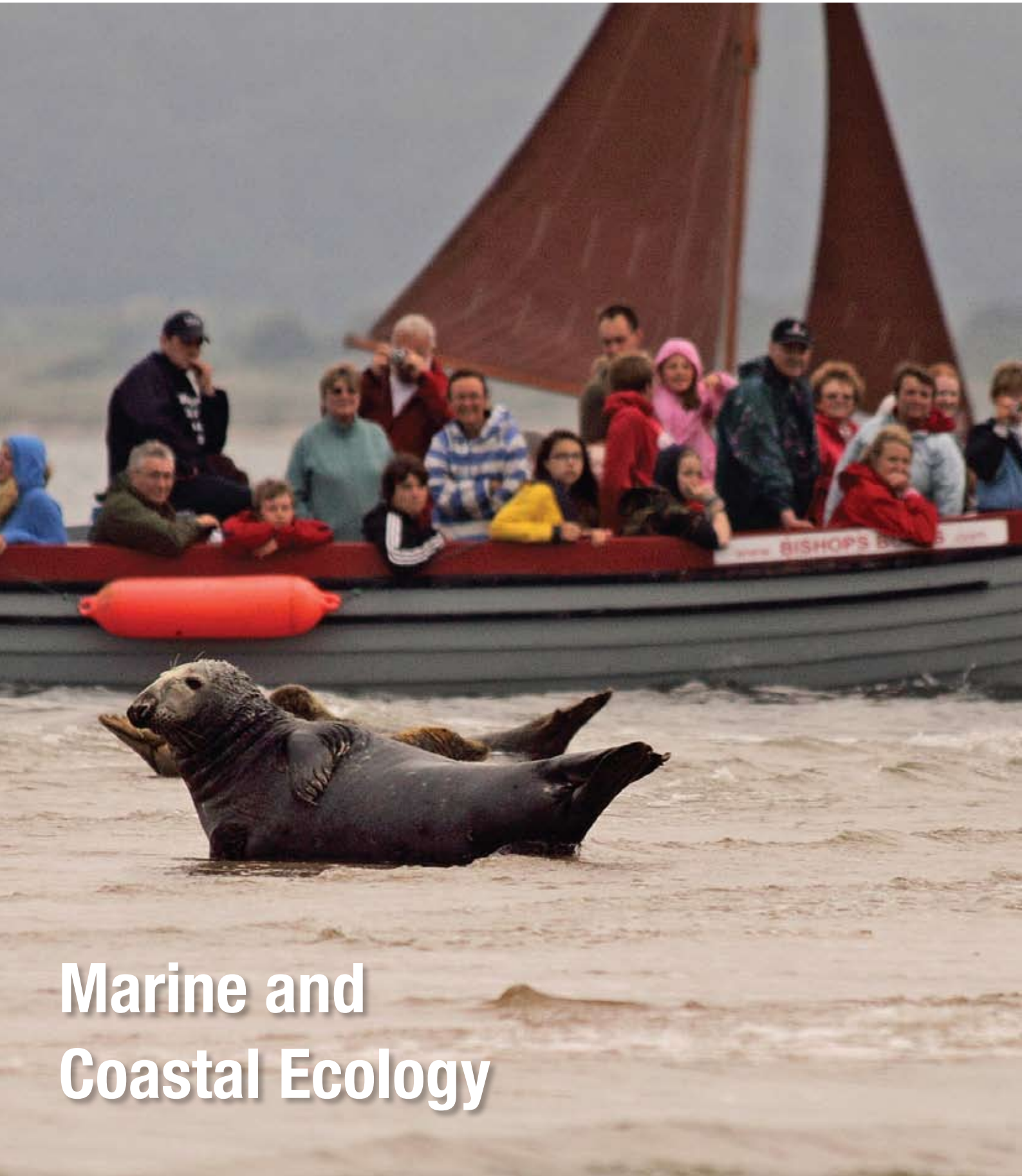




In Practice

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**Marine and
Coastal Ecology**

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McParland Finn
British Ecological Society

Editorial

Marine and Coastal Ecology

The request to write an editorial on coastal zone management arrived just as I was leaving to take part in the latest technical consultation meeting on what is set to become the UK's largest habitat creation scheme of saltmarsh and transitional habitats. My involvement is not professional but personal; I chair the residents' group of the village to be most affected by the scheme, with retention of access and flood protection our key concerns. The meeting involved people representing local governments, farming, highways, footpaths and open space, landscape, heritage, power generation and transmission, a commercial dock company, wildfowling interests, regeneration strategies, maritime and riverine navigation interests, and nature conservation to name but a few, as well as the people who live in the area. All of these have conflicting aspirations for the same few hundred hectares of coastal land. This is perhaps the single most characteristic feature of coastal zone management – the diversity of interests involved and the disparity of aspirations they generate.

The importance of the coastal zone is of inestimable importance to Mankind because of the interface of the rich resources between land and sea. A quick trawl of the internet suggests (unverified) that between 40% and 60% of the global human population lives within 100 km of the coast; that this population is growing by 50 million each year (about 6.5 times the population of Greater London); and that three-quarters of the world's mega-cities are located by the sea. Yet our waste and destruction of these resources remains profligate, and pressure on this zone is probably greater than on any other, e.g. fish provide the greatest percentage of the world's protein consumed by humans, but 25% of the world's recognized (mostly coastal) marine fisheries are overexploited or already depleted; more oil reaches the oceans each year from non-point land-based sources than was spilled by the Exxon Valdez; significant degradation of tropical coral reefs has occurred in 93 countries, the majority of which are among the world's least developed; over 50% of mangrove ecosystems globally have been transformed or destroyed by human activity; and <0.5% of global marine habitats are protected compared to 11.5% of terrestrial habitats. Such diversity, such importance, so many problems. And on top of these, the challenges posed by climate change herald more pressure and more problems – if the computer modellers' predictions prove correct, the coastal zone will bear the brunt of the ensuing sea level rise; a new lexicon – coastal squeeze, adaptation – and mechanism – Agenda 21 – which are already in place.

Newton's third Law of Motion states that when one object exerts a force on another, the second object exerts on the first a force equal in magnitude but opposite in direction. This seems to apply equally to the process of coastal zone management for whenever a proposal arises in this overcrowded area, a reaction to it seems to occur which is opposite and equal in force and justification, e.g. plans to develop the Severn Barrage to meet climate change emissions' targets are met with objections on biodiversity grounds. So what role does ecology play in all of this? Well as usual, it's right in the centre, underpinning all the processes and services prevalent in this zone. And where does this leave ecologists and environmental managers? Central to grappling with the enormity of the task and yet peripheral to most of the key decision-making processes. When IEEM was originally formed, one of its stated objectives (I can't remember if or where it was ever written down) was to promote the involvement of its members into decision-making positions or at least to influence the process. I make no judgement as to whether it is succeeding, but nowhere is that involvement more necessary than in managing the coastal zone. However, the skills needed are more than just those of ecology. Management of the coastal zone (like management of anything) requires a diverse range of abilities – communication, consensus building, participatory approaches, innovativeness and vision – which we as ecologists must acquire and embrace. In my view, the training and professional development aspects of IEEM are still too narrow. Eirene Williams makes the point (*In Practice* 61) that 'the overwhelming majority of CPD recorded involved species specific training ... but we would urge members to undertake a wide range of professional development including business skills... involvement with policy at all levels ... [and] other generic skills', while Nick Jackson (*In Practice* 65) states that 'Non-ecological training that is relevant to your job can (and should!) be included [in your CPD]'. It definitely should – perhaps as a CPD requirement.

The task of managing the coastal zone efficiently and effectively is daunting. It needs development of partnerships and effective communication if it is ever to be predicated upon sound science and ecological principles. If the membership of IEEM cannot achieve this (at least within the UK) then who is better placed professionally to succeed? Precisely, as the following pages may demonstrate, no-one. So, to quote Shakespeare; Henry V Act III:

*"Once more unto the breach, dear friends, once more;
...show us here
The mettle of your pasture; let us swear
That you are worth your breeding; which I doubt not;
For there is none of you so mean and base,
That hath not noble lustre in your eyes.
I see you stand like greyhounds in the slips,
Straining upon the start. The game's afoot:
Follow your spirit, and upon this charge ..."*

And so back to fighting the corner for my village. Compromise, what compromise?

*Phillip Edwards CEnv FIEEM
Director, Xenus Ecology*

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Cover image: Grey seals on the north Norfolk coast

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.

The Certainty of Uncertainty:

Developing Adaptation Strategies to Reduce Environmental, Social and Economic Impacts of Climate Change at the Coast

Jeremy Hills CEnv MIEEM*, Niall Benson**, Maeve Lee**, Martin Le Tissier MIEEM* and Hester Whyte*

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The predictions for climate change, such as those from the UK Climate Projections (UKCP09) and Intergovernmental Panel on Climate Change (IPCC), suggest a trajectory of change for coastal and marine areas. It is possible that the consequences of these changes are likely to modify the existing environmental, social and economic aspects of coastal and marine areas in many ways. Much management in the coastal and marine area takes place in a reactive way, or with a relatively short-term timeline often aligned to budget cycles. As such, responding effectively to climate change requires adjustment in management approaches and the architecture by which management is delivered. In the work presented here we describe an approach that promotes collaborative and cooperative working by the main institutional stakeholders in an integrated way and a methodology that uses scenario development to produce climate change adaptation strategies that address the impacts of climate change at a regional scale.

Working Together in an Integrated Way

It is not uncommon to hear views from scientists that 'the science that I produce is not used by managers'. It is not uncommon to hear views from managers or practitioners that 'the science that is produced is not in a form that I can use'. The interface between applied science and management is a two-way process, a negotiation, with the aim of producing practical approaches and techniques for enhancing management, underpinned by a solid evidence base. This interface becomes even more complex when you move from consideration of conservation of a single species, or a single protected site to larger areas that include not only a range of habitats and conservation features but also economically and socially important activities taking place; a situation frequently found on the coast.

Expert Couplet Nodes

In order to explore the interface between science and management, an approach has been developed to facilitate the communication and understanding across this boundary and to help deliver coherent and integrated approaches to coastal management: this approach is termed an Expert Couplet Node (ECN). An ECN involves developing a close collaboration between a management institution and a research-led institution, for example the North



Lough Swilly is the study area for an Expert Couplet Node between Donegal Council and University of Ulster

East (NE) England ECN, between the Durham Heritage Coast Partnership of Durham County Council and Envision Management Ltd, a coastal research consultancy.

Nine ECNs have been set up across northwest Europe as part of the IMCORE project (Innovative Management for Europe's Changing Coastal Resource) which is funded by INTERREG IVB. These ECNs have been set up in order to try to integrate and focus the activities of management and research sectors with respect to adaptation to the effects of climate change at the coast. In the UK, there are other ECNs such as in the Severn Estuary (Severn Estuary Partnership and Cardiff University), Aberdeen (Aberdeen City Council and Aberdeen University); outside the UK other ECNs are located in Belgium, France and the Republic of Ireland. Common across all ECNs is this approach of working together (within agreed Terms of Reference). However, in each locality the ECNs operate in a way which is most relevant to the issues of that area and the existing institutional set-up.

For instance, in the NE England ECN, the initiative has acted as a catalyst to bring together the main institutional stakeholders in the area. Through a climate change policy review of the region and recognition of the remit of these institutions, the ECN has acted as a focus for developing an integrated approach for the coastal area of NE England with respect to climate change. A NE steering group has been created which involves: ClimateNE, Environment Agency, Government Office North East, Marine Management Organisation, Natural England, the North East Coastal Group (of local authorities) and Northumberland Area of Outstanding Natural Beauty: this NE entity is called ForeSea. Rather than just meeting to discuss coastal and climate change matters, ForeSea meets to specifically work through the stages of developing an adaptation strategy for the marine and coastal

area of the NE England. Through this process, engagement and ownership of the strategy is promoted in the institutions who will be directly involved in implementation of aspects of an adaptation strategy. This contrasts with a not uncommon approach of developing a strategy in isolation and then considering ownership and implementation later.

Critical Befriending

Within the partners of the ECN and their associated stakeholders it has been realised that all of the required capacity and expertise does not exist at some stages of the process of developing an adaptation strategy; therefore some form of external expertise is required. The IMCORE project addresses this potential limitation by facilitating exchange of expertise between the ECNs. We call this type of expert-exchange ‘critical befriending’ in that it is carried out in a friendly and supportive manner but with a view to critical but constructive appraisal. For example, as part of the adaptation strategy development, our ECN required some further understanding of the likely sediment changes in the near-shore area that might be caused by sea level rise in one area of the coast and thus identified and requested a visit from experts in geomorphology from another partner organisation (University of Ulster). In exchange, Durham Heritage Coast and Envision have supported a workshop carried out for the Donegal ECN (Donegal Council and University of Ulster) based on previously developed experience in the NE England area.

The focus on transforming the interface between the science and management, linked to the pool of ‘friendly’ expertise to call upon, has created an institutional structure within which the development of adaptation strategies can progress with ongoing engagement, ownership and expertise. However, along with this structure a clearly defined process for development of adaptation strategies has been developed: this is described below.



Critical befriending – exchanging transnational expertise between Expert Couplet Nodes on Durham Heritage Coast

Developing Coastal Adaptation Strategies to Climate Change

There are many forms of climate change adaptation strategies available (e.g. Cimato and Mullan 2010, Royal Commission on Environmental Pollution 2010, Smith et al. 2010). These have been developed using many methods, some in relative isolation and others with extensive engagement. In this work we aimed to focus on the coastal and marine area and at the scale of the ECN area (e.g. NE England for our ECN, Lough Swilly for the Donegal ECN and

Cork Harbour for the Cork ECN). The approach used by ECNs for the development of adaptation strategies followed three main steps:

1. Identification of issues. These issues cover environmental as well as social and economic aspects of the coastal area under study.
2. Development of exploratory scenarios. These exploratory scenarios can be considered to be possible futures for the coastal area.
3. Development of a normative scenario. The normative scenario in this case is a more detailed version of a single exploratory scenario which has been selected by consensus by the stakeholders and represents the ‘preferred’ future for the coastal area.

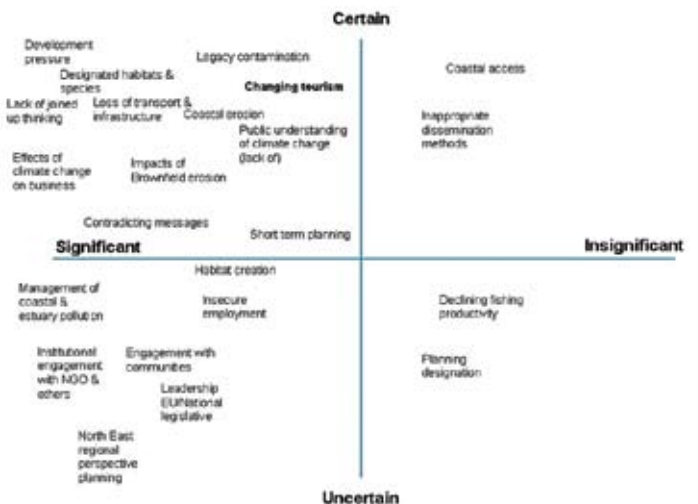
Identification of Issues

The first stage of the scenario process was to identify issues in the target region. An individual’s view of issues on the coast is personal and subjective and based on their own discipline, experience and attitude. Consequently, to identify issues in a representative way requires an involvement from a wide constituency. To achieve this a workshop was carried out in the NE which included elected representatives, County Council officers, relevant governmental institutions, NGOs, industrial/commercial interests and community activists. The workshop used group work to identify issues in the NE as well as associated information needs and constraints. In terms of issues, the most common theme was related to the institutional set-up of the region, followed by particular environmental and social issues.

Development of Exploratory Scenarios

The list of issues provided the platform for the next stage, which was development of an exploratory scenario. The scenario was developed based on a 20-year planning horizon (i.e. for 2030), again in a workshop setting, but with the members of the ForeSea steering group. Using the issues identified in the initial workshop, group work was used to orientate each of the issues on a pair of axes relating to significance (highly significant to insignificant) and certainty (certain to uncertain). Whilst these two axes are in arbitrary units, through discussion a consensus could be reached about the relative position for each of the identified issues for the NE area.

Figure 1. The orientation of coastal issues on a plot of ‘certainty’ and ‘significance’ as agreed through consensus by institutional stakeholders of North East England

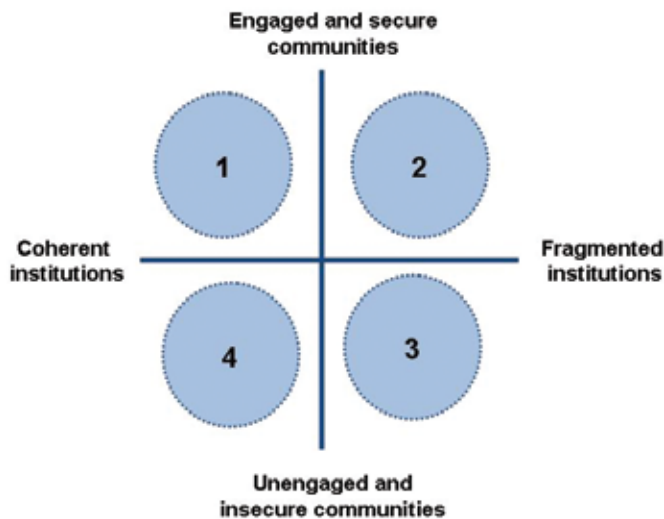




Institutional stakeholders from North East England discuss the 'significance' and 'uncertainty' of various coastal issues

The next stage of the exploratory scenario process was to focus on the 'uncertain' and 'significant' sector of the issues plot; because the approach is fundamentally about forward planning that encompasses the 'uncertainties'. It is often the uncertainties that upset the success of management aimed at what are perceived to be certain future changes: the approach followed here explicitly focuses on the uncertainties. New emergent axes were formed which tried to encapsulate the significant and uncertain issues; this was again done through discussion to derive a consensus. The emergent axes which were considered to best represent the significant but uncertain issues were associated with engagement and security of communities and the degree of coherence of institutions.

Figure 2. New emergent axes formed to encapsulate the significant and uncertain coastal issues which represent four possible scenarios for the year 2030



The four quadrants of the emergent axes represent four possible scenarios for 2030 such as engaged and secure communities but fragmented institutions or coherent institutions and unengaged and insecure communities.

Development of a Normative Scenario

The next stage of the process was for the ForeSea steering group to select one of the exploratory future scenarios as the desirable or preferred future: in this case the 'coherent institutions' and 'engaged and secure communities' scenario was selected. This scenario was then taken forward and a PESTLE analysis carried out: PESTLE stands for Political,

Economic, Social, Legal and Environmental. A PESTLE analysis identifies key features of the future scenario in terms of these elements and makes statements about each in terms of their status in 2030. This detailed planning of a single future scenario represents a normative scenario. The PESTLE analysis was discussed with the ForeSea group and various refinements were made to produce a final validated version.

Table 1. PESTLE analysis of the normative scenario for the North East England coast in 2030. Elements which have a (*) do not directly link to the ClimateNE Climate Change Adaptation Strategy.

<p>Political</p> <ul style="list-style-type: none"> • Political initiatives closely linked to NGOs and community organisations. • Policy developments in the NE closely linked to evidence-base and policies/plans.
<p>Economic</p> <ul style="list-style-type: none"> • Coherence between economic development initiatives of NE management organisations with prioritized actions. • Opportunities for sustainable coastal development are optimized. • Funding and support adequate to avoid short-term and reactive planning.
<p>Social</p> <ul style="list-style-type: none"> • Community based organisations are active voice in coastal decision-making (*). • Delegated community representatives embedded in a broader management architecture (*). • Support for entrepreneurship of coastal businesses which optimize opportunities for sustainable development.
<p>Technology</p> <ul style="list-style-type: none"> • Coherent approach within management organisations to data collection and monitoring. • Integrated regional data storage and management, embedded in other sub-national and national structures, with public access facility. • Appropriate technology in place to maintain high environmental quality, especially pollution.
<p>Legal</p> <ul style="list-style-type: none"> • Clear leadership from EU and national policies (*). • Subsidiarity of laws and policies agreed by management institutions operating in the NE. • Targeted dissemination of laws and policies to community and NGO sector (*).
<p>Environmental</p> <ul style="list-style-type: none"> • Evidence base used to provide long-term view of environmental change as much as possible. • Communities aware of predicted trajectories of coastal change and impacts on them. • Pro-active local responses to future predicted changes, such as habitat creation (*).

The process of developing the normative scenario suggests that in light of the significant but uncertain issues on the NE coast, the preferred scenario for 2030 would have the

various features identified in the PESTLE analysis. The final stage is to identify what action is required in management terms to achieve the status of the PESTLE analysis by 2030; these actions then form the core of the adaptation strategy.

Of the various elements in the PESTLE analysis over 65% of these elements link directly to the regional climate change adaptation strategy for North East England that covers the terrestrial, coastal and marine area (ClimateNE 2008). The aspects which are in the PESTLE but not in the ClimateNE adaptation strategy link to the wider involvement of communities and enhanced communication and dissemination approaches. This may be associated with the perceived importance of participatory approaches in managing the coastal area and the more focussed 'coastal' target of this work.

Engagement, Participation and Process

Coastal works to mitigate the effects of climate change on habitats are likely to take place in specific locations, such as areas needing coastal realignment or beach-recharge schemes. These works are associated with particular issues unique to each region of the UK, however it is worth noting that in the NE these issues tend to be in the significant but certain areas of the issues plot (Figure 1; e.g. coastal erosion, brownfield erosion, legacy contamination, designated habitats and species). This suggests that there already exists some perceived capacity and confidence to deal with these issues in the ForeSea stakeholders. The uncertainties associated with climate change are more associated with institutional engagement, planning and leadership. Thus, whilst site-specific conservation or environmental gains can be made with the range of techniques that have been developed, for an integrated response at a regional level the functioning and inter-relationships of the institutions is presently the area of concern for the stakeholders.

Whilst the status of coastal management identified in the PESTLE for 2030 has a high degree of relevance in terms of strategic planning for the NE, it is worth noting that this approach was only possible due to the engagement between organisations built up through the ECN approach. This engagement opened up the research-management interface which then acted as a focus for this work for the key institutional stakeholders in ForeSea and the wider NE stakeholder group. To what extent the disjoint between applied research and management is a barrier to an integrated response to climate change in other regions is not clear. It is, however, worth noting that similar gains from the ECN approach have been experienced at many of the other ECNs across northwest Europe.

Environmental management requires both top-down (EU/National) and bottom-up (e.g. Councils, pressure groups) approaches to be effective. However, this work also suggests that there is a need for approaches in-between the 'top' and the 'bottom' in terms of adaptation to climate change at the coast not just in administrative terms, but also in biogeographic or environmental terms. This may make sense as well, for example in terms of the scale of sediment cells used in the Shoreline Management Plan 2 (North East Coastal Authorities Group 2007).

A review of the role of regions in delivering coastal management in four areas of the UK concluded that there was a notable difference in terms of regional delivery of coastal management, but in all areas regional approaches did enhance delivery (COREPOINT 2007). Thus, whilst political change may lead to a weakening of regional level



Coastal realignment work in Northumberland undertaken by the Environment Agency can realise conservation benefits

management institutions, the need for institutions to engage at a regional level to respond effectively and in an integrated manner to the effects of climate change on the coast may be paramount. The ECN approach which helps bring together research and management and promote engagement with a wider community, coupled with the scenario methodology which helps to identify priorities for an uncertain future, may be tools which can act as the 'sandwich filling' between the top-down and bottom-up approaches.

Further and more detailed outputs of the stages of the scenario approach in the NE approach can be found at: <http://imcore.wordpress.com/partners/durham/>. More details of the other ECNs and the wider IMCORE project can be found at <http://www.imcore.eu/>. The authors would like to acknowledge the support of INTERREG IVB for carrying out this work.

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Sediment - The Coastal Environment's Overlooked Asset

Roger Morris CEnv FIEEM
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Introduction

“Put rocks on a beach to stop it eroding - that is how to manage the coast” was the immediate riposte of a friend who learned I was attempting to write a book on coastal management. I am pretty sure that the great majority of the British public if asked about coastal management issues would highlight coastal erosion as a big management issue and would offer similar advice. But, is erosion really the threat, or is it part of the solution?

To find the answer we need to look to the way that our coastline has responded over the past 8,000-10,000 years since the end of the last glaciation to understand how the coast works, and how it responds to sea level rise. At the peak of the last glaciation some 18,000-20,000 years ago sea levels were as much as 120 m below current levels and the British Isles were effectively part of the European mainland, albeit with a tundra-like climate. Glacial melt-waters together with isostatic adjustment and thermal expansion of sea water combined to elevate seas to modern levels at a fairly rapid pace, so that by the time our recorded history emerged from the Iron Age the coastline largely resembled its modern form.

Our modern coastline has benefitted from the huge volumes of material deposited by the retreating glaciers. The melt-waters helped to sort the material and to transport it towards the sea, whilst the sea itself contributed to the sorting process by moving sediments of differing weights over sometimes considerable distances. Much of the sediment was pushed landward by the sea to form sand dunes, mudflats and shingle ridges, very large volumes of sediment were also deposited in deeper water to form sandbanks in the southern North Sea and the Irish Sea, whilst finer fractions may have been drawn offshore and deposited in deeper water where re-mobilisation is less likely. In addition, substantial sections of the eastern and southern English coastlines have eroded to feed sediment into the evolving coastline.

These processes provide an important explanation about how the coast evolves in the face of sea level rise: it rolls back, with mobile sediments pushed landwards by the rising seas. On the open coast, these sediments are bigger and heavier cobbles, shingle and sand, whilst upstream in estuaries the finest clay and silt particles coagulated as flocs in response to particular chemical and physical parameters. Thus, whilst some of the UK's coastal evolution is driven by fluvial sources, the vast majority arises from re-working of existing material or from the legacy of the last ice-age.

Most of the historic supplies of sediment have been used up (Orford and Pethick 2006) or are in the process of re-working. In addition, substantial sections of the coast have been defended to arrest erosion, leading to reduced sediment supplies from the one remaining viable resource. Saltmarsh erosion in south-eastern England is one of these responses. Sea level rise leads to increased energy inputs on the outer face of the mudflats

and saltmarshes and re-mobilises sediment. The question is what happens to this re-mobilised sediment?

Roll-Over - A Theory Borne Out By Geological History

Using the idea that as sea levels rise sediment is pushed landwards, a conceptual model (Figure 1) can be constructed in which eroded sediment will be pushed inland until it achieves a lower level state of entropy. This is readily apparent when wash-over fans on shingle beaches are examined (Photograph 1). Each episode of wash-over pushes the shingle inland, with the broad estimated rate equating to 1 m of lateral movement for every metre of sea level rise. Thus, it can be expected that barrier beaches such as Chesil Beach will eventually over-run freshwater features to their rear. Apart from Chesil Beach there are many others such as Cley-Salthouse and the Walberswick to Minsmere coast.

For roll-over to work, however, there must be somewhere for this sediment to go. This coastal space is known as 'accommodation space' which is absolutely crucial to coastal evolution. In estuaries for example, it is the land in the floodplain that has been annexed to form some of our most important and productive agricultural land. If there is no space, the sediment is likely to be transported offshore: often into deeper water offshore where it cannot be re-mobilised.

Where roll-over does happen in muddy environments, eroded sediment will be deposited on saltmarshes, making them gain vertical height, whilst their lateral position may still adjust landward. For example, in the Blyth Estuary in Suffolk, despite

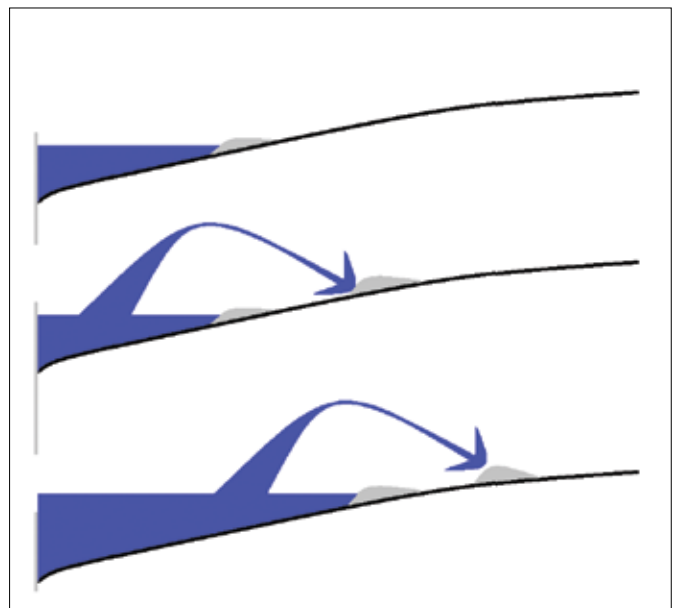


Figure 1. A simple model of sediment roll-over in response to sea level rise. This particular model represents barrier beaches of heavier pebbles forming shingle banks.



Photograph 1. Wash-over fan behind the shingle barrier beach at Porlock, Somerset. At this site, the sea has been allowed to breach the shingle barrier beach in order to allow the evolution of a more stable coastline.

there being lateral erosion, the saltmarshes continue to accrete vertically (French and Burningham 2003). The problem is that there is now insufficient accommodation space in many estuaries which have now been effectively canalised or their form is such that they export rather than import sediment. What is more, the upper ends of estuaries have lost the majority of their tidally inundated freshwater marshes (Van den Bergh *et al.* 2009) that would have been the most important accommodation space and also provide the chemical and physical parameters that facilitate flocculation.

The Role of Accommodation Space

Where accommodation space is lacking, saltmarsh erosion continues and is followed by mudflat loss too. This leads to exposure of sea walls to ever increasing levels of wave energy because mudflats and saltmarshes are natural energy interceptors (Morris 2010). This in turn leads to sediment exported into offshore locations whilst structural stability of sea walls declines and they require increasing levels of engineering to maintain them. (Photographs 2-3). A useful additional indicator of shortfalls in accommodation space is the paucity of saltmarsh in estuaries that have had much of their former saltmarshes converted to agriculture so that very little saltmarsh remains. Estuaries that face these problems invariably have sea walls that have to be armoured and that require strengthening of the toe of the wall to prevent undercutting (Photograph 4).

If, on the other hand, there is sufficient accommodation space, mudflats and saltmarshes will continue to recede laterally but they will gain elevation and hence they will maintain their value as energy absorbers. This means that there is a need to create accommodation space in estuaries, *i.e.* managed realignment. One of the enduring problems facing coastal managers is the tendency for the public at large to regard realignment as unacceptable retreat - allowing the sea to take back hard-won resources. In addition, realignment has been largely promoted as a conservation tool and consequently it is associated with wildlife management rather than a necessary part of flood risk management.

Lack of accommodation space starts to equate as a monetary value, because as the coastline erodes, the costs of maintaining sea walls increases to the point where further efforts are too difficult or too costly. But, it is just half of the challenge. Not only is there a need to create accommodation space for saltmarshes and mudflats to roll back over, there is a need for

sediment to be available in sufficient volumes to allow mudflats and saltmarshes to keep pace with sea level rise. Erosion of the foreshore alone is not sufficient as tides and currents inevitably lead to leakage. Some of the sediment eroded from the coast of eastern England is believed to end up on the Dutch and German coasts (HR Wallingford *et al.* 2002), so coastal managers need to take this into account when planning coastal adaptation programmes.

Valuing Sediment - A Paradox

At the end of the last glaciation the landscape had much greater plasticity. There were ample supplies of mobilisable sediments and plenty of water to undertake the engineering required. Today the landscape has evolved so that very little material is mobilised from terrestrial sources even during major storm events. Woodlands and grasslands largely bind the sediment and the volumes of water passing over the land surface differ considerably from those arising from melt waters. Consequently, estuaries and the open coast are hugely dependent on various forms of re-mobilisation by the sea. This is well-illustrated by the sediment budget for the Humber Estuary, which has been estimated to comprise less than 5% from fluvial sources (Townend and Whitehead 2003) with the remainder arising from re-mobilisation, cliff erosion on the Holderness coast and erosion of associated wave-cut platforms.

The Humber is an important model because it lies down-drift from one of the largest uninterrupted sources of new sediment in the UK. The exceptionally high sediment loading of this estuary gives it the appearance of a river of mud at times, but the importance of this sediment is well illustrated by accretion rates at realignment sites such as Paull Holme Strays on the north bank (Richardson 2004) which accreted by as much as 5 cm per month in the first year. By comparison the Tollesbury realignment in the Blackwater Estuary accreted at least an order of magnitude more slowly.

Sediment shortfalls along the coasts of Suffolk, Essex and Kent, combined with lack of accommodation space mean that development of more sustainable defence lines along realigned boundaries is much more challenging. The same holds in the Solent, where defences along the coast between Selsey and East Head have influenced the evolution of the spit at East Head and have given rise to concern that it might breach at its neck. Similarly, much of the coastline between Christchurch Harbour and the Lymington Estuary is now defended against erosion, reducing sediment availability in the Lymington River and elsewhere in the Solent.



Photograph 2. Foreshore erosion in front of the sea wall at North Killingholme, North Lincolnshire. This illustrates the loss of fine muddy sediment and exposure of harder consolidated sediments.



Photograph 3. Saltmarsh erosion exposing the toe of the sea wall at Wallasea Island, Crouch and Roach Estuary, Essex. This photograph shows classic coastal squeeze features: cliffed saltmarshes, lowered mudflats and undermining of sea walls.

Problems of sediment shortfall and the need to create sediment sinks to minimise loss must eventually lead to significant policy changes. At the moment, for example, Government is unwilling to consider compensation for people whose homes and land are eroded away. This is of course understandable from one perspective, but perhaps an alternative view is to consider high profile erosion hardship cases reinforcing the public perception that coastal erosion is something that must be countered? Each time more coastal protection is installed there is less sediment entering a system that is gradually moving towards a rate of sea level rise analogous to the rates following the last glaciation. Surely, therefore, there is a case for looking at ways to maintain or even increase sediment supplies?

Sediment Husbandry: The New Coastal Paradigm?

Taking the long view of coastal evolution, it is clear that our attempts to hold the line all along the coast are doomed to failure. It may be possible to continue current levels of defence for perhaps a further generation, but when the defences cannot be maintained the problem this will cause will be of a far greater magnitude than we might experience today. The most critical point is that whilst we fail to create adequate accommodation space to absorb eroded sediment, non-renewable supplies will be leaked into deeper water where they can only be retrieved in comparatively small volumes at very high monetary and carbon costs. Such an approach cannot be sustained and so the cost to future generations will be much higher than they might be if action is taken now.

This means that a monetary value can be placed on sediment. The calculations have not been done as far as I am aware, but bearing in mind that 1 cm of accretion over 1 ha of a saltmarsh requires a sediment input of 100 m³ of wet clay and silt, the volumes required simply to warp up realignments to the height required to support mid- and high-level saltmarsh are phenomenal. This means that eroding cliffs start to have a very real value if one also takes into account the conversion ratio of eroded material to sediment reaching the target site.

A similar approach can also be taken towards dredged sediment from navigation channels. Far from being a waste product, it is a valuable resource that has more value in the coastal environment than either being disposed of far offshore or being landed for use as fill. Offshore disposal does confer

one possible benefit however: providing the disposal site is sufficiently close to the coast, dispersed material may be returned to the coastal environment and absorbed elsewhere. The crucial issue is to create the necessary sinks to prevent loss.

Following this sequence of thoughts, the concept of managed realignment could and probably should be re-packaged as creating sediment sinks to improve adaptation to sea level rise. Meanwhile, coastal erosion needs to be re-branded as a positive contribution to adaptation to sea level rise and not as a threat to people and property: the real threat is insufficient erosion.

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Photograph 4. Armouring at the base of the sea wall at the eastern end of Wallasea Island, Crouch and Roach Estuary, Essex. This illustrates how foreshore recession has led to piecemeal attempts to maintain the integrity of the sea wall.



Ecological Issues in the MARINE ENVIRONMENT

IEEM Marine Conference 2010

21 October 2010, St Andrews

This first Marine Conference to be run by IEEM will look at the benefits, challenges and opportunities of the new EC Marine Strategy Framework Directive and launch IEEM's Guidelines for Ecological Impact Assessment in Britain and Ireland: Marine and Coastal.

The Marine Strategy Framework Directive constitutes the vital environmental component of the EU's future maritime policy, designed to achieve the full economic potential of oceans and seas in harmony with the marine environment. It aims to achieve good environmental condition of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend.

Each country in the UK and Ireland is transposing, or has transposed, the Marine Directive according to the circumstances of the country, but the ambitions are the same: to provide greater protection for the marine environment.

The conference aims to advance the future protection of the marine environment through the sharing of information and enhanced understanding of the impacts of the policy framework, disseminating ongoing research and highlighting good practice by ecologists and other professionals.

Conference topics include:

- the current state of the marine environment;
- a range of current marine ecological issues using case studies: fish, marine mammals and seabirds;
- the Marine Directive;
- the potential and implementation of Marine Protected Area Networks;
- ecological impacts of climate change;
- the development of renewables using case studies of offshore windfarms, wave and tidal energy; and
- an overview by the largest stakeholder of the seas, The Crown Estate.



Full details and booking available at:
www.ieem.net/conferences.asp



Photos: Martha Tressler, Philip J Edwards, Scottish Natural Heritage, Sand Dune and Shingle Network, Gavin Parsons, Scottish Natural Heritage, Sally Sharrock, www.wildstock.co.uk

Sand Dune and Shingle Network

*Paul Rooney CEnv MIEEM and John Houston CEnv MIEEM
Sand Dune and Shingle Network*

The Sand Dune and Shingle Network featured in this publication back in March 2007 when it was relatively new. Now, with four years experience and a new staff member, it 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, so it seems fitting to provide an update here.

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 three 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. In particular, we are making contact with Environment Agency staff at the moment, so if you know one, or are one, and have an interest in dunes or shingle please get in contact.

Currently we have more than two hundred Network members and our newsletter is circulated to over four hundred people worldwide who share an interest in sand dune and shingle habitats and their management.

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. We engage with a wide range of issues and involve many sectors: the latest July 2010 issue featured news from around the sites, the England Biodiversity Strategy, European coastal erosion projects and much more.

In 2010 we have 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. The 'Conservation and Management of Coastal Vegetated Shingle' was the first such paper and was the result of a Network workshop held on the east coast of England in September 2008. In the tradition of good IEEM events, following talks on advances in understanding and practice, delegates were taken to the field for some animated discussions on the conservation of shingle. This evidence-informed and practical approach to conservation is also shared with IEEM. Future Occasional Papers include the

management of sea buckthorn (a coastal shrub) and accounts of current dune management practice in The Netherlands. They result from knowledge exchange events organised by the Network making use of members' experience and expertise with the view that everyone has something to share.

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. Paul Rooney is a founding trustee and Advisory Council member of the Golf Environment Organisation (GEO), a body promoting sustainable practices in the golf industry. GEO shares a desire to protect the interests of sand dune habitats in the wider context of sustainability in golf. For example, they are leading voices in criticising the development of dunes by the American billionaire Donald Trump at Menie Links, Scotland. The Network now has a 'Making Links' initiative targeted at links (sand dune) golf courses to improve the dialogue between conservationists and golf managers. In Spring 2011 we will be organising a golf symposium to respond to the need for greater co-operation and understanding between golf and conservation interests.

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. Following a 'Sand Dune Hydrology Workshop' in March 2010, the Network has been working closely with the Centre for Ecology and Hydrology (CEH) to develop this group and plan to use it as a model for future thematic groups. The hydrology group is currently collating data sets to inform predictive models and is strategically examining the approach to data management.

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. The Sand Dune and Shingle Network is working closely with the Coastal and Marine Union (EUCC) to provide a structure, focus and purpose to the existing loose association of national contact points for dunes which grew up in response to previous European events. The European Dune Network will concentrate on the conservation of the EU dune habitats and species which underpin the Natura 2000 network.

So, the Network has been very active since first appearing in these pages in 2007, but there are many challenges remaining. For more information of our work please visit our web pages at www.hope.ac.uk/coast There are some interesting events and activities planned for 2010/11 and you are warmly invited to join us if you share an interest in dunes and shingle.

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

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Developing a Grasp of European Eel Conservation

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Every November, when the Moon is at its darkest, there's a stirring. On riverbeds, lake bottoms and marshlands around Europe writhing masses of snake-like fish respond to an ancient urge and turn towards faster-moving water. This is the time when adult eels begin a 4,500-mile journey down deep ocean trenches and across undersea mountain ranges to end their lives spawning in the windless waters of the Sargasso Sea.¹

This is the received wisdom on eel migration, but in fact much of the ecology of the European eel *Anguilla anguilla* remains a mystery to biologists. In an attempt to draw together what is currently known about these intriguing and increasingly endangered creatures a review of relevant current literature is drawn together in the following paragraphs. In order to protect and enhance this species in the UK we first need to understand their ecology.

The journey that adult eels make to the Sargasso Sea to end their lives after spawning has been inferred from catching increasingly smaller juvenile eels (Leptocephali – see life cycle section below) in the approach to the sea. No spawning has been observed directly in the Sargasso Sea and no adult eels have been found there. To date, the only adult eel that has been found in proximity to this sea was recovered from the stomach of a sperm whale off the Azores. Further mystery enshrouds the Sargasso Sea itself. It is the only sea without shores, an area of ocean distinct from the surrounding Atlantic, bounded by the currents of the Gulf Stream, a windless expanse of floating seaweed reputed to trap ships; indeed it is located within the Bermuda Triangle.

Biologists still have much to learn about the European eel. One thing we do know is their numbers have dramatically declined throughout Europe in the last 25 years and, as a result, in 2007 the species was added to the International Union for Conservation of Nature Red List of critically endangered species². 'Critically endangered' is the highest risk category for wild species, and means that the species numbers have decreased or will decrease by 80% within three generations. The causes of this decline are not fully understood but are likely to be manifold and include nematode infection, obstacles to migration as a result of development and overfishing.

The species is further included in the UK list of priority species as well as the Natural Environment and Rural Communities (NERC) Act 2006 Section 41 list (England) and Section 42 list (Wales) of species of principal importance for the conservation of biodiversity. The NERC Act places a legal duty under Section 40 of the Act, such that - 'Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. The Eels (England and Wales) Regulations 2009³ came in to force on 15 January 2010 to implement the short- and long-term measures set out in the Eel Management Plans⁴, which are intended to ensure at least 40% of adult eels return to the sea to spawn.

Taxonomy

The European eel is one of many species of eel that exist. True eels (Anguilliformes) are an order of fish, which consists of four suborders, 19 families, 110 genera and approximately 600 species. The term 'eel' is also used for some other similarly shaped fish, such as electric eels and spiny eels, but these are not members of the Anguilliformes order.

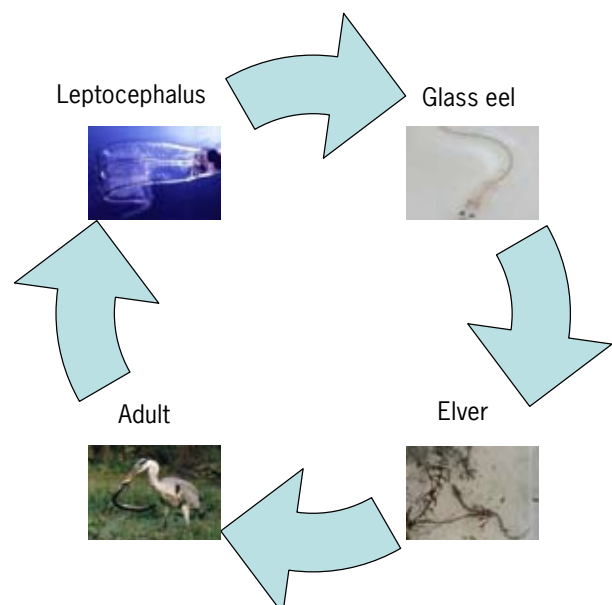
There are two eel species found in UK waters; the conger eel *Conger conger* which only lives in marine habitats and the European eel *Anguilla anguilla* which lives in freshwater habitats, both still and flowing, as well as inshore coastal waters.

Life Cycle

Thought to start life in the Sargasso Sea, the European eel larvae are flat, leaf-like creatures (known as a leptocephalus) that are carried on oceanic currents towards Europe. As they reach the coasts of Europe and enter estuaries they have transformed into small, transparent glass eels⁵. The glass eels metamorphose into pigmented elvers as they enter the UK estuaries with the spring tides in April and May, migrating upstream into freshwater where they stay and mature for up to 20 years, attaining a size of 60-80 cm. Adult eels spend most of their lives in freshwater, but they are capable of surviving for short periods of time out of water and can cross land and damp meadows in their search for water systems.

Eels are an important source of food for fish, birds and mammals, including other protected species such as bittern and otter. They are also an important commercial fish with long-standing freshwater fisheries across the UK.

The life cycle is illustrated below (photos courtesy of the Zoological Society of London, the Friends of Troopers Hill⁶ and Wikipedia).

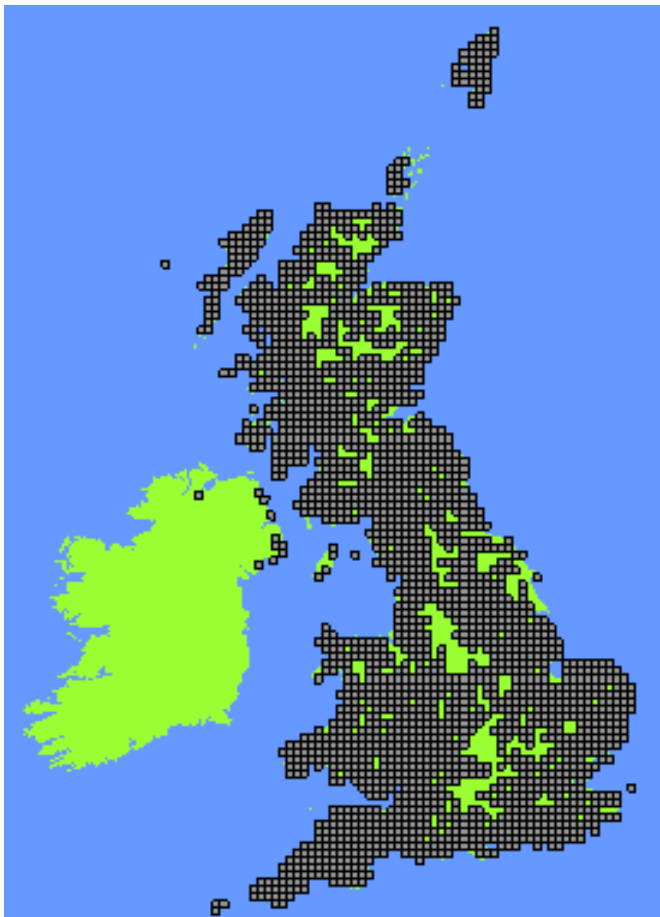


Habitat Requirements and Distribution

Eels can be found in wetland habitats including rivers, streams, waterfalls, bogs, marshes, swamps, fens, peatlands, lakes, canals and ponds as well as more saline habitats of river estuaries and the UK coastline. Since eels are capable of surviving for periods out of water, and will cross damp meadows to reach new habitat areas for maturation or migration, their ability to colonise a range of freshwater habitats has resulted in eels becoming one of the most widely distributed British freshwater fish.

The presence of eels within a site may be an indicator of a healthy and diverse ecosystem, or at least a eutrophic one, as they require abundant invertebrate prey. As they grow, freshwater eels diversify their prey range to include invertebrates of all sizes, newts, fish spawn, fish and even young waterfowl (ducklings)⁷. They require adequate physical cover to protect them from excessive predation, such as overhanging trees and dense marginal vegetation.

Eels are found throughout the UK as shown on a recent distribution map below⁸; gaps on the map may indicate gaps in recording effort rather than an absence of eels.



Research Projects

There are several research initiatives that are underway to improve our understanding of eel ecology and the factors leading to their decline. The pan-European research project known as the Eeliad⁹ is a cooperative project with institutes and researchers from across Europe working together to better understand and safeguard this critically endangered species.

The project aims to:

- identify spawning areas and marine migration routes;
- identify biological and ecological characteristics of eels that contribute to migration success and reproduction;
- develop understanding of the recruitment processes of eels from hatching to their entry to river catchments;
- refine our understanding of the stock structure of European eels; and
- make recommendations to national and international organisations for regional conservation measures to maximise recovery of the European eel stocks.

INDICANG¹⁰ is another research project that is linked in to the Eeliad with work being undertaken in the UK. Furthermore, the Zoological Society of London has been monitoring eel migrations in the River Thames and its tributaries since spring 2005 as part of the Tidal Thames Conservation Project¹¹. These research projects are gradually improving our knowledge of eel ecology.

Conservation and Enhancement Recommendations

During a walk-over survey it would be hard for an ecologist to predict the distribution and abundance of eels on the basis of the habitats within a site alone. Such detailed survey information may not be necessary as all wetland habitat has the potential to support European eel and their presence can be assumed. Indeed, surveys conducted by the Environment Agency show eels to be present in nearly all river systems in England and Wales, although there are some areas where they are scarce or absent, particularly the upper reaches of rivers.

Mitigation for eels is necessary if a development results in impacts to wetland habitats. Even if the wetland habitats within a site are not affected there are opportunities to enhance a site for eels.

Approaches to mitigation and enhancement will vary between sites, but may include: (i) improvements to water quality - ongoing programmes aimed at achieving better river quality and good ecological status under the Water Framework Directive will contribute to increasing eel populations; and (ii) provision of abundant marginal vegetation and over-hanging trees - which will both increase the abundance of invertebrates and small fish for eels to feed on and offer refuge sites for eels from predators.

Another key mitigation strategy for conserving eels is to ensure there are no obstacles to migration for elvers moving upstream and eels as they travel downstream on their return to the Sargasso Sea. Elver and eel passes¹² can be installed over obstructions, and standard fish passes can be adapted for eels. Such passes have been used at numerous locations by the Environment Agency (EA) who will regulate and advise on any projects where eel mitigation is undertaken. Elver passes can be a low cost option (from £100) and often involve a narrow strip of bristles that water gently trickles down (see photograph of the construction of such a pass). Elvers will wriggle up between the bristles, which are spaced at varying intervals for elvers of different sizes to grip on. Monitoring the success of the passes is important and can be done by netting elvers as they swim over the top or by capturing the image on a night camera.

An EA consent is required for capturing eels and elvers, for scientific purposes, and the eel fishing byelaws, which are to be updated in 2011, must be adhered to. For example, in different areas of the country particular capture techniques are banned¹³. The byelaws aim to protect eels at particularly sensitive times



Eel pass construction

Photo: Roger Genge, Environment Agency

in their life cycle such as the spring migrations up streams and the autumn migration to the Sargasso Sea. Works affecting wetlands at these times of year are best avoided, especially at night time when eels are on the move.

In the absence of a comprehensive understanding of eel ecology we rely on the Eel Management Plans, that are enforced by The Eel (England and Wales) Regulations 2009, to conserve and enhance the species.

The views expressed in this article are the author's personal views. The comments of her colleagues at Atkins are gratefully acknowledged.

Notes

- ¹ Adapted from *The Times* website 2009: <http://www.timesonline.co.uk/tol/news/environment/article6163961.ece>. Accessed on 14 July 2010.
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- ⁷ Yorkshire Wildlife Trust website 2010: http://www.ywt.org.uk/_filestore/File/Wildlife%20Factsheets/Eel%20Fact%20Sheet.pdf. Accessed on 14 July 2010.
- ⁸ The various Data Providers, Original Recorders and the NBN Trust bear no responsibility for any further analysis or interpretation of this data. National Biodiversity Network website 2010: <http://data.nbn.org.uk/interactive/map.jsp?srchSp=NBNSYS0000188599>. Accessed on 14 July 2010.
- ⁹ The Eeliad project website: <http://www.eeliad.com/>. Accessed on 14 July 2010.
- ¹⁰ INDICANG website: <http://tamarconsulting.org/wrt/projects/indicang.htm>. Accessed on 14 July 2010.
- ¹¹ Thames Tidal Project webpage: <http://www.zsl.org/conservation/regions/uk-europe/european-eels,1035,AR.html>. Accessed on 14 July 2010.
- ¹² Details of eel passes: <http://www.link75.org/mmb/Cybrary/americaneel/eel%20passage%20manual.pdf>. Accessed on 14 July 2010.
- ¹³ EA eel and elver fishing guidance: <http://www.efishbusiness.co.uk/formsandguides/eel-elver-guidance.pdf>. Accessed on 14 July 2010.

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Cord-Grass Planthopper *Prokelisia marginata* (Hemiptera: Delphacidae) Sweeps into Kent

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Introduction

The *Spartina* planthopper *Prokelisia marginata* (van Duzee) (Figure 1) was recorded as new to Britain from specimens collected at Fawley and Hythe along the south Hampshire coast in July 2008 (Wilson and Mühlerthaler 2009). It is a denizen of the eastern seaboard of the USA where it feeds on native cord-grass *Spartina alterniflora*. It has been proposed that the planthopper may have been introduced into Europe from America with cord-grass that is frequently used for packaging (Anon 2008).

Observations

Dr Alan Stewart of the University of Sussex, who is conducting research on this species in the UK, requested members of the Heteropterists Forum to look out for this species in their areas. A quick visit on 13 July 2009 to the Kent Wildlife Trust reserve at Oare Marshes, Faversham (OS grid reference TR0164), revealed the planthopper was present on *Spartina anglica* in very high numbers, with approximately 20-30 adults and nymphs per sweep of a net. Lots of other individuals were disturbed in the process of sweeping, causing a scattering of individuals to nearby plants, so the total numbers must have been very high, possibly as much as 100,000 in the main bay.

A series of visits to nearby localities confirmed the presence of the planthopper in all large stands of the grass along the north Kent coast from Minnis Bay (TR2769) in the east to near Gravesend (TQ6677) in the west (Figure 2). A visit to the Isle of Sheppey showed that *P. marginata* was present by the Kingsferry Bridge (that links the island to the mainland), Ladyhole Point in the west and Shellness National Nature Reserve in the east, though not at Warden Bay in the northeast where the host plant appears to have died out in recent years. A month or so later a visit was made to Pegwell Bay on the east Kent coast where nymphs of a later generation were found in lowish numbers. Nymphs and adults were still present at Oare Marshes on 1 November 2009 showing that this insect is capable of progressing through several generations in one year; a factor which may help to explain its rapid spread in this country.

Prokelisia marginata appears to have spread very rapidly along the Kent coast as it was not recorded when a brief survey of the smaller islands in the river Medway was undertaken on 1 July 2007. Travelling in a lightweight dinghy, landings of up to an hour were made at Nor Marsh, Burntwick Island, and Slayhills Marsh which support, or are mainly composed of, cord-grass and may in the case of Slayhills Marsh be semi-



Figure 1. *Prokelisia marginata* on *Spartina anglica* at Oare Marshes Kent Wildlife Trust Reserve, Kent, October 2009

submerged at high tide. It is possible that the planthopper may have been overlooked and not recorded on this occasion if only small nymphs had been present. In the USA, the planthopper is recognised as an active flyer and macropters have been recorded in light-traps 100 km off shore in the Gulf of Mexico (D Strong pers. comm.).

The distribution of *P. marginata* and its host plant are shown in Figure 2. The latest records of *S. anglica* were kindly provided by Eric Philp from his forthcoming atlas of the Kent flora. The distribution of the plant today is very similar to that recorded in Philp (1982) although the plant has disappeared from several localities along the north Kent coast. The status of *Spartina* in Kent has undergone some remarkable changes over the past century. Small cord-grass *Spartina maritima*, a presumed native, referred to as *S. stricta* Roth in the flora

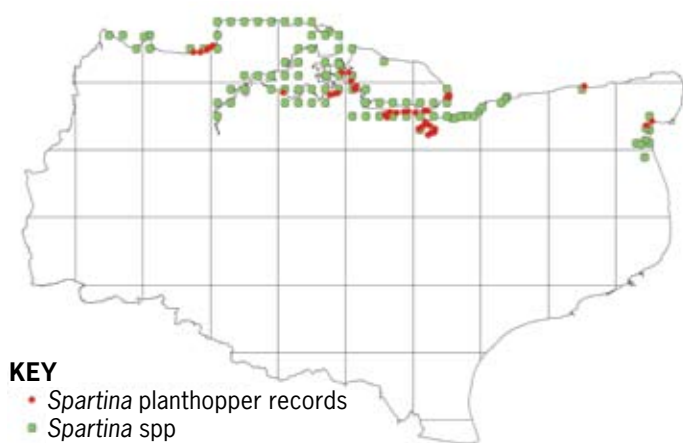


Figure 2. The distribution of *Prokelisia marginata* and its host plant in Kent 2009. Prepared from data held at Kent and Medway Biological Records Centre.

of Hanbury and Marshall (1899) was stated to be 'Native. Muddy sea-shores; rare and very local'. A mere five localities were listed; Oare Creek, Harty Ferry, between Whitstable and Seasalter, and Queenborough. Dr Goodenough (*loc. cit.*) rated it as 'plentiful on Sheppey Isle'. The species account is remarkably brief compared with that of many common species and it is probably significant that it was not recorded from Pegwell Bay along the east coast. At about this time, *S. anglica* was recorded for the first time as a novel amphidiploid derived from the sterile primary hybrid *S. townsendii* (*S. alterniflora* x *S. maritima*). Viable seed from this plant enabled it to spread naturally along the south coast of England and to reach the north coast of France (Cope and Gray 2009). Cuttings and seed of *S. anglica* were also actively transferred to new localities in the UK in order to stabilise soft mud and reduce coastal erosion. The spread and dominance of *S. anglica* was such that by 1982, *S. maritima* was known from only one site in Kent, where it has since died out (Philp 1982).

Discussion

Common cord-grass *S. anglica* has been successfully planted around the world but in certain areas it has tended to dominate local saltmarsh communities to such an extent that control measures have had to be undertaken. For example, in North America, a biological approach to controlling the spread of *S. anglica* has been investigated using *Prokelisia* spp. planthoppers. Very high planthopper densities resulted in more than 90% plant death in glasshouse studies (Wu *et al.* 1999). Follow-up tests with *S. anglica* in the field were not conducted. Thus there is a possibility that the planthopper *P. marginata* may have a significant effect on *Spartina* stands here in the UK as it is certainly capable of achieving high densities under natural conditions. Many plants of *S. anglica* in southern Britain (below 53°N) have become infected with ergot fungus *Claviceps purpurea* (Fr.) Tul. which has resulted in loss of sward vigour and die-back (Cope and Gray 2009). The combination of these two agents may have a cumulative deleterious effect on *Spartina* survival, which if true, will undoubtedly have a knock-on effect on the stability, extent and composition of our native saltmarsh communities. However, it is possible that ergot-infected *Spartina* may be deleterious to *Prokelisia* nymphs as fungal-derived toxins in grasses have been shown to be toxic to a wide range of developing insects (Krauss *et al.* 2007).

Despite recording appreciable numbers of nymphs early in 2010 as an indication of very high numbers for 2010, the

subsequent cold winter appears to have reduced numbers by approximately 90%, so at the present time, numbers remain very low and it will be interesting to see whether numbers recover sufficiently in later generations to affect plant growth as predicted.

Conclusion

The planthopper *P. marginata* has spread rapidly and widely in Kent since its introduction, occasionally reaching very high densities. The potential decline of *Spartina* locally as a result of feeding damage caused by the delphacid combined with the deleterious effects of ergot infection may be seen as beneficial in some quarters in the UK, as large stands of *Spartina* have been recorded as interfering with foraging of shorebirds (Goss-Custard *et al.* 1995), the exclusion of native fish (Gray, Marshall and Raybould 1991) and other side-effects. With this insect's mobility and its ability to reproduce quickly in mind, it is surely necessary to monitor the effects that it is having upon our estuarine ecosystems and processes.

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Batpods – A Method for Monitoring Bat Activity Along Linear Features

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This article describes a method that was developed out of a combination of boredom and frustration. The boredom came from sitting on damp grass next to hedgerows in the dead of night attempting to determine if, and how bats were using hedgerows scheduled to be severed by a road scheme. The novelty soon wears off and the frustration of hearing bats flying above you and not knowing which direction they were travelling takes over. The method we were using involved individuals with bat detectors sitting next to hedgerows for fixed periods of 30 mins or 1 hour. This had limited success. One of the major drawbacks was that it would be unreasonable to expect someone to sit from dusk till dawn and record every passage of bats above them throughout the night. And only recording for 1 hour was not giving a full picture of the night's activity. But the main issue was that there was no means of knowing the direction the bat was flying in or whether the bat passes were the same bat moving in one direction and then returning, or whether it was a sequence of bats flying out from a roost site in the same direction early in the night and returning later.

The current method has been developed to better inform the mitigation for the same road scheme when it became necessary to repeat the activity surveys to update the data. The basic principle is simple. The output from two 'Batbox Batons' are directed into a stereo digital sound recording device, the output from one Baton being sent to the left channel and that of the other being sent to the right channel. To obtain the information about the direction of travel the two detectors are located between 1 m and 5 m apart along the linear feature. The system was devised to monitor activity along hedgerows, but other linear features such as walls, canals and streams could also be monitored. The technique has adopted the colloquial name of Batpods because of the need to keep the equipment dry should it rain unexpectedly during the night. The equipment is housed inside a modified 2 L clear plastic drinks bottle (as used for making great crested newt bottle traps) to make a self-contained and waterproof 'pod'. This was tested on a rain-free night to ensure that the thickness of plastic did not significantly impede sound getting to the microphones in the Batons. The thin nature of the plastic on these drinks bottles appears to have little tangible impact on the intensity of the sound passing to the detectors. These pods can be stuffed into the top of hedges (see Figure 1) strapped to shrub stems (see Figure 2), or mounted on special bat stakes either near ground level (see Figure 3) or higher, as required.

Once the detectors are in place any activity of bats passing up or down the linear feature will be recorded as a registration that becomes apparent either in the left channel passing to the



Figure 1. Batpod stuffed into the top of a typical 'compact' hedge



Figure 2. Batpod strapped to twiggly new growth

right, or in the right channel passing to the left. These clearly indicate the movement of a bat in a specific direction along the hedgerow (see Figure 4).

Listening to the output through stereo headphones gives a clear indication of any directional passes. The other registration of activity that is of value is where a bat is heard in either the left channel only, or the right channel only, and does not register as passing from one channel to the other. This indicates that the bat in question did not cross the Batpods and may have turned back before reaching them. This indicates activity 'offstage' either side of the Batpod location point.

There are several key results using detector surveys in this fashion. The primary objective is to record the direction of movement. Ancillary data includes evidence of activity that does not involve bats crossing the Batpods, information on the species using the area and also a temporal analysis of which species are active at which time during the night and any patterns of their movement throughout the darkest period.

In terms of the practicalities of using the equipment, one of the fundamental issues is ensuring that the battery life and the recording capabilities are sufficiently long to continue to work from dusk until dawn throughout the bat activity season with the changing length of darkness during the summer. The equipment that we use is capable of running for a maximum of 15 hours continuously. The batteries in the Batons are capable of lasting for 15 hours and the batteries in the recorder – an Olympus LS-10 – are capable of recording continuously for 18 hours. Depending on the length of darkness this can mean that the detectors can be set in place relatively early in the evening and left to run until late morning. Both the detectors and recorder have been tested using rechargeable NiMH batteries as the initial work was becoming very expensive using disposable alkaline batteries. If the work is scheduled to run continuously night after night during the week, spare batteries will need to be purchased or a rapid charger obtained to recharge the batteries



Figure 3. A pair of Batpods 'staked out' along the base of a hedge where stock or disturbance is not an issue

exhausted each day. It is also important to ensure that, should the batteries in the recorder become exhausted, the file in the recorder is closed and saved rather than being lost.

Another practicality of installing the detectors is to ensure that they perform their function and are not interfered with. Ideally they should be placed as high in the hedge as practicable and as far apart as possible. Our detectors are fitted with 5 m long leads, but longer leads could be used should the need for them arise. This might be the case if the objective of the survey was to monitor the movement, or lack of movement, of bats across significant gaps in hedgerows. Although a 20 m lead might be advantageous, the same data could be obtained by placing a pair of Batpods at one side of a gap only. Any bats crossing the Batpods, entering or leaving the gap would be recorded as a single passage in one direction. If the bat entered the gap and immediately turned and returned this would feature as two registrations in quick succession in opposite directions. For extremely large gaps of say 50 m, installing two pairs of Batpods either side would be necessary to indicate whether bats were turning back at both ends of the hedgerow and were not crossing the gap.

Having been developed in Yorkshire it is obvious that no expense has been spared in developing this equipment. The plastic drinks bottles cost around 10 pence each. The pods are held together by elastic bands and are held into the hedgerow by further elastic bands. The Batbox Batons are relatively inexpensive at approximately £70 each (less than the Batbox duet that used to be one of the cheapest frequency division detectors at £250) and the Olympus LS-10 recorder (one of very few devices with the stamina to last the necessary 15 hours for recording all night) costs around £220 (or the LS-11 at £250); a lot cheaper to lose than two Anabats! And don't forget to put a note on the Batpods if the public might see them and report them as suspicious objects, as has happened in the past! It is also good practice to tell the landowner what they are and where you put them, especially if they might turn stock out into the field after you have installed the Batpods and left the site.

The analysis of the output is relatively simple and not unduly time-consuming (it normally takes less than 1 hour to analyse 15 hours of data unless the site is particularly 'busy'). To obtain good quality recordings the Olympus LS-10 is set to record in Windows Media Audio (WMA) format at 160 kilobits per

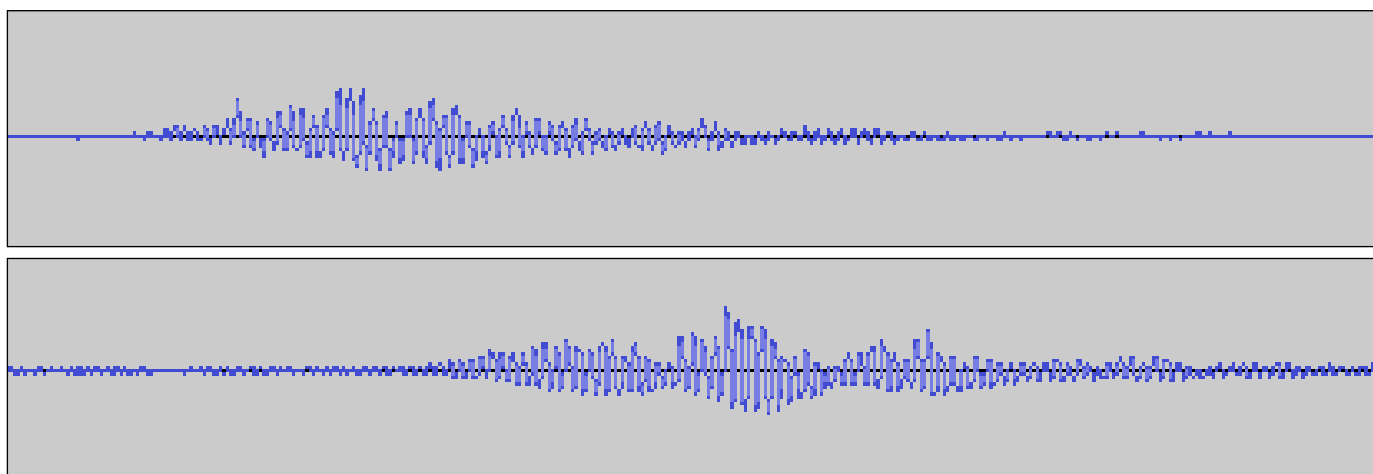


Figure 4. A section of recorded waveform showing a registration picked up first in the left channel (upper waveform) then the right (lower waveform)

second (kbps). This was another consideration in selecting the equipment, having a memory card large enough to record the memory-hungry high quality audio files necessary.

The data are downloaded onto a computer into music editing software that shows the waveform of the recordings. With experience the waveform peaks caused by bats can be recognized and 'zoomed' in on to confirm and be recorded as a registration and the timing logged. This visual check removes the need to sit through recordings listening to them in real time. The bat sound blips are then identified to species if possible, the direction of movement determined and other information recorded such as a feeding buzz or how loud or faint the registration was. If it does unexpectedly rain, depending on the intensity it is sometimes possible to pick out bat blips from rain splashes (bats do fly when it is raining!). Early Batpods were fitted with 'woolly hats' (hand-crafted black fleece covers) to deaden the sound of raindrops. This worked well and again did not seem to adversely affect sensitivity. But the general principle is that bats are less likely to be active in the rain and sessions should be timed to avoid nights when it is forecast.

It is obviously very important to know the layout of your detectors as this will reflect in the directional movement that can be presented as the result. The convention we have adopted is that the detectors are installed from one side of the hedge. Whichever side that is, the Batpods are placed with the left channel pod to the left and the right channel pod to the right. If the hedgerow ran north-south and was approached from the west, the left pod would be to the north and the right pod to the south (see Figure 5).

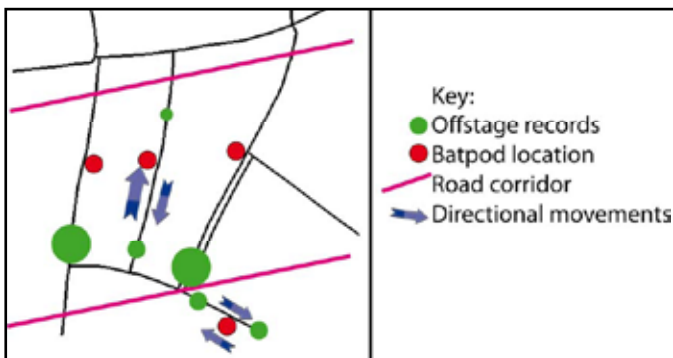


Figure 5. A section of road corridor map showing the bat activity. This shows very little activity to the north and moderate movement north and south along the middle hedgerow only. The size of circle and the size of arrows reflect the total night-time activity records. The red circles indicate which side of the hedge the Batpods were installed from.

Knowing this, when analysing the data, any bat heard in the left channel first and passing to the right channel would be travelling from north to south. Also, any bat heard only in the right channel would be flying in the southern part of the hedgerow but not crossing the Batpods and moving to the north side. An additional inflection added to the data analysis is to make an auditory judgement on the intensity of the registration. Faint registrations in either the left or right channels would indicate either distant bats further away from the pods, and low down, or bats at higher altitude, whereas louder registrations would indicate that bats were flying closer to the Batpods but still not crossing from one to the other. It has not been possible to confirm the maximum detection distance of the equipment, but there are clearly some very faint calls picked up that suggest these bats are probably a considerable distance away.

Once the data is obtained and analysed it can be presented in a variety of different ways. The simplest representation

would be to indicate on a map the total number of passes in each direction and the total number of registrations 'offstage' either side of the Batpods (see Figure 5). A further refinement would be to do the same exercise at one hour or quarter hour intervals. This would potentially detect any significant directional movement at different times during the night as might be expected when bats were emerging from a roost and passing down a particular hedgerow in numbers. Their return would then be monitored at a different time during the night. One useful way is shown on the Excel graph in Figure 6. This shows a timeline from midnight until 09:36. Moving along this timeline the red circles on the lower line (-2) indicate registrations that were 'offstage' to the right of the Batpods, the upper line (+2) would have indicated similar 'offstage' registrations to the left of the Batpods.

However, in this particular instance there were no registrations to the left only of the Batpods, indicating that there was 'offstage' activity, but that it was all to the right. The inner traces (-1 and +1) indicate positive movement from left to right or right to left. The -1 trace line indicating a movement from left to right, and the +1 trace line indicating movement from right to left. It can be seen from this instance that there were relatively few movements across the pods in either direction. There was one movement left to right early in the evening followed by two movements right to left and finally one movement left to right just before dawn. This diagram furnishes a wealth of information about the temporal activity throughout the night as well as indicating any cross Batpod movement: whether or not, and when, there was activity 'offstage' and at which side of the Batpods this occurred.

Another example (see Figure 7) shows activity at a site where there is clearly movement along the hedgerow as shown by the busy inner traces and relatively little 'offstage' activity on either side. But there is no evidence of any systematic movement in either direction that might indicate movement from or to a roost site.

Unfortunately there is no way of determining how many bats were involved in these registrations and the technique is still effectively an activity monitor. With closer analysis of data where there was significant passage across the Batpods, it

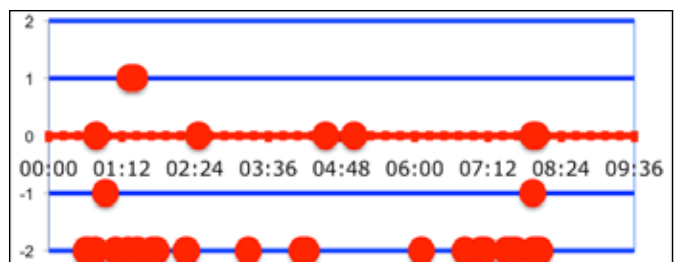


Figure 6. An example of a trace showing activity only to the right (-2 line), no activity to the left only (+2 line) and very few instances of passes across the Batpods (+1 = R-L and -1 = L-R)

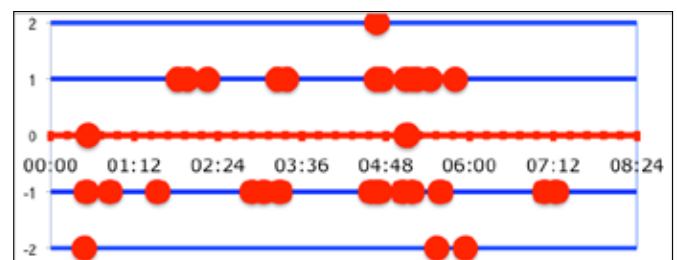


Figure 7. An example of a trace showing little activity to the right only (-2 line) or left (+2 line) and many instances of passes across the Batpods (+1 = R-L and -1 = L-R)

is possible to confidently predict that this may have been a single bat passing in both directions repeatedly. This would be indicated by passes being L-R, R-L, L-R, R-L, etc. in relatively quick succession. An example of this is in Figure 8. The first three records were almost certainly the same bat based on the time intervals. The last record was logged as 'F' indicating a faint registration ('M' is a medium volume registration). This could have been a pass at altitude, not directly overhead, or possibly further out into the field.

Figure 8. An example suggesting a single bat passing backwards and forwards over the Batpods

Bat22 - M,LR	4:42:03
Bat23 - M,RL	4:42:16
Bat24 - M,LR	4:42:24
Bat25 - F,RL	4:45:04

Not only does stereo recording help interpret bat activity using static fixed locations and Batpods, but can also be used as a mobile, hand-held system when doing transect recording or surveying trees, etc. Again, in the pitch black it is often impossible to detect whether a bat flew in a particular direction when doing a survey. Using a hand-held stereo 'Batstick' will remove these uncertainties. Doing a bat survey at a tree in stereo and getting repeated registrations left to right would strongly indicate that a bat is circling the tree, or random directional passes could be several bats flying in different directions around the tree. The device is simply a 'T'-shaped

piece of wood (parts of a recycled IKEA coffee table) onto which is strapped a recorder on the upright and the left and right detectors on the 'T'. Attaching a pair of stereo headphones to the recorder allows the observer to move the Batstick in order to determine the direction of movement of any bats heard overhead (see Figure 9), e.g. behind and passing forwards or in front, passing backwards.

The system using Batpods was developed to look at movement across a road scheme where commuting route severance was the issue. It can be adapted to get data on the movement into and out of roost sites, and the movement, or lack of, across hedge gaps, etc. The relative cheapness of the equipment means that several sets can be installed each night of the survey to record activity simultaneously within the local landscape. We used four sets (being a number that can easily be set by one person) and moved them round, but more can be used if they can be set by one or more people in the evening.

The main message to emphasise is that we cannot see which way bats are moving, but we can find out by using stereo recording systems. The days of sitting by a hedge surrounded by curious slobbery cows or scary sheep are long gone and hopefully remote recording is the way forward. The method described here is only one way of monitoring activity along linear features in stereo. Another novel system is being trialled by Baker Consultants. This is a self-contained stereo bat sound recording unit. Both systems will be demonstrated at the National Bat Conference in Loughborough in September 2010.

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Figure 9. A simple Batstick setup to listen, in stereo, to bats during hand-held surveys

Habitat Suitability Index Scores as an Indicator of the Presence of Great Crested Newts

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Introduction

There is abundant anecdotal evidence from ecologists suggesting that great crested newts (GCNs) are often found in water bodies that appear to be unsuitable or have low potential to support this species. The purpose of this study is to determine whether Habitat Suitability Index (HSI) scores are reliable in predicting the presence (and absence) of GCNs in water bodies and whether HSI scores are accurate enough to allow ecological consultants to use this information with confidence. This has been achieved through comparing HSI scores of water bodies with the results of presence/absence surveys, using data from Atkins surveys of 67 water bodies undertaken in 2009.

The GCN HSI was developed by Oldham *et al.* (2000) to evaluate habitat quality of a water body. It is a quantitative measure and is recommended by Natural England as a potentially useful tool in GCN surveys and mitigation (Natural England 2010).

HSI is a number from 0 to 1 based on an assessment of 10 habitat variables known to influence the presence of GCNs. For each water body this includes an assessment of 10 characteristics of the water body: geographical location, surface area, desiccation rate, water quality, amount of shade, number of waterfowl, presence of fish, density of water bodies in the area, quality of terrestrial habitat and the macrophyte (vegetation) cover.

An HSI score of 1 indicates optimal habitat (*i.e.* a high probability of GCNs being present in a water body). An HSI score of 0 indicates unsuitable habitat for GCNs. There are five HSI water body

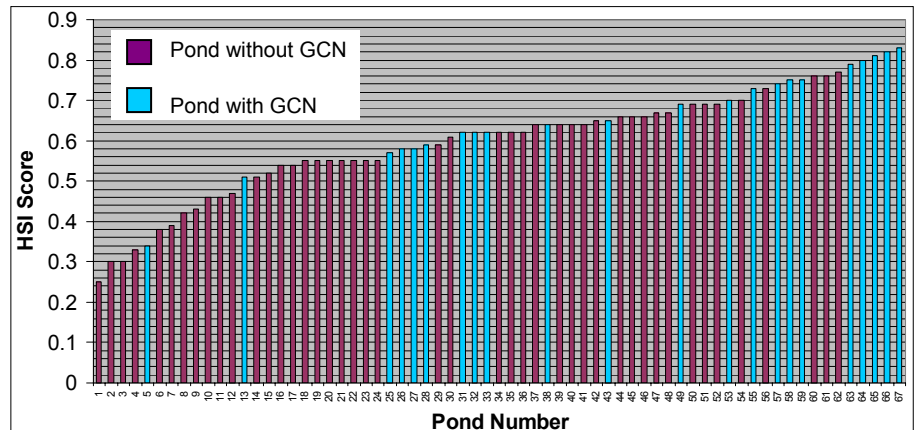


Figure 1. Comparison of HSI scores for ponds with and without great crested newts

suitability categories: excellent (scores greater than 0.8), good (scores between 0.7 and 0.79), average (scores between 0.6 and 0.69), below average (scores between 0.5 and 0.59) and poor (scores below 0.5).

Natural England's guidance (Natural England 2010) notes that the use of HSI scores is not a substitute for newt surveys. However, this guidance suggests that if a water body has an HSI less than 0.5 (a poor potential to support GCNs) that with due care, and in limited circumstances, the HSI might be used in the absence of newt presence/absence surveys to help conclude that an offence is highly unlikely and that therefore work could proceed in that area without a GCN licence. However, in these circumstances Natural England urge that reasonable precautions be taken to avoid affecting GCNs during works (Natural England 2009). A reasonable precaution may include the use of a Precautionary Method of Working (PMW). A PMW is a document which sets out how works will be completed where the presence of GCNs is possible but considered to be highly unlikely. It is a method statement which details the precautionary approach to be taken throughout the works to ensure that, should a GCN be found, it will not be harmed. Methods of working can include an ecologist supervising vegetation

clearance and carrying out destructive hand searches. There are, however, risks to this approach; if GCNs are found subsequently, it may lead to delays to the works. It is therefore imperative that the basis on which any such judgements are made is robust.

Methodology

A total of 67 water bodies have been included in this study from around England. The water bodies, in the majority, were located in rural areas in the South East and the Midlands. These water bodies have all been subject to HSI assessment and GCN presence/absence surveys (which conformed to Natural England guidelines) by Atkins ecologists between March and June 2009.

Results

A total of 22 of the 67 water bodies were found to support GCNs.

The likelihood of water bodies supporting GCNs rises as the HSI score increases (Figure 1). This indicates that HSI is generally reliable for predicting the suitability of water bodies for GCNs.

Table 1 shows there is one water body in the 'poor' HSI category which supports GCNs (with an HSI score of 0.34). This pond has a small population of GCNs.

There is also a cluster of water bodies in the 'below average' and 'average' HSI categories that support GCNs. One of these water bodies (Pond 38 with an 'average' HSI of 0.64) has the largest GCN population of the 22 water bodies with newts present (with a maximum of 43 being counted on one night). This data suggests that the anecdotal evidence of GCNs occurring in lower quality habitats is correct. The average HSI score for water bodies supporting GCNs is 0.67 and the average HSI score for water bodies that have been found not to support GCNs is 0.57.

Table 1. Percentage of water bodies with GCN population for each HSI category in Atkins 2009 dataset

HSI Category	No. of Water Bodies with GCNs	No. of Water Bodies Without GCNs	% of Water Bodies Supporting GCNs
Poor	1	11	8%
Below average	5	12	29%
Average	6	17	26%
Good	6	5	55%
Excellent	4	4	100%

Figure 2 compares the proportion of water bodies in each HSI category that support GCNs in the current Atkins dataset (based on 22 out of 67 water bodies) and the expected proportions from the Oldham *et al.* (2000) study (NARRS). This figure shows that the higher the HSI category, the more likely it is to support GCNs (e.g. with 100% of water bodies in the 'excellent' category

in the Atkins study supporting this species) and conversely, the lower the HSI category for a water body the less likely it is to support GCNs (e.g. with only 8% of water bodies in the 'poor' category supporting this species).

Figure 2 shows that the survey results used in this study do not correlate precisely to those of the Oldham *et al.* study. This is particularly the case in the 'poor' and 'below average' categories where the results show a greater percentage of water bodies supporting GCN populations than the Oldham *et al.* study. The lack of a clear relationship in the 'below average' to 'good' categories could indicate either that the HSI does not take these lower quality habitats into account as much as it should or that recording the characteristics of water bodies in the mid-range of quality is more problematic. The assessment of certain pond characteristics using HSI relies on subjective assessments rather than objective measurements (e.g. dessication rate and number of water fowl). As such the accuracy of recording these relatively complex and numerous characteristics, particularly for water bodies in the mid-range of quality, may contribute to the HSI for these ponds being under-estimated.

Figure 2 also shows that the percentage of water bodies in the 'average' and 'good' HSI categories are less than the guidance suggests. However, the 'excellent' category is very similar (with all four water bodies in the Atkins sample supporting GCNs). In any case, water bodies with these HSI scores in these categories are likely to be subject to presence/absence surveys and as such present less of a risk to any proposed works.

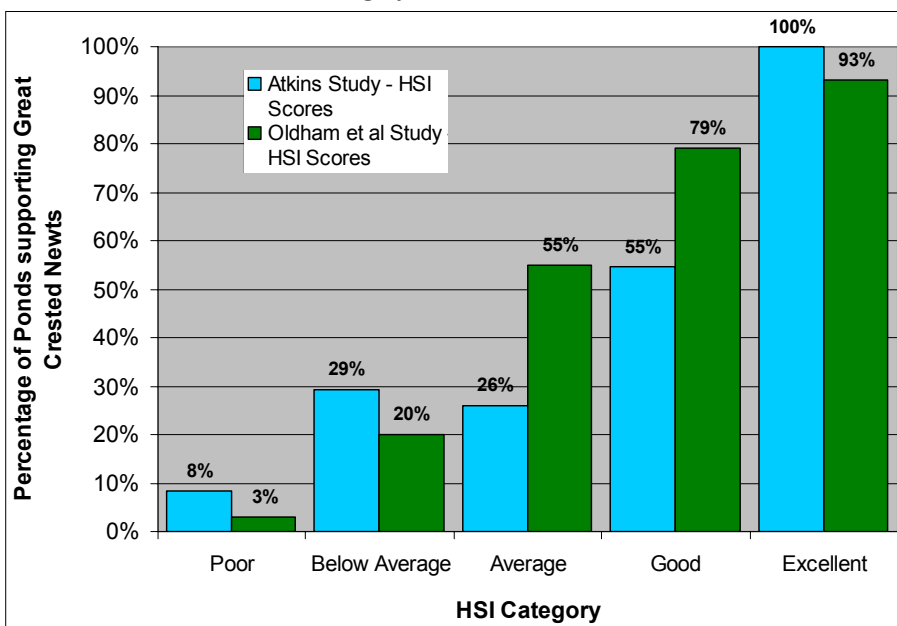


Figure 2. Comparison of Proportion of Ponds Supporting Great Crested Newts from Atkins Data and Existing Guidance

In general, the Atkins data suggests that it is unlikely that GCNs will be found in water bodies that have an HSI score of less than 0.5. It also suggests that GCNs are highly likely to be present in water bodies with scores above 0.8. However, for scores between these two values (i.e. in the 'below average' to 'good' categories) there is no clear relationship between HSI scores and the presence of GCNs, confirming the anecdotal evidence of the presence of GCNs in water bodies of apparently low quality. In the sample used for this assessment, GCNs were recorded in 26% to 55% of water bodies in these HSI categories.

Practical Applications

This study has found that HSI scores are relatively reliable in assessing the suitability of good quality water bodies to support GCNs. However, this study has also noted that there are exceptions to the reliability of the score, and that some water bodies do not appear to fit into the predicted pattern.

For ecologists this is particularly important when considering water bodies with 'poor' or 'below average' HSI scores. Ecologists frequently have to make decisions about whether to undertake presence/absence surveys or whether the works could be completed under a PMW. The HSI score plays a large part in this decision making process. If a water body has a 'poor' HSI score it is possible that ecologists will use this as justification that a PMW is a suitable approach (in accordance with Natural England 2010). If this approach is taken without consideration of other factors in relation to the proposed works (e.g. size and scale of the proposed works and the potential of the terrestrial habitats to be affected to support GCNs) this could result in significant programme delays and the associated additional unforeseen costs for the client if GCNs are subsequently found (e.g. carrying out presence/absence surveys and applying for a development licence from Natural England).

A water body with a 'poor' HSI score does not necessarily mean that GCNs will not be present. The results of this study suggest that the likelihood of finding GCNs in water bodies with low suitability, i.e. a 'poor' HSI score, may be greater than the guidance sets out (8% in this study as opposed to 3% in the Oldham *et al.* (2000) study), although it is acknowledged that this is based on one water body with GCNs, out of 12 in the 'poor' category in the Atkins study. This is something that ecologists should be aware of as even water bodies with very low scores have been found to support GCNs (see Photograph 1). If



Photograph 1. Water body with a 'poor' HSI score which supports GCNs

the potential impacts on the pond and associated terrestrial vegetation are high, it would present less of a risk to undertake surveys instead of relying on a PMW.

Ecologists need to consider carefully how to apply HSI scores, particularly relating to water bodies with a 'poor' or 'below average' score. For this study the average HSI score for water bodies supporting GCNs is 0.67 (in the 'average' HSI category) and the average HSI score for water bodies that have been found not to support GCNs is 0.57 (in the 'below average' HSI category). There is not a large difference between these scores and ecologists should use the HSI system with care, also taking into account the location, scale and type of the proposed works to be carried out in the vicinity of the water body. The use of the Natural England Rapid Risk Assessment (Natural England 2010) is a useful tool in this decision making process.

One way to minimise risks when determining whether presence/absence surveys are required or if a PMW is an appropriate approach is to relate each of the potential impacts of the proposed works to each of the offences relating to the protection of GCNs listed in Regulation 41 of the Conservation of Habitats and Species Regulations 2010. This will ensure that the effects of the proposed works have been fully assessed and that PMWs are written in

such a way that the wording is strong enough and clear enough to ensure that all aspects of the proposed works and potential impacts on GCNs have been considered. Generally speaking this is the approach taken by Atkins when producing PMWs.

We are continuing to analyse HSI scores and the results of GCN presence/absence surveys (particularly for water bodies with lower HSI scores). The relationship of water bodies with low HSI scores (that are found to support GCNs) with water bodies up to 500 m away is also being investigated. This is to assess whether GCNs are only present in ponds with a low HSI when there are ponds with a high HSI score in the vicinity (suggesting that they help to support meta-populations of this species rather than support a population in their own right).

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Getting Mitigation Right for Hen Harriers

Hen Harrier *Circus cyaneus* Mitigation at Knockacummer Wind Farm Development – A Case Study

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Knockacummer Wind Farm, a 29 turbine wind farm, is located near Rockchapel, County Cork in the Republic of Ireland. It is located within an EU designated Special Protection Area (SPA) for the hen harrier *Circus cyaneus*. Planning permission for this development was granted in December 2005 subject to compliance with 21 planning conditions, a number of which relate specifically to the hen harrier, an Annex I species under the EU Birds Directive. This case study outlines both the management plan designed for the site to protect the hen harrier and also monitoring progress during 2008 and 2009.

Introduction

Most of the Knockacummer Wind Farm site is located within the Stack's to Mullaghareirk, West Limerick Hills and Mount Eagle SPA (Site Code 004161), designated under the EU Birds Directive in response to the presence of internationally significant populations of hen harrier. Additional qualifying interests include both red grouse *Lagopus lagopus* and short eared owl *Asio flammeus*. Knockacummer is located on the southern foothills of the Mullaghareirk Mountains, which is an area of national importance for the hen harrier, holding approximately 28% of Ireland's present population. These mountains combined with the Stack's, Glanarudderies, Knockanefune and the area north of Abbeyfeale in County Limerick were found to have an estimated 40-45 pairs of hen harrier during the national hen harrier survey in 2005 (Barton *et al.* 2006).

The primary concerns of the Planning Authority and the National Parks and Wildlife Service (NPWS) with respect to the development of a wind farm at Knockacummer were in ensuring that the



Adult female hen harrier
Photo: Bird Survey Ireland

project could proceed without adverse impact on the hen harrier. As a result of a consultation process between the Developer (SWS Energy, which is now a wholly owned subsidiary of Bord Gáis Energy) and NPWS during the Environmental Impact Assessment (EIA) and Planning Application stage, a number of measures were put forward relating to mitigation actions, management and retention of clear fell areas (in agreement with Coillte, the Forestry Service), the development of a research study and also the implementation of agreements with local landowners to manage lands as foraging habitat over the lifetime of the project.

A 25-year Landscape Model was prepared by SWS Energy outlining the current land use in terms of forestry and wind farms within the 5 km hinterland and projecting future trends in forestry based on information from CORINE habitat mapping, Forestry Inventory/ Planning System (FIPS) databases, Coillte Forestry Data, aerial photography and ground truthing. A detailed Ornithological Monitoring Programme was drawn up by INIS Environmental Consultants Ltd through close consultation with NPWS. This Programme began two years prior to construction (construction started 2010) and will continue throughout the lifetime of the wind farm.

Historical Surveying at the Site

The NPWS, the Irish Raptor Study Group and BirdWatch Ireland conducted hen harrier monitoring surveys within the foraging range of the Knockacummer site in 1998-2000, and in 2002. Surveys were carried out by SWS Energy on-site and in the 5 km hinterland in 2003 and 2004 as part of the EIA.

Since planning consent was received in 2005, independent consultants have carried out additional pre-construction monitoring resulting in the collation of almost seven years of baseline data. Surveying of the site by Biosphere Environmental Services (BES) took place in 2006; from 2008-2010 hen harrier monitoring of Knockacummer has been carried out by INIS Environmental Consultants Ltd in a manner that has mirrored the BES format to allow for year on year comparisons.

The main objective of this monitoring programme is the investigation of hen harriers onsite and their use of/interaction with the wind farm site. This before, during and post construction monitoring (over the wind farm lifetime) will provide valuable data on hen harrier usage of the site over time. However, additional components including monitoring of habitat mitigation plots, phased fallow plots and borrow pit areas also form part of the overall ornithological programme.

The components of the monitoring programme are as follows:

1. Standard format hen harrier survey.
2. Borrow pit area hen harrier usage analysis.
3. Phased fallow plot experimental trial plot monitoring.
4. Habitat mitigation plot monitoring.
5. Prey item survey.

The aims of this survey work are to:

1. investigate how hen harriers utilise the subject site;
2. examine hen harrier prey availability within post clear fell lands under different management regimes;
3. monitor any changes in behaviour before, during and after construction of the wind farm;
4. manage mitigation against disturbance and habitat loss; and
5. develop recommendations/improvements for such projects in the future.

This case study will serve as a diary, documenting each step of the wind farm process at Knockacummer and its impacts on hen harriers, from pre-planning surveying through to the construction and operational phases.

Components of the Monitoring Programme – Methods Employed

Standard Format Hen harrier Survey

A standard hen harrier survey using NPWS methodologies was carried out between April and July 2006 by ecologists from BES, and between March and August 2008-2009 by INIS Environmental Consultants Ltd (an additional 2010 survey is ongoing). All surveys were carried out according to NPWS recommended

standard methodologies and the *Survey Methods for Use in Assessing the Impacts of Onshore Wind farms on Bird Communities* (Scottish Natural Heritage 2005).

In line with both NPWS and Scottish Natural Heritage methodologies, a minimum of 36 hours of watches was conducted at each vantage point from March to August each year. In March 2010, an additional pre-construction survey was conducted to ensure adequate monitoring of hen harrier activity in the area prior to construction commencing. A total of seven vantage points are used to survey the entire site.

Surveying of a 5 km hinterland was undertaken in 2008 and 2009 and focussed on areas of known activity from past years in addition to cold searching. This was coupled with any information on nests from other surveyors and NPWS personnel.

Borrow Pit Area Usage Analysis

Planning applications for the construction of up to nine borrow pits for use during the construction of the wind farm were submitted as part of the planning submission. Borrow pits by their nature are open pits that are devoid of any habitat while being used. The vast majority of these borrow pits on site are located within mature forest. They can be extensive and obtrusive and as such it is important to assess the implications of excavating them in any particular area.

Hen harrier survey work undertaken by INIS Environmental Consultants Ltd

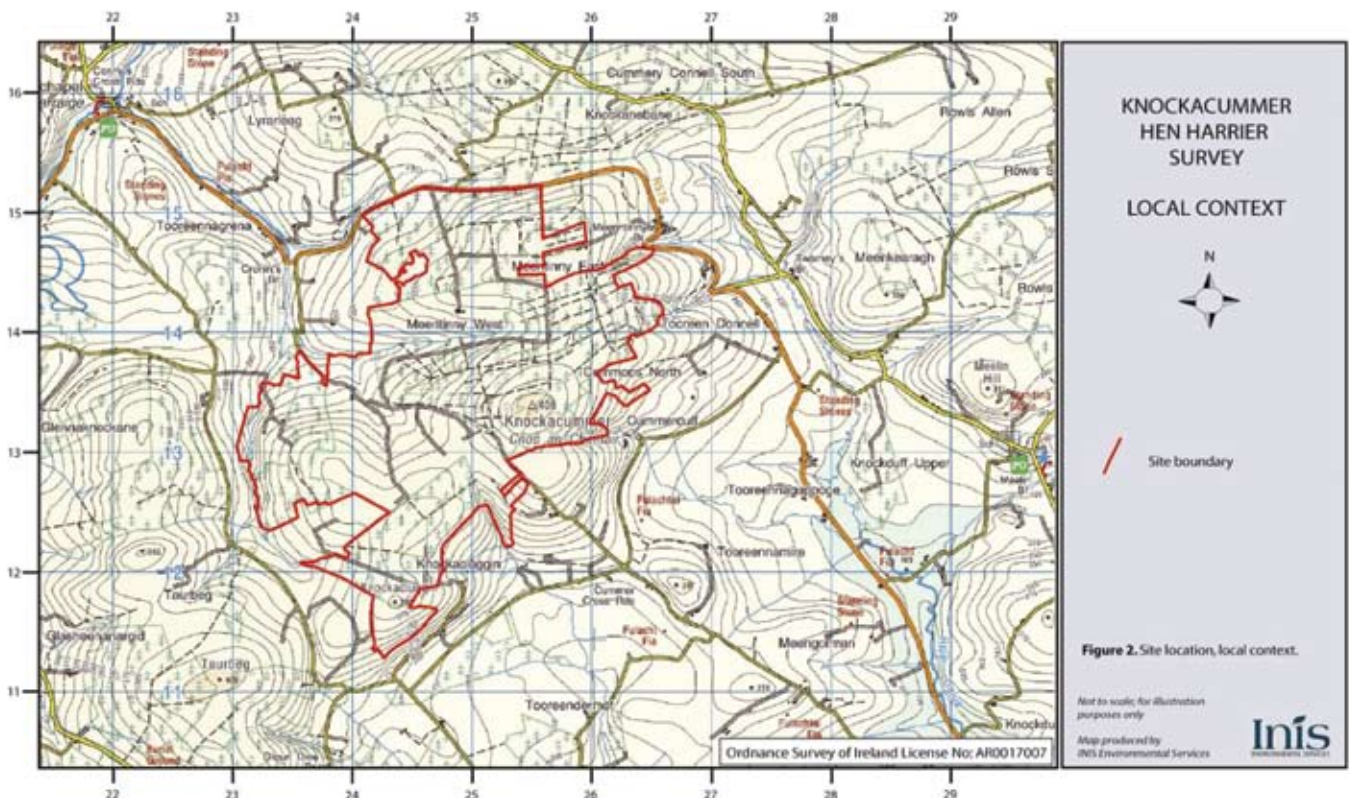
involved monitoring of these borrow pit areas for hen harrier usage and ensuring that recommendations for borrow pit restoration follow the requirements of NPWS to maximize their future potential as foraging areas for harriers.

Phased Fallow Experimental Trial Plots (PFETP)

During the project planning stage, land outside of the wind farm was set aside by the developer in consultation with the land owner and Coillte. Areas were clear felled and have been left fallow for up to three years rather than just one to two years (as is the usual practice). These experimental trial plots of land in the northern section of the Knockacummer site are being left fallow before replanting with forestry (initiated in 2005) to see if the biodiversity will increase and, if so, what management practices will encourage this. Of particular focus are trials developed for management practices to improve biodiversity for hen harrier prey species (bank vole *Clethrionomys glareolus* and small bird prey such as meadow pipit *Anthus pratensis*).

The purpose of the continued monitoring is to establish viability of these plots in providing foraging habitat for hen harrier. In turn it is planned to utilise information gleaned from this part of the assessment to increase the foraging potential, through habitat management, of lands between clear fell and replant, forestry edges, etc.

The following narrative gives a short explanation of the plots and the different management regimes in each:



Knockacummer site location – local context

Uncultivated: This plot is made up of lands where there has been clear felling and all the brash has been left in situ. It is 7.8 ha in area and is uniform throughout.

Control: Made up of replanted forestry this is the largest of the plots at 14.5 ha. Growth of trees is slow and non-uniform.

Cultivated: These plots are windrowed, mounded and drained and total 3.74 ha in area.

Fallowed: These lands have been left fallow for a considerable time. They exhibit lush growth of willow *Salix* spp., with some gorse *Ulex* spp., *Rubus* spp., willowherb *Epilobium* spp. and myriad grass species.

Every month during surveying from Vantage Point 4 the fallow plots as described above were observed and any harrier movement through this area was recorded.

Mitigation Habitat Monitoring

Privately owned areas of mitigation habitats have been selected and the location and management regimes agreed with NPWS. These lands are maintained as rough grassland with rush *Juncus* spp. which is a high value habitat for hen harrier foraging. These plots, and the monitoring of the plots, have been incorporated into the hen harrier monitoring survey to establish the extent of the birds' usage of mitigation habitats and also to drive management to maximise the value of these areas. These mitigation habitats have been reviewed by INIS ecologists and were designated viable foraging habitat for hen harriers due to the nature of vegetative growth and contiguous nature of the sites with areas of high hen harrier activity.



Mitigation habitat at Knockacummer

Photo: Bird Survey Ireland

Prey Item Survey

This part of the monitoring programme consists of a Countryside Bird Survey (CBS) and a bank vole live trapping survey undertaken by ecologists in University College Cork.

The CBS is carried out within the PFETP to assess the diversity and densities of bird species within the various forestry compartments of the PFETP. This in turn provides data on the productivity of each forestry/plot type as foraging habitat for hen harriers. Minor adjustments were made to the survey guidelines to take into account site-specific restrictions such as similarity of subunits and their small size. Transects and methodology used have been replicated as closely as possible each year to allow for accurate year on year comparison.

Bank vole surveys were carried out by University College Cork to assess distribution and densities of these mammals as they may form a considerable part of the hen harriers' diet. The bank vole surveys were also carried out within the PFETP.

Findings to Date

A total of 288 hours of timed watch was conducted from March to August 2008 and 306 hours over the same period in 2009. Overall usage of the site for both years was low when compared to previous years. In 2008, a pair were resident but failed to breed successfully and this was the main reason for an almost 50% reduction in sightings in 2008 compared to 2006.

No occupied territory was recorded onsite in 2009 although a breeding attempt

(which subsequently failed) took place to the southwest just outside the site boundary.

The addition of a seventh vantage point in the southwest of the site in 2009 resulted in increased sightings, in particular in June, including a sighting of a wing-tagged female. While most of this activity was off site, it does reflect the attractiveness of the habitat present for hen harriers. We believe this increase in sightings in June may be attributable to the dispersal of failed breeding birds from other territories within the range.

When it became obvious that no nesting attempt was going to occur at the western edge of the site in 2009, an extensive search of the remainder of the site was undertaken to investigate if the pair had moved. A certain amount of flexibility in surveying is often necessary and the ability to note and respond early to indications of changes in hen harrier movements can prove invaluable.

A short eared owl (another qualifying interest of the SPA) was also noted on site in April 2009. Whilst probably a passage bird this sighting does indicate the potential the site may have for breeding short eared owls in the future.

Overall numbers of pairs in the Mullaghareirks in 2008 were the same as the previous year with no marked decline or increase. From year to year one may notice a new pair here and there but low recruitment is a diagnostic feature of the hen harrier lifecycle, especially in years of inclement weather conditions during the breeding season.

Results of the hinterland survey in 2009 reflect low densities and success rates during this period. Only four territories were occupied within the 5 km hinterland, none of which were successful in 2009. This illustrated a decrease in reproductive success on previous years, possibly due to factors such as poor weather during critical periods in the breeding cycle.

Hen harrier breeding occupancy survey results are summarised in Table 1.

The borrow pit analysis showed that hen harriers do, to a small extent, move proximal to the proposed borrow pit areas but are not dependant on them as foraging or breeding areas. When these areas are rehabilitated it will be important to incorporate the results from the experimental trial plots and rehabilitate to a habitat that is the most productive in terms of prey items for hen harriers.

The results of both the borrow pit monitoring and PFETP in 2009 were similar to that in 2008 with usage very low. The fallow plots, we feel, may be too small in area to effectively be used as a quantitative instrument measuring habitat

Table 1. Hen harrier Breeding Occupancy Survey Results. Dashes (-) indicate unknowns.

Location	Survey	No. of Pairs	
		Confirmed	Probable
Onsite	NPWS 1998/2000/2002	1	-
Within 5 km Hinterland		4	1
Onsite	EIS Hen Harrier Survey 2003	1	1
Within 5 km Hinterland		3	1
Onsite	EIS Hen Harrier Survey 2004	0	0
Within 5 km Hinterland		-	-
Onsite	Pre-Construction Survey 2006	1	-
Within 5 km Hinterland		-	4 - 5
Onsite	Pre-Construction Survey 2008	1	0
Within 5 km Hinterland		3	1
Onsite	Pre-Construction Survey 2009	0	0
Within 5 km Hinterland		3	4

preference for harriers, nevertheless the study results showing the varying increases in biodiversity in the different trials is useful in itself. Hen harriers range over large areas of ground when foraging and small pockets such as this will not be used/attract harriers to any greater degree with the exception perhaps when an irruption of small mammals occurs (this has been noticed on occasion when monitoring hen harriers in Northern Ireland).

The mitigation habitats (rough grassland areas) managed for hen harriers were used quite a lot in both 2008 and 2009. Birds were seen to use these areas to forage and move through the site. Setting aside areas such as these is an important component of this development and should be a top priority component of all wind farm developments alongside habitat enhancement of areas damaged during the construction process such as borrow pits, etc. This is especially pertinent when one takes into account the density of hen harriers versus unplanted foraging area in this SPA compared to other SPAs (Barton *et al.* 2006).

The results of the small mammal survey carried out in 2008 show that bank voles and field mice are present on all four treatment plots. The population of bank voles has increased on the study site since 2006 and it is clear that they have become established in the cultivated plots. They are also breeding throughout the site as lactating females were noted in all four plots. The abundance of bank voles on the cultivated plots is now at a similar level to that in the long-term fallow plot. The abundance of bank voles remains small in the uncultivated plot (where brash was not windrowed). Field mouse numbers were highest in this plot however.

Bank voles can quickly colonise a newly planted site and increase in numbers as the ground vegetation increases. The

importance of structural complexity to bank voles is seen by the absence of significant numbers from the uncultivated plot where ground vegetation remains largely absent. The small size of the plots and their close proximity to one another make it difficult to surmise how quickly colonisation into larger areas might take place.

The CBS survey illustrated that the same suite of species were present at Knockacummer in 2009 as in 2008 (24 versus 18 species, respectively). Densities have not changed and biomass is similar in both years. As expected, the density of small birds is highest in fallowed areas as the habitat is more productive and has a higher level of cover. Vegetation is increasing on the control and cultivated unplanted areas and it would be expected that these areas would experience an increase in numbers and diversity in the future. Diversity of species is low on a whole within the three plots and this may be attributed to a poor supporting environment.

In conclusion, the 2008 and 2009 surveys gave us good information on recent usage of the site at Knockacummer. We now know that hen harriers onsite have a bad record for successful fledging of young, and that no nesting attempt took place on site in 2009. The southwest of the site does seem to have seen an increase in foraging activity in 2009 and this may reflect changes in the foraging capacity of some of the habitats within the main portion of the site.

Meaningful mitigation has been put in place at Knockacummer and the developer has actively allowed us as surveyors to increase survey effort, where needed, in order to suit onsite real-time issues and accumulate information that will give us a better insight into what is important to hen harriers onsite and how these interests can be protected in a proactive manner.

Continued surveying, particularly during construction and operation of the wind farm, will provide important information for hen harrier protection across wind farm sites, but particularly those within or close to SPAs.

The findings from the Knockacummer Wind Farm Hen Harrier Monitoring Programme will be important for future developments of this kind, both in Ireland and the UK.

Meaningful Mitigation – What Have We Learnt From Knockacummer?

1. Fallow plots when designed should be linear in design and contiguous with areas of hen harrier activity.
2. Mitigation habitats should always be contiguous in nature with areas of high hen harrier activity – mitigation habitats are one of the most important measures that can be put in place for hen harriers.
3. The ability to increase survey effort, in real time, in response to onsite issues is extremely important to compile meaningful and concise data.
4. Mitigation may not benefit just resident harriers but also dispersing breeding birds from other territories and additional qualifying interests such as short eared owl.

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Biodiversity Offsets:

Possible Methods for Measuring Biodiversity Losses and Gains for Use in the UK

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Introduction

There is increasing interest in biodiversity offsetting to achieve no net loss (or preferably a net gain) of biodiversity, when development might otherwise result in residual adverse effects despite appropriate avoidance and mitigation measures. There are now laws requiring biodiversity offsets in many countries, generally supported by 'no net loss' or biodiversity enhancement policies. Development of similar systems in the UK and the EU is being explored (Defra 2009, EU 2010¹), making it important to consider the risks and opportunities presented by biodiversity offsetting. There is a growing body of theoretical and practical experience to draw on: an extensive overview can be found on the Business and Biodiversity Offset Programme's website².

In determining what constitutes a reasonable and fair offset, we need to consider the extent to which losses (due to impacts) and gains (due to offsets or compensation) balance out to achieve 'no net loss' as a minimum. An essential ingredient of a robust biodiversity offset system is therefore a credible method for measuring biodiversity losses and gains. This is the main focus of this paper.

The challenge is to develop methods which will be straightforward to apply in practice without sacrificing the precision required to ensure that all important aspects of biodiversity are captured. In the absence of an agreed, universal measure of biodiversity and for entirely pragmatic reasons, most offset systems are habitat-based. Compared with species populations, habitats are relatively stable over time, can be adequately described with fewer types and are normally used as the primary focus of biodiversity conservation.

Recognising that some important ecological attributes will not be adequately reflected using habitat as a surrogate (population decline caused by traffic collisions, for example), we suggest a habitat-based approach to measuring impacts and determining offset requirements which might lend itself to the UK situation. This draws on a version first published in Defra (2009) and reflects methods being used in other countries and by some of the world's larger mining companies. It is based on hectares of habitat of particular type³ or intrinsic 'distinctiveness', adjusted to account for differences in condition (which in UK habitats is often closely linked to suitability of management). It is intended to complement the UK's existing policy and planning system and the requirements of the UK Biodiversity Action Plan (BAP) (2006) and should be seen as a starting point for purposes of discussion and debate rather than a recommended final solution. For purposes of illustration we present a hypothetical worked example, but rigorous testing would be required to ensure that the approach delivers acceptable outcomes 'on

the ground'. At the end of the paper we identify some potential pitfalls and issues that might need further consideration.

Some Key Principles and Assumptions

There are some circumstances in which use of offsets will never be appropriate: offsets should not be used for impacts on biodiversity which needs to be conserved *in situ* for it to survive, for example. In the UK, offsets might therefore be inappropriate for any BAP habitat with a 'no loss' target, or for any habitat which takes so long to establish and mature that it is effectively irreplaceable in any reasonable human timeframe, such as ancient woodland or raised bog.

Another key concept in biodiversity offsetting is 'additionality', or the requirement for offsets to deliver conservation outcomes which can be shown to be additional to those that would have occurred anyway, or which are the responsibility of statutory bodies to deliver. Additionality might be achieved by protecting lowland deciduous woodland that would otherwise have been rapidly destroyed, or by creating a diverse habitat on intensive arable cropland. On the other hand, there would be no additional value in buying woodland that was not under any immediate threat and then doing nothing with it. Even if the woodland improved in quality over time, for example through succession, this could not be claimed as an outcome or benefit of the offset *per se*.

Biodiversity offsets can not be used to solve every conservation challenge and should be used intelligently in conjunction with other conservation policies and tools. We have therefore assumed that any UK offset system would have to complement existing requirements for ecological compensation under the Habitats Directive and would only apply to losses of habitat occurring outside the Natura 2000 network.

Possible Approach/Framework

The approach requires levels of 'distinctiveness' and 'condition' to be assigned to areas of habitat which will be exposed to an impact and also to land which might be used for an offset.

It is possible to draw on established methods to assess habitat condition, such as those used on nationally designated sites (Natural England 2008), but there are no universally agreed methods for assessing levels of biological distinctiveness. A consultation exercise is currently underway through the auspices of the Natural Capital Initiative⁴ 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, but this is an area where further research is likely to be necessary.

A potential scoring system is set out in the offset matrix shown in Figure 1. We propose a four point scale for levels of 'distinctiveness' from 0 to 3 in which a score of 0 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 Directive⁵). For current purposes we have doubled the 'distinctiveness' score in the matrix to account for the fact that intrinsic biological distinctiveness is a more fundamental and less alterable property than current condition. Again, this requires testing to ensure that reasonable outcomes result in practice. Scores can be normalised on a scale of 0 to 1 as shown in square brackets. A score of 1 results in cases where habitat with high distinctiveness and optimum condition is affected.

Figure 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]

The area of habitat to be lost, multiplied by the score from the matrix 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. To quantify gains on potential offset land the final predicted outcome in terms of area x matrix score must be compared with the baseline or starting condition of the land to be used.

Generating Measurable Biodiversity Gains

In a system such as the one proposed here, the main ways to generate measurable biodiversity gains are by improving 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 2 grassland such as 'Other Neutral Grassland' to a Category 3 grassland such as 'Lowland Meadow BAP' habitat).

Gain on the distinctiveness scale involves a movement to the right in the matrix (e.g. a low level of distinctiveness to a high level), while gain on the condition scale involves an upwards movement (e.g. improvement in condition from poor to good). Use of the matrix to determine offset requirements means that every offset should contribute to requirements under the UK BAP to:

1. Achieve condition in existing (priority) BAP habitat.
2. Restore relict/degraded habitat to a BAP habitat type.
3. Expand area of BAP habitats through creation effort.

A Hypothetical Worked Example

Figure 2 shows 14 ha of land near Aberdeen which has been mapped using Integrated Habitat System (IHS) (NESBReC 2007) and is due to be lost as a result of a hypothetical development proposal. Hypothetical condition scores have been assigned to habitat parcels.

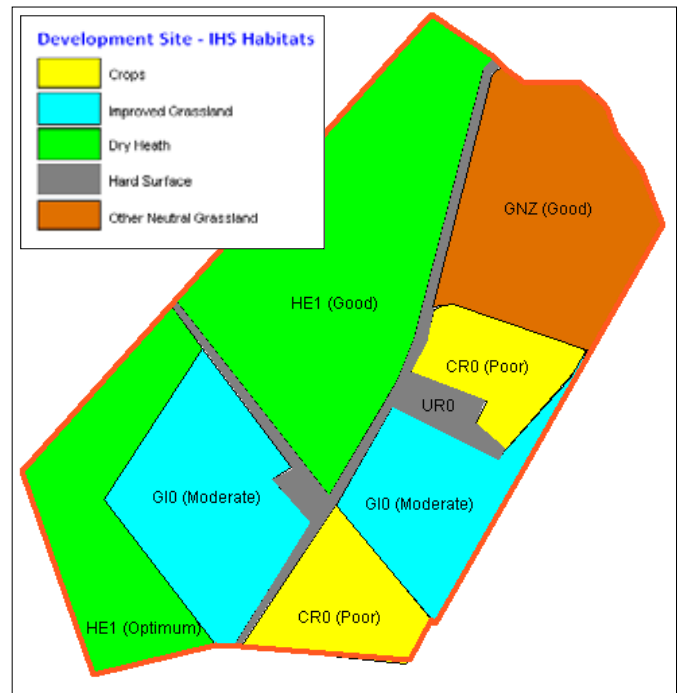


Figure 2. Habitat types and condition on land to be affected by the development

Figure 3 summarises the losses that will occur and the credits required.

Figure 3. Credits or habitat units to be lost

Habitat type	Area (ha)	Distinctiveness	Condition	Matrix Score	Offset credits or 'habitat units' required
Hard surface	0.8	Very Low	n/a	0	0
Crops	1.7	Low	Poor	0.08	0.14
Improved grassland	3.2	Low	Moderate	0.17	0.54
Neutral grassland (non BAP)	2.5	Medium	Good	0.50	1.25
Dry heath (BAP)	4.0	High	Good	0.75	3.00
Dry heath (BAP)	1.8	High	Optimum	1.00	1.80
Total area of impact and credits required	14.0				6.73

Figure 4 shows 32 hectares of land, also near Aberdeen. In our hypothetical example this area has been offered as a potential offset and we need to decide whether it is able to provide the required credits or habitat units.

Figure 5 summarises the habitats on the potential offset area and their baseline levels of distinctiveness and condition. The offset needs to deliver gains commensurate with the losses identified in Figure 3. There are various options for achieving this, the most obvious being through gains in condition.

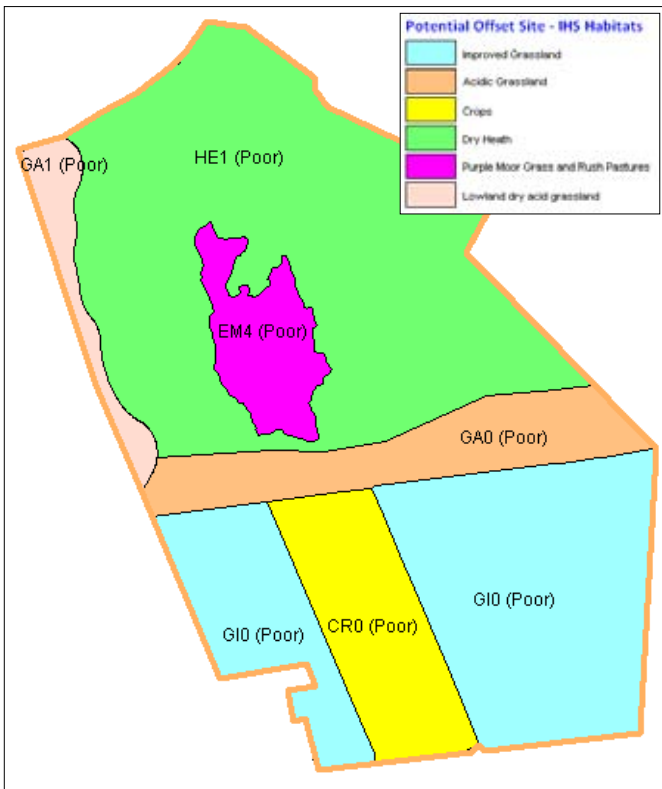


Figure 4. Habitat types and condition on potential offset site

Figure 5. Baseline assessment of potential offset

Habitat Type	Importance/ justification for level of distinctiveness	Distinctiveness	Condition	Matrix Score	Area (ha)	Baseline ('habitat units')
HE1 (Dry Heath)	BAP habitat	High	Poor	0.25	13.6	3.40
EM4 (Purple Moor Grass and Rush Pastures)	BAP habitat	High	Poor	0.25	1.7	0.43
GA1 (Lowland Acidic Grassland)	BAP habitat	High	Poor	0.25	1	0.25
GA0 (Acidic Grassland)	Non BAP habitat	Medium	Poor	0.17	3	0.51
CR0 (Crops)	Non BAP habitat	Low	Poor	0.08	3	0.24
G10 (Improved Grassland)	Non BAP habitat	Low	Poor	0.08	9.7	0.78

Impacts should be offset by actions on specific parts of the proposed offset area, with the final status of the offset land always equal or better on both distinctiveness and condition scales than the corresponding impacted land. This means that losses of BAP habitat extent or condition would have to be offset through gains in extent or condition of the same or a different BAP habitat. On the other hand, loss of extent or condition in a non-BAP habitat could be offset through gains in extent or condition in a BAP habitat.

Figure 6 summarises potential enhancements, based on the assumption that all land will be maintained at, restored to or created as BAP habitat (thus scoring 'high' on the distinctiveness scale); and that the offset must result in achievement of 'good' or 'optimum' condition when it is mature (suggested rules which are open to debate). There may be a time lag involved in achieving the required condition, hence the likely need to consider using multipliers in any eventual UK system (beyond the scope of this paper).

Figure 6. Options for delivering gains

Habitat Type	Action to deliver gain	Potential enhancement (change from poor to good condition in habitat units)	Potential enhancement (change from poor to optimum condition in habitat units)
HE1 (Dry Heath)	Achieve condition	6.80	10.20
EM4 (Purple Moor Grass and Rush Pastures)	Achieve condition	0.85	1.28
GA1 (Lowland Acidic Grassland)	Achieve condition	0.50	0.75
GA0 (Acidic Grassland)	Restore BAP habitat	1.74	2.49
CR0 (Crops)	Expansion (create BAP habitat)	2.01	2.76
G10 (Improved Grassland)	Expansion (create BAP habitat)	6.50	8.92

Offset options vary. Focusing on one habitat only, achieving 'good' or 'optimum' condition on the Dry Heath or creating BAP habitat in optimum condition on the Improved Grassland could deliver the required gain of at least 6.73 credits/habitat units (see Figure 3). Another option might be to achieve optimum condition on EM4, and GA1 and create BAP habitat in optimum condition on CR0 and G10, resulting in a composite offset delivering 7.28 habitat units.

Most biodiversity offset systems in use worldwide include rules relating to allowable exchanges between habitats when determining offset requirements. Most have a 'within-type' assumption for replacement of lost habitat, but allow offsets based on different types provided that these are of higher conservation priority ('like for like or better'). In our example, a similar rule might be to require the offset to deliver the same habitat as the impacted one, unless there is gain on the distinctiveness scale. This would require at least some habitat creation to take the form of 'Dry Heath' creation, to offset the loss of 5.8 ha. Creation of other BAP habitat (for example additional Purple Moor Grass and Rush Pasture) would only be possible once losses of Dry Heath had been offset.

Possible Unintended Consequences and Issues Requiring Further Consideration

This paper has focused on just one aspect of biodiversity offsets; there are many others which will require careful consideration and testing in practice before a robust system

can be assured. Some issues requiring further consideration are outlined here, as well as some possible unintended consequences of the proposed approach.

Based on a review of methods in use worldwide, we conclude that it would be possible to develop a workable method to assess losses and gains as part of an offset system which could deliver demonstrable gains in BAP habitat extent and condition. However, any UK system for biodiversity offsets would probably apply only in certain prescribed circumstances. It is likely that offsets would apply to losses of habitat occurring outside the Natura 2000 network and that impacts on certain habitats would be considered 'not offsettable' as discussed earlier in this paper. The method suggested here could apply to any impact (however small) on any habitat (whether considered important or not), with potential benefits in terms of tackling cumulative impacts (such as those highlighted in a recent article on development creep in *The Guardian*⁶) but its use for small scale impacts on habitats of low distinctiveness and condition would only be practicable if a straightforward system for requiring and identifying offsets could be established to ensure an acceptable bureaucratic load for numerous smaller transactions (a system of Developer Contributions or 'in-lieu' fees, for example).

It might be necessary to put safeguards in place to avoid an outcome in which impacts are always offset by condition enhancement on existing habitat, rather than by gains in distinctiveness (which are likely to be harder to achieve in practice). This could be avoided by a rule requiring offsets to include an equivalent area of habitat expansion and/or restoration to ensure that there is no loss of extent of BAP habitat, where impacts will result in deterioration on the biodiversity distinctiveness scale.

Another necessary safeguard might be a requirement for the final condition of any offset to be 'good' or 'optimum'. Clearly further work is required to identify suitable criteria for determining when such a condition has been achieved and to establish a reasonable timeframe for this. It may be necessary to establish indicators which can be used to determine whether implementation of appropriate management does indeed deliver demonstrable gains in condition and/or distinctiveness, for example. Whatever system is introduced, and whoever delivers the offsets ('habitat banks' or some other agency), it will be essential to have independent, trusted auditing or verification.

Recognising that habitat expansion, restoration and condition achievement carry varying levels of outcome uncertainty, it may be necessary to consider use of appropriate multipliers to ensure a robustly fair offset. Similarly there may be long delays in achievement of prescribed outcomes. In some cases it will not be appropriate to replace habitat lost now with the same habitat units in 20 years' time, particularly for amenity values or rare species where longer term population viability could be compromised by temporary loss of habitat. Multipliers could also play a part here, but this is a controversial area, beyond the scope of this paper.

The proposed metric (area x condition x distinctiveness) is a general metric that can be applied to all UK sites/habitats and is fungible. In effect it represents a kind of 'lowest common denominator'. Supplementary methods would be necessary to ensure that high-priority biodiversity features for which habitat is not a good surrogate are appropriately measured and offset. Risk of impacts on habitats with high distinctiveness or the presence of BAP species might be the trigger for further consideration of this kind.

If a biodiversity offset system allows impacts on one habitat type to be offset through actions to enhance another (as suggested here), it is important to check that the overall balance of habitats is maintained with impacts and offsets in place over time and that some habitats do not gain at the

expense of others (perhaps those which are more challenging to restore). This requires reasonably reliable 'live' monitoring of habitat distribution and condition as well as clear exchange rules such as the one suggested earlier. A reliable system of strategic spatial planning might also be important to ensure that offsets are delivered on suitable land or that opportunities to develop habitat networks are realised. This is an aspect which will require careful consideration given recent changes in regional planning.

Notes

¹ eftec, IEEP et al. (2010) *The use of market-based instruments for biodiversity protection – The case of habitat banking*. Technical Report to European Commission DG Environment. <http://ec.europa.eu/environment/enveco/index.htm>. Accessed 8 August 2010.

² <http://bbop.forest-trends.org>

³ Integrated Habitat System (IHS) is suggested 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).

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.

⁶ www.Guardian.co.uk/pbp

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BIODIVERSITY BEYOND 2010: Missed Targets, New Opportunities

IEEM Autumn Conference 2010

2 - 4 November 2010, Dublin

Heads of State and Government undertook in 2001 to halt the decline of biodiversity in the EU by 2010 and to restore habitats and natural systems. In 2002, they also joined some 130 world leaders in agreeing to significantly reduce the rate of biodiversity loss globally by 2010.

In the International Year of Biodiversity what 2010 targets have been met? What still needs to be done? What tools are available to improve biodiversity conservation in the future?

This conference aims to:

- investigate how biodiversity policies and legislation (including the Common Agricultural Policy, Fisheries Policy and the Marine and Coastal Access Bill) are affecting and driving biodiversity conservation;
- showcase biodiversity tools and methods available to ecologists; and
- review case studies of some of the more practical methods used in biodiversity projects.

The conference will consider future targets and approaches to biodiversity conservation.

Confirmed keynote speakers:

- Dr John Cross
Woodland Specialist at NPWS
- Mairead McGuinness MEP
Member of the European Parliament's
Committee on the Environment
- Dr Damon Stanwell-Smith
UNEP WCMC

Other confirmed speakers:

- Liam Lysaght
Director, National Biodiversity Data Centre
- Matthew Jebb
Director, Dublin Botanical Gardens
- Dr John Finn
Biodiversity and Agri-Ecology, TEAGASC
- Catherine Farrell MIEEM
Bord na Mona



Full details and booking at:
www.ieem.net/conferences.asp



Ecology Legal Update

The Court of Appeal on the 'Morge' Case: A Further Update

Penny Simpson

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In my last article I talked about the High Court decision in the case of *Vivienne Morge v Hampshire County Council* dated November 2009. The case involved a judicial review of a decision by Hampshire County Council to grant planning permission for a new bus route along a disused railway from Fareham to Gosport. Bats were present at the site. The case was appealed in the spring of 2010 and so I warned that it may be worthy of further comment depending on what the Court of Appeal said.

We now have the Court of Appeal judgment and it certainly does merit further comment. In summary, the Court of Appeal, like the High Court, has also ruled that Ms Morge's case should fail. However, the analysis they gave, particularly of the 'deliberate disturbance' offence from Art 12(1)(b) Habitats Directive (implemented by Reg 41 of the Conservation of Habitats and Species Regulations 2010) has gone considerably further than that of the High Court.

It will be welcomed by developers, particularly those (such as wind farm developers) for whom the 'deliberate disturbance offence' may be problematic. However, it is a controversial decision and throws up a number of difficulties. What is more, this may not be the end of the story - as I understand it Ms Morge is seeking leave to appeal to the Supreme Court and I would not be especially surprised if the matter were ultimately referred to the Court of Justice of the European Union.

This article makes further comment on the Court of Appeal's decision following the same headings I had adopted in my article on the High Court's decision.

a. Observations on the EPS offence of 'deliberate disturbance'

The Court of Appeal (CA) has said that the purpose of Art 12 of the Habitats Directive (which contains all the prohibitions for protected species) is to protect the distribution and abundance of the species in the long-term; and that the focus is the conservation of the species as a whole and not necessarily the protection of an individual member of the species. Therefore the loss of an individual bat or perhaps even two or three bats may not constitute a danger to the preservation of the bat species on a long-term basis as a viable component of their natural habitat.

In relation to the Art 12(1)(b) 'deliberate disturbance' prohibition specifically, the CA has pointed out that there is no mention of the word 'significant' in the offence. Therefore in their view there must be a 'real' or 'discernable' disturbance but it need not be 'significant'. There must however be a detrimental impact so as to affect the conservation status of the species at population level and biogeographic level, *i.e.* there must be long-term effects on the distribution and abundance of the population of the bats.

Applying this to the facts:

Foraging impacts: the CA accepted that vegetation clearance would mean loss of foraging habitat and that this would amount to up to nine years of moderate adverse impact on the foraging bats as bats would have to travel further and expend more energy during foraging. Nevertheless, the CA said that this was not within the deliberate disturbance offence. The CA said that the offence is not intended to be used as a way of protecting habitat, unless a disturbance to the species results. The CA said that a bald statement that the bats have to travel further

and expend more energy in foraging did not justify a conclusion that the conservation of the species is imperilled or at risk. There was no evidence that the bats would lose so much energy (as they might when disturbed during hibernation) that the habitat will not still provide enough sustenance for their survival, or their survival would be in jeopardy.

Collision impacts: the CA accepted that clearing vegetation from bat commuting routes would lead to an increased risk of collision by bats into vehicles. However the CA said that this was also not deliberate disturbance as there was no evidence that the risk was so great that the mortality rate would have any adverse impact on the population of these bats in the long-term. Occasional deaths of bats will be a trivial disturbance with no ecological importance. This would also not be regarded as 'deliberate killing'.

Comment

The CA's analysis will be helpful for developers, for example in relation to windfarms. However, is the CA correct?

The CA's views on Art 12 and Art 12(1)(d) here are controversial. The wording of Art 12(1)(b) is 'deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration'. This is certainly different to the clear wording of Art 12(1)(a) which refers to 'deliberate capture and killing of specimens of these species'. But is it right to conclude that the conservation of the species need not require conservation of individuals? One could argue that in order to conserve the species you have to first conserve individuals. Also the other prohibitions of Art 12(1) focus on individuals/all breeding sites and resting places, so is it right to assume that the wording of Art 12(1)(b) is intended to adopt a different approach? The EU guidance that the CA refers to does say that disturbance must be considered as against the effect of the species at population level and biogeographic

level in a Member State. But it does not go as far as the CA to conclude that certain numbers of individuals could be lost. Finally it is true that the Habitats Directive's definition of favourable conservation status talks about the long-term distribution and abundance of populations, but surely this is not to the exclusion of the short-term?

The CA's analysis of the facts also seems to suggest their need for *proof* of adverse impacts, which is inconsistent with the precautionary approach that the European Court of Justice tends to adopt. Also the level of impact the CA seems to regard as necessary does not sit easily with their interpretation of the law (above) that the disturbance need be 'real' or 'discernable' but not 'significant'. Their rigid adherence to the need for *long-term* impacts can also be said to be inconsistent with the Habitats Directive.

Finally, if the CA is correct in its interpretation of this offence, this means that (as the CA itself said) 'it follows that in most if not all cases an act which constitutes disturbance will not be capable of being licensed'. The CA concluded this because the licensing test which must be satisfied ('maintenance of favourable conservation status') can never be met for the disturbance offence if that offence is interpreted (as the CA has) as specifically requiring the conservation status of the species to be prejudiced. This is a real difficulty because the Habitats Directive specifically envisages licences being potentially available for all offences. The CA saw this difficulty but dismissed it. I doubt it can be dismissed so easily.

b. Observations on the EPS offence of 'damage or destruction of a breeding site or resting place'

As I expected, the CA has overruled the High Court's decision here. The CA has said that (contrary to the decision of the High Court in *Morge* (which was very surprising) both direct and indirect effects on a breeding site or resting place are relevant to this offence. The CA has said that the High Court judge erred when he had dismissed the relevance of indirect effects to this offence. The CA judgment means that if, for example,

a resting place was subjected to bright lights or loud noise such that it was no longer suitable for use by the species (*i.e.* indirect effects) then this would be within the offence.

The CA has stated that mere *potential* roosts (e.g. trees that may contain potential bat roosts) are not covered by the offence. It was relevant here that surveys had been carried out and had found no bats although the trees were still potentially suitable roosts.

The CA has also said that risk of collision of bats with buses as the bats swoop low over a road on their way to a foraging place cannot be regarded as indirect damage/destruction of roosts under this offence. The risk of collision has no impact on the physical degradation affecting the breeding site itself. The CA said that 'otherwise any action interfering with a bat commuting route would lead to the perpetrator being prosecuted under the breeding site/resting place offence which would be absurd'. My comment would be that activities closer to a breeding site or resting place which may block or restrict access to those sites by the animals using them may still very well fall within this offence.

c. Comments on the Woolley case

The CA has added clarification to the judgment in the *Woolley* case (also discussed in my last article).

The High Court in the *Woolley* case gave the following advice to Local Planning Authorities:

'But it means that if it is clear or perhaps very likely that the requirements of the Directive cannot be met because there is a satisfactory alternative or because there are no conceivable 'other imperative reasons of overriding public interest' then the authority should act upon that, and refuse permission. On the other hand if it seems that the requirements are likely to be met, then the authority will have discharged its duty to have regard to the requirements and there would be no impediment to planning permission on that ground. **If it is unclear to the authority whether the requirements will be met it will just have to take a view whether in all circumstances it should affect the grant or not.**'

The CA has made the points perhaps even more clearly and has altered the part of the guidance in bold above.

'If in this case the Committee is satisfied that the development will not offend Article 12(1)(b) or (d) it may grant permission. If satisfied that it will breach any part of Article 12(1) it must then consider whether the appropriate authority, here Natural England, will permit a derogation and grant a licence under Regulation 44. Natural England can only grant that licence if it concludes that (i) despite the breach of Regulation 39 (and therefore of Article 12) there is no satisfactory alternative; (ii) the development will not be detrimental to the maintenance of the population of bats at favourable conservation status and (iii) the development should be permitted for imperative reasons of overriding public importance. If the Planning Committee conclude that Natural England will not grant a licence it must refuse planning permission. If on the other hand it is likely that it will grant the licence then the Planning Committee may grant conditional planning permission. **If it is uncertain whether or not a licence will be granted, then it must refuse planning permission.**'

d. Further points

The CA commented that the (old) Reg 39 offence (in the Conservation (Natural Habitats, &c.) Regulations 1994 may not follow adequately the Habitats Directive because, even despite the changes made to this offence in 2009, the retention of 'significant' in 'affecting significantly the local distribution or abundance of the species to which they belong' may not be lawful.

I would agree with this. However, perhaps more importantly, if the CA's interpretation of the disturbance offence is correct then the deliberate disturbance offence as currently drafted in (new) Reg 41 is not accurate, as it focuses on 'deliberate disturbance of wild animals' rather than the species.

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IEEM Membership Survey 2010

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In early 2010, we conducted two simultaneous surveys of the IEEM membership, one for Student members and one for all other membership grades (i.e. Fellows, Full, Associate, Graduate, Affiliate, Retired and Abeyance). For the Student survey we received 102 responses, and 1,099 for the main survey.

The outcomes of the surveys will be used to guide the Institute over the coming years and will be incorporated into the development of the new Strategic Plan for 2011-2015.

Along with this report, further quantitative details from the surveys are available to download from the members' section of the IEEM website (www.ieem.net/members.asp) and a poster presentation will be on display at the Autumn Conference in Dublin in November 2010.

Thank you to all those members who responded to the survey. The £50 NHBS vouchers were awarded, randomly, to Jonathan Jones for the student survey and Jonathan Hart-Woods CEnv MIEEM for the main survey.

About the Respondents

Over two thirds of respondents to the main survey were Full members and there was a split of almost 1:1 male to female, with slightly more females in the student survey. This is an improvement on the 1992 and 2007 surveys, where the split was around 2:1 and 1.25:1 respectively.

Nearly all respondents to both surveys were ethnically white and not disabled. For the main survey the majority of respondents were between 30 and 50 years of age and between 22 and 25 for the student survey, however, interestingly there was a second peak in the student survey at 30-39 years old.

About the Respondents' Education and Careers

Nearly 60% of respondents to the student survey were either in their third year of an undergraduate course or in the first year of a postgraduate course, and a further 20% were PhD students. Nearly 80% were in full-time education. The courses studied were overwhelmingly biased towards terrestrial ecology and environmental management issues, with very small proportions for freshwater, marine and coastal.

Most student courses were weighted more towards ecology than environmental management and did not provide any vocational training. Most student respondents are involved in some way with a conservation body outside of their studies. Most student respondents will be looking for a career in ecology or environmental management, however only around 60% think that they will be successful. The most popular sector that respondents would like to go into was consultancy (as an employee), followed by research/teaching and working for an NGO; the least popular were the media, self-employed consultancy and industry. Over half thought that their starting salary would be between £17,000 and £25,000, however over three quarters would consider voluntary or low paid employment to start with. Over 90% of student respondents do not intend to take a gap year. Most respondents perceive the ecological and environmental management professional as good whilst they feel other professions see it as average. Most students found out about IEEM from their lecturer

or other students, they have found membership to be useful and intend to remain members after they graduate as they feel it will be to their advantage when looking for a job.

Most respondents to the main survey have been a member for either 2-3 or 5-10 years and work in terrestrial ecology, however there is a much better proportional split than with the content of student courses mentioned above. There were also improvements on the 2007 survey where, for example, members involved in marine ecology jumped from 5% to 10%.

Very similar to the 2007 survey, around 50% of respondents are employed in the consultancy sector, however there are also large minorities in other sectors, for example in local authorities. Most respondents work mainly in England and more specifically in southern England, however there is considerable work also done in Scotland and Wales.

IEEM subscription fees are paid for mostly by employers (including self-employed). Respondents to the main survey found that IEEM membership had been useful, they were aware of advertisements for employment requiring IEEM membership and that, where relevant IEEM membership had been useful in tendering for work. Two thirds of respondents to the main survey had been either slightly or moderately affected by the economic recession, with around 9% affected severely and nearly a quarter not affected at all; the most frequently stated reasons for being affected were reduced work, redundancies, reduced/cut funding and cut/frozen salaries.

Other Professional Bodies

Most respondents to both surveys are not members of another professional body, however in both cases the largest proportion of those who are members of another body are members of the Institute of Environmental Management and Assessment (IEMA). Other notable bodies from the main survey are, in descending order, the Society of Biology, the Chartered Institution of Water and Environmental Management (CIWEM), the Arboricultural Association, the Association of Local Government Ecologists (ALGE), and the Royal Town Planning Institute (RTPI). For the student survey, the Institution of Environmental Sciences (IES) had the second largest proportion after IEMA.

IEEM Services

Most respondents ranked 'professional recognition' as the most important aspect of the services that IEEM provides. However, this was closely followed by: a network of professionals; a provider of membership services; and career progression.

For both surveys, the satisfaction with services currently provided by IEEM is around 90% for 'satisfied' and 'very satisfied' combined. The most common reasons for dissatisfaction were: the disproportionate spread of events/conferences/training in the regions; the need to put more resources into improving standards (for example, IEEM getting its own Chartership); and the disproportionate focus on the needs of consultants over other sectors. The services that respondents ranked highest were workshops, *In Practice* and conferences; there were however anomalies, for example, Professional Indemnity Insurance was ranked at the extremes being very useful to some respondents and of little use to others.

Around 65% of respondents agree that IEEM membership reflects all sectors of the industry, with nearly 75% agreeing that IEEM membership is good value for money. Over half of student respondents are aware of job advertisements asking for membership of IEEM.

IEEM Membership Entry

Nearly 80% of respondents agree that the current standards for entry into the Institute are about right. Around half feel that their colleagues think that the membership criteria are about right too, however over 40% are unsure of what their colleagues think.

The IEEM Website

The overwhelming majority of respondents to both surveys responded that they visit the IEEM website either monthly or rarely, with even fewer visiting the members' section of the website. However, around 80% of respondents agree that the website meets their requirements and also presents the right image to the outside world. The areas of most interest on the website were workshop information, notice of IEEM events, the Professional Guidance Series, and conference information. Job adverts were also of significant importance to respondents to the student survey.

Additional features that respondents would like to see were relevant documents to download and external CPD training providers. In addition, respondents to the student survey ranked 'more careers advice and careers profiles' highest. Other additional features that respondents requested were: more news; policy and legislation updates; a more user-friendly commercial directory; and more best practice examples and guidance.

IEEM Communication and Publications

Over 90% of respondents said that communication from IEEM was about right, with just under 90% agreeing that the frequency of *In Practice* was about right. Almost half of respondents said that they make regular use of *In Practice*. The most highly ranked sections of *In Practice* were: technical papers; reviews of recent publications; news; conference and event reports; and journal summaries. Additional features that respondents asked for included: more examples of best practice; more legislation and policy updates; and profiles of IEEM members. Basil O'Saurus seems to have a dedicated minority following.

There was a mixed response to whether *In Practice* should become peer-reviewed, with a rough split of 'yes', 'no' and 'do not know'. Over 60% of respondents felt that the current printed version of *In Practice* should not be replaced by an online version.

Over 85% of respondents stated that the frequency of the E-Newsletter was about right, however, nearly 13% said that it is not often enough. Over 60% of respondents make regular use of the E-Newsletter. Most respondents do not find the Annual Review useful, nor would they like more information on the activities of Council and the Committees.

The External Face of IEEM

Nearly 90% of respondents feel satisfied with the level of professional representation currently provided by IEEM. Just under 60% of respondents are aware of IEEM Position Statements whilst over 70% are aware that IEEM responds to consultations in the UK and Ireland. Nearly two thirds of respondents felt that IEEM should hold more public events, with events held jointly with other organisations and an annual lecture being the most popular.

Over half of respondents agree that the IEEM Tony Bradshaw Best Practice Awards are a useful way of raising standards, however, over a third were unsure of the impact. Over 70% of respondents agreed that IEEM should recognise the contributions of distinguished individuals to the profession, for example, through the IEEM Medal.

The Society for the Environment (SocEnv)

Just over 70% of respondents were Chartered Environmentalists (CEnv), of those non-CEnvs around 60% intend to apply to become Chartered. Just over 60% of CEnvs agreed that SocEnv had met their expectations, were satisfied with the current level of service provided, and felt that being a CEnv was good value for money. Over 90% of respondents visit the SocEnv website only rarely.

Other Partner Organisations

Over 70% of respondents agreed that having partners in the UK was worthwhile, whilst almost 80% agreed that having European and international partners was important. However, in both cases, around 20% were unsure.

The IEEM Charter

Over 70% of respondents stated that if IEEM had its own Charter they would apply for it, however, over half said that they were not sure if IEEM having its own Charter would persuade more of their colleagues to join.

Geographic Sections

Over 85% of respondents to the main survey, whilst only around 40% of student respondents, knew that there is a Geographic Section for their region. Nearly 60% of respondents to the main survey have attended a Section event. The most popular type of Section events were: field visits; evening or half-day sessions with invited speakers; and Section conferences. Over 60% of respondents to the main survey, and over 80% of respondents to the student survey, have not attended a Section event or conference.

IEEM Conferences

Nearly half of respondents to the main survey, and over 85% of respondents to the student survey, have not attended an IEEM conference. Just over 30% of respondents to the main survey have attended one or two IEEM conferences. Workshops and case studies/site visits were the elements of conferences that respondents found to be of most use. Over half of respondents thought that IEEM conferences represented good value for money, however over 30% were not sure.

IEEM Training Workshops

Just over 60% of respondents have attended an IEEM training workshop, with about 30% attending one workshop per year and 15% attending two per year. Only around 5% attend three or more workshops per year. Over 70% of respondents thought that IEEM workshops have been helpful in meeting their training needs and also represent good value for money.

IEEM Professional Obligations

Over 80% of respondents feel that IEEM effectively upholds the standards of the profession and that the CPD requirements are not too onerous. Almost 80% of respondents find the Professional Guidance Series useful. Nearly 70% of respondents rarely refer to the Code of Professional Conduct, whilst around 50% think that the Code is fit for purpose and 40% being unsure. Just under 70% are aware that IEEM investigates allegations of non-compliance with the Code. Nearly 90% and just over 75% of respondents would be willing to make an informal or formal, respectively, complaint about a member's professional conduct.

Further Involvement with IEEM

Around 30% of respondents would be willing to become more involved in the running of the Institute, with the following being the most popular: working party on a relevant theme; Geographic Section activities; and Committee member.

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Awards Evening Report

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On 23 June 2010, over 60 members and invited guests gathered at Mander Hall in Hamilton House in London for the IEEM Awards Evening.

Professor Steve Ormerod, IEEM President, opened the evening by welcoming members and invited guests and gave an overview of IEEM and its reason for being. Steve then introduced the guest speaker for the evening, Dr Mike Clarke, who is the new Chief Executive Officer for the RSPB, having taken over from Sir Graham Wynne.

Guest Speaker, Dr Mike Clarke

Dr Clarke introduced the RSPB's mission to speak out for birds and wildlife and to tackle the problems that threaten the environment. In doing this the RSPB has four principles that underpin much of what it does: sound science; large scale solutions; practical delivery; and connecting people with nature.

He raised three issues that are very current and are of concern to both IEEM and the RSPB.

1. This is the International Year of Biodiversity. This is something that we do really need to keep the focus on and is one of the first and most important messages for the Government.

2. The climate change negotiations in Bonn, and in particular the Land Use, Land Use Change and Forestry (LULUCF) strand. This is effectively the way in which global policy and carbon financing can be aligned with the planet's life support systems and the RSPB is very concerned about how the negotiations were not only a failure but the reporting figures and baselines being proposed were very dubious. At the time of writing, the negotiations continue so all may not be lost just yet.

3. There are three important aspects of the budget statement and, even more significantly, the comprehensive spending review behind it.

3.1. The Government intends to produce a Natural Environment White Paper. This is going to be a very important statement for the future of nature conservation.

3.2. There are very evident issues surrounding public spending. Clearly there is a national issue with a fiscal deficit but the RSPB is concerned that this will turn into a deficit for nature. Defra is likely to have a 30% budget cut and this may also knock on through into the devolved administrations. This is on top of efficiency savings that all of the agencies have already made and there is concern for the integrity of the current models that we have and the statutory functions that are being carried out.

3.3. What is the role and responsibility of the third sector, of Government, and of business? This is a big debate but we have got to be sure that we do not lose sight of what needs to be done by Government. There are three issues here related to the law of unintended consequences.

3.3.1. How will the new paradigm actually be delivered? We will hope to get some of this from the new White Paper. If we have a diminished capacity within the statutory sector we may well see agricultural support squeezed and that is a critical element in terms of delivering whatever the White Paper produces. It may be that by the time we get to the White Paper we have actually lost the most important tools currently available.

3.3.2. We risk losing a lot of the intellectual capital for nature conservation within Government and the statutory sector and that has a lot of bearing on the role of IEEM, as it does on the voluntary sector as well. There is, from the training and development stage to where the expert knowledge is held, a serious issue.

3.3.3. Nature does not respect frontiers and so we cannot have a nature conservation framework in this country without having some international framework to go with it. Of course we have seen Directives, transposed at the national level, come through as huge drivers for improvements over the years but there is a great risk that this will get lost during this period of upheaval.

In conclusion, Dr Clarke noted that there are many mechanisms for nature conservation, but that we also have to make the case for nature in its own right. He also mentioned the RSPB's 'Letter to the Future' campaign, which now has over 250,000 signatories. Visit <http://bit.ly/6a60Tr> to sign up yourself.

After his talk, Dr Clarke was kind enough to present Fellowship certificates to David Parker, Colin Shawyer, Peter Beale, Eirene Williams and Fred Slater.

IEEM Medal, Professor Brian Moss

The IEEM Medal citation for Professor Brian Moss, for his distinguished lifelong contribution to the theory and practice of limnology, was read out by Steve Ormerod and the Medal itself was presented by Mike Clarke. The full citation can be viewed on the IEEM website at www.ieem.net/awards.asp.

Professor Brian Moss responded to the Medal with a thank you, an apology, another thank you and then expressed some concerns.

His first thank you was to IEEM for the Medal. Professor Moss said that he appreciated it especially on behalf of other freshwater researchers, for in recent years he said they had felt perhaps a bit marginalised.



Dr Mike Clarke (left) presents the IEEM Medal to Professor Brian Moss

The apology was for never getting around to joining IEEM. When he moved to Liverpool in 1989, Tony Bradshaw gave him a signed nomination form which rested on his 'to do' pile for a couple of years. Unfortunately, the Dean was also pressing him to join the Fellowship of the Institute of Biology because it would look good to have all the Liverpool biology Professors as Fellows. Tony was very affable; the Dean was more sinister, and controlled the departmental budget, so he joined the IOB. He said that he resigned after a couple of years and perhaps felt that it would have been better to have joined IEEM, but that he is temperamentally not a natural joiner, more a bit of a maverick and he felt that the world needs both reputable professional organisations and awkward buggers.

The second thank you was to his wife for a considerable degree of support and forbearance over the years and all those with whom he had worked during his career: colleagues, post-docs and graduate students, and those undergraduates who eventually realised that what they learnt was not what he told them but what they discovered for themselves.

And finally to his concerns. He said that all of us should be worried about the state of our environment and our future; what to do to ensure a reasonably comfortable, civilised existence for ourselves in the future, as we push the ecological mechanisms of regulation to their limits.

He said that professional ecologists would agree that a restored, more extensive natural world has to be a part of this. We had damaged or destroyed over half of the world's land ecosystems by 1950, predictions are for about 70% by 2050 and there is increasing evidence of damage to the oceans by acidification. The symptoms of damage include the rises in greenhouse gases, as the ecological systems no longer cope to steady the atmospheric composition as they had evidently done in the past, when changes were much less rapid.

He continued that he did not think it widely realised that no matter how much we reduce carbon emissions, the temperature will continue to rise until the rate of emission is lower than the rate of storage in sinks like peats, soils and ocean sediments. At present the emissions are still rising and the sinks are still declining, so the gap is widening.

The symptoms are like the temperature chart of a fevered patient. And the doctors are concerned. The health service managers are making some of the right noises, but in the secrecy of their board meetings they fear that to fund the right treatment will cause too much inconvenience, so the expensive drugs or the elaborate operations are denied to the doctors, who are left with panaceas. The doctors protest, and their resignations are demanded, for it is not their place to question the management. But some persist and are dismissed.

There are then two scenarios. One is that they belong to a strong professional organisation, which mobilises its influence, and the outcome is good, for fortunately its leaders are strong and courageous. The second is that its leaders have the same mindset as the health service managers. They do not want the embarrassment of confrontation and inconvenience, and so they do nothing more than condemn the whistle blowers for unprofessional behaviour. And in the end not only the patient fades away.

Where medicine is concerned we already have such cases, but our real problems are environmental and parallel situations are developing and will become more intense in the future. Professor Moss's specific concern is how ecologists and environmental scientists will fare as our environmental problems worsen. The lessons of history are that societies in tight spots become frightened and even start to shoot the messengers.

But the problems will not go away. There will be an increasing need both for the independent whistle blowers and for strong professional organisations. For even where there is comment and accusation, clamour and bluster, self-serving and ladder climbing, the truth is

still the truth. IEEM, like all environmental organisations, will find itself, should find itself, increasingly at odds with vested interests as the problems bite. But the truth is still the truth. If its leadership has courage, its membership will follow the example.

One of Professor Moss's more maverick ways of coping with increasing bureaucracy in his University was to write satirical poetry commenting on the latest management idiocy. He found that the bureaucrats could not cope with a sense of humour and left him alone. But the serious side is that the arts can sometimes do more than the sciences in getting over messages. He ended with a poem that expressed some of his concerns, entitled 'Some sort of ending'.

*What is the roar that I hear in the night?
The crash of the wave as it rolls on the beach
With the fleck of the spray in the grey moon light
And the rattle of stones as it draws to the reach?*

*But no, it's the noise of the trucks on the road
The grind of their gears as they pound out the miles
The moan of the motor that pulls on the load
To fill up the shelves in surreally lit aisles*

*What is the screech that sears the night air?
With an answering call from the woods on the point
A tawny owl hunting, a fox from her lair
A warning, yet sign of a life still in joint?*

*But no, it's the jolt of a set-off alarm
On a gross SUV in a murderous black
With a solid steel fender that surely means harm
To a subjugate rambler who walks on the track*

*What is the wail that hails deep from the sea?
In the misty air with the dew on the grass
A fog horn for boats as they seek out the quay
And struggle the waves and the reefs they must pass?*

*But no, it's a siren, a black and white car
That speeds to the door in the early hour
Sinister flash of its blue beacon flare
Sign of a rapidly corroding power*

*Thud on the door, 'we've been tapping your phone
And we've noted the critical tone of your verse
The State has the rights of the thoughts that you own
And the State doesn't like the subversions you nurse'*

*'You've been right off message, you teach far too free
You don't seem to believe that the State knows best
You get in the way of the profits, you see
So we'll take you away for a good long rest'*

*Now what is the noise in my cell in the night?
The incoming vans, the clang of the gate
The anonymous sounds that are out of my sight
As I wait for some date of release or my fate?*

*But no, it's the rage of a massive protest
The plundered poor with their ills to avenge
And the land aflame from the scorn of the West:
The tempest and furies of Gaian revenge.*

IEEM Executive Director Retirement, Dr Jim Thompson

IEEM President, Steve Ormerod, concluded the evening by paying tribute to our retiring Executive Director, Dr Jim Thompson. Steve noted that Jim has been one of IEEM's long-serving heroes and one of the Institute's greatest assets over the past 14 years.

Steve recalled memories of Jim from two members to illustrate that there is more to him than meets the eye.

Nigel Bell has known Jim since 1972, when he became a post-doc working with Jack Rutter at Silwood Park. Jim spent a lot of

time working in the field on motorway verges and their central reservations measuring air pollution and other environmental factors which might stress the vegetation in these places. Nigel spent several days with him on the busiest part of the M4 near Heathrow Airport, and remembers running for his life to reach the central reservation amid the nightmare of fumes and gusts from the vehicles passing at a combined speed of 150 mph. Jim clearly outran Nigel. Probably would still do so today. Though we can wonder what risk assessments would make of such work now?

Pam Nolan remembers how it has been a pleasure to work with Jim throughout her time with IEEM, and has appreciated his wise counsel and foresight throughout the good times as well as the not so good times. His cautiously optimistic annual summaries of IEEM progress and accounts were always something to look forward to. Pam also describes Jim's dry wit in the bar afterwards and has very happy memories of Jim's 'outstanding performances on the dance floor at the legendary IEEM ceilidhs. What a mover!'

Jim's hidden talents are clearly in both physical as well as mental agility in being able to dodge cars on the M4, dodge IEEM Council members in financial forecasting, and out-dance his colleagues! Both Nigel and Pam echo the views of all the membership in wishing Jim a long and happy retirement.

On the serious side, when the Institute's history is written, Jim Thompson's name will sit alongside our founder, Tony Bradshaw, as the most important in these early years.

Back in 1996 when Jim joined IEEM, we had only 700 members, only one full-time staff member (him), and within weeks of his starting, IEEM found itself embroiled in a very bitter case of defamation of character brought through a High Court writ that would lead to a prolonged High Court case that would go on for two years. These were our darkest hours, involving organisations and Council members lending us money and Jim remained at the helm through this period, even working without salary for a considerable period.

We finally emerged bruised but with Jim still in place, and from that point out we went from strength to strength. Jim's achievements have been to set up the IEEM HQ in Winchester in 1998 whilst at the same time servicing all of the Committees single-handedly, and in recruiting all of the Institute's staff, including Anna Thompson, Joel Bateman, Nick Jackson, Linda Yost, Jason Reeves and all others who have followed.

And under Jim's leadership the Institute has: established its annual programme of conferences (with our largest so far attracting 400 people) and workshops (increasing in number from six to over 100); increased the membership to over 4,000 (and members with the high degree of professionalism and standards after the ideals that were first imagined); established means of recruiting Student and Graduate members; increased very substantially the number of Fellows; brought us to the point where we are now pursuing our own Royal Charter; kept the budgets in a robust, positive state and with dramatically increased income in excess of £600,000 and reserves at over £220,000; set up a full, active complement of Geographic Sections, including Wales, Scotland and Ireland; fully established all our communications channels, including the magazine *In Practice*, the E-Newsletter, the website and a whole range of specific publications; hosted parliamentary evenings in Westminster; launched the annual awards scheme (including the IEEM Medal and Tony Bradshaw Best Practice Awards); set up links with a range of key national, European and international organisations; played a key role in the development of the Society for the Environment (with its own Royal Charter and 5,000 Chartered Environmentalists) and the European Federation of Associations of Environmental Professionals; and dealt with issues of professional standards, producing Position Statements, responding to consultations and representing the voice of practising ecologists and environmental managers.

From a personal perspective Steve said that, due to Jim's gritty determination, his tenacity in getting things done, his steadfastness to IEEM's ideals and his beliefs in the organisation's purpose and

ethos, IEEM owed him a great deal and paid him huge thanks on behalf of the members.

Jim responded by thanking Steve and all gathered for the immensely kind words and truly generous gifts. He continued by remembering the stepping stones that had led up to him joining IEEM in 1996, and the early dark days of the legal case, IEEM almost being declared bankrupt, and being summoned to appear in court the day before the annual conference in Llandudno. But IEEM pulled through with help from many Council members and others – including the RSPB and the British Ecological Society.

Continuing, Jim said that the spirit of wanting IEEM to succeed is still there to this day amongst the membership and the current staff. For membership of a professional body is not something to be purchased on E-bay; it means much more than that as you have only to see at an IEEM event or a conference or to be at the end of the telephone trying to provide some help and advice to a distressed member.

It was with pride that Jim looked back over his achievements with IEEM, saying that the longest running issue is individual Chartered Status for IEEM, this being the final piece of the jigsaw that he wished to see put in place.

Then to some points that Jim wished to emphasize. The first being that we must keep IEEM outward looking and maintain our links with other organisations in the UK, Europe and globally. The often lone voice of IEEM promoting biodiversity amongst a raft of other professional organisations - in the UK in the case of the Society for the Environment, and the European Federation of Associations of Environmental Professionals (EFAEP) in the case of the wider European perspective - is an opportunity not to be missed. It is not just how much these contacts cost but how we can gain through them and, by using our experience and evidence-based science, we can use our influence to make a practical difference for biodiversity.

Jim's second point concerned the decline of ecological skills as familiarity with the natural world becomes increasingly subsumed in universities to the needs of the biomedical world and purely economically-driven research. The continued involvement of IEEM in this subject area is vital.

Jim commented that he felt really quite moved and very pleased to see a number of colleagues with whom he had worked over the years. He also thanked family and friends for attending, and especially the Thompson family, particularly his wife Anna, for all their support during his time with IEEM.

To keep himself busy in retirement, Jim explained that he would be continuing as Treasurer of EFAEP until the autumn and remaining an IEEM Fellow. He is also a keen gardener, his plant identification skills are in need of refreshment, his languages need some remedial work, his house in France is in need of some attention, and his music collection needs an overhaul. In addition, he will need to brush up his skills in the kitchen and there is some travelling to do. And that is just for starters!

Finally, Jim paid tribute to the IEEM staff, who together with Council and the Committees, constitute the creative partnership that lies at the heart of the recent success of IEEM.

Jim concluded by saying that IEEM is in great shape but that we cannot afford to be complacent. He was pleased that strong and secure foundations have been laid for his successor, Sally Hayns, to take over and he wished her and the whole of IEEM well for the future.

Correspondence: jasonreeves@ieem.net

Institute News

A Profession Under Pressure

The economic situation continues to put severe pressure on many members. Although there are signs, at least in some quarters, that the flow of work for those in the private sector is starting to improve, the recent announcements of the scale of the public sector spending cuts is very worrying indeed. Our members in the local authorities and statutory agencies face an anxious few months as they wait to hear news of where the axe will fall.

IEEM has two roles to play at this time. Firstly, the Institute is commencing a campaign of lobbying to draw attention to the importance of retaining professional ecologists and environmental managers within the public sector at a time when the environment is under so much pressure. We have started this with a direct letter to the Secretary of State for the Environment, Caroline Spelman, and also a press release highlighting the issue.

Secondly, one of the most important aspects of IEEM membership is the support network that it provides. Do take the opportunity to attend local events and speak to other colleagues within the profession. Making new contacts can be invaluable in difficult times and one of the 'added value' aspects of our events is the opportunity to network with others.

Membership Renewals

Membership renewal notices have now been sent out. If you have not yet sent in your response please do so as soon as possible. Every year the membership team spends many hours chasing members for a response and we really would appreciate your help in reducing the size of this task so please act on your renewal notice now. IEEM has ambitious plans for the future but these are dependent on having a growing and active membership. If you have colleagues who are eligible for membership of the Institute but have not yet joined please do give them a nudge.

Staff Changes and News

In addition to our new CEO, **Sally Hayns**, who started in June, IEEM is pleased to welcome **Laura Wilson** who has joined us for six months on an internship following her graduation from the University of Portsmouth having recently completed a BSc in Marine Biology and an MSc in Coastal and Marine Resource Management. Laura is helping to support the Section activities as well as putting into practice some of the student support work that a previous member of staff, **Tanya Waring**, started in 2009.

At the end of August we said goodbye to **George Knights** who had completed his six month internship with IEEM. George made an invaluable contribution to our activities, assisting with the organisation of the 2010 Medal Evening, the IEEM Tony Bradshaw Best Practice Awards, workshop bookings and administration as well as contributing to the Ecological Skills Gap Project. He has now started a position with URS as an Environmental Impact Assessor. We wish him well for his future career.

The former Executive Director, **Jim Thompson**, has sent in this final message: 'This is to thank the many members who sent me very kindly worded messages and cards wishing me well for my retirement. These with the 'send off' on 23 June will remain as an indelible memory of friends and colleagues in IEEM. I hope to meet many of you again at some future date and as a Fellow, will continue to take a keen interest from the sidelines in the future development of IEEM. Many thanks, Jim Thompson.'

Ecological Skills Gap Project

The next phase of work in addressing the Ecological Skills Gap is now underway. By the time you read this IEEM will have appointed a consultant to research and analyse feedback from students and employers on what is taught, what knowledge and skills new entrants into the profession need and what skills ecologists will need in the future as they seek to enhance biodiversity against a background of changing national and international social and economic policies. As part of this phase of the Project, there will be a one day technical workshop early in 2011 bringing together stakeholders to hear the outcomes of the research and to help identify a way forward. If you are interested in receiving further details about this workshop when available please e-mail lindayost@ieem.net.

2011 Professional Development Programme

We are currently putting together the 2011 programme of workshops and training courses. It is important that the programme meets the needs of more experienced ecologists and environmental managers seeking to develop their knowledge and skills as well as those who are newly qualified. What courses/subject areas would you like to see IEEM add to its course programme? Are there courses you can offer to teach? Please do get in touch with our Education Officer, Nick Jackson, with your ideas and suggestions by e-mailing nickjackson@ieem.net.

IEEM Logo Usage

We have now implemented a new procedure for members and others to use the IEEM logo. We are not necessarily encouraging members to use the logo, rather we have found that many members are already using it, but often inappropriately (and sometimes even the wrong logo). We are happy for members to use the logo on their links page to redirect people to the IEEM website or next to the person profile of a member. However, the logo should not be used on a website homepage or letterhead as we 'endorse' the individual member and not the company/organisation. Please remember that in order to use the IEEM logo (whether you intend to or already do so) you must first contact the IEEM office. For more information please contact jasonreeves@ieem.net.

IEEM Wallplanner 2011

IEEM will again be producing a wall calendar for 2011. If you are interested in advertising on the wallplanner please visit www.ieem.net/advertising.asp or contact Jason Reeves at jasonreeves@ieem.net. The deadline for artwork will be Friday 22 October 2010, but please do get in touch as soon as possible as every year we have more interest than spaces available.

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. For more information please contact jasonreeves@ieem.net.

Edition	Theme	Submission Deadline
70 - December 2010	Biodiversity Beyond 2010	25 October 2010
71 - March 2011	Agri-Environment and Ecology	24 January 2011
72 - June 2011	Invasive Species	25 April 2011

Somethings in life just can't be imitated



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EMPLOYMENT LEGAL ADVICE FOR IEEM MEMBERS

IEEM Insurance Services have successfully negotiated this advice service with leading employment lawyers Turner Parkinson LLP as an additional benefit for members.

The Service

The service will provide advice only in relation to employment matters for individual members of the Institute.

The Cost

There will be no charge for the initial telephone advice!!

If members require more than advice, the cost of such additional services will be clearly outlined.

Who are Turner Parkinson?

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Contact Details

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Telephone: 0161 833 1212 in normal business hours

Fax: 0161 834 9098

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2011 IEEM WORKSHOPS

We need your help!

IEEM is looking for experienced trainers to run workshops as part of the 2011 programme. If you have experience of teaching ecological courses and would like to contribute to our 2011 programme, please do get in touch.

We particularly want to provide a good geographical spread of training opportunities for members and are looking for people to run workshops on the following topics in all areas of the UK and Ireland...

- Environmental legislation.
- Planning and biodiversity.
- Marine, coastal and estuarine ecology.
- Freshwater ecology.
- Protected species - including applying for an EPS licence (bats, great crested newts, reptiles, crayfish, dormice *etc.*).
- GIS and GPS.
- Report writing.
- Habitat survey *i.e.* Phase 1 or NVC.
- Botanical identification *i.e.* grasses, flowering plants.
- Invasive species.

We will also be offering a 'training the trainers' course in 2011 so if you would like to run a workshop but don't quite know where to start, then please apply for this.

If you would like to run a course, then please get in touch with Nick Jackson (nickjackson@ieem.net or 01962 868626) for a proposal form.

Alternatively if you would like to suggest a workshop to be included in the 2011 programme, please use the same e-mail address.



Photo credits: Nick Jackson, Greg Carson, James Constant

North East England Section News

Section Meeting Report

The North East England Section held a field meeting on a glorious sunny evening on 7 July 2010 at the RSPB's Saltholme Reserve on Teesside.

Saltholme RSPB Reserve opened in early 2009 and supports around 380 hectares of wet grassland, reedbed, open water and other habitats. We were lucky enough to be allowed access to parts of the reserve that are normally off limits providing a unique opportunity to learn about the creation and management of a number of habitats.

The 55 ha of wet grassland are of particular conservation importance. The grassland was specifically designed to benefit breeding waders and is kept wet using groundwater from the nearby SABIC petrochemical works, which was previously discharged straight into the River Tees. Along with careful grazing management, this has led to a massive increase in the numbers of breeding lapwing (57 pairs in 2009, up from less than 10 pairs before RSPB started managing the site) and redshank (23 pairs in 2009, up from less than five pairs).

We were also able to see some of the existing and newly-created reedbeds, an area of wildflower meadow sown on an old landfill site, a highly successful artificial sand martin bank and several of the many pools and scrapes.

The birders in the party were excited to find a Temminck's stint on one of the lagoons. Other wildlife highlights included a flock of 20 black-tailed godwits, little ringed plover and chick, hundreds of breeding common terns and a party of six stoats.

Many thanks must go to Saltholme site manager David Braithwaite and warden Emma Birnie for being such informative and enthusiastic guides. Special thanks are also due to Emma for coming back to rescue the eight Section members who remained chatting in the car park for so long after the meeting that they were locked in!

*Duncan Watson CEnv MIEEM
Committee Member, North East
England Geographic Section*



North East England Section members learn about reedbed creation and management at Saltholme RSPB Reserve

North East England Section Conference

Floods, Floodbanks and Wetlands: Lessons Learned on the River Till

1 October 2010, Lady Waterford Hall Ford Village, Northumberland

This major regional conference will be chaired by Emeritus Professor Malcolm Newson. A range of invited papers will show the way the River Till has been influenced by man and influences man. It will explore these themes in the first two papers: 'River Till: the Historical geomorphologic picture' by Dave Pasmore, and 'The management of wetlands in the river Till catchment: a historical perspective' by Steve Pullan. Then the conference will explore the work of the River Till Wetland Restoration Project, hosted by the Tweed Forum, in 'The River Till Wetland Restoration Project: lessons learned' by A Laverty and 'Floods: the impacts of recent floods and Environmental Stewardship' by Bob Cussen and Caroline Brumwell. Finally, it will look at other aspects of the work on the Till and the range of projects that have attempted to build wetland capacity in an innovative way that allows man to live in the catchment and benefit from a range of ecosystem services. The conference is very much about lessons learnt that would benefit others who wish to take a similar approach.

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

South East England Section News

Forthcoming Events

Morning Dip into Freshwaters

Saturday 23 October 2010, Wheatley, Oxford

Whether you are an experienced terrestrial ecologist wishing to expand your knowledge of freshwater impact assessment or a budding aquatic ecologist wanting to learn more, we hope that you will enjoy this fun morning with Jim Fairclough. The session will include a beginner's guide to freshwater ecology and assessment as well as identification and survey techniques, using samples which we will collect from the Thames (next door to the venue). Attendance will be free but places will be on a first come, first served basis – so look out for the IEEM e-mails and website for more details.

Thames Basin Heaths SPA Delivery Framework

Friday 29 October 2010, Pirbright Village Hall, Surrey

Come and hear about 'The Problem' and 'The Solution' from some of the key players involved in the development and implementation of the Delivery Framework. This will be a full morning of talks followed by packed lunch on the heaths (weather dependent!). Details will be advertised via IEEM e-mails and on the website (www.ieem.net/sesection.asp).

*Angela Bond MIEEM
Convenor, South East England Geographic
Section*

Partnership News

2010 International Year of Biodiversity

The Global Business of Biodiversity (GBOB) Symposium was held on 13 July 2010 at the Excel Exhibition Centre in London and attended by around 650 delegates. IEEM had a stand at the event and specifically promoted the commercial directory, forthcoming conferences and IEEM membership. The event saw the maiden speech on biodiversity from the new Defra Secretary of State, the Rt Hon Caroline Spelman, and *The Economics of Ecosystems and Biodiversity Report for Business* from Pavan Sukhdev (www.teebweb.org). The IYB-UK Secretariat is now working with the event organisers to produce a report of outcomes from the conference to contribute to the business segment talks at the Convention on Biological Diversity COP10 talks in Nagoya, Japan in October 2010.

At one of the side events at GBOB, Ed Gillespie presented an interesting thought piece on 'branding biodiversity'. It highlighted the communication tensions between conventional appeals based around awe, wonder and love of nature, and those emerging out of putting a monetary value on ecosystem services. View the article PDF at <http://bit.ly/d0giZl>.

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

European Federation of Associations of Environmental Professionals

EFAEP held its 15th General Assembly in Porto, Portugal in May this year. A number of important issues were discussed at the meeting which are outlined below. The full minutes of the meeting can be found on the EFAEP website. The General Assembly unfortunately attracted fewer participants than in the past, probably due to the economic situation in many countries. There were also a number of

attendees who were frustratingly unable to travel at the last minute because of French strikes.

Jim Thompson (IEEM) is the current EFAEP Treasurer, however he will be stepping down at the next General Assembly in Brussels in October and we will of course need to elect his replacement on the Executive Committee.

There was much discussion on the new Working Groups. One of the decisions relating to this was to amend the EFAEP Byelaws so that only two members are needed to create a Working Group rather than three. This is just one way of reducing obstacles to members becoming more involved. The new Working Groups are continuing to draw attention from interested members. Please visit the website (www.efaep.org/documents/topic/91) to see if there is a group that you might be interested in joining.

The most important decision made at the General Assembly was regarding the EFAEP name. It was proposed that 'EFAEP' should be renamed as 'ENEP'. The advantages being that it is simpler to promote and market as a brand. A number of concerns were raised, including losing the obvious notion of EFAEP being a 'body of associations', and the costs of lost heritage, of promoting a new name and of changing promotional material, website, etc. The proposal was approved by a vote of nine for and two against, with seven abstentions. It was agreed that 'EFAEP' will remain the official name and that 'ENEP' will simply be the trading name. The Executive Committee has been delegated to oversee the changeover but as yet no timescale has been set.

Since the General Assembly, the Executive Committee has managed to filter through the over 230 applications for the Project Officer position and have now also conducted interviews. They are currently in discussions with the chosen candidate and will hope to have the person in post by the beginning of September.

EFAEP currently has a 'hotdesk' contract at the sustainable and ethical building, Mundo-B (www.mundo-b.org), in downtown Brussels, but had been looking into permanent office space for the Project Officer, as our registered address, and for some storage. There had been the possibility of sharing an office with the Europarc Federation, but they have since decided to vacate the building and another organisation has now occupied that office. There may still be the opportunity to share the office and EFAEP continues to pursue various options within the Mundo-B building.

EFAEP was fortunate enough to have a stand at this year's Green Week conference and exhibition in Brussels during the first week of June. This year's theme was on biodiversity and Mike Barker (IEEM) and the EFAEP Biodiversity Working Group put together the EFAEP poster for the stand. EFAEP representatives on the stand met a number of useful contacts during the week and these are being followed up. Furthermore, Green Week was a great opportunity for EFAEP to get exposure to the EU/EC and other relevant Brussels organisations and individuals. IEEM material was also available on the stand.

www.efaep.org/
www.environmentalprofessionals.eu

British Ecological Society

IEEM and the British Ecological Society are hosting a panel discussion on 'Landscapes of the Future' at this year's British Science Festival on 14 September 2010. Confirmed speakers include Mark Felton (Natural England), Roy Haines-Young (University of Nottingham), Francis Hesketh (TEP), David Miller (Macaulay Land Use Research Institute) and Jon Sadler (University of Birmingham). We have also partnered up with the Macaulay Land Use Research Institute who will be displaying a 'Virtual Landscape Theatre'. To find out more please visit <http://bit.ly/9ji24U>.

www.britishecologicalsociety.org

Recent Publications



Species Management: Challenges and Solutions for the 21st Century

Editors: John M Baxter and Colin A Galbraith

Available from: www.tsoshop.co.uk

Price: £27.50

ISBN-13: 9780114973483

This is the latest book in Scottish Natural Heritage's (SNH) excellent Natural Heritage of Scotland series and contains

the papers presented at SNH's 2008 conference held at Heriot-Watt University. The book contains a number of chapters that draw on the experience of the many authors from a range of international experts (including several IEEM members) in facing and resolving the different challenges presented when trying to manage species in need of conservation, when dealing with invasive non-native species, resolving conflicts of interest between native species, our sustainable exploitation of species, how best to deliver species management within a wider ecosystem approach, and how we can continue with meaningful species management in the face of climate change which is having an increasing impact on species and ecosystems around the world.



Evidence of Pine Martens in England and Wales 1996-2007: Analysis and Foundations for the Future

Authors: Johnny Birks MIEEM and John Messenger CEnv MIEEM

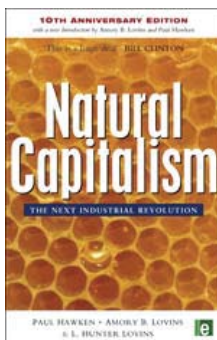
Available from: www.vwt.org.uk

Price: £ 14.95

ISBN-13: 97809460815544

The pine marten *Martes martes* has been wiped out in most parts of Britain, with only small populations surviving in Wales and areas of northern England, but relatively

strong populations are still to be found in some parts of the Scottish Highlands. Recent studies show that the pine marten in Scotland appears to be making a good recovery, however, this recovery taking place in Scotland has not yet occurred in those parts of England and Wales where pine martens survive. Since the mid-1990s, The Vincent Wildlife Trust has been gathering and evaluating reported sightings of pine martens from England and Wales. This work suggests that the species still survives in certain core areas of northern England and parts of Wales. However, the animals are apparently rare and elusive, and evidence of their presence is very hard to find. For more information about pine martens, please visit: www.pinemarten.info.



Natural Capitalism: The Next Industrial Revolution (2nd Edition)

Authors: P Hawken, A B Lovins and L H Lovins

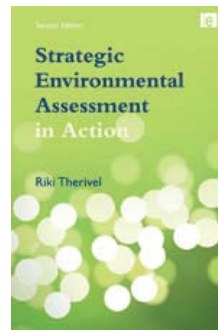
Available from: www.earthscan.co.uk

Price: £14.99

ISBN-13: 9781844071708

On its first publication 10 years ago, *Natural Capitalism* rocked the world of business with its innovative new approach - an approach that fused ecological integrity with business acumen using the radical concept of natural capitalism. This 10th anniversary edition features a new introduction that updates

the story to include the successes of the last decade. It sets out the path that we must now take to ensure the future prosperity of our civilisation and our planet. The Financial Times calls it 'an analysis of how capitalism would work if the world's 'natural capital' were properly valued, resulting in a drastic reduction in resource use by industrialised countries.'



Strategic Environmental Assessment in Action

Author: Riki Therivel

Available from: www.earthscan.co.uk

Price: £29.99

ISBN-13: 9781844070428

This is a practical guide on how to approach the Strategic Environmental Assessment (SEA) process. The book is broken down into three logical parts. Part I provides an overview of the aims, principles, advantages and problems of SEA as well as looking at

key SEA regulations and their requirements. Part II examines the SEA process in considerable detail including setting the policy context, describing the baseline, identifying alternatives, predicting and evaluating impacts and using the SEA information in decision-making. Part III is devoted to assuring SEA quality with a discussion of resources and capacity building. The publication has a useful number of case studies and examples and would be useful for anyone carrying out or studying SEA at any level.



LIFE: building up Europe's green infrastructure

Author: European Union

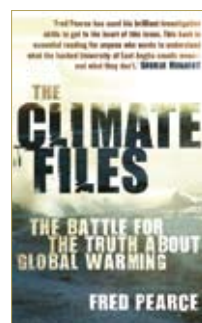
Available from: <http://bit.ly/aNmrnJ>

Price: free PDF download

ISBN-13: 978-92-79-15719-6

Habitat loss, degradation and fragmentation have been by far the biggest drivers of terrestrial biodiversity loss at EU level over the past 50 years. This is a result of the massive expansion of urban zones and transport infrastructures, which have been cutting up Europe's landscape.

In addition, traditional land-use practices have been replaced by more intensive, mechanised and industrial-scale activities, especially in the agricultural and forestry sectors. This has weakened ecosystems, their functions and the biodiversity they support. The challenge now is to assess the substantial knowledge acquired through LIFE-funded projects and to finalise the concept of the green infrastructure strategy. This strategy will aim to find ways to reduce landscape fragmentation, improve ecosystem resilience, including the protection of its biodiversity, adapt to climate change and integrate spatial planning. The good practices and innovative solutions introduced by LIFE projects, as highlighted in this publication, are demonstrating how such a green infrastructure can be best supported and built up in the future.



The Climate Files: The Battle for the Truth about Global Warming

Author: Fred Pearce

Available from: www.guardianbooks.co.uk

Price: £8.99

ISBN-13: 9780852652299

The biggest scandal to hit science in years: thousands of documents and e-mails are stolen then leaked on the eve of the UN climate summit in Copenhagen. What appears to be a conspiracy between scientists to boost the case for global warming is revealed.

Fred Pearce, one of Britain's best science writers, examines the personalities, the feuds and disagreements at the heart of climate science and raises disturbing questions about the way research is carried out into the most important international issue of our age. George Monbiot called this 'essential reading for anyone who wants to understand what the hacked University of East Anglia e-mails mean.'

In the Journals

Sponsored by



British Ecological Society

Jim Thompson HonFSE CEnv FIEEM, Jason Reeves AIEEM and Laura Wilson

S E Newson *et al.*

Population change of avian predators and grey squirrels in England: is there evidence for an impact on avian prey populations?

Journal of Applied Ecology 2010, **47**: 244-252

The authors examined whether 29 English bird populations may have been depressed by increases in the abundance of two broad categories of predators. The first includes predators of juvenile and adult birds: Eurasian sparrow hawks *Accipiter nisus*, common kestrels *Falco tinnunculus* and common buzzards *Buteo buteo*, and the second comprises five nest predators: carrion crow *Corvus corone*, black-billed magpie *Pica pica*, Eurasian jay *Garrulus glandarius*, great spotted woodpecker *Dendrocopos major* and grey squirrel *Sciurus carolinensis*. For 22 avian prey species, there was no evidence that increases in common avian predators and grey squirrels are associated with large-scale depression of prey abundance or population declines. There was ambiguity for the remaining seven. There was an unexpected large number of positive associations between predators and prey, particularly for native avian nest predators, which largely exonerates these predators as driving declines in passerine numbers.

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A Amar *et al.*

Spatial and temporal associations between recovering populations of common raven *Corvus corax* and British upland wader populations

Journal of Applied Ecology 2010, **47**: 253-262

Recovery of common raven *Corvus corax* populations in the UK and Europe has given rise to a conflict with some stakeholders over their concerns for both the protection of livestock and the possible detrimental impact on some upland bird species, particularly ground nesting waders. This has led to demands by some land managers for licences to control ravens to protect upland breeding birds. The authors used data from surveys of distribution and abundance of upland breeding birds in the UK carried out in 1980–1993 and 2000–2002 to test whether variation in raven abundance or change in raven abundance was negatively associated with changes in abundance of five species of waders. The study found no significant negative associations between raven abundance and population changes in upland waders, and so does not support granting of licences for the control of ravens in the interest of population-level conservation of these upland wader species. However, the near significant negative associations with lapwing and curlew merit further investigation. This study emphasises the importance of making a thorough evaluation of the evidence base before making decisions regarding predator control.

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G M Davies *et al.*

Fire intensity, fire severity and ecosystem response in heathlands: factors affecting the regeneration of *Calluna vulgaris*

Journal of Applied Ecology 2010, **47**: 356-365

Large areas of upland heaths in the UK are managed through prescribed burning to improve habitat and grazing for red grouse *Lagopus lagopus scoticus*, red deer *Cervus elaphus* and sheep *Ovis aries*. Previous research has identified trends

in vegetation development following burning, but has not linked this to variation in fire behaviour and severity. The authors burned 15 experimental fires on an area of *Calluna vulgaris*-dominated moorland, and recorded pre- and post-fire vegetation structure and composition, fire behaviour characteristics, and several 'proxy measures' of fire severity. Post-fire regeneration was strongly linked to stand age and post-fire substrate type. Fire behaviour and severity had little effect, though fire-induced ground-surface heating may promote *Calluna* seedling establishment. Vegetative regeneration of *Calluna* was extremely poor in older stands, as was seedling establishment in areas where the post-fire substrate was dominated by live or dead pleurocarpous moss mats. Younger stands, less than c. 30 cm tall, should be the focus of management if the objective is to maximize *Calluna* regeneration. Burning older and uneven-aged stands is discouraged except for the purposes of fire hazard management. Managers should develop landscape-level burn plans to target burning effectively and create diverse fire regimes.

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B A Woodcock *et al.*

The role of management and landscape context in the restoration of grassland phytophagous beetles

Journal of Applied Ecology 2010, **47**: 366-376

Declines in area and quality of species-rich mesotrophic and calcareous grasslands have occurred all across Europe. While the European Union has promoted schemes to restore these grasslands, the emphasis for management has remained largely focused on plants. This paper focuses on restoration of the phytophagous beetles of these grasslands. Using a 3-year multi-site experiment, the authors investigated how restoration success of phytophagous beetles was affected by hay-spreading management (intended to introduce target plant species), success in restoration of the plant communities and the landscape context within which restoration was attempted. Restoration success of the plants was greatest where green hay spreading had been used to introduce seeds into restoration sites. Beetle restoration success increased over time, although hay-spreading had no direct effect. Restoration success for beetles capable of flight and those showing oligophagous host plant specialism were also positively correlated with connectivity to species-rich grasslands. Increasing the similarity of the plant community at restoration sites to target species-rich grasslands will promote restoration success for the phytophagous beetles. However, landscape context is also important, with restoration being approximately twice as successful in those landscapes containing high as opposed to low proportions of species-rich grassland.

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F Eigenbrod *et al.*

The impact of proxy-based methods on mapping the distribution of ecosystem services

Journal of Applied Ecology 2010, **47**: 377-385

An increasing number of studies are examining the distribution of ecosystem services, often with the goal of identifying areas that will provide multiple ecosystem service 'hotspots'. However, there is a paucity of data on most ecosystem services, so proxies are frequently used to map their

distribution. To date, there has been little attempt to quantify the effects of using proxies on distribution maps of ecosystem services, despite the potentially large errors associated with such data sets. Through a series of maps, the paper shows that land cover based proxies provide a poor fit to primary data surfaces for biodiversity, recreation and carbon storage, and that correlations between ecosystem services change depending on whether primary or proxy data are used for the analyses. The paper concludes that proxies may be suitable for identifying broad-scale trends in ecosystem services, but even relatively good proxies are likely to be unsuitable for identifying hotspots or priority areas for multiple services.

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S M Eglington *et al.*

Managing water levels on wet grasslands to improve foraging conditions for breeding northern lapwing *Vanellus vanellus*

Journal of Applied Ecology 2010, **47**: 451-458

The widespread drainage of wetlands and grazing marshes has been one of the main drivers of severe reductions in the number and range of breeding waders across Europe. Wader chicks require wet, invertebrate-rich foraging habitats and most agricultural land is now too dry to support sustainable breeding populations. The paper explores the effect of wet feature provision on invertebrate abundance and the growth rates and body condition of northern lapwing *Vanellus vanellus* chicks, on grazing marshes in eastern England. Wet features supported more than double the biomass of surface-active invertebrates and a greater abundance of aerial invertebrates than the vegetated grazing marsh. Chick foraging rates were also two to three times higher in wet features than in the grazing marsh, as was the estimated biomass intake per food item. At the start of the breeding season, chick condition was unrelated to wet feature provision but late in the season, when water levels were low, chick body condition was significantly higher in fields with footdrain (shallow ditches) density of more than 150 m.ha⁻¹. The installation of wet features on grasslands provides valuable foraging locations for chicks, particularly later in the season when these features are likely to be the main source of water available. Predicted changes to the seasonality of precipitation at temperate latitudes means that provision of wet features is likely to be increasingly important for maintaining breeding wader populations.

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S C Votier *et al.*

Individual responses of seabirds to commercial fisheries revealed using GPS tracking, stable isotopes and vessel monitoring systems

Journal of Applied Ecology 2010, **47**: 487-497

The large amount of discards produced by commercial fisheries can have major impacts on marine predator populations: this abundant food may increase populations of some scavengers or decrease others via accidental bycatch. The paper assesses the influence of commercial fisheries' activity on the foraging behaviour of individual breeding northern gannets *Morus bassanus*. There were marked individual differences in the proportion of fishery discards in the diet and individual variability in behavioural response to trawlers. Ultimately, reducing bycatch and removing dependency on discards remain key conservation priorities but managers should also ensure that scavenging species have sufficient alternative food to meet their needs.

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A P Møller *et al.*

Climate change affects the duration of the reproductive season in birds

Journal of Animal Ecology 2010, **79**: 777-784

This paper examines how effects on the growing season due to climate change have implications for bird breeding patterns. The authors analysed extensive long-term data sets on timing of breeding in 20 species of birds from Denmark, based on records of over 100,000 individual offspring. There was considerable heterogeneity among species in duration of the breeding season. This became significantly longer in eight species, significantly shorter in five species and did not change significantly in seven species. Mean temperature for March and April increased dramatically in the study areas since 1970 thus extending the growing season. This implies more broods or better temporal spacing of broods in multi-brooded species, while the time window for reproduction has become narrower in single-brooded species. The single-most important predictor of change in duration of the breeding season was change in the date that breeding started; there was no change in the date of end of breeding. Species advancing their breeding date the most also expanded the duration of the breeding season. Also there was no clear evidence of body size, adult survival rate or generation time being related to the change in the duration of the breeding season. This also applied to species undergoing long distance migration.

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N Redpath *et al.*

Crofting and bumblebee conservation: The impact of land management practices on bumblebee populations in northwest Scotland

Biological Conservation 2010, **143**: 492-500

Northwest Scotland is a stronghold for two of the UK's rarest bumblebee species, *Bombus distinguendus* and *Bombus muscorum*. Crofting is the main form of agricultural land management here and is considered beneficial to a wide range of flora and fauna, however there is currently a lack of quantitative evidence to support this regarding bumblebees. The authors assessed the effect of land management on foraging bumblebee abundance and the availability of bumblebee forage plants in the region. The study results show that current crofting practices do not support high densities of foraging bumblebees. Traditional crofting practice was to move livestock to uplands in the summer, but this has been largely abandoned and summer sheep grazing of lowland pasture has a strong negative impact on bumblebees. The authors conclude that the creation of agri-environment schemes which promote the use of Fabaceae-rich (the three most frequently visited species were from the Fabaceae) seed mixes and the removal of sheep grazing on lowland areas in the summer are essential in order to conserve bumblebee populations within crofted areas.

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H Smith *et al.*

Short-term successional change does not predict long-term conservation value of managed arable field margins

Biological Conservation 2010, **143**: 813-822

Field margins have been widely advocated as a means of integrating agronomic and biodiversity objectives and are included in agri-environment schemes across Europe. However, data on the long-term development of field margin plant communities remains limited. The authors describe a 13-year experiment on the effects of field margin management on biodiversity and weed species. Swards were established by natural regeneration or sown, and the frequency and timing of mowing, application of herbicide and leaving of hay

were manipulated. Sown swards were eventually invaded by unsown perennials, but they remained distinct from naturally regenerated swards. Plant species richness declined throughout the experiment. Annuals were lost most rapidly from sown swards but, under natural regeneration, loss could be modified by mowing. Perennial species initially increased during natural regeneration before stabilising. In sown swards they declined under all treatments. Species richness in naturally regenerating swards was promoted initially by mowing twice annually. After 13 years, timing and frequency of mowing had no significant effect on species richness although it still influenced sward composition. Leaving cut hay lying produced species-poor swards. The authors conclude that the choice of establishment and management methods for arable field margins significantly affects the long-term conservation value of the swards.

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M Gioria *et al.*

The conservation value of farmland ponds: Predicting water beetle assemblages using vascular plants as a surrogate group

Biological Conservation 2010, **143**: 1125-1133

Ponds are among the most diverse and yet threatened components of freshwater biodiversity and they would greatly benefit from the identification of surrogate taxa in preliminary assessments aimed at detecting ponds of potentially high biodiversity value. In this study, the authors used predictive co-correspondence analysis (Co-CA) to quantify the strength of plant species composition and plant community types in predicting multivariate patterns in water beetle assemblages, based on data from 54 farmland ponds in Ireland. Co-CA showed that plant species composition had a positive predictive accuracy, which was significantly higher compared to that of data at the plant community type level. The authors conclude that wetland plants can be effectively used as a surrogate taxon in the identification of conservation-priority ponds, and that conservation strategies aimed at maintaining and enhancing pond biodiversity should be based on considerations on plant species composition.

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J Smart *et al.*

Illegal killing slows population recovery of a re-introduced raptor of high conservation concern – The red kite *Milvus milvus*

Biological Conservation 2010, **143**: 1278-1286

Red kites are declining over much of their European range and have been reintroduced to England and Scotland. Considerable regional variation in population growth exists and this study aimed to identify the reasons for the low population growth in north Scotland. Productivity in north Scotland was equal to high compared to other UK populations, with annual survival of wild-fledged birds low for first-year birds compared to other Scottish populations and second-year survival declined over time. In north Scotland, 40% of 103 red kites found dead were killed illegally, mainly by direct poisoning. In the absence of illegal killing, the authors estimate that annual survival rates in wild red kites might increase. Models, which exclude illegal killing, predict a population trajectory and size very similar to that found in the Chilterns, a rapidly growing population in southeast England reintroduced at the same time but where rates of illegal killing are much lower. The authors conclude that illegal killing of red kites is the cause of poor population growth in north Scotland.

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C A Sullivan *et al.*

The ecological status of grasslands on lowland farmlands in western Ireland and implications for grassland classification and nature value assessment

Biological Conservation 2010, **143**: 1529-1539

The identification and protection of High Nature Value (HNV) farmland is an objective of the European Rural Development policy which has yet to be met by Member States. Remote sensing and models based on farm statistics are commonly used to identify HNV farmland. Use of datasets such as Corine Landcover Classes is widespread but it has been acknowledged that such datasets can significantly overlook fine-scale biodiversity features and in countries where farmland is predominantly grass-based, there is an added difficulty in distinguishing between grassland types without undertaking field-scale survey work. The authors analysed the grassland species composition of 603 fields on 32 lowland farms and investigated their relationship to management, ecological and spatial descriptors. Analysis of the grasslands and their ecology on these farms revealed a continuum between semi-natural and improved agricultural grasslands, including an intermediate Semi-Improved Grassland type. This gradation from improved to semi-natural grassland highlights the biodiversity variation that occurs on farms that are frequently considered to be of low nature value. The detailed description of the grasslands that occur on these lowland farms has the potential to provide a better assessment of the overall nature value of a farm, potentially aiding the identification of Type 2 High Nature Value farmland. Before this can be achieved, however, there is a need to amend the grassland classification system used in Ireland in order that intermediate semi-natural grassland assemblages can be identified at the field level. Field surveys are necessary for this level of detail.

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N Reid, R A McDonald and W I Montgomery

Homogeneous habitat can meet the discrete and varied resource requirements of hares but may set an ecological trap

Biological Conservation 2010, **143**: 1701-1706

Hares *Lepus* spp. are in widespread decline in agricultural landscapes due to agricultural intensification and habitat loss. The authors examined the importance of habitat heterogeneity to the Irish hare *Lepus timidus hibernicus* in a pastoral landscape. They used radio-tracking during nocturnal active and diurnal inactive periods during one year and found that in autumn, winter and spring, hares occupied a heterogeneous combination of improved grassland, providing food, and *Juncus*-dominated rough pasture, providing refuge. In summer, hares significantly increased their use of improved grassland. This homogeneous habitat can fulfil the discrete and varied resource requirements of hares for feeding and shelter at certain times of year. However, improved grassland may be a risky habitat for hares as silage harvesting occurs during their peak birthing period of late spring and early summer. The authors therefore assume the existence of an ecological trap inherent to a homogeneous habitat of perceived high value that satisfies the hares' habitat requirements but which presents risks at a critical time of year.

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A Kuczynska and E Moorkens

Micro-hydrological and micro-meteorological controls on survival and population growth of the whorl snail *Vertigo geyeri* Lindholm, 1925 in groundwater fed wetlands

Biological Conservation 2010, **143**: 1868-1875

Vertigo geyeri is a rare, tiny species of mollusc, living in calcareous, spring fed wetlands. It is considered to be

threatened within the EU community and is therefore protected under the EU Habitats Directive. This snail has very specific micro-habitat requirements, which were mostly unknown. This study established the detailed micro-hydrogeological and micro-meteorological requirements for this microscopic species in order to manage their future existence on Pollardstown Fen, Ireland and at other sites. The results show that relative humidity above 80% and close proximity to a phreatic water surface (approximately 0.1 m below ground surface) are the most important factors for maintaining populations of the snail.

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S C Culloty *et al.*

Reproduction of the biogenic reef-forming honeycomb worm *Sabellaria alveolata* in Ireland

Journal of the Marine Biological Association of the United Kingdom 2010, **90**: 503-507

The geographical distribution of the honeycomb worm *Sabellaria alveolata* (L.) stretches from the Firth of Clyde and Berwick in the North Sea as far as the Moroccan coast. Intertidal reefs formed by this species have been recorded from a range of Atlantic and Mediterranean locations. There are limited records also of this species forming reefs subtidally. In this study, the stage of development of the gametes of both male and female honeycomb worms was examined, using histology over a 14 month period. Samples came from Howes Strand and Garrettstown, County Cork in southwest Ireland. A clear cycle of both male and female gametogenesis was evident, with a distinct peak in the summer (June-September) when the majority of them were ripe. During October-January a small proportion of males contained abundant spermatozoa, but no mature oocytes were found. Over the whole sampling period the ratio of males:females was 1.4:1. Further south in Roches de la Fosse in France at the centre of its range, two spawnings and an even sex-ratio have been reported.

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B Morton

Predator-prey interactions between a population of *Nucella lapillus* (Gastropoda: Muricidae) recovering from imposex and *Mytilus galloprovincialis* (Bivalva: Mytilidae) on the south-east coast of England

Journal of the Marine Biological Association of the United Kingdom 2010, **90**: 671-681

A population of the dogwhelk *Nucella lapillus* on the south-eastern coast of England was studied over a 52-month period for changes in population size and structure, reproduction and feeding behavior. During the study period, there was a 20-fold increase in the size of the *N. lapillus* population, and recovery from imposex was total. Significant changes in feeding behavior were also reported. For example, peaks in *N. lapillus* predation were recorded over the winter months, but as population size increased, this temporal seasonality was masked due to the growing numbers of juveniles feeding on smaller individuals of *Mytilus galloprovincialis* (as opposed to barnacles) as the study progressed. Similarly, with freedom from imposex, the numbers of failed drilling attempts declined and numbers of prey with more than one drill hole increased as the incidence of kleptoparasitism increased. Predated *M. galloprovincialis* were also increasingly attacked in the antero- and postero-dorsal quadrants of their shells as the study progressed. Contrary to expectations, only a slightly positive relationship between predator and prey sizes was recorded overall however, suggesting that beyond a shell height of ~13 mm, when the transition from barnacle to mussel feeding occurs, *M. galloprovincialis* individuals of virtually any size are preyed upon by *N. lapillus*.

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A Brown, O Heilmayer and S Thatje

Metabolic rate and growth in the temperate bivalve *Mercenaria mercenaria* at a biogeographic limit, from the English Channel

Journal of the Marine Biological Association of the United Kingdom 2010, **90**: 1019-1023

The northern quahog *Mercenaria mercenaria*, occurs over a wide geographical range in North America, from the Bay of Chaleurs, Gulf of Lawrence, south to the Florida Keys, surviving temperatures between 0 and 30°C. Following introduction to England during the late 19th and early 20th centuries, a naturalized breeding population became established in Southampton Water. In this study, functions for age-specific metabolic rate, growth and derived somatic production and respiration were calculated and compared with other findings to assess the contribution of physiological impairment to the observed biogeographical limit of the hard clam *Mercenaria mercenaria*. An individual metabolic model expressed as a function of soft tissue dry mass was fitted to data of 18 individuals. Individual age-specific somatic production was calculated, demonstrating increase with age to a maximum of 3.88 KJ.y⁻¹ at 10 years old followed by decrease, and individual age-specific annual respiration was calculated, demonstrating asymptotic increase with age at 30 years old. Results found here lie within the physiological tolerances reported across the biogeographical range, suggesting that the species' biogeographical limitation in the UK to Southampton Water results from ecological rather than physiological factors.

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R H Leeney *et al.*

Abundance, distribution and haul-out behaviour of grey seals (*Halichoerus grypus*) in Cornwall and the Isles of Scilly, UK

Journal of the Marine Biological Association of the United Kingdom 2010, **90**: 1033-1040

The study investigated the patterns of haul-out habitat use and distribution of the grey seal around Cornwall and the Isles of Scilly. A full census of the coast was carried out by boat over four days, in order to make a full count of seals, and to document all haul-out sites. Regular land-based surveys were made of three haul-out sites in Cornwall, to investigate the effects of spatial, temporal and environmental factors on seal haul-out behaviour. The highest proportion of seals was observed at three haul-out areas on the Isles of Scilly. In Cornwall, seals were observed in higher numbers on the north coast, than on the south coast. At one key haul-out site in Cornwall, a distinct seasonal pattern was evident in data collected between 2004 and 2007, with higher numbers of seals present during the moulting and breeding seasons than over the summer months. There was considerable inter-annual variability in peak seal abundance, during the moulting season at this site. Data on seal abundance, distribution and haul-out behaviour may aid the designation of Special Areas of Conservation for the protection of grey seals in Cornwall and the Isles of Scilly.

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News in Brief

Consultation on the Natural Environment White Paper

Members will be aware that Defra is currently consulting on 'Natural environment: an invitation to shape the nature of England'. This is the start of the Natural Environment White Paper process. IEEM will be responding to the consultation, however our response will specifically focus on the importance of ecological and environmental professionalism, skills, standards and competency. The draft response will be available in the members' section of the website in due course. As we are intending to submit a focussed response we would encourage all members to also respond either individually or through their own organisation on other issues that you feel are equally important as well as reiterating the IEEM message. The deadline for responses is 30 October 2010. Full details at <http://bit.ly/ahicvH>.

New web-based Biodiversity Planning Toolkit

A pilot for a new web-based Biodiversity Planning Toolkit has been launched by the Association of Local Government Ecologists (ALGE). The toolkit aims to help the planning community contribute to the conservation, enhancement and sustainable use of biodiversity and geodiversity. The toolkit is still under development, but the pilot is intended to help users appreciate its potential and to understand the basic structure from the content already prepared - and to get a feel for how useful it will be in their day-to-day work. The pilot will run until early September and includes a questionnaire which should take about 10 minutes to complete. The pilot also aims to gather suggestions on future tools to develop. At present ALGE and its partners are working on tools to assist with geodiversity conservation, small-scale residential developments, wind farms, minerals and waste applications, green infrastructure, forward spatial planning and sustainable urban drainage systems. These will be added to the toolkit later in the year. More information at <http://bit.ly/d2kXd2>.

Charting progress in the UK's seas

Defra has published a comprehensive report on the state of the UK seas, *Charting Progress 2*, carried out by the UK Marine Monitoring and Assessment community. There are some improvements; coastal waters, and estuarine fish stocks and diversity are improving. However, most fish stocks are still declining and the future is uncertain for seabirds. Litter and localised pollution remain a problem. Full report at <http://bit.ly/985WpN>.

Defra cuts arm's length bodies

Defra has announced reforms to more than 30 of its arm's length bodies. Amongst the cuts, Defra has announced that it will be: withdrawing Defra funding from the Sustainable Development Commission (SDC); abolishing the Royal Commission on Environmental Pollution; abolishing the Agricultural Wages Board, the 15 Agricultural Wages Committees, the 16 Agricultural Dwelling House Advisory Committees and the Committee on Agricultural Valuation; abolishing the Inland Waterways Advisory Council; and abolishing the Commons Commissioners. More details at <http://bit.ly/9XPVmd>.

Three quarters of government websites to be cuts

The UK Cabinet Office is currently reviewing the government's hundreds of websites in a bid to cut the financial deficit. According to a statement from the Cabinet Office, the 820 government-funded websites will be reviewed to look at 'cost, usage and whether they could share resources better'. The government expects to shut down 75% of the existing sites and halve the costs of the remainder. The Central Office for Information has found that the most expensive website is uktradeinvest.gov.uk (£11.78 per visit), whilst the cheapest is defra.gov.uk (£0.02 per visit). However, Defra has announced that it will cut two thirds of the websites that it sponsors by April 2011. The list of Defra-sponsored websites

can be found at <http://bit.ly/atYp1t>. IEEM would be particularly interested to know if any of the Defra-sponsored sites due to be closed are of value to members.

Farmland bird numbers in England fall to record low

According to the UK Government, populations of breeding birds on farmland in England are at their lowest levels since formal attempts to monitor them began in 1966. Although the most recent annual decline of 5% might be due to a cold winter and recent changes to farming practice, experts believe the long-term trends caused by continuing pressure on habitats mean most of the 19 species surveyed are in trouble. The significant falls last year included kestrels (down 27%) lapwings (12%), grey partridge (23%), skylarks (5%) and starlings (20%). The figures for England are based on the annual breeding birds survey by the British Trust for Ornithology. Cuts in environmental stewardship could further exacerbate these declines.

Poisoning of Scottish birds of prey at highest levels in 20 years

RSPB figures reveal that birds of prey such as golden eagles and red kites were poisoned in record numbers in Scotland in 2009 and now conservationists are pushing for stronger laws to combat wildlife crime on Scottish grouse moors. RSPB Scotland said that ministers should make grouse moor owners legally responsible for attacks on birds of prey on their estates because existing laws and voluntary codes had failed. The RSPB's latest official figures showed there were 46 proven poisoning incidents targeting birds of prey last year, the highest total in two decades, and another seven cases where illegal poisons were found on shooting estates.

Good news for Britain's red squirrels

The first annual report of the Red Squirrel Survival Trust (RSST) indicates that red squirrels are at last fighting back at key sites throughout the UK, including Lancashire and Anglesey. RSST is also supporting the Cornwall Red Squirrel Project, which aims to reintroduce reds to the Lizard and West Penwith over the next three to five years. The charity's report describes promising developments on the England-Scotland border where the Red Squirrels in South Scotland project has created a grey squirrel control zone stretching from coast to coast. The charity is currently co-ordinating discussions to develop a co-ordinated red squirrel project for northern England.

Conservation groups warning over funding cuts

A coalition of 25 conservation organisations in England, including the RSPB, RSPCA, CPRE, Friends of the Earth England and the Wildlife Trusts, has warned the government about the dangers of cutting public funding in the countryside. The coalition said reducing funding for rural projects would have a profound effect on wildlife, landscapes and people and that short-term savings would create huge, long-term economic costs. It said that without funding for protected areas (e.g. Sites of Special Scientific Interest) reedbeds would dry up, heathlands would vanish and rivers and canals would get clogged up. Reducing the budget for wildlife-friendly farming and land management measures (i.e. higher level stewardship) would threaten species such as smooth snakes, bees, butterflies and bats, as well as wildflowers and woodlands. At sea, a lack of conservation measures could damage reefs and seagrass beds, while an increase in illegal fishing could put pressure on fish stocks.

Pembrokeshire badger cull halted after appeal

The planned cull of around 1,500 badgers in southwest Wales has been halted after protesters won their legal challenge to stop it. The Badger Trust appealed against Welsh Assembly Government plans for a trial cull to reduce TB within cattle. The

trust had questioned the cull's effectiveness, though farmers losing diseased stock wanted action. What was clarified during the Appeal Court hearing was that a 9% reduction in cattle TB was all the government was expecting. Two of the three judges said this did not amount to a 'substantial' reduction in disease - and that is what is required by law to kill badgers, which are a protected species. One consequence of this ruling could be an increase in the extent to which farmers quietly (and illegally) dispose of badgers on their land.

'Finding Sanctuary' first progress report

The project responsible for developing Marine Conservation Zones (MCZs) in the English West Country has published its first progress report. Finding Sanctuary's work will eventually lead to the setting up of Marine Conservation Zones (MCZs) throughout the region, protecting species and habitats of national importance. The report is the first of three that will be delivered to the Science Advisory Panel - an independent body comprised of expert marine scientists specifically set up to support the four regional projects in the MCZ selection process by offering objective scientific assessment of site proposals, and independent advice to Ministers. The project's final recommendations will be presented to the Government in June 2011, and subsequently Defra will hold a public consultation on the proposed MCZs. The progress report can be downloaded at www.finding-sanctuary.org.

Hampshire ferries illegal

A court ruling in favour of the Lymington Rivers Association in Hampshire has found that a ferry company that introduced a larger vessel to its Lymington to Yarmouth route did so unlawfully because it did not carry out an Appropriate Assessment. The company will still be permitted to operate the larger ferries but must now properly investigate ways to minimise any adverse impacts that they may have on the local wildlife. Not only does this help to safeguard local wildlife, but it has also greatly increases the range of damaging activities that can be addressed through the proper application of the European Habitats Directive. Therefore this ruling may well have a much wider impact than the issue at Lymington.

Free marine public lectures

The Birkbeck University of London Institute of Environment will be holding a free public lecture series on 'Seas for Life: Our oceans, their future and their biodiversity' on Friday evenings in London during October and November 2010. For more information please visit <http://bit.ly/11obgl>.

Improving cost-effectiveness of Natura 2000 conservation

An analysis of conservation management strategies in the EU in *Biodiversity and Conservation* has identified a number of options for increasing the cost-effectiveness of conservation within the Natura 2000 network of protected areas. The various options were identified as follows: 1) societal benefits of conservation needed to be accounted for, e.g. higher recreational value of a site will increase tourism; 2) careful consideration of trade-offs associated with stakeholder involvement are needed, e.g. more public participation leads to higher decision-making costs but reduces the risk of costly conflicts; 3) funding for conservation projects should be guaranteed in the long-term, as it delivers more conservation benefit for a given budget; 4) more money should be spent on implementing conservation management plans, rather than making them, as this achieves more conservation for the same cost; and 5) more research is required to better understand trade-offs in conservation, management and optimum timescales and levels, e.g. local, regional, national) for design of conservation policies.

A baseline for measuring progress

Europe's failure to halt biodiversity loss by 2010 was partly caused by gaps in available knowledge about the state of biodiversity in Europe and the absence of easily quantifiable targets. The Biodiversity Baseline launched at Green Week by the European

Environment Agency (EEA) is intended to solve these problems and provide policy-makers with a starting point for measuring the state of biodiversity inside the EU and unveiling major information gaps. It provides a framework for articulating linkages between species numbers, habitats status and ecosystem services, and uses facts and figures that are scientifically robust and have been validated and/or peer reviewed in the Member States. Download the PDF at <http://bit.ly/cudagX>.

Survey on how environmental assessments address ecosystem services

The World Resources Institute (www.wri.org) is currently working on ensuring that the tools and information needed to address ecosystem services in Environmental Assessment are available. WRI needs to understand where you stand regarding ecosystem services, the ways you address them in your work, when and why you do not address them, and what you think needs to be done to have them addressed. The survey (<http://bit.ly/cuwJhZ>) will take about 10-15 minutes. We appreciate you sharing your experience, knowledge, and ideas by 8 October 2010. For more information please contact Florence.Landsberg@wri.org.

IPBES launched in Busan

The recent UNEP meeting in Busan, South Korea has officially recommended the establishment of an Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). Delegates agreed that IPBES will be established as an independent intergovernmental body, administered by one or more existing UN organisations. IPBES will respond to requests of government and also welcome suggestions from all relevant stakeholders. IPBES will perform regular and timely assessments of knowledge on biodiversity and ecosystem services. These assessments will be scientifically independent and peer-reviewed. IPBES will also support policy formulation and implementation, and place a major emphasis on capacity building needs to improve the science-policy interface. The official launch will most likely take place during the 65th session of the UN General Assembly (on 20-30 September 2010). <http://ipbes.net/>

Ecologists shun the urban jungle

According to a report in *Nature*, only one in six ecology papers tackles inhabited areas. The world's top ecologists are failing to study the landscapes that most need work and potentially risk delaying conservation efforts and making their subject irrelevant. The bias is a major problem for both the sector and the environment because it is areas used by humans, which take up most of the Earth's landmass, that are in most need of conservation. The analysis also found that true wildlands, areas devoid of humans, were also understudied.

Online conference on soil bioengineering

IEEM members with an interest in the growing field of ecological engineering might wish to participate in an international internet conference that is being hosted by the State Technological University of Maikop in Russia. The theme is 'Soil Bioengineering in the Modern World' and its scope includes the following: biological engineering in the context of landscape planning, agricultural landscapes, water-logged soils, and rivers and catchments; biological engineering in urban land and in transport systems; and creation and maintenance of basic biological engineering constructions. To find out more go to the portal at <http://mkgstu.ru/konf/> and in the English section click on 'download an information message' for an MS Word document with full details. The final round-table conference is scheduled for 1 December 2010 as an online event. IEEM member Alan Hopkins (environment.hopkins@virgin.net) is a member of the scientific committee and is happy to answer queries.

Biodiversity 100

George Monbiot and *The Guardian* are currently collecting ideas for 100 actions that governments should take to halt the loss of biodiversity. Add your views at <http://bit.ly/byOKur>.

Tauro-Scatology and the Recession

These are uncertain times, with many IEEM members having to deal with the impact of cuts in public spending as the Government tries to reduce the deficit. At times like these, we need original and creative thinking. At times like these, we need people who can think outside the box. At times like these, we need a Professor of Tauro-Scatology like we've never needed a Professor of Tauro-Scatology before. What is your prescription for the economic crisis, Prof?

Economic and fiscal tauro-scatology isn't my field. At times like these, we all need to stick to what we know and so I am going to start where I finished last time, with a consideration of academic journals.

This sounds like a digression.

Not entirely: bear with me. Remember last time when I pored over *Journal of Applied Ecology*, suggesting ways in which authors might sharpen up their message for a 21st century audience?

Just about.

Well, one feature that struck me about many of the papers that I read, even in a high-ranking journal such as *Journal of Applied Ecology*, is the extent to which authors rely on correlation coefficients, and related statistics, to support their hypotheses. We all know how useful these can be to demonstrate relationships between two variables, but we also know how easily they can be abused.

Correlation is not the same as causation, for example.

Exactly. Demonstrating a relationship between X and Y does not mean that the value of Y depends on the value of X. Both X and Y may be responding to an unmeasured variable. This is particularly important for us as applied scientists, because we are often asked to predict outcomes of particular strategies. It is tempting to say that because the correlation coefficient, or coefficient of determination, for a particular relationship is high, then adjusting the level of X will lead to a shift in the level of Y, without any hard evidence of an underlying causal relationship.

To be fair to ecologists, experimentation is often difficult, and levels of natural variability are often high, so it is no wonder that many researchers fall back on survey-based approaches, and measures of association.

No doubt you are right. All I want to do is make sure that people think hard about the true meaning of correlation coefficients before they scatter them liberally through a paper.

How are you going to do that?

The 'R tax'. Every use of a correlation coefficient, Pearson's or Spearman's, in a paper in a peer-reviewed journal incurs a fee. Not only does it focus the mind of the researchers, it also spares us, the readers, from those huge matrices of correlation coefficients spewed out by statistical software packages.

What will you do with the money you raise?

We'll use it to set up a fund for experimental ecology, to encourage researchers to adopt methods that demonstrate causal relationships rather than just associations between variables. Of course, if the scheme works as planned, people will cut down the number of correlation coefficients that they use, and the fund won't raise an enormous sum of money.

Unless, of course, the R tax turns out to be like taxes on alcohol and tobacco, and simply increases the cost of something to which people are addicted. Then we can just simply hike the R tax by a small amount each year and actually raise quite a lot of money.

There is that. People will find more and more of their limited research budgets being set aside to feed their habit. They'll find that they want to use more, not fewer, correlation coefficients, and turn to dubious under-the-table contracts with shady developers in order to fund their research. The Netherlands will, as ever, be a haven of liberalism and toleration and people will be flying to Amsterdam in order to write up their work in Correlation Coffee Shops. Before too long, ecologists will be signing into The Priory to clean themselves up.

What do you do next?

We'll need to explore treatment options. I understand that there is already something called Bonferroni therapy, in which counsellors persuade multiple correlation abusers that their significance levels aren't what they used to be, but people can become acclimatised to this treatment. We may have to set up Correlators Anonymous, with a 12 step plan to cut down on the abuse of correlation coefficients by the most persistent offenders.

Then people will start to argue for legal controls of correlation coefficients?

Exactly. Academics will start debating the ethics of correlation coefficients, and whether public policy should be based on studies that rely largely on measures of association. A respectable broadsheet newspaper will pick up the issue, and a think tank somewhere will come up with a strategy to reduce the use of correlation coefficients. A minister will give a speech advocating that policy should only be based on controlled experiments and a Statistics Czar will be appointed to steer the Government's Correlation Abatement Strategy.

And then what?

I would have thought that is obvious. In the run-up to the next election, the Government will release a report showing a significant decrease in the use of correlation coefficients by applied scientists. They will hail this as a policy success, ignoring one important fact.

What is that?

The researchers used a correlation coefficient in order to demonstrate that this decline was significant.

Another great scheme bites the dust, then? Thanks again for your time Prof.

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 - Aquatic Landscapes




European Network of Environmental Professionals

ENEP is the European electronic Network of Environmental Professionals. It is a web portal set up by EFAEP (European Federation of Associations of Environmental Professionals), where its members can record their contact and professional details and where both members of EFAEP and non-members can search for environmental professionals.

The two main aims of ENEP are:

1. to facilitate active communication and exchange of knowledge between EFAEP members, and
2. to provide access to the expertise and experience of environmental professionals at the European level.

This will also give the environmental professionals of Europe a platform where they can present their professional profiles, where they can get in touch with each other, and where clients and service providers can meet.

EFAEP is an association of environmental professionals from all over Europe and was founded in 2002 in response to the increasingly important and diverse role of environmental professionals. The restoration, protection and enhancement of the environment is no longer a secondary phenomenon but has penetrated all areas of life. In response to the growing sensitivity of society to environmental issues, the activities of environmental professionals have been steadily growing over the past decades and have become an unquestionable necessity.

EFAEP brings together professionals who are working in the field of the environment all over Europe and gives them an opportunity to exchange their experiences from their home countries, to find common solutions and to learn from successes and failures made in the current and future member countries of the European Union.

ENEP is the unique web tool EFAEP uses to connect its 40,000 members. It is currently the only internet site in Europe letting environmental professionals thoroughly describe their own experience and capabilities, effectively classify their skills, and quote their papers and projects in order to build a really complete profile.

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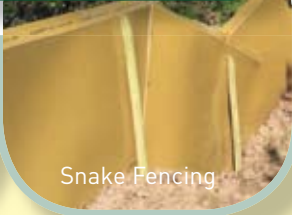
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Blackpool: 17 March, Middlesbrough: 26 May, Manchester: 16 June, Cardiff: 14 September, Bristol: 23 September

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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 **8 October 2010**. 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.

Mr Philip Belfield, Ms Gwenda Diack, Mr Kevin Hart, Miss Rebecca Miller, Miss Caroline Moscrop, Mr Ian Murat, Miss Anna Palmer, Miss Lorna E Parker, Mr Sean Reed, Miss Louise Samson, Dr Dean A Waters, Mr Mark S Wilkinson

APPLICATIONS FOR ASSOCIATE MEMBERSHIP

Mr David Allen, Miss Helen Forster, Mr James Humphreys, Mrs Coralie Niven

APPLICANTS WISHING TO UPGRADE TO ASSOCIATE MEMBERSHIP

Miss Joanne Ellam

ADMISSIONS

IEEM is very pleased to welcome the following new members:

FULL MEMBERS

Mrs Liz Anderson, Mr Danny Ardeshir, Mr Jason P Ball, Mr Naveed R Bhatti, Mr Steve Bloor, Mr Ian Carle, Mr Michael A Carr, Dr Jacqueline A Carroll, Miss Rachel Craythorne, Ms Ann Y Deary, Miss Jennifer Edwards, Dr Martin J Gaywood, Mr Gareth E Grindle, Mr Peter J Harris, Mr Thomas Hastings, Mr Simon Jennings, Dr Sarah Kimberley, Mrs Kirsty S Kirkham, Mr Charles Morrison, Miss Stephanie Murphy, Mr Charles E Perez, Mr Josef Saunders, Dr Jane A Sedgeley, Mr Steven Shepherd, Mr Paul Spencer, Mr Christian Williams

ASSOCIATE MEMBERS

Mr Alex Boulton, Miss Natasha Collings, Mr Raymond J Cranfield, Mr Christopher Cullen, Mr Henry J Dobson, Mr Robert Firmin, Miss Cheryl L Gogin, Mr Gerard F Hayes, Mr Andrew J B Lester, Mrs Anne Litherland, Miss Laura E Palmer, Miss Louise J Parker, Mrs Hilary M Phillips, Prof Carmen Postolache, Mrs Susan Rowell, Mr Andrew P Slater,

GRADUATE MEMBERS

Mr Ian Blessley, Mr Andrew P Bodey, Miss Rebecca L Brown, Miss Hannah Crow, Mr Fabio M Delle Grazie, Mr Shaun M Denney, Miss Kirsten Dewhurst, Miss Penny J Helme, Mrs Jill Gillard, Miss Zoe Grange, Mr Benjamin W Hall, Mr Daniel K G L Hunt, Miss Jacquelyn Kerr, Mr David A Mallaburn, Mr Christopher A Melhuish, Mr James E Meyer, Mr Ryan J Oakley, Mr Simon Parkes, Mr David Phillips, Miss Estelle Skinner, Miss Carys Solman, Mr Jonathan Spencer, Miss Jordan A Taylor, Mr Sujai Veeramachaneni, Miss Julie Watson, Miss Stacey Whiteley

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Miss Helen J Connett, Ms Susan Craig, Mr Nicholas J Eley, Miss Ann-Marie MacMaster, Mr Simeon Smith

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UPGRADES

The following have successfully upgraded their membership:

UPGRADES TO FULL MEMBERSHIP

Miss Julia G Bastone, Miss Victoria Bennett, Mr Laurence G Brooks, Mr Adam Ellis, Mr David Fallon, Mr Thomas B Gardiner, Mr Stuart A Graham, Miss Leona Graves, Miss Catherine Greenhough, Mr Graham Hill, Miss Claire Holder, Miss Alexandra L Hollands, Miss Rebecca CM Johnson, Dr Rosalind F King, Mr Geoffrey J Moxon, Miss Hannah L Roberts, Mr Andrew G Upton, Mr James Vafidis, Mr David Watson,

UPGRADES TO ASSOCIATE MEMBERSHIP

Mr Christopher Barker, Mr Stuart Blair, Mr Joseph W Bull, Mr Simon Cope, Miss Alys G Duggan, Miss Faye M Durkin, Miss Rebecca A Gill, Mr Thomas A Haynes, Miss Sara J Hill, Mrs Helen Lundie, Mr Niall Lusby, Dr Sian Moore, Ms Caroline Nash, Mr Ross Phillips, Miss Diane Wood

UPGRADES TO GRADUATE MEMBERSHIP

Mr Barry Clarkson, Mrs Miranda Green, Mr Daniel L Jones

Forthcoming Events

IEEM Conferences

DATE	EVENT	LOCATION
1 October 2010	North East England Section Conference and AGM - Floods, Floodbanks and Wetlands: Lessons Learned on the River Till	Northumberland
20 October 2010	West Midlands Section Conference - Bats and Mitigation: Sharing Good Practice	Worcestershire
21 October 2010	Marine Conference and Scottish Section AGM - Ecological Issues in the Marine Environment	Fife
2 - 4 November 2010	Autumn 2010 Conference and AGM (and Irish Section AGM) - Beyond 2010: Missed Targets, New Opportunities	Dublin
23 March 2011	Spring 2011 Conference - Invasive Species: New Natives in a Changing Climate?	London
1 - 3 November 2011	Autumn 2011 Conference and AGM - Tools for Rebuilding Biodiversity	Liverpool TBC

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

IEEM Training Workshops

6 October 2010	Field Signs and Habitat Management for Water Voles	Scotland
8 October 2010	Introduction to the National Vegetation Classification (NVC) Survey	South East England
11 October 2010	Water Vole Ecology	South West England
11 - 12 October 2010	Macro-fungi Identification for Beginners	South West England
12 - 13 October 2010	Water Vole Conservation and Development	South West England
14 - 15 October 2010	Water Vole Conservation and Development	South West England
2 - 3 November 2010	An Introduction to ESRI ArcGIS for Ecologists and Ecological Consultants	West Midlands
4 November 2010	Accessing and Using Satellite Data in GIS - An Introduction for Ecologists and Ecological Consultants	West Midlands
10 November 2010	Surveying for Bats and Development - The Consultants' Approach	South East England
10 November 2010	Badgers: Survey, Exclusion and Mitigation (NB: This workshop date has changed - was previously on 17 November)	Scotland
11 November 2010	Peatland Restoration (NB: This workshop date has changed - was previously on 18 November)	Scotland
20 - 21 November 2010	Outdoor First Aid and Incident Management	South East England
24 November 2010	Winning Approaches: What do you Need to Convince a Planning Inspector?	South East England

For the full list of workshops and more information please visit: www.ieem.net/workshops.asp

IEEM Geographic Section Events

15 September 2010	West Midlands Section AGM with speakers	Solihull
16 October 2010	Scottish Section Event - Skills Sharing Workshop: Badger Surveying in Association with Scottish Badgers	Ayr
23 October 2010	South East England Section Event - A morning dip into freshwaters	Oxford
29 October 2010	South East England Section Event - The Thames Basin Heaths SPA Delivery Framework	Surrey

For more information on IEEM Sections please visit: www.ieem.net/geographicsections.asp