduced signal crayfish in Sweden – a statistical evaluation when success is partially known
Journal of Applied Ecology 2010, **47**: 1044–1052
The signal crayfish *Pacifastacus leniusculus* is an invasive species in Sweden, threatening the red-listed nobel crayfish *Astacus astacus* through spreading the crayfish plague. The authors used a model to predict the time to successful establishment of signal crayfish populations introduced into Sweden. The models showed that the chances of establishment were highest in the time periods immediately following the first introduction. The model also predicts establishment success to be <50% within five years after first introduction over the current distributional range of signal crayfish in Sweden today.
Correspondence: ullrika.sahlin@ekol.lu.se

B Pérez Lapeña *et al.*
Environmental impact assessment of offshore wind farms: a simulation-based approach
Journal of Applied Ecology 2010, **47**: 1110–1118
This paper presents a method based on geostatistical simulation to assess whether pre- and post-construction collected bird count data suggest displacement of birds due to the wind farm. The method takes into account spatial autocorrelation in species abundance at various scales, pre- and post-construction differences in environmental conditions and in survey effort and design. The authors demonstrate that taking these factors into account influences the conclusions about a wind farm's impact on bird life. In particular, incorporating spatial autocorrelation in seabird numbers is an important factor in reducing the risk of wrongly identifying an effect of a wind farm on bird abundance.
Correspondence: b.perez-lapena@utwente.nl

MJ Hutchings
The population biology of the early spider orchid *Ophrys sphegodes* Mill. III. Demography over three decades
Journal of Ecology 2010, **98**: 867–878
The author presents a 32-year plant-based demographic study of the rare early spider orchid *Ophrys sphegodes*, covering periods of management by cattle grazing (1975–1979) and sheep grazing (1980–2006). Despite a dramatic increase in the number of emergent plants approximately 10 years after management changed to sheep grazing, and large numbers of emergent plants thereafter, mortality greatly exceeded recruitment over the last 10 years of this study. The author concludes that conservation of orchids like *O. sphegodes*, which have numerous 'weedy' life-history characteristics, is heavily reliant on appropriate management and although previous management prescriptions for conservation remain valid, some site disturbance will be beneficial to recruitment.
Correspondence: m.j.hutchings@sussex.ac.uk

KH Orwin *et al.*
Linkages of plant traits to soil properties and the functioning of temperate grassland
Journal of Ecology 2010, **98**: 1074–1083
This study used a field-based monoculture experiment involving nine grassland species that had been growing on the same base soil for seven years to test whether leaf, litter and root traits associated with different plant growth strategies can be linked to an extensive range of soil properties relevant to carbon, nitrogen and phosphorus cycling. Soil properties included the biomass and structure of the soil microbial community, soil nutrients, soil microclimate and soil process rates. The results indicate that plant species from a single habitat can result in significant divergence in soil properties and functioning when grown in monoculture, and that many of these changes are strongly and predictably linked to variation in plant traits associated with different growth strategies. Traits therefore have the potential to be a useful tool for understanding the mechanisms behind plant–soil interactions and ecosystem functioning, and for predicting how changes in plant species composition associated with global change will feedback to the Earth system.
Correspondence: k.orwin@lancaster.ac.uk

There were three Biological Flora of the British Isles papers during the period since the last *In Practice*:

GED Tiley
Biological Flora of the British Isles: *Cirsium arvense* (L.) Scop.
Journal of Ecology 2010, **98**: 938–983

H Jacquemyn and MJ Hutchings
Biological Flora of the British Isles: *Spiranthes spiralis* (L.) Chevall.
Journal of Ecology 2010, **98**: 1253–1267

K Taylor and P Rowland
Biological Flora of the British Isles: *Stachys sylvatica* L.
Journal of Ecology 2010, **98**: 1476–1489

R Inger *et al.*
Carry-over effects reveal reproductive costs in a long-distance migrant
Journal of Animal Ecology 2010, **79**: 974–982
The authors investigated how winter habitat selection in a long-distance migrant, the light-bellied Brent goose *Branta bernicla hrota*, with extended parental care is influenced by parental status and how this has a counter-intuitive effect on subsequent breeding success. Dominant individuals and groups generally monopolise the best quality resources. In the case of geese, families are dominant; however, the findings highlight a hidden cost to raising a family. Stable isotope analysis demonstrates that later in the non-breeding season, adults with families utilise lower quality resources than non-breeders. This is probably caused by parents being constrained in habitat choice by the lower foraging efficiency of their juveniles. Consequently, parental adults end the winter in poorer condition than non-breeders. Additionally, the authors show that parents in one year are less likely than expected to breed again in the next year and suggest that this is caused by conditions during the non-breeding period being carried over into the breeding season.
Correspondence: s.bearhop@exeter.ac.uk

F Eigenbrod *et al.*
Error propagation associated with benefits transfer-based mapping of ecosystem services
Biological Conservation 2010, **143**: 2487-2493
An increasing number of studies are taking the important first step in global efforts to conserve key ecosystem services by mapping their spatial distributions. However, a lack of primary data for most services in most places has largely forced such mapping exercises to be based on proxies. The common way of producing these proxies is through benefits transfer-based mapping, in which estimates of the values of services are obtained from a small region for particular land cover types, and then extrapolated to a larger area for these same types. However, the errors that may result from such extrapolations are poorly understood. The authors separate the generalisation errors associated with benefits transfer mapping into three constituent components – uniformity, sampling, and regionalisation error – and evaluate their effects using primary data for four ecosystem services in England. Variation in ecosystem services within a particular land cover type (uniformity error) alone led to a poor fit to primary data for most services; sampling effects (sampling error) and extrapolating from a small region to a larger area (regionalisation error) led to substantial, but highly variable, additional reductions in the fit to primary data. They also show that combining multiple ecosystem services into a single layer is likely to be even more problematic as it contains the errors in each of the constituent layers. These errors are sufficiently large to undermine decisions that might be based on such extrapolated maps. Greatly improved mapping of the actual distributions of ecosystem services is therefore needed to achieve the goal of conserving these vital assets.
Correspondence: k.j.gaston@sheffield.ac.uk

RA Stillman *et al.*
Assessing waterbird conservation objectives: An example for the Burry Inlet, UK
Biological Conservation 2010, **143**: 2617-2630
This study used an individual-based model to assess the conservation objectives for knot *Calidris canutus* L. and oystercatcher *Haematopus ostralegus* L. on the Burry Inlet Special Protection Area (SPA), UK. Population monitoring has identified a decline in oystercatcher numbers, but cannot determine whether this is due to a decline in site quality. Long-term data on cockle stocks show that the biomass of the large-sized cockles consumed by oystercatchers declined after 2004, whereas a similar decline was not observed in the smaller cockles consumed by knots. The model postdicts that during the winters of 2005/2006 to 2008/2009 the site was unable to support the number of oystercatchers present at the time it was designated (*i.e.* the SPA population). Large cockle biomass remained low during 2009/2010, but increases in mussel biomass meant that the model postdicted that the site could support the SPA population of oystercatchers. Knot food supplies remained high during most years, except 2008/2009 during which the model postdicted that the SPA population could not be supported. The model postdicted that the stock reserved for oystercatchers after shellfishing needed to be 2-4 times the amount consumed by the birds in order to support the bird population. The authors recommend that where necessary, the conservation objectives of waterbirds should be assessed using a combination of thorough population size and behaviour monitoring to identify sites with population declines, and individual-based modelling on these sites to determine whether reduction in site quality may contribute to the site-specific population decline.
Correspondence: rstillman@bournemouth.ac.uk

S Larsen and SJ Ormerod
Combined effects of habitat modification on trait composition and species nestedness in river invertebrates
Biological Conservation 2010, **143**: 2638-2646
Using the Usk river system in Wales, the authors assessed whether catchment-scale change in land-use and patch-scale sedimentation affected organisms with specific life-history traits and whether this resulted in nested assemblages with species-poor sites occupied mostly by sub-sets of organisms from richer sites. The authors conclude that habitat modification in this river catchment has led to the systematic drop-out at two different scales of specific groups of organisms with particular trait character. Large-scale agricultural intensification appears to have removed larger, longer-lived invertebrates that probably require stable conditions, and they advocate further studies to appraise whether such organisms are at risk more globally from land-use conversion.
Correspondence: larsen@igb-berlin.de

S Connop *et al.*
The role of dietary breadth in national bumblebee (*Bombus*) declines: Simple correlation?
Biological Conservation 2010, **143**: 2739-2746
Dietary specialisation, specifically on flowers of Fabaceae, has been hypothesised as driving differential declines in bumblebee species but the reliability of previous studies has been questioned. The authors present a 3-year study of the foraging behaviour of two UK Biodiversity Action Plan bumblebee species. Analysis of nectar and pollen foraging was performed on sites where nationally rare UK bumblebees were as abundant as more nationally ubiquitous species. The results indicated that the nationally rare *Bombus sylvarum* collected the majority of its pollen from flowers of *Odontites verna* and had a significantly narrower mean nectar dietary breadth than ecologically similar species *Bombus humilis* and *Bombus pascuorum*. In contrast, the dietary breadth of the nationally rare *B. humilis* was similar to the more nationally ubiquitous species *B. pascuorum* and *Bombus lapidarius*. Moreover, *B. lapidarius* was recorded as having the narrowest pollen dietary breadth, collected pollen from the least number of floral taxa and was the most specialised of the *Bombus* species on pollen of Fabaceae. The authors conclude that the patterns of dietary specialisation were inconsistent with national declines and the results highlighted a need for further detailed investigation into the factors contributing to differential declines.
Correspondence: s.p.connop@uel.ac.uk

CP Lynam, MJ Attrill and MD Skogen
Climatic and oceanic influences on the abundance of gelatinous zooplankton in the North Sea
Journal of Marine Biological Association of the United Kingdom 2010, **90**: 1153-1159
This study addresses the dispute on the various findings, regarding the influence of the climate on gelatinous zooplankton in the North Sea, and explores the likely mechanisms linking climate to jellyfish abundance. Oceanographically based mechanisms are shown to explain the spatial variation in the climatic relationship between the abundance of medusae (*Aurelia aurita* and *Cyanea* spp. of the class Scyphozoa), in the North Sea between 1971 and 1986 during June-

August, and the winter (December-March) North Atlantic Oscillation Index (NAOI). A scyphomedusa population to the west of Denmark shows a strong inverse relationship between medusa abundance and fluctuations in the NAOI; the NAOI correlates strongly with both annual sea surface temperature (1950-2008) and with winter precipitation on the Danish coast at Nordby (1900-2008) suggesting a direct link between the influence of the climate and medusae abundance. In contrast, scyphomedusa abundance and distribution in the northern North Sea appears to be influenced by oceanic and mixed water inflow, which may overwhelm or mask any direct climatic influence on jellyfish abundance. Similarly, advection can also explain much of the interannual variability (1959-2000) in the abundance of other gelatinous tissue and nematocyst (stinging cells) in Continuous Plankton Recorder samples. Jellyfish (Scyphozoa) in the southern North Sea may benefit from low temperature anomalies and the long-term effects of global warming might suppress *Aurelia aurita* and *Cyanea* spp. populations there. However, the biological response to temperature is complex and future research is required in this area.
Correspondence: Chris.Lynam@cefas.co.uk

E Capasso *et al.*
Investigation of benthic community change over a century-wide scale in the western English Channel
Journal of Marine Biological Association of the United Kingdom 2010, **90**: 1161-1172

Since the early part of the 20th century the impact of a range of anthropogenic activities in our coastal seas has steadily increased. The effect of such activities is a major cause for concern but in the benthic environment few studies exist that date back more than a few decades. This study utilises an historic benthic dataset and resurveyed an area west of Eddystone reef in the English Channel previously investigated 112 years ago. The aim of the present work was to describe the current benthic community structure and investigate potential differences between 1985 and 2007. For each of the four major phyla investigated (Polychaeta, Crustacea, Mollusca and Echinodermata), multivariate community analysis showed significant differences between the historic and contemporary surveys. Echinoderm diversity showed a clear reduction between 1985 and 2007. The sea urchins *Echinus esculentus*, *Spatangus purpureus*, and *Psammechinus miliaris* and large star-fish *Marthasterias glacialis* showed a shift from tubiculous species to small errant and predatory species such as *Glycera*, *Nephtys*, and *Lumbrineris* spp. Within the group Mollusca large species such as *Pecten maximus* and *Laevicardium crassum* decreased in abundance while small species increased. Crustaceans in 1985 were dominated by crab species which were present in similar abundances in 2007, but, the order Amphipoda appeared to show a significant increase. While some of the differences observed could stem from differences in methodologies between the surveys, in particular increases of small cryptic species, the loss of large conspicuous species was judged to be genuine. The study area is an important beam trawling and scallop dredging ground; the differences observed are associated with changes generally associated with disturbance from demersal fishing activities such as these.
Correspondence: cave@mba.ac.uk

DH Durieux *et al.*
Sedentary behaviour establishment in O-group common sole *Solea solea*: a laboratory video-tracking study
Journal of Marine Biological Association of the United Kingdom 2010, **90**: 1257-1262

This study aims at bringing new insights on O-group sole swimming behaviour during the sensitive post-colonisation period in order to better understand the dynamics of individuals in shallow coastal areas. Spontaneous swimming activity was evaluated using a video-tracking system under laboratory conditions. An experiment was conducted during two consecutive days on individuals sampled in June, July, September and November (2004) in coastal nursery ground (Pertuis Charentais, Bay of Biscay, France). The measured behavioral variables were: distance travelled and frequency of occurrence of burying, swimming and immobility. O-group sole showed a relatively clear circadian activity in line with the artificial light conditions (day, twilight and night). Swimming activity of O-group sole decreased drastically from June to July, thereafter remaining at a very low level in September and November. Such important changes reflect the transition between the exploratory behaviour of the post-colonization period and a well established sedentary behaviour remaining until the onset of winter. These results highlight the potential limitation in habitat use capacities of O-group sole once settled in coastal nursery grounds.
Correspondence: edh.durieux@gmail.com

E Le Guilloux *et al.*
Association between the squat lobster *Gastroptychus formosus* and cold-water corals in the North Atlantic
Journal of Marine Biological Association of the United Kingdom 2010, **90**: 1363-1369

Intricate ecological associations between anthozoans and crustaceans are well known in shallow, warm-water ecosystems. Although such associations are less well known in cold-water habitats, recent research is beginning to reveal that similar interactions may also be common in the deep-sea. This study describes observations of the chirostylid *Gastroptychus formosus* at numerous sites in the North Atlantic. Although there are no previous descriptions of the habits of chirostylids in the North Atlantic, its is likely that species in the genera *Uroptychus*, *Eumunida* and *Gastroptychus* have close ecological ties with deep-sea corals since they have all been recorded in trawl samples containing corals from >200 m depth. The authors analysed *in situ* distribution of *G. formosus* and potential hosts at a range of north-eastern Atlantic sites and found that this species forms a close association with deep sea corals that resembles the chirostylid-anthozoan associations reported in shallow Indo-pacific waters. The authors update the known distribution for *G. formosus*, confirming that it is an amphiatlantic species that occurs along the Mid-Atlantic Ridge at least as far south as the Azores and along the continental margins from the Canary islands to Scotland at depths of 600-1700 m. The adults have very specific habitat preferences, being only found on gorgonian and antipatharian corals with a strong preference for *Leiopathes* spp. as a host. The highly restricted habitat preference is likely to render chirostylids vulnerable to the impacts of demersal fishing both directly, as by-catch, and indirectly through habitat loss.
Correspondence: kavine.olu@ifremer.fr

E Boisnier *et al.*
Distinguishing resident from transient species along marine artificial reefs
Journal of Marine Biological Association of the United Kingdom 2010, **90**: 1297-1303

Marine artificial reef studies commonly refer to the distinction between resident and non-resident species. Even if artificial reef studies heavily refer to the distribution between resident and transient species, there is still no widely shared available method to distinguish objectively these two groups. Such an absence makes any comparison between studies difficult. This study aims to test whether the four objective distinction methods successfully applied to a 21-year time series on fish assemblage in an English estuary may be as successful when applied to marine artificial reefs. For such a purpose, each distinction tool was tested separately with reference to four different artificial reef fish assemblage datasets (sampling effort, reef structure type, location and sampling method). Three of them were drawn from the literature. Results indicate that none of these tools used either individually or collectively, provide an efficient solution to distinguish resident species for the four datasets considered. This suggests that one of the major reasons for this failure may lie in the relative sampling size. Nonetheless, as these four datasets are representative of the datasets generally reported in the literature, tools capable of distinguishing reliably and efficiently resident from transient species along artificial reefs have yet to be developed. However, such a development requires fish residence to be previously and accurately defined by artificial reef scientists and managers.
Correspondence: shirokumaori@yahoo.jp

News in Brief

New White-nose Syndrome Guidance for Bat Workers

The Bat Conservation Trust and Statutory Nature Conservation Agencies recently published new guidelines for bat workers in relation to White-Nose Syndrome (WNS): a condition associated with the deaths of over one million bats in the US. The guidance urges bat workers to stay vigilant for symptoms of the syndrome during their usual hibernation activities. That is, to look out for:

- bats with a white fungus *Geomyces destructans*, particularly around the nose, but also on the wings, ears and/or tail;
- bats clustered near the entrance of hibernacula, or in areas not normally identified as winter roost sites;
- bats flying outside during the day in temperatures at or below freezing; and/or
- dead or dying bats in or near hibernation sites.

The guidance also provides a step-by-step guide for anyone who sees a suspect live or dead bat (to ensure these are identified and acted on quickly) and recommends standard decontamination procedures (to minimise the potential risk of spread).

For more details of WNS and to download the guidance, please go to www.bats.org.uk/pages/about_bats-white- nose_syndrome-586.html. Or, for more information, contact Laura Dunne or Helen Miller on 0845 1300 228.

Highways Agency Bat Advice

Halcrow Group Ltd, in partnership with Richard Green Ecology Ltd, has been commissioned to produce two new documents on behalf of the Highways Agency: *A review of bat mitigation in relation to highway severance* (a state of the art report); and, *DMRB Volume 10 – Nature Conservation Advice in Relation to Bats*. As part of the process they are consulting on the draft versions of each document. Both draft documents will be available for review on 19 January 2011 and they need responses by 16 February 2011. The intention is to publish the two final documents in early to mid 2011. The Highways Agency is also interested in furthering research in the area of bat mitigation and severance, and is keen to obtain expressions of interest in future partnership research. For further information please contact Gemma O'Connor (oconnorg@halcrow.com) or Richard Green (r.green@richardgreenecology.co.uk).

Lawton Review of England's Protected Areas and Connectivity

Defra has published an independent review of England's wildlife sites and the connections between them, entitled *Making Space for Nature*, with recommendations to help achieve a healthy natural environment that will allow our plants and animals to thrive. Led by Professor Sir John Lawton, the review was set up to look at England's wildlife sites and whether they are capable of responding and adapting to the growing challenges of climate change and other demands on our land. The report makes the following key points for establishing a strong and connected natural environment:

- we need to better protect and manage our designated wildlife sites;
- we should establish new Ecological Restoration Zones;
- we need to better protect our non-designated wildlife sites; and
- society's need to maintain water-quality, manage inland flooding, deal with coastal erosion and enhance carbon storage, if thought about creatively, could help deliver a more effective ecological network.

The full report can be downloaded from www.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf.

New Red Squirrel Project for Northern England

A five-year red squirrel conservation project for northern England has been announced that will coordinate action across the North East, the North West and parts of Yorkshire. Red Squirrels North England is a partnership project between the Red Squirrel Survival Trust, Natural England, the Forestry Commission and The Wildlife Trusts. The project will be based around 17 red squirrel strongholds in northern England, with government funding for the project being spent primarily in these areas. The project will also provide funding for grey squirrel monitoring and control across the wider landscape of northern England. More information from www.rsst.org.uk.

The Marine Conservation Zone Project publishes its second progress reports

The four regional stakeholder groups within the Marine Conservation Zone (MCZ) Project have published a second set of regional progress reports, as part of the development of recommendations for future Marine Conservation Zones. To view the progress reports, please visit the relevant web site:

- South East (Balanced Seas) - www.balancedseas.org
- South West (Finding Sanctuary) - www.finding-sanctuary.org
- Irish Sea (Irish Sea Conservation Zones) - www.irishseaconservation.org.uk
- North Sea (Net Gain) - www.netgainmcz.org

These are the second in a set of three progress reports. The third set of reports will be published at the beginning of March 2011, and final recommendations will be submitted to Government in June 2011.

England's First Marine Plan Areas

The Marine Management Organisation (MMO) has selected the sea areas off the coast between Flamborough Head in East Riding of Yorkshire to Felixstowe in Suffolk (known formally as East Inshore and East Offshore) as the first two English marine plan areas that will be developed from April 2011. These two area plans will be the first in a series that will, over the coming years, grow to become a comprehensive marine planning system around England, enabling the effective integration of economic, social and environmental factors and promoting the sustainable development of our seas. More information from www.marinemanagement.org.uk.

First North Sea 'No Take Zone' Becomes Reality

On 21 July 2010, the North Sea's first No Take Zone (NTZ) was formally established to protect marine wildlife off Flamborough Head, East Yorkshire. This is only the third NTZ to be designated in British waters and the first to incorporate intertidal habitat. The NTZ covers an area of 1 km^2 and stretches from the Bridlington edge of Danes Dyke to Sewerby Steps for a distance of 700 m seaward from the cliff base.

Climate Change Impacts on UK Seas

A new report from the Marine Climate Change Impacts Partnership, entitled *Marine Climate Change Impacts Annual*

Report Card 2010–2011, has documented the impacts of climate change on the UK marine environment. In addition to rises in temperature and sea level, notable effects are a 50-400 km northwards shift in the range of some fish species and a 9% decrease in the number of breeding seabirds, for which climate change is partly responsible. The report commissioned around 100 leading UK marine climate scientists from almost 40 institutions to review high quality evidence on climate change impacts on the UK's seas. More information from www.mccip.org.uk/arc.

Severn Tidal Power - Feasibility Study Conclusions

The Government has concluded that it does not see a strategic case to bring forward a tidal energy scheme in the Severn estuary at this time, but wishes to keep the option open for future consideration. The decision follows a consideration by Ministers of the evidence gathered during a 2-year feasibility study to assess whether, and on what terms, the Government could support a tidal energy scheme in the Severn estuary. The decision has been taken in the context of wider climate and energy goals, including consideration of the relative costs, benefits and impacts of a Severn tidal power scheme, as compared to other options for generating low carbon electricity. The feasibility study report can be downloaded from www.decc.gov.uk/assets/decc/What%20we%20do/UK%20energy%20supply/Energy%20mix/Renewable%20energy/severn-tp/621-severn-tidal-power-feasibility-study-conclusions-a.pdf.

Insect Attraction to Wind Turbines

A recent paper in the *European Journal of Wildlife Research* has looked at the effect of turbine colour on bat and bird mortality due to wind turbines. The relative attraction of a selection of specific turbine colours and other hues was assessed in order to determine if turbine paint colour could be influencing insect numbers at these installations. The common turbine colours 'pure white' and 'light grey' were among those found to attract significantly more insects than other colours tested, which in turn attract more bats and birds, and so suggest that turbine colour may have a role to play in potential mitigation.

Ten years of the Water Framework Directive

Ten years ago the European Water Framework Directive (WFD) introduced a shift in water management, placing ecology at the centre of decision-making. A new review of its implementation in *Science of the Total Environment* identifies both the achievements of the WFD and its ongoing challenges, providing recommendations on how to overcome these. The WFD has called for EU Member States to achieve good ecological status of their surface waters by 2015. This review, conducted as part of the EU-funded WISER (Water bodies in Europe: Integrative Systems to assess Ecological status and Recovery) project, considered three areas:

- Development of Assessment Methods
- Monitoring Systems
- River Basin Management Plans (RBMPs)

More information from www.wiser.eu and http://water.europa.eu.

Conservation Systems Improve Resilience of Biodiversity Policy

A new review in *Global Environmental Politics* suggests that the key to long-term conservation policy could lie in the creation of 'Conservation Systems'. These are a collective of activists, organisations and policy-makers which could make biodiversity conservation efforts more resilient to major external changes, such as economic crises, change in government or conflict.

One of the main challenges of environmental policy is that there can be a mismatch between the long-term needs of environmental management and the short-term needs of the public who have an impact on the environment and who affect decisions about management. For example, decisions governing land use and harvesting often pit short-term private costs to farmers or land owners against long-term environmental gains. The study analysed the concept of resilient institutional design to inform the development of conservation policies that can withstand unpredictable, external change, such as economic growth and collapse, ethnic conflict, civil wars and political changes. It points out that previous approaches to resilient design have paid little attention to the role of social constituencies and political mobilisation in ensuring the long-term survival of biodiversity and ecosystems. The study suggests that this promotes a narrow focus on financial incentives and misses the diverse motivations that underpin political action to improve conservation. As a solution the study suggested the promotion of Conservation Systems, which are networks of interlocking institutions and social constituencies that provide a 'safety net' to protect biodiversity.

EU Adopts Text for the Conservation of Biodiversity

The European Parliament has adopted the text of the resolution of 21 September 2010 on the implementation of EU legislation aiming at the conservation of biodiversity. The full text, including all 99 articles, can be found at www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P7-TA-2010-0325+0+DOC+XML+V0//EN.

Outcomes from the CBD COP10 in Nagoya

The Convention on Biological Diversity (CBD) has made available the advance unedited decisions of the 10th meeting of the Conference of the Parties (COP 10). The Strategic Plan for Biodiversity for 2011-2020 will be known as the 'Aichi Target' and has 20 targets divided into five strategic goals. The goals are:

1. address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society;
2. reduce the direct pressures on biodiversity and promote sustainable use;
3. to improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity;
4. enhance the benefits to all from biodiversity and ecosystem services; and
5. enhance implementation through participatory planning, knowledge management and capacity building.

For more information please visit www.cbd.int/nagoya/outcomes/.

Final TEEB Report Launched

The final TEEB (The Economics of Ecosystems and Biodiversity) report was launched at the CBD COP10 in Nagoya, Japan in October 2010. This synthesis report is entitled *Mainstreaming the Economics of Nature: a synthesis of the approach, conclusions and recommendations of TEEB* and can be downloaded from www.teebweb.org/InformationMaterial/TEEBReports/tabid/1278/Default.aspx. TEEB has also launched the Bank of Natural Capital (http://bankofnaturalcapital.com), a website designed to communicate the TEEB Study findings to citizens.

Census of Marine Life

First Census of Marine Life 2010: Highlights of a Decade of Discovery is a 64-page report that describes some of the scientific highlights of 10 years of exploration, research and analysis undertaken by Census of Marine Life scientists. The full publication can be downloaded from www.coml.org/pressreleases/census2010/PDF/Highlights-2010-Report-Low-Res.pdf.

Tauro-Scatology and Pimp My Ride

For this issue of *In Practice*, our special correspondent has caught up with Basil O'Saurus in a small industrial unit throbbing with the sounds of generators and hammering on metal. Our very own Professor of Tauro-Scatology emerges wearing unfamiliar garb...

Yo, wassup blood?

Explain to our readers, please, why you are wearing white trainers, sunglasses, a gold chain around your neck, reversed baseball cap... and must you really wear your jeans so low that we can all see your boxer shorts?

Is this about the colour of my skin, man?

It just looks faintly ridiculous on a middle-aged white man. Tell us what's going on.

For you, bro', I'll drop the accent which is, to be honest, difficult to render into the written word.

Somewhere, far away, in the tangled undergrowth of TV Channels where Nice Grown-up People rarely venture is MTV and, amidst the many forgettable music videos, there is a program called *Pimp My Ride*, in which a group of American mechanics convert a beaten up old car or van into a shiny, chrome-wheeled, music-blastin', hot-rodding monster that the owner regards as being the coolest thing on the road and everyone else thinks is utterly preposterous.

And, let me guess, this gave you an idea for an IEEM-themed alternative.

Got it in one. We are ecologists, never happier than when out in the countryside, and this is typified by the vehicles that we drive: practical, no-nonsense, unflashy workhorses. So, what we need is... *De-Pimp My Ride*.

How does this work?

First, you decide reluctantly that you need a new vehicle. You then do what any self-respecting environmentalist would do and tune in to the next edition of Top Gear.

Surely not?

Absolutely. You wait until Clarkson utters the name of a vehicle in a tone of voice that is so completely dripping with contempt that you know it must be a reliable, fuel-efficient, unpretentious machine, and you go straight out and buy it.

Job done?

No way. This is only the start. You now have a neat, smart, tidy little vehicle which, from the point of view of an ecologist, is a disaster. People might think you are an accountant or a shift manager at a call centre or something. You need to get to work on that car and make sure the whole world knows that you are an ecologist.

So, what do you do?

You could start with an RSPB or Wildlife Trust sticker in the back window, but that's a little too obvious and ever so slightly naff. In my opinion, the essential first step is to take it on a field visit, ensuring at least one farm track with a few puddles so that the wheel trim loses its shine. Next, get in and out a few times wearing muddy Wellington boots, to introduce some of that all-important shabbiness to the upholstery. Once you've done that, you can really get started...

Easy steps are retro-fitting the door pockets, making sure that when a passenger surreptitiously puts in a hand to check out your CD collection...

...let's face it, everyone does it...

...the most recent CD they find is Steeleye Span's Greatest Hits.

Nice one. But why stop at CDs?

You're getting into the spirit of this. You also need to put one or two wildlife identification guides and a pair of binoculars into the glove box and .... this is the really important part .... some dead or (better) decaying vegetation into the door pockets ...

...so when your passenger tries to pull out a CD, he or she actually puts their hand on something soft and squelchy...

Absolutely. This would be a good time to make a comment about how much you enjoyed last week's fungal foray, though you still can't be one hundred percent sure that you know which of the *Boletus* fungi are edible and which are poisonous.

That should stop any surreptitious CD snooping. What else?

We want this to be a full-on sensory experience so let's think about smells. A rich, ripe 'wet dog' odour is a good detail to include. Easy, of course, if you do have a dog, and you then get the added bonus of dog hairs all over the back seat. But don't be discouraged if you don't have a dog. You just need to make that extra effort. I normally install a couple of pairs of matured walking boot socks under the front seats. This means that there is always a pair to hand if you forget to bring a pair for field work and these occasional outings just add to their ripeness and the overall ambience of your car.

In the process, of course, the resale value of your car has plummeted...

...thus encouraging you to keep it and not give in to the seductive but, ultimately, unsustainable inducements from the car industry to trade in and get a shiny new vehicle...

So *De-Pimp My Ride* is actually a moral crusade?

Only partly. It also means that your kids are too embarrassed to ever beg lifts for themselves and friends, so you get more leisure time as a result.

Win-win, in other words. Thanks again, 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 Chief Executive Officer by telephone or letter before **10 January 2011**. 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

Associates applying to upgrade to Full membership were listed previously for their Associate application and are not listed again.

Mrs Emma Austin, Miss Sarah Baulch, Miss Gemma L Bodé, Dr Ian Buchan, Miss Rebecca Dale, Mr Adam Fulton, Dr Nicola Hall, Dr Alison C Hannah, Mr Kenny Kortland, Miss Kate E McNutt, Mrs Joyce Novak, Mrs Eleanor Sorfleet, Dr Fiona Strachan, Ms Zoe J Trent, Mr David R Warner, Miss Elizabeth Wilson, Mr Nigel Wood

APPLICATIONS FOR ASSOCIATE MEMBERSHIP

Mr Tom Davies, Mr Philip Dutt, Miss Catherine V Finlay, Miss Karen Hassard, Mr Neil T Monaghan, Miss Alison Reed, Miss Jenny Simcock, Mr Michael Stopa, Miss Cassie Todd,

APPLICANTS WISHING TO UPGRADE TO ASSOCIATE MEMBERSHIP

Mr Faheem Anwar, Miss Emily Aron, Miss Victoria Brooks, Miss Katie J Burrough, Mr George Burton, Mr Matthew Cook, Ms Annemarie Greenwood, Mr Andrew Halcro-Johnston, Miss Victoria Levett, Miss Louise M Lowans, Miss Katie Mardon, Miss Sarah Proctor, Mr David M Prys-Jones, Mr Jonathan A Reeves, Miss Amy L Roberts, Miss Rachel Sanderson, Miss Natasha J Seaward, Mrs Carol Seddon, Mrs Joanna Shipton, Miss Tracy Simpson, Miss Christine Singfield, Miss Kim Wallis

ADMISSIONS

IEEM is very pleased to welcome the following new members:

FULL MEMBERS

Mr Joseph M Adamson, Mr Philip Belfield, Miss Stephanie Buell, Mr Francis J Castro, Dr Frank M Clarke, Ms Gwenda Diack, Dr J Gregor Fullarton, Mr Duncan Fyfe, Dr Merryl Gelling, Mr Kevin Hart, Mr Robin A Jarman, Miss Claire Lacey, Mr Tim Liddiard, Mr Paul Lynas, Ms Sarah Maslen, Dr Derek McLoughlin, Miss Caroline Moscrop, Miss Anna Palmer, Miss Lorna E Parker, Miss Louise Parkinson, Miss Rebecca Price, Mr Sean Reed, Mr Patrick W Roberts, Miss Katherine Robinson, Mr Pulahinge RK Rodrigo, Mr Neil A Rowntree, Miss Louise Samson, Ms Lisa Schembri-Gambin, Miss Eleanor J Shield, Mrs Margaret A Street, Mr André Thiel, Dr Emma-Lee Vernon (née Glen), Dr Dean A Waters, Mr Maurice Webber, Mr Mark S Wilkinson

ASSOCIATE MEMBERS

Mr David Allen, Mr Paul AR Carrier, Miss Lynsey Crellin, Miss Anna Fraser, Miss Naomi Hutchinson, Miss Coralie Niven, Mr Todd D Sajwaj, Mr David Tarrant, Miss Ruth J Testa, Mr Steven Whillans, Mr Kevin Wright

GRADUATE MEMBERS

Miss Sarah I Arthur, Miss Stephanie Ballantyne, Miss Clare L Barnard, Miss Jessica A Batchelor, Miss Nadia Bidzinska, Ms Niamh Burke, Mr Andrew Burrows, Miss Corey Cannon, Miss Jodie Clarke, Miss Lauren J Clarke, Miss Emily Coombes, Miss Alice Cragg, Ms Helen Craig, Mr John A Crisp, Mr Matthew J Dowse, Ms Charlotte N Durkin, Miss Alice M Eaton, Miss Tracie Evans, Mr Edward Faherty, Miss Emily Fallows, Miss Sophie E A Goddard, Miss Abigail Hemmant, Miss Sarah Hodgetts, Miss Anne Marie Hodgson, Mr Jonathan F Jackson, Miss Katie Jackson, Miss Zoe Jackson, Miss Nicole A Jenkins, Miss Michelle M Knight, Mr Alexander J Lane, Miss Johanna Leeks, Mrs Martha-Leonor Kotzen, Mr William E Linnard, Mr Willie-John Macken, Miss Abigail J Moore, Mr Aidan P Neary, Miss Michelle Nesbitt, Miss Judith A Nicholson, Mr Robbie Peart, Mr Matthew Peden, Mr Eugenio Penalvo Lopez, Miss Lorna Potts, Miss Heather M Read, Miss Emma J Reid, Mr Nathan J Roberts, Miss Rebecca Sansom, Ms Catherine Seale, Miss Rebecca Smith, Miss Hannah B Stebbings, Miss Eleanor Stubbs, Miss Elizabeth H Sturgess, Mr Caspar J Searle, Miss Sinead Thom

AFFILIATE MEMBERS

Mr James R Baldwin, Mr Antony Butler, Ms Susan Craig, Mr William M Davis, Mrs Elizabeth Gatenby, Miss Rebecca E Harmsworth, Mr Paul Johnson, Miss Andrea J Lowe, Mr Doug Mackenzie, Mr Roderick Middleton, Miss Charlotte Phillips, Mr Shaun Pryor, Miss Cathy Purse, Mr Alan J Roper, Mr Simeon Smith, Mr Guy Stephens, Mr Mark R Troughton, Ms Hetty Wakeford

STUDENT MEMBERS

Miss Heather Barbour, Mr Douglas E Beattie, Miss Laura J Boggeln, Ms Abigail Brewer, Mr Stuart Brooker, Mr John Brooks, Mr Andrew R Clare, Miss Laura Clements, Miss Kate Collingridge, Miss Mihaela E Cozma, Miss Hannah C Cubaynes, Miss Chloe Date, Miss Emma R Davis, Mr Stephen A Egerton-Read, Evangeline E Imuetinyan, Mr Matthew C Golding, Mr Robert W Goodchild, Miss Erin Grieve, Miss Ning Hii, Miss Alice Hudson, Mr Andrew J Hunt, Mr Chris Jack, Mr Imran Khan, Mr Charles Kyprianou, Miss Samantha S Lintern, Mr Neil E Marjoram, Mrs Tara-Jane Marjoram, Miss Lucy Marum, Mrs Stephanie McGovern, Mr Issa C McKay, Mr Benjamin G McLean, Ms Karen Moore, Mr miles Newman, Miss Sarah Still, Miss Lauren Stonebridge, Ms Alua Suleimenova, Mr Dhanuvintha Tharmarajah, Mr David G Thompson, Miss Tiffany Wallace, Miss Zoe C Webb, Miss Elizabeth M White, Miss Laura E Wilkinson

UPGRADES

The following have successfully upgraded their membership:

UPGRADES TO FULL MEMBERSHIP

Mr Richard Barnard, Miss Phillippa Baron, Dr Elaine Bennett, Mrs Elizabeth Brandon-Jones, Miss Kelly J Clark, Mr Alexander C Crossman, Mr Henry J Dobson, Miss Rachel Dobson, Miss Louise AC Forder, Mr Daniel Foster, Miss Victoria C Gaillard, Mrs Ruth C Georgiou, Mr Derek Gow, Mr David Hennessey, Mr Liam Hogg, Ms Liza JK Hollinghurst, Mr David A Hope-Thomson, Mrs Helen J Jacobs, Miss Caroline Jewell, Mr Andrew Lester, Miss Crystal Leung, Miss Marion MacNair, Dr Helen Markland, Miss Rebecca Miller, Mr Chris Mitchell, Mr Peter Mulder, Mr Thomas O'Donnell, Mr Thomas Owens, Mr Gareth J Parkinson, Miss Fiona M Percival, Mr Ross Phillips, Miss Katharine Roper, Miss Jodie S Smith, Miss Catherine Soper, Miss Susan E White, Mr James A Whiteford, Miss Caroline R Wood, Miss Jill Wood

UPGRADES TO ASSOCIATE MEMBERSHIP

Miss Charlotte E Bell, Mr Gavin Boyd, Mr Jonathan P Byrd, Miss Rachel Candy, Miss Mary-Jane Fleming, Miss Vicky Gilson, Miss Rohan Holley, Miss Jennifer Leach, Mr Tom Moore, Mr Chris Mungo, Miss Hazel Robson, Ms Kerry Skelhorn, Mr Stewart Wesley, Mr Matthew Wilson, Miss Diane Wood

UPGRADES TO GRADUATE MEMBERSHIP

Ms Frances E Anderson, Miss Kathleen Anderson, Mr Stuart K Andrew, Miss Rachel Bates, Mrs Alison Bird, Miss Katherine Bubb, Mr Andrew Buxton, Mrs Angela Collins, Miss Emily C Day, Miss Rachael Ford, Miss Emma Grace, Mr Ian Hayes, Mrs Ilona Hopkins, Mr Simon Kain, Mrs Rachel Levi, Mr Tony Marshall, Mr Samuel D Martin, Miss Clare Rees, Miss Helen R Staton, Miss Sally Walker, Miss Charlotte Warwick

Forthcoming Events

IEEM Conferences

DATE	EVENT	LOCATION
23 March 2011	Spring 2011 Conference - Invasive Species: New Natives in a Changing Climate?	London
2 - 3 November 2011	Autumn 2011 Conference and AGM - Tools for Rebuilding Biodiversity	Liverpool

For more information on conferences please visit: www.ieem.net/conferences.asp

IEEM Training Workshops

24 February 2011	Trees and Bats	Dorking, Surrey
25 February 2011	BS 5837 (Trees in Relation to Construction) and Bats	Dorking, Surrey
9 March 2011	Successful Mitigation Techniques for Lesser Horseshoe Bats	Builth Wells, Powys, Wales
14 - 15 March 2011	Lower Plant (Lichens, Mosses and Liverworts) Identification	Cleeve, Bristol
14 March 2011	Water Vole Ecology	Lifton, Devon
15 - 16 March 2011	Water Vole Conservation and Development	Lifton, Devon
17 - 18 March 2011	Water Vole Conservation and Development	Lifton, Devon
17 - 18 March 2011	Outdoor First Aid and Incident Management	Dorking, Surrey
28 March 2011	Identification and Survey Techniques for Amphibians, with a Focus on Great Crested Newts	Silloth, Cumbria
29 March 2011	Ponds and Development	Peterborough
31 March 2011	Habitat Management for Reptiles	Hadleigh, Essex
2 April 2011	Great Crested Newt Survey and Interpretation	Brockenhurst, Hampshire
5 April 2011	Field Signs and Habitat Management for Water Voles	Lenzie, East Dunbartonshire
6 April 2011	Great Crested Newt Surveying Techniques and Assessment	Near Polegate, East Sussex
6 - 7 April 2011	Identification and Survey Techniques for Amphibians, with a Focus on Great Crested Newts	Croy, North Lanarkshire
7 April 2011	Introduction to Sand Dune Ecology and Management	Hope Park, Liverpool
12 April 2011	Introduction to Habitats Regulations Assessment	Chester, Cheshire
13 - 14 April 2011	Reptile Survey	Horndean, Hampshire
13 - 14 April 2011	Evaluation and Impact Assessment in Ecology	Chesterfield, Derbyshire
13 April 2011	Bat Basics – Where and How to Find (and Survey) Bats	Near Polegate, East Sussex
15 April 2011	GPS Field Data Collection	Cambourne, Cambridgeshire
19 April 2011	Great Crested Newt Survey and Interpretation	Selby, North Yorkshire
20 April 2011	Bat Mitigation – Licensing Development	Near Polegate, East Sussex
23 - 24 April 2010	Introduction to Bryophyte Identification for Habitat Survey	Derrygonnelly, County Fermanagh
27 April 2011	Water Vole Ecology and Conservation	Herne Bay, Kent
28 - 29 April 2011	An Introduction to Badgers and Badger Survey Techniques	Axminster, Devon
6 May 2011	Breeding Bird Survey – Habitat Management, Identification and Fieldcraft Techniques	Newtownbutler, Co. Fermanagh, Northern Ireland
6 May 2011	Botany of Ancient Semi-Natural Woodlands	Dorking, Surrey
11 May 2011	Great Crested Newts - Survey and Ecology	Hoddeson, Hertfordshire
11 - 12 May 2011	Reptile Mitigation	Horndean, Hampshire
12 May 2011	Baseline Habitat Surveys	Hoddeson, Hertfordshire
12 - 13 May 2011	Introduction to Plant Identification and Phase 1 Habitat Survey	Newark, Nottinghamshire

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