



A Future for White-clawed Crayfish?

Paul Bradley, MIEEM

Introduction

This short article introduces key elements of a five-year research project (1999-2004) investigating mechanisms of population change in white-clawed crayfish (*Austropotamobius pallipes*) in Northwest England, and highlights certain important issues to be considered by professional ecologists and environmental managers when contemplating project work involving white-clawed crayfish (Plate 1). The style of the current article is deliberately brief, as further more detailed advice will be published during 2004.



Plate 1. White-clawed Crayfish

Conservation status of white-clawed crayfish

Nationally, many populations of white-clawed crayfish have suffered severe declines over the last 30 years. Much of this decline has been attributed to the spread of the American signal crayfish (*Pacifastacus leniusculus*), and the crayfish plague (*Aphanomyces astaci*) that it carries. Catchments in the south and east have been particularly affected, and populations in the Midlands have also suffered dramatic declines.

The current distribution map shows that the species remains widespread throughout much of the country. But in fact only fragments of former populations now exist in most of its former range, and plague outbreaks and/or non-native crayfish species have been recorded or suspected in many catchments. White-clawed crayfish are undoubtedly experiencing one of the most rapid declines of any species in this country, and could conceivably be heading for near extinction in many regions over the next decade.

Despite the observed decline of white-clawed crayfish, mass mortality has been recorded at only a relatively small number of the sites from where they have 'disappeared'. Local extinctions are suspected to have occurred, and many are thought to have resulted from *A. astaci* infection. However, there have been relatively few confirmed cases of crayfish plague in this country and, before the current study, this devastating disease had been little studied in the field. A few remaining catchments in Northwest England support some of the country's last strongholds for white-clawed crayfish.

The current research project

In July 1999, my then employer, the Environmental Consultancy University of Sheffield (ECUS), was commissioned to investigate the possible effects of quarrying discharges and dewatering on selected watercourses in the Yorkshire Dales. One element of the fieldwork was a baseline survey of white-clawed crayfish. Fascinated by the intriguing results of this fieldwork, and concerned by the lack of previous field-based research, I resigned from my position as ECUS Principal Ecologist to register for a p/t MSc (latterly PhD). The study has since benefited from the results of an evolving series of field investigations, and has made progress in furthering our understanding of key mechanisms of population change in white-clawed crayfish, particularly involving crayfish plague.



Plate 2. River Ribble.

Over the last four years, I have witnessed the near extinction of white-clawed crayfish from a river catchment (Plate 2), and have also investigated population declines at off stream sites throughout the region (Plate 3). A better understanding of the mechanisms of population change is now enabling additional conservation measures to be developed and implemented. Fish stocking practices have been revised at several key sites, and both English Nature and the Environment Agency have introduced revised procedures aimed at reducing the spread of crayfish plague between catchments. In addition, the study has discovered previously unknown populations of white-clawed crayfish,

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Beckett announces the decision

The long awaited announcement from the government that some GM production can go ahead could have been worse. At least the ban remains on sugar beet and oil seed rape, both of which have wild relatives in Europe. The statement in the House was 28 paragraphs long and was, in my opinion, a fair statement of the facts.

The maize argument, though, rests partly on evaluating the effects of wildlife by comparing GM production methods with the established ones which normally make use of Atrazine as the herbicide.

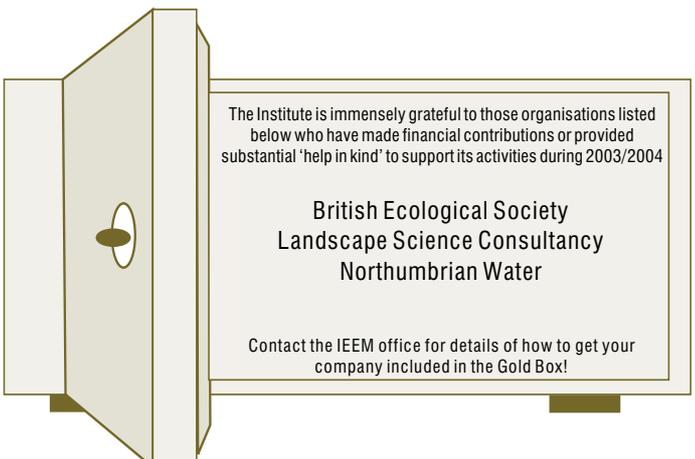
I remember as a student working on herbicide trials for Ciba Geigy in which Simazine and Atrazine were much in vogue. Though I hate to admit it, this was actually 40 years ago. I don't think you would need to be much of a clairvoyant to anticipate that Atrazine would soon be phased out and so it has turned out to be. To any scientist, a decision made partly on the basis of a trial involving a substance about to be made obsolete must be bizarre in the extreme. As ecologists, drawing conclusions from carefully controlled, sensibly based experiments goes to the very heart of our profession and perhaps this government reliance on such an experimental result, more than anything else, is difficult to accept. Replacements for Atrazine there will certainly be and it is not difficult to envisage a situation where GM maize was, in comparison to the new herbicide, a worse solution for wildlife – without a sensible trial we remain in the dark.

Worse still, the UK decision seems to have been taken in advance of a Europe wide decision, so we could have a situation where maize grown near Dover is GM and maize grown near Calais is not. How far does maize pollen travel on a good north-west wind? The UK's decision comes in the middle of discussions in the EU to lift the *de facto* ban on authorising new GM products and maize pollen will be free to roam over the frontiers of Europe. But consider the following: that in the Agriculture Council on 26-27 April, Member States might decide to lift the current moratorium altogether and then - here's a thought, we might have to thank Margaret Beckett for actually limiting the GM juggernaut in England. What will the Welsh Assembly and Scottish Parliament decide?

There is also the related point, that regardless of the logic of the basic decision, there are to be some pretty hefty controls imposed which might, in the end, undermine the economic case.

I can't help wondering though what the effects of GM maize might be in say south/central America – home of very many varieties, a vast gene pool and with some, perhaps as yet unexplored economic potential. As I mentioned in my previous editorial on this matter, if there are advantages to third world agriculture and poverty alleviation, they certainly need to be considered as the government acknowledges. The WTO talks and the role of the IMF could, if properly mobilised, make the advantages of GM maize for the third world a mere drop in the ocean – unless you're the Agri-chemical industry that is!

Jim Thompson



and is also developing generic advice for the conservation agencies. Therefore, the fate of white-clawed crayfish might not be quite as gloomy as it was four years ago.

Key mechanisms and priorities

The national decline of white-clawed crayfish has attracted much attention, and a plethora of action plans have been written by many bodies over recent years to help highlight its perilous state. However, most of these are based upon the perhaps mistaken belief that the fate of white-clawed crayfish in this country will be largely determined by our success in controlling the spread of invading non-native crayfish species (principally signal crayfish). In the long term, this might well be the case, but in many areas white-clawed crayfish have been lost well ahead of the spread of non-native crayfish.



Plate 3. Investigating standing waters.

That signal crayfish eventually displace white-clawed crayfish at sites where they coexist is generally supported by field observations. However, the role of the now widespread signal crayfish in the transmission of crayfish plague is still far from clear. There are many examples of the two species co-existing in the same system for several years without crayfish plague being either confirmed or suspected.

The inescapable conclusion, which is supported by our current study, is that observed crayfish plague events might not in all (or even most) cases be triggered by the arrival of signal crayfish into a system. Although the disease appears likely to have been brought into this country (and Europe) by North American crayfish species, it may now be spreading through native white-clawed crayfish populations, at least partly independent of the continuing spread of signal crayfish. Even if the conservation agencies are successful in finding effective control and eradication techniques for non-native crayfish species, the progress of the disease through the native population might reasonably be expected to continue.

Our research has found that crayfish plague can remain active (and therefore infective) in a white-clawed crayfish population for several years. Infected fragments of former populations can be extremely difficult to detect, and may remain as potential sources of transmission to new areas for some time. Therefore, in considering safe working practices to minimise the risk of spreading crayfish plague, professional ecologists and environmental managers should not only consider sites where non-native crayfish or crayfish plague have been recorded (or suspected), but must also be aware of the need to minimise wet transmissions (and deliberate translocations!) between sites where only white-clawed crayfish are present (or have previously been recorded).

Crayfish plague almost certainly poses the most serious threat to the short-term survival of white-clawed crayfish in Britain. Its longer-term survival may also be threatened by a number of additional factors, including non-native species, pollution events and habitat change. By contrast, individual development projects might pose a lower risk to the species' survival, provided that they do not provide a mechanism for the transfer of crayfish plague or non-native species between catchments. Therefore, it is vital that professional ecologists and environmental managers take extreme care to ensure that their actions (and advice) do not facilitate the spread of these extinction mechanisms to new areas, especially to headwaters and off-stream sites.

Professional practice and training

When I began the current study, I was struck by a degree of protectionism that appeared to characterise some of the previous crayfish work in this country. I believe that those who are now involved in crayfish work, in all sectors, should have particular regard for IEEM's objectives: to advance the science, practice and understanding of ecology and environmental management, and to further the conservation and enhancement of biodiversity.



Plate 4. IEEM crayfish workshop (Jul-02).

To help promote professional standards in this area, we have been running IEEM training workshops 'Working with Crayfish' for the last three years (Plate 4). During 2004, there will be two more residential workshops, again based at FSC Malham Tarn Field Centre. The first of this year's courses, focusing on survey, monitoring and conservation, has been scheduled for a weekend at the start of the season for crayfish fieldwork (9th-11th July 2004). Later in the year, the Stage II course (6th-8th September 2004) will focus on crayfish plague, non-natives, and mitigation of development works.

Acknowledgements

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Paul Bradley is currently completing a p/t PhD at the University of Sheffield. Paul would be grateful to hear personal observations of population change in white-clawed crayfish, reports of dead or dying crayfish, and any comments on this article.
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The Palace Leas Hay plots: what has this historical experiment to tell us today in relation to fertilisers and grassland management?

Steve Pullan MIEEM

Introduction

In 1895 Northumberland County Council with Newcastle University acquired Cockle Park Farm in Northumberland as a northern experimental site to undertake similar experiments to those such as the Park Grass experiment at Rothamstead Experimental Station which had started 54 years earlier. The grassland experiments at Cockle Park were Palace Leas, a hay meadow experiment, Hanging Leaves and Tree Field, both grazing experiments with fertiliser treatments similar to the Palace Leas, and The Backhouse experiment which was a rotational arable grass experiment. The Palace Leas is the only remaining experiment of this group after all the other experiments were terminated in 1957 and this was written up in detail by Pawson, (1960). So does this remaining experiment have anything useful to say today 100 years on and was it worth keeping?

Table 1. Manure and fertilisers applied to the Palace Leas plots and the amount of nutrients supplied by them.

Plot (ha)	Manure	Fertilisers currently applied - kg/ha				Nutrients supplied kg/ha/year		
		AS ¹	TSP ²	MP ³	GM ⁴	N	P ₂ O ₅	K ₂ O
1	23	40	44	46	52	137	91	188
2	20	3	0	0	0	123	73	1160
3	231 ⁵	0.40	0.44	0.46	0.55	68	45	94
4	231 ⁶	0	0	0	0	60	35	80
5	431 ⁶ 100	0.40 0.10	0.44 0.10	0.46 0.10	0.55 0.55	73	51	100
6	0	0	0	0	0	0	0	0
7	0	100	0	0	0	34	0	0
8	0	0	87	0	0	0	41	56
9	0	0	0	93	0	0	0	56
10	0	100	87	0	0	34	41	56
11	0	100	0	93	0	34	0	56
12	0	0	87	93	0	0	41	56
13	0	100	87	93	0	34	41	56

¹Ammonium sulphate (21%N), ²Triple superphosphate (37%P₂O₅), ³Potassium chloride (65%K), ⁴Sodium nitrate (16%N), ⁵Plots 3-5 receive different materials on a two or four year cycle: basic. In this case the plot receives 20 t/ha FYM (6kg/ha N, 3.5kg/ha P, 8kg/ha K) in one year and chemical fertilisers in the next. Adapted from Shiel (2003)

Table 1. Manure and fertilisers applied to the Palace Leas plots, and the amount of nutrients supplied by them.

The Palace Leas experiment

The objective of the Palace Leas was to study on a long-term basis in a northern climate, the impact of a range of manure and fertiliser treatments on quality and quantity of the hay crop and on the botanical composition of the herbage in the field. The Palace Leas was marked out in 1896 into 13 plots, each about 120 m by 15 m (~0.15ha in size), to which a range of treatments were applied (Table 1). On each plot there is a range of manure, fertiliser, or combination of two or more fertiliser types applied, apart from one plot which was left as an untreated, 'control' (Table 1). The amounts of fertilisers and manures treatments applied are considered small by modern standards, but were considered generous at the time. The fertiliser treatments have continued unchanged apart from changing from basic slag to triple superphosphate as the phosphorus-containing fertiliser in 1976, due to the problem of obtaining basic slag. The plots were established in what was at the time described as 'old land hay'. As the Palace Leas is close to the farm buildings and had previously received more Farm Yard Manure than

other fields used as sites for experiments, it was considered one of the best on the farm (Pawson 1960). The application rates of FYM used on plots 1, 2 and 5 were considered extravagant in 1890 and Plot 4 was considered closest to normal practice, with plot 3 being the same FYM with the addition of some inorganic NPK in the alternate years. The meadow management has been consistently applied for the last 100 years and this consists of cutting in the first week of July and grazing the aftermath in autumn and sometimes lightly in spring, using a mixture of cattle and sheep. There has been no attempt to control movement of stock when the plots are grazed over the 100 years.

Discussion of the impacts

Palace Leas, as with other long-term experiments, such as Park Grass, has been influenced by a range of methodological changes. Palace Leas has primarily suffered from survey methodological and environmental changes only and it has not suffered from treatment changes, other than in the form of the phosphorus applied. It has been consistently shown that grassland composition is impacted by grazing, cutting and fertiliser and Smith (1988) demonstrated that methodology changes on the Park Grass experiment caused declines in species richness and diversity when the grazing ceased. The lack of a definitive starting point for the Palace Leas and Park Grass experiments means some care needs to be exercised in defining the true starting plant community for these long term experiments. Pullan & Shiel (in prep) for the Palace Leas and Dodds et al (1995) for the Park Grass have used the data available and matched this to the National Vegetation Classification (NVC) (Rodwell 1992) to work out what the original NVC communities were. Botanical analyses were not completed before the start of the treatments on both Park Grass and Palace Leas until after the differential treatments had begun. On Palace Leas the analysis was completed with the first hay cut in 1897, hence little time had elapsed for botanical differentiation to occur. The early results 1897-1903 showed an impact of fertiliser on the grasses species and this changed the balance between *A. capillaris*, which dominated the plots at the start and even at the time this was considered peculiar, and the other more productive grasses. The plots in 1897 had very low levels of *Lolium perenne* <1% and this species did respond to the addition of fertiliser and has come to dominate on plot 1 in particular, but is still scarce or rare on most other plots (Pullan & Shiel in prep). On plots 8 and plot 12 clovers have obtained co-dominance or are very frequent, but are infrequent on most other plots and have less than 5% cover on many of the other plots. Plot 11 in particular, is dominated by *Fescue* grasses, *Agrostis* and some *Anthoxanthum odoratum*, *Luzula campestris* and an odd herb. The impact of dunging is very visible on this plot, as it can be observed where the old cow pats landed and this lasts over several years in the colour of the sward and the grass community found in such a patch.



Plot 1 showing the aftermath growth on the plots after the hay cut 3 weeks earlier. The sharp boundary is between plot 1 and an area that is used as a guard area.

From the data gathered in 1997 it would seem that the untreated 'control' (plot 6) might not be the true control treatment, as this plot has changed NVC community and become more acid (Figure 1). The other plots which have changed the least from starting plant community type are plots 2, 4 and possibly plot 3. Plot 2 is a very productive MG6b and can be seen as a transition to MG7, with high a cover of *Lolium perenne* but plot 4 still is a close match to both MG6 and U4b, with low levels of *Lolium perenne*. Plots 3 and 5 receive some fertilisers and may be similar to the starting point because the amounts of fertiliser are only a fraction of the amount supplied by the manures. The best NVC fit for the whole field as the start community in 1897 is U4b upland acid grassland. This community occurs on all plots in that year and the subsequent 6 years. This community is the most productive of the acid upland grasslands. It is generally characterised by being associated with enclosed pastures around the upland fringe and has strong similarities to MG6b (Rodwell 1992). However, the next best fit and the one that Pullan & Sheil (in prep.) argue is more likely the starting point is a *Lolium perenne* poor MG6b, taking account of the unusually high level of *Agrostis capillaris* with more than 70% cover on most plots. The main differences between these two plant communities MG6b and U4b is in the amounts of species like *Cynosurus cristatus*, *Lolium perenne* and *Ranunculus acris* (Rodwell 1992).



Plot 6 showing the aftermath growth on the plots after the hay cut 3 weeks earlier.

If one looks at the archetypal conservation meadows, MG3 upland meadows then the management imposed upon them will give the base line for the management of similar grassland types. The picture for Piper Holes and Bowberhead meadows, some of best examples of this community type give an interesting picture of the management involved. These meadows having been cut and grazed in the same sequence since the 1940's (Smith & Jones 1991), have also received an annual dressing of around 13 tonnes ha of rough muck, along with a programme of gradual liming on every field over 30 years They also received basic slag, which was applied about five times between 1940 and 1965 at a rate of around 1250 kg ha⁻¹ (250kg P ha⁻¹ approx 50kg P ha⁻¹ year⁻¹ of Basic slag and 46kg P ha⁻¹ year⁻¹ from the FYM) (Rodwell 2002).

From 1940 to 1970 this could be considered as being similar to plot 3 on the Palace Leas, but now this can be said to be closer to Plot 4 (Table 1) since no slag has been applied since 1965.



Plot 8 showing the aftermath growth on the plots after the hay cut 3 weeks earlier.

If one considers the yield data on Palace Leas (Figure 1), then the lowest yield was obtained from the no fertiliser treatment. This result is borne out in part by the comments about Agri-environment schemes (Howard 1997). This has major implications for the maintenance of the farming community support for such schemes, if the compensation does not take account of the dramatic fall in yield. The yield differential between plots 1 and 6 is, 6t ha⁻¹ of Dry Matter hay yield in 1997. Therefore, the implications of the Palace Leas plots for conservation management is if the objective is to maintain species diversity, then FYM should

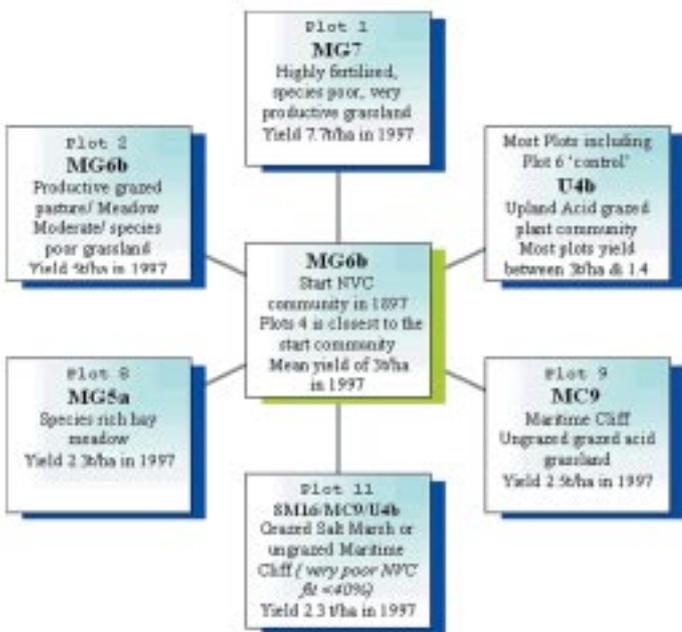


Figure 1 The main NVC plant communities after 100 years of the same fertiliser treatment on the Palace Leas plots in 1997 based upon the results of Pullan & Shiel (in prep) All NVC 'Tablefit' results were 60%+ apart from plot 11.

When Dodd et al. (1994), analysed historical botanical data of the Park Grass experimental plots using the NVC, they found that plots receiving nitrogen-free fertilisers changed from MG5b *Cynosurus cristatus* lowland meadow towards a species-rich type of MG1e *Arrhenanthrum elatius* grassland in 50 to 80 years, however, those plots which received nitrogen moved towards MG1 and then to MG7d. The plot that originally received ammonium sulphate changed to MG7d, but since part of it has been limed, that community has moved back to MG5, resembling the untreated plots and taking a further 70 to 90 years to do so. What this suggests is that the impact of fertiliser is more complex and not as rapid as most proponents suggest. What this also shows is the importance of lime and the maintenance of pH through liming. In the ESA meadows in Teesdale, Askew (1993) found that historic liming (pre 1980) increased species richness compared to meadows with recent or no application.

be applied at traditional rates (Table 1). The application of neither inorganic fertiliser, nor FYM does mean that in the long term >100 years, species diversity and richness could well be lost from species rich hay meadows and a change in NVC plant community occurs. In Agri-environment schemes the present prescriptions for meadows and pastures preclude the application of FYM, basic slag or regular lime on those fields entered into the scheme. There is evidence that the farming community is unhappy at the levels of yield being obtained from their fields (Howard 1997). These prescriptions were based on the experimentation on the Somerset Levels (Mountfield et al. 1993), which concluded that species change even at the lower rates of application (25kg ha⁻¹ of N) caused species to be lost, even after eight years. However, Figure 1 shows the communities have moved in some cases in the direction predicted for fertiliser application and this supports the hypothesis that fertiliser is detrimental (Plot 1) and high fertility, species poor meadows are the result (MG7). Plots 7 and 11, are the other extreme where the impact of fertiliser has been to acidify the plots. The result of this acidification, without the balancing impact of pH neutralisation by FYM or lime, shows that soil can be made artificially acid by fertilisers, again supporting the hypothesis of species change by acidification. These very acid plots (plots 11 & 7), when compared to the FYM plots (1, 3 & 5), show clearly the role of FYM is not just to supply plant nutrients, but also more importantly it helps to control pH. In contrast, plot 8 has become more species rich and diverse. This plot has an increasing level of species richness and diversity, not supporting the hypothesis of fertilisers being detrimental. This plot's results suggest that basic slag, P application, encourages clovers and this can be a positive benefit and the end result is an increase in species richness and diversity. Further, plot 6, considered the original control has changed to a more acid type, whereas plot 4, the likely long-term control proposed by Pullan & Shiel (in prep), has changed the least and has continued to increase the numbers of species present, as predicted by the normal ecological rules of immigration and emigration.



Plot 11 showing the aftermath growth on the plots after the hay cut 3 weeks earlier.

Therefore, if the conservation objective is to maintain plant species richness and diversity in species rich hay meadows then the following rules need to be applied for the maintenance of the conservation interest. First is the control of fertility: there should be no application of inorganic fertilisers which has the impact of acidifying the soil. There needs to be periodic correction of the acidification impact by the application of lime, say every 20-30 years (Askew 1990). Secondly, the use of recycling of nutrients through judicious application of farmyard manure, and Pullan & Shiel (in prep) suggest 20 t/ha⁻¹ every two years can be used as a starting bench mark when no other data is available on the traditional applications applied. Thirdly, the meadows should be grazed in autumn and spring as shown by Smith et al, 1996, to a sward height of 20-50mm (Pullan 2003) and fourthly, cutting and making hay is required to shed seed (Smith, Pullan & Shiel 1996). All these elements are required to maintain species rich hay meadows and if one of the elements is missing or changed,

then the species balance will change and so will the community. Without the input of nutrients into the system then the grassland will not be sustainable over time, 100 years plus. The consequence therefore for agri-environment schemes is that they could fail to meet their long-term objectives of maintaining and enhancing biodiversity, especially in relation to mesotrophic hay meadows and pastures, if farmyard manure at 20t/ha every two years is not considered as mandatory. A derogation to apply lime every 20-30 years and basic slag once every five years plus may also be necessary. Hopefully this summary shows that this historical experiment can still provide useful scientific data, even after 100 years plus of the same treatments and can act as a bench mark for other grassland experiments to test their results against.

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Biodiversity by any other name...would NOT smell as sweet

Tim Kitchin

- an open letter to the biodiversity community -

Dear friends

I hold the following truth to be self-evident: That our biggest global challenge lies not in preserving life-giving ecosystems, but in overcoming our lack of common will to do so. To fix our ecosystem; we must first fix our ethosystem.

Why do I feel so glum? Why do I feel progress is so retarded? Because I watch television and read newspapers and meet and drink coffee with apparently well-informed, well-intentioned people who have no idea how to answer two very simple questions:

“What can biodiversity do for me?” AND “What can I do for biodiversity?”
The reciprocal nature of these questions expresses the exchange of value at the heart of any conscious relationship, and any community. They are the essence of social stability; the building blocks of business and the cornerstone of global mutualism. The more clearly and consistently we can answer these questions about a person, or an idea, the more committed we will be to him or her - or it.

These same relationship questions are also, strangely, the building blocks of any brand. If a purposeful brand – like ‘biodiversity’ – cannot convey and deliver a promise – then it has no right to ask for anything in return – like the commitment of governments and indigenous peoples, for example.

On the upside, the rewards of building and supporting an honest exchange of value are enormous. If Coca Cola can build a multi-billion dollar business on the back of promising ‘real refreshment’ from brown fizzy liquid, how much more loyalty can we expect to generate from promising (and delivering) human survival? Once such a common commitment does exist; concerted action will surely follow...

For now, however, we face a broken, or at least fractured ethosystem. As global citizens, we are mired in confusion, misinformation and mutual mistrust. We are enmeshed in political, legal and economic systems which appear to be beyond our individual control. Relationship chaos reigns, beneath a veneer of transactional order.

Among those who are active stakeholders (or active staketakers) in the meaning of biodiversity, there are as many agendas as there are activists. The new high priests in this decentric world are the NGOs and the media, who carry a new and unprecedented burden of trust. But sadly, even these groups, who presently enjoy our greatest reverence, sometimes seem incapable of exercising a wider social responsibility. Listening to the endless academic squabbling, media consumers can surely be forgiven for believing that the emperor of biodiversity has no clothes.

So as this critical meaning slowly dissipates into the ether, and the belief needed to motivate concerted action goes with it, what is to be done?

The answer is that the brand of biodiversity must be resuscitated and nurtured by those who are willing to take a responsible, and transparent, lead.

Why are brands so important?

Before the world ends, we just have time for a brief poetic interlude:

“Romeo, Romeo. Wherefore art thou Romeo?
Deny thy father and refuse thy name,
Or if thou wilt not, be but sworn my love
And I’ll no longer be a Capulet.”

W. Shakespeare: Romeo and Juliet

Juliet’s pubescent, lovelorn plea is a cry for freedom. She yearns to break free from the duty her family name imposes; and to detach her life’s meaning from the social expectations which bind her. Bless her!

What she realises, with such tragic consequences, is that her destiny is actually bound up in her name - and is inescapable. The names Capulet and Montague are like brands, stamped onto the lovers’ hearts. Their meaning cannot be transcended.

Another great literary figure, Humpty Dumpty railed against the same barrier in Alice in Wonderland:

“ ‘I meant, by ‘impenetrability’, that we’ve had enough of that subject and it would be just as well if you’d mention what you mean to do next, as I suppose you don’t mean to stay here all the rest of your life’. [said Humpty Dumpty]

‘That’s a great deal to make one word mean’. Alice said, in a thoughtful tone ...”

Humpty, although only an over-sized egg with arms and legs, is expressing something deeply human. He wishes to assert his individuality. He wants to escape the burden of two-way communication.

Although we sympathise, Lewis Carroll is actually asking us to laugh at Humpty’s foolishness. Language IS social. Unless meanings are more or less commonly shared, language breaks down. Humpty’s assertion that he can create a totally individual language is fruitless, and naive.

The lesson of these two passages is clear – at least to me. Ideas, or brands, exert a powerful influence on our behaviour – for good or ill, but they only function when we collaborate to shape and share their meaning. For those of us who care about the ‘something or other’ that we think is expressed in the idea of biodiversity, the implication is clear: Whatever this connected, consequential idea of fragility and systemic interdependence is, it must certainly be much better communicated.

Why am I making such a fuss?

The truth is, ‘Biodiversity’ is at war, mired in academic debate, trivialised by television, and abused by marketeers. Biodiversity is competing in a marketplace of sexier ideas, struggling to engage its fragmented stakeholders, facing disbelief, mistrust, disrespect and apathy. A cross-section of conversations in preparation for this piece, produced the following typical reactions (expletives deleted).

“So what? What difference does it make?
It’s too complicated to bother about
Preserving biodiversity means sacrificing progress
The government will sort it out
The Americans are responsible
It’s not about people anyway
Nobody really understands it
I have more pressing concerns

Tomorrow will be soon enough
It's exploitative. One rule for the rich; another for the poor
We'll be safe in any case. We can always move to Canada.
It's about them, not me. Over there, not over here.
They're only animals. We can breed more.
They're only trees, we can grow more.
We'll never run out of water.
It's so nice for the children...."

What action is necessary?

Firstly, as any consumer will tell you, you can only build a brand by generating awareness. We actually have to start using the brand-name, and convince others to use it. Hats off to Germaine Greer in this regard:

"It was never my intention to become the proprietor of 125 acres of Australian rainforest...I didn't know then, that what I could see was not only a national park, but also...represents the area of highest biodiversity in the entire Australian rainforest system." Daily Telegraph, December 27 2003

What I love about Germaine Greer is that she's not afraid to call a system a system.

Secondly, we have to find a shorthand which trips slightly quicker off the tongue than the following:

'...the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and between ecosystems.' (from the Convention of Biological Diversity).

Thirdly, we have to set out, as individuals and organisations to address the relationship gaps which face brand biodiversity:

The Belief Gap

Assuming biodiversity can overcome the hurdle of its incoherent promise (what are its timescales? impacts? outcomes?), then how will it actually be seen to deliver? Sadly, in the world of brands, only consistent delivery of promises builds belief.

A thought: I wonder, does UNEP need a more proactive communications role?

The Trust Gap

The implications of brand biodiversity are out of control – it carries fuzzy associations with global warming; water shortages, economic slowdown, sustainability, environmental security, global anarchy...you name it. Moreover the behaviour of its custodians can seem disconnected and inconsistent. Those who represent the brand can seem more interested in self-promotion than in building a consistent picture which might activate a change in behaviour.

A thought: I wonder, do NGOs embrace some new form of self-governance?

The Respect Gap

The intention of biodiversity is unclear (is the biodiversity movement trying to inform us, or persuade us? Are we preserving biodiversity, or conserving it? And what's the difference?) Against this confusing backdrop rests a prevailing attitude of intellectual snobbery and petty, but obviously heartfelt disputes in which the public are left confused.

A thought: I wonder, could NGOs sign up to a 'natural' communications charter?

The Commitment Gap

Finally, how does biodiversity drive commitment? If it can first win belief and respect and trust, it must then recruit its stakeholders to the cause, by proving its integrity. This should be easy as long as the motivation becomes clear. But is that motivation humanistic, or anthropomorphic? Or utilitarian? Or aesthetic? Or all of the above? Reducing, or perhaps assimilating these different motivational agendas is job No.1.

A thought: I wonder, could the NGO sector collaborate to assess the implications of a number of different motivation-systems and promote the role of biodiversity within them? Visualising these dominant mind-sets like corporate strategic scenarios would yield some interesting implications!

What is to be done to build collaboration?

What I am absolutely NOT advocating is for some overarching body to be created to drive a global communications campaign to brainwash people into believing the gospel according to GREENWASH Inc.

What I AM suggesting is that key NGOs take a transparent lead to re-start an open global debate. By recruiting intergovernmental and corporate support a forum could be created, on and off-line where all stakeholders voices can be aired. Here a truthful, 'deep and meaningful' brand of biodiversity could be built, tested, refined and shared – in public.

Within such a community a consensual meaning of biodiversity would, emerge, from which NGOs, governments and others would all subsequently take their cue.

What I am suggesting is open branding - branding as global democracy. The future health of the ethosystem depends upon this level of engagement.

Open Brands, like 'biodiversity', cannot and must not have meaning foisted upon them, they must acquire it through transparent conversations. They do not have to mean the same thing to everybody, but they have to offer us enough common meaning to motivate a collaborative response.

If common and concerted action is to be achieved, among a vast and diverse group of stakeholders – all 6 billion humans, plus trillions of other life-forms, then a shared conversation what biodiversity is, and why it matters, must be initiated – urgently.

In a situation where no no-one owns this brand, leadership is called for, and the time for it is now. It is incumbent upon those with biodiversity influence to be open-minded, and adopt an open approach to our shared learning.

B-i-o-d-i-v-e-r-s-i-t-y matters.

Yours faithfully

Tim Kitchin

This article captures the essence of a speech given by Tim Kitchin at the Royal Institute for International Affairs in December 2003 to a gathering of international NGOs. Tim Kitchin is co-founder of The Glasshouse Partnership – a corporate marketing consultancy. He is a co-author of 'Beyond-Branding' (Kogan Page 2003).

What features should be included in new urban residential developments to maximise the opportunity for a diversity of breeding birds?

Katharine Land

Why design bird-friendly developments?

The majority of new housing developments in the UK follow a set design and landscape formula that offers fairly poor habitat quality for birds. The Government has targeted birds as barometers of healthy environments, yet birds are declining throughout the country, with even 'common' urban species such as the House sparrow *Passer domesticus* and starling *Sturnus vulgaris* in decline. Could thoughtful planning based on the principles of landscape ecology and behavioural ecology produce an urban environment that contributes significantly to the conservation of such species?



Planning policy

Government Policy specifies that good design, high quality environments and abundant and diverse wildlife should be achieved within new developments and through land use planning (e.g. Planning Policy Guidance Notes for Housing, PPG1 and for the Countryside PPG9 etc.) The Government has forecast the need to build 155 000 new houses per year, yet current figures estimate a shortfall of 35 000 houses (DEFRA, 2003).

The suitability of urban areas for birds

Research in Ohio, USA, by Beissinger & Osborne (1982) found that many bird communities of residential and urban areas contained higher bird densities than out-lying natural areas. Glue (1982) stressed the biological importance of the millions of gardens associated with the housing stock of the UK (including the small town gardens) as one of the richest habitats in Britain. He calculated the total garden area in the UK, in 1980, as 270 000 hectares (based on the assumption that an average garden was 9 by 20 metres): twice the area covered by the then 166 National Nature Reserves.

Interest in birds

Birds are popular. Expenditure related to public enjoyment of and interest in birds in the UK exceeds £100 million per annum (RSPB, 2003). Over one million people in the UK are members of the RSPB (a number much greater than the membership of any political party). Birds are charismatic, acting as 'flagship' species for the less showy wildlife, such as the 'creepy-crawlies', which are essential in maintaining healthy food webs and the natural environment. Birds link people from all socio-economic backgrounds, an interest in birds often helping to establish a long-term interest in wildlife generally and the natural world.

Health benefits

Recent research has provided evidence for the direct benefits of urban nature to humans in terms of health and well being. Ulrich (1999) stated that patients with a view of trees recovered from operations more rapidly, as compared with patients without a view of trees. Similar finding made by Parsons et al. (1998) indicated that people who travelled along nature-dominated roads experienced quicker recovery from stress and greater resistance to subsequent stress than people who viewed man-made dominated environments. This may extend the reasons for conserving birds, especially song birds, in urban areas beyond those of 'indicators' and providers of 'interest' at a much more fundamental level (Wells, 2003).

Economic incentive

People with choice generally prefer to live and work in leafy surroundings (Baines, 1999). Indeed, the presence of trees has been proved to increase the value of properties. Designing for birds has the potential to enhance sale and resale values so important to developers, through promoting the ecological, social and psychological benefits (Fernandez-Juricic & Jokimaki, 2001) of nature conservation and encouraging a greater overall wildlife. It is furthermore possible that simple changes in designs, at little extra cost and requiring the minimum of maintenance (Glue, 1982) could create dramatic improvements for the desirability of the built environments for birds.

LITERATURE REVIEW

What is a suitable urban environment for birds?

Habitat structure

Habitat structure, the density and height of vegetation (McArthur, 1961), was found to be particularly important, with the ideal avian landscape being widely likened to a 'woodland-edge', rich in trees and shrubs providing food, shelter, nesting sites and song posts. (Cody, 1985). Man-made features such as buildings, telegraph poles and walls are important components of overall structural diversity (Fernandez-Juricic & Jokimaki, 2001).

Shelter from human disturbance

The success of nesting blackbirds in avoiding predation was found to vary according to the height and cover of vegetation and the location of the nest away from paths and buildings (Karlsson & Kallander (1977) in Sweden. Blackbird density correlated with mean distance to nearest tall shrub, which provided shelter from predators (especially for fledglings) as well as nesting and roosting cover. Breeding dispersion was found to be more influenced by available cover than feeding potential.

Age of habitat

Soper (1983) commented that a newly constructed house with a young garden provided the least attractive prospect to a bird. Research in North Queensland, Australia by Jones (1981) emphasised the need to prevent the replacement of existing vegetation by young, unproductive, habitat in design solutions. Hohtola (1978) similarly commented on the importance of mature landscape: elements such as rivers, ponds, hedgerows, walls and original trees. The inclusion of standing dead wood and log piles was also considered beneficial.

Size, Patchiness and Location of Habitat

The size of a suitable habitat can affect the density and diversity of birds using it, as well as the local rates of colonisation and extinction (Newton, 1995). This can be compared to the ecological 'island' theory; small islands support fewer species and smaller populations of species than larger islands, as they are difficult to find and colonise. Different species have varying thresholds for habitat area, below which they occur only sporadically and above which they occur regularly. These areas frequently exceed minimum territory sizes, as birds require varying buffer zones beyond territory limits (Wells, 2003).

Where patches of gardens are organised together, they can provide a large area of habitat with a transition of management styles (Cannon, 1998). If habitat complexity is high, such habitats can act as 'high quality stepping stones', temporarily used by different species in their way through urban habitats (Fernandez-Juricic & Jokimaki, 2001). Fernandez-Juricic & Jokimaki (2001) found that wooded streets in Madrid with a complex habitat structure positively influenced the number of birds, species persistence and guild densities in parks, effectively enlarging park shape. Such habitat threads prevented the fragmentation of landscapes, by connecting garden and park refuges.

Species of Plants

Native plant species are invaluable to birds, with birds evolving to exploit foliage, fruit or seeds through the seasons. For many species this includes; caterpillars in spring, spiders in summer, fruit in autumn and seeds in winter (Cannon, 1998). Exotic species can also provide opportunities for nesting and shelter, with key species producing a berry/fruit crop (e.g. varieties of *Cotoneaster*, *Pyracantha* and barberry). *Cotoneaster interrimma*, for example, fruits late between Hawthorn and Ivy, providing finches, thrushes and tits with berries.

Usage of chemicals within gardens, however, can serve to render plants useless, by removing food sources and even poisoning birds (Cannon, 1998). Research has proved the pest control function of birds, with the diet of many species consisting largely of the eggs, larvae and adult forms of insect species which are harmful to plants (Bolund, 1987).

Provision of nesting and feeding watering stations

Erecting nest boxes, providing feeding stations and water, particularly when such features were lacking naturally, were further found to increase the appeal of a landscape to birds. Great tit numbers, for example, have been shown to increase with the addition of nest boxes (Cody, 1998).

Designing urban landscape for birds

Soper (1982) described the objective when designing a landscape for birds was to reinforce the positive advantages of the site and location, to introduce complementary possibilities and to exert influence on the neighbouring land. He described an ideal garden as having a diversity of shrubs and flowering plants, a mix of young, prime and decaying trees; some clad in ivy, an orchard surrounded by thick impenetrable hedges, allied to a house with plenty of corners and ledges, cracks and crevices. Even a small garden can provide diversity vertically with ground cover plants, shrubs and small trees (Canon, 1998).

Wood (1989) suggested mimicking the local, semi-natural woodland plant communities or including a sample of the species present, to encourage birds into gardens. He emphasised that consideration should be paid to the orientation of habitat and where shelter is needed within the garden.

A CASE STUDY IN NOTTINGHAM

Introduction

Fieldwork was undertaken in Nottingham between April and May 2003 to investigate the importance of the habitat features described in the literature review for birds in an urban setting. New and mature urban residential areas

were surveyed to determine the features that appeared to affect abundance, richness and diversity of breeding birds.

Methods

Three category of streets were chosen to survey:

1. Streets with generally large houses, of a low density, with large mature gardens.
2. Streets with generally medium to small houses, of a high density, with medium-small mature gardens.
3. New development streets, of a generally high to moderate density, with small/large houses and immature gardens. (Houses were between 2 and 10 years old).

As far as possible, streets associated with relatively good bird habitats such as parks, allotments and open space were not selected for study. Main roads or particularly busy arterial streets were also excluded.

Habitat availability was measured by counting the number, height and species of roadside trees in the streets and by estimating the percentage cover of habitats as would be viewed from a bird's eye. Habitat usage was investigated by mapping bird activity within habitats.

A mapping technique was selected to register the birds and their behaviour within a habitat (Bibby et al. 2000). The surveyor walked in the middle of the street, allowing observations of man-made structures, garden and roadside habitat on either side of the street. Bird species and activity was registered using BTO symbols (Gilbert et al., 1998) on 1:500 street maps showing individual house and garden units. The precise habitat feature being used by a species was registered using a code system at the same time as registering bird species. The habitats recorded were: large tree (>5m tall) small tree (<5m tall) shrub/hedge, flowerbed, lawn, climbers and 'man-made' (e.g. house, pavement, lamp).

The ten streets were walked three times between April and May, both on weekdays and at the weekends.

In all the street categories, barriers such as walls, hedgerows and fences frequently restricted visibility and the scope of registrations. Habitat surveyed was thus generally restricted to the street, the houses and the smaller front gardens, as larger gardens were usually concealed behind the houses. Man-made structures (house roofs, aerials, street lamps, over-head wires, pavements and roads) and street trees were invariably the most visible habitat, increasing the likelihood of birds regularly using such features being registered most frequently. In contrast, hedge/shrub habitat often concealed species, making registrations difficult, therefore, potentially creating bias against birds abundant within it.

Certain bird species are more cryptic and difficult to detect than others (Bibby et al. 2000). The potential of detecting and recording such species was, therefore, lower than for the more conspicuous species. The best way of checking reliability of the transect results would have been to undertake focussed verification surveys, detecting all birds present in a selected number of sub-areas encountered by the transects. Although time did not permit this, more time was spent in scrutinising trees and shrubs than other habitats during any survey visit.

Surveying transects on three occasions clearly did help to 'smooth' the effects of any unusual bird activity or double recording during a given visit. Any residual underestimation in cryptic habitats was probably similar for all sites of similar overall quantity of cover. Overall the results of the survey were considered moderately reliable in terms of providing an indication of the relative use of the study areas by different (except perhaps the rarest and most cryptic) bird species.

Conclusions

Review of the field study in relation to the wider literature review
 The results of the surveys were analysed at three levels:

- Species abundance: abundance of species within all the streets.
- Habitat associations: relationships between birds, species and habitat within the streets.
- Street quality: the relationships between species and particular street habitats.

Species Abundance

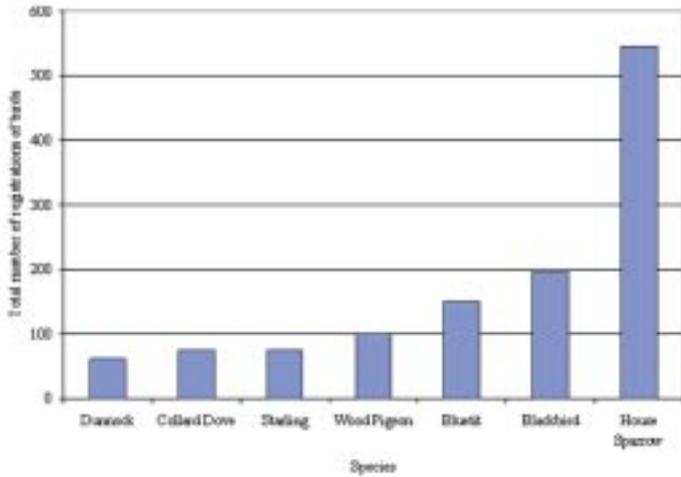


Figure 1: Abundance of individual species throughout the streets surveyed

Species with over 50 registrations:

Figures 1 and 2 indicate that the urban bird communities surveyed were dominated by a large number of a few species. 7 out of the 20 species recorded were registered more than 50 times and of those house sparrow, blackbird, blue tit and woodpigeon were recorded over 100 times. House sparrow registrations were by far the most common, being recorded nearly three times more than blackbird, for which the second greatest number of registrations was recorded.

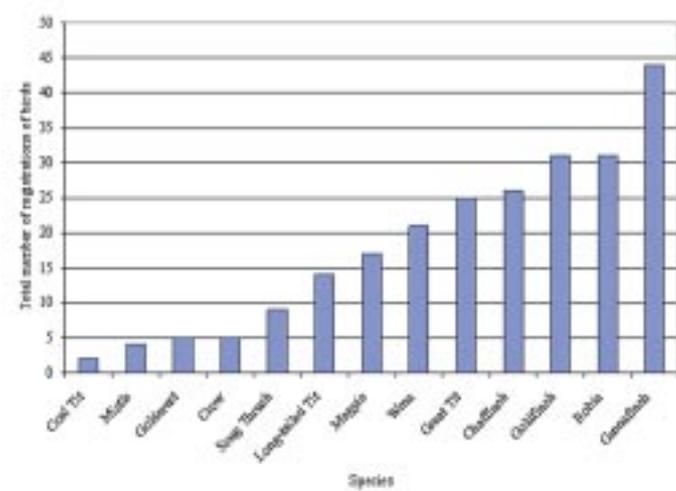


Figure 2: Abundance of individual species throughout the streets surveyed

The abundance of house sparrow registrations was of note in view of its status as a red list species of conservation concern and recorded disappearance from many urban areas in the UK (Gregory et al., 2002). The presence of the red list species, starling and song thrush and the amber list species, mistle thrush and goldcrest was also notable in view of their conservation status.

**Species with less than 50 registrations:
 Habitat Associations**

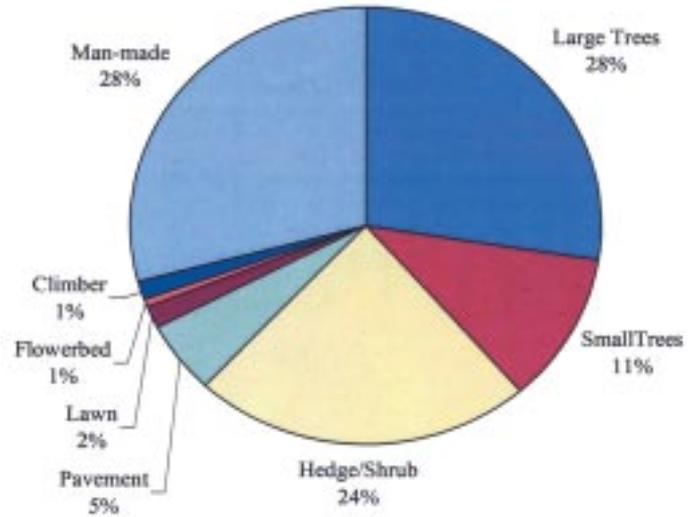


Figure 3: Percentage of total registrations of birds within each habitat category for all the streets

Trees were confirmed as important features for birds within street landscapes (Wood, 1989 and Holden & Cleaves, 2002) providing for activities such as, nesting, foraging and singing. The importance of trees was indicated in the field study by their scoring the highest percentage of registrations of birds out of all the habitats in the study. Registrations were most frequently made in association with native trees and tall trees. Cannon (1998) commented on the importance of native plants that birds have evolved to exploit. Blue tit, for example, was frequently registered on lime, birch and oak trees where present, which coincides with its natural preference for deciduous woodland (Cannon, 1998). Exotic trees such as tall Leylandi were, however, used by a number of species including greenfinches as song posts and by goldcrest for foraging and nesting.

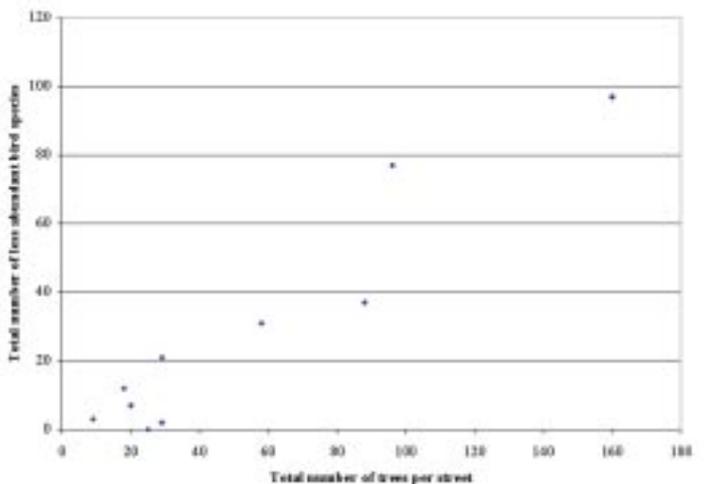


Figure 4: Correlation between less abundant bird registrations and the total number of trees per street

In the study, hedge and shrub habitat was the site of a high proportion of the overall bird registrations, but only wren and house sparrow were frequently

registered using the habitat. The difficulty in detecting birds within the habitat (as discussed previously) may have partly contributed to the apparently low association between birds and the habitat. Hedge and shrub habitat is known as important for a wide range of garden birds for nesting, foraging, providing cover from predators and shelter for roosting (Glue, 1982, Cannon, 1998, & Holden and Cleaves, 2002).

Birds in the field study were often registered using exotic plants. For example, dunnock, wren and robin were registered searching for invertebrates under dense non-native shrubberies. It appeared that it was the density of the hedge/shrubbery habitat that was more important than the species composition. For example, house sparrow, congregated in large flocks within both dense non-native privet *Ligustrum ovalifolium* and native hawthorn hedgerows.

Man-made structures in the field study featured frequently in registrations, particularly for species such as collared dove and woodpigeon which used aerials, chimneys and overhead wires as song posts, while starling and house sparrows nested in building cavities. Karlsson & Kallander (1997) and Gavareski (1975) commented on how such features could increase habitat diversity in urban areas. Great tit and wren were also registered nesting within creepers attached to houses, demonstrating how man-made habitat can be improved by judicious planting (Glue, 1982).

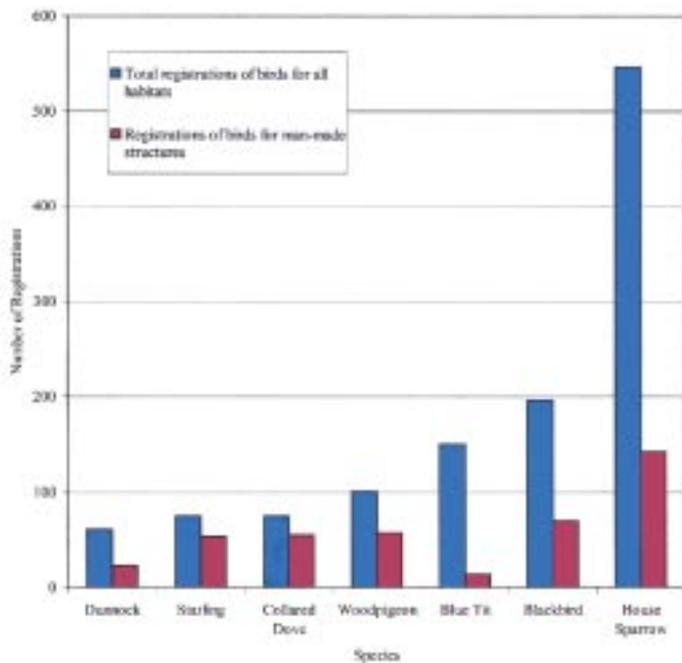


Figure 5: Total habitat registrations for species recorded on more than 50 occasions, compared to the proportion of those registrations that were for man-made structures

Nest boxes and bird tables were not specifically surveyed during the study. One bird table was, however, present in one of the gardens of the Category 2 streets and its influence on bird registrations was noted. Starlings, house sparrows and a song thrush were all registered using the bird table. The list of bird species commonly recorded in UK gardens (Cannon, 1998, Holden & Cleaves, 2002, and Toms, 2003) is testimony to the importance of bird tables and their use in attracting birds into a garden. Fernandez-Juricic & Jokimaki (2001) commented that feeding stations were a straightforward way of increasing urban habitat diversity.

One nest box was encountered during the survey erected on the bare wall of a flat in a Category 3 street, above a car park providing no cover, yet a family of blue tits occupied it. The provision of the nest box increased the habitat diversity

of the street, as trees with natural nest holes were lacking (Fernandez-Juricic & Jokimaki, 2001 and Bolund, 1987). Other species such as great tit have been shown to increase in number with the addition of nest boxes (Cody, 1985).

Street Quality

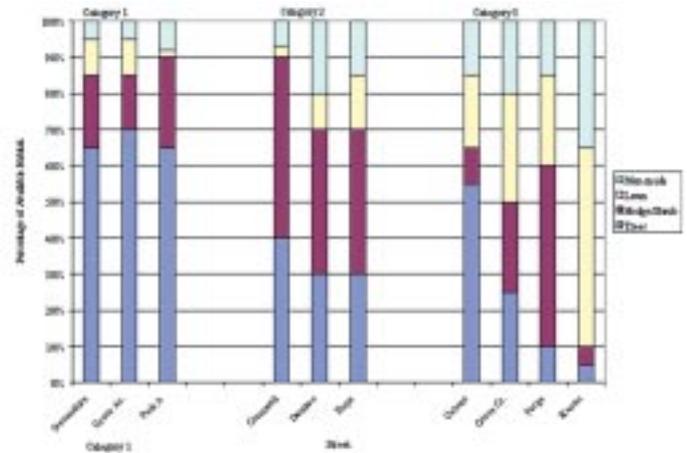


Figure 6: Estimated percentage of habitat available to birds in the different streets, as would be viewed from the air

The bird communities of the study area were dominated by a few highly adaptable, generalist species, a characteristic representative of many urban bird communities in the UK and internationally (Jones, 1997). More diverse bird communities were present, however, in the large established gardens of Category 1 Streets. Numerous trees lined the streets, particularly tall native species, providing the, 'high quality stepping stones' identified as important in connecting different habitats by Fernandez-Juricic & Jokimaki (2001). A complex vegetation structure (emphasised as fundamental in avian habitats by numerous authors including Cannon, 2003, Farina, 1983 and Soper, 1982) was provided by trees, shrubs, hedgerows, lawns and climbing plants in the gardens of Category 1 streets.

The new developments generally lacked vegetation complexity, mature habitat features and tall trees.

They were generally found to attract fewer birds and a limited number of species, reinforcing the comments of Soper (1982) who described newly constructed houses with young gardens as providing the least attractive prospect to a bird. Hohtola (1978) emphasised the importance of mature landscape elements such as hedgerows and original trees to birds. Such features had been retained within the new development of Calvert Close and were likely to have attracted the greater number of individual birds and species, compared to the other streets in the Category. The results appeared to support the suggestion of Soper (1982) that mature habitats should be preserved when designing new landscapes

Various authors including Newman (2000), Newton (1995) and Cody (1985) have linked the size of a suitable habitat to the density and diversity of birds using it, with different species requiring different thresholds for habitat area. The effects of size of gardens, location and position of streets within the wider landscape setting were not directly investigated by the study. The categorising of the streets was, however, based on the consideration of such factors. All streets were located within 1 km of one another and as far as possible isolated from relatively good bird habitats, such as parks and graveyards. The larger gardens of Category 1 Streets generally appeared to attract the greatest number of individual birds, greatest number of species and the highest bird diversity. The potential of the garden patches in all the streets to attract birds, is likely to have increased when positioned together, particularly in the case of Category 1 Streets, where the large gardens joined to form a large expanse of varied habitats.

GUIDELINES FOR DEVELOPERS

This study provides further support for the benefits of including a number of features within urban environments that appear important to birds and which could be adopted by house builders:-

- Tall native trees, providing 'stepping stones' through urban areas.
- Structural complexity through the multiple layering of vegetation and man-made features, including trees, shrubs, herbs, houses, telegraph poles, aerials and over head wires.
- The retention of mature habitat features, including trees, shrubs and scrub.
- The interconnection of habitats through 'wooded' streets, adjacent gardens and natural spaces such as allotments and parks.
- Garden size, potentially increased by the juxtaposition of other gardens and suitable bird habitats.

The need for new houses is growing. There is currently a 'gap in the market' for developers to design new developments that are marketed on the basis of their attractiveness to birds and benefits to people. Planning with and for nature conservation, could become an opportunity rather than an obligation, to enhance the design of new developments and provide a net gain for the UK's ailing bird population.

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I would particularly like to thank Dr. Mike Wells MIEEM, Associate Director of Nicholas Pearson Associates, Bath, for reviewing this paper.

Katharine Land is an Ecologist with Faulks Perry Culley and Rech.

New Articles Needed

Articles for *In Practice* are always needed.

Each page takes about 1,200 words and papers are welcome up to 4 pages, preferable in 1-page units.

It helps to have articles with good quality illustrations, photos or slides.

We reserve the right to edit or not to publish but most IEEM members who have submitted articles to date have had them published.

Once again, In Practice has secured an exclusive, in-depth interview with Basil O'Saurus, Professor of Tauro-Scatology at University College, Neasdon, to explain the outcome of some high-level discussions he has been brokering on behalf of the Institute.

Nice to see you again, Professor O'Saurus. It's nice to be back.

Can you tell us, please, a little about these negotiations that you have been conducting for the Institute?

Well, the need for these negotiations started when I was flicking through some health and safety guidelines for fieldwork issued by one of our statutory agencies.

Are you going to tell us which one?

And risk future contracts? You must be joking.

Go on then.

Well, as I read these guidelines, I suddenly realised that I had overlooked a fundamental aspect of health and safety practice for my entire professional life.

And what was that?

Well, the risk assessment pointed out to me that walking from my vehicle to the sampling site was far more hazardous than I had hitherto thought. Road traffic hazards, attacks from livestock, hypothermia, frostbite, sunburn and skin cancer were all listed as potential hazards, and more besides. Presumably not all at the same time.

So what did you do?

I chose what I thought was the item on the list most likely to present a real hazard to fieldworkers, which was road traffic hazards, and then offered my time, free of charge, to broker negotiations between the IEEM and an organisation with a distinguished track record in this field.

And which organisation would that be?

The Tufty Club. As a result of these talks, we are now close to concluding a concordat between the two institutions that should allow IEEM members to perform fieldwork in far greater safety than was previously the case.

Can you give us some details?

Well, there are two strands to this work: firstly, the Institute will be able to offer short courses in road safety as part of their programme of professional development. This is quite a radical step in itself because, for the first time, not only will IEEM members get a thorough and up-to-date briefing on road safety that will contribute to their Continuing Professional Development for the year, but they will also get a cute little badge with a squirrel on it. If the pilots are a success, we may start to offer lapel badges as rewards for all the other short courses the institute offers. The Professional Affairs Committee is delighted.

Why?

Because members only get their lapel badge once they have submitted a completed CPD record sheet for the year, something that is not happening as much as the Professional Affairs Committee would like at the moment.

And what is the other strand to this work?

The concordat between the two institutions should lead, in due course, to an accredited qualification that will allow those members completing the course to add more letters to their name. The proposal at the moment is that a member who passes the stringent tests that the Tufty Club sets us will be able to say that they have a Certificate in Road Accident Prevention. So an ordinary member would become 'Joe Bloggs MIEEM cRAP', for example.

Is this wise?

Oh yes: we employed an expensive firm of management consultants to perform an Acronym Research and Selection Exercise to make sure that our new acronym had no undesirable connotations. They said that the acronym was fine, so long as we understood that it should be pronounced "see-rap" and not ...

... yes, thank you, Professor O'Saurus, I think we get the picture. Are there any other benefits you can think of?

Well, most importantly, it will keep premiums for Employer's Liability Insurance down which is, let's face it, one of the main drivers for health and safety functions in big organisations. Fill big thick manuals with protocols for dealing with every conceivable situation and no one will ever be able to sue for negligence. It's no big deal for the fieldworker, because they do most of their work out of sight of their line managers, so they just get on with a good old-fashioned, commonsense appraisal of hazards as they go along.

Finally, Prof. O'Saurus, should fieldworkers be wary of the risk of being hit by a meteorite?

Do you know, I hadn't thought of that. But as long as there's a lawyer out there who will fight a potential case on a 'no-win, no-fee' basis, then big organisations must look on it as a risk that must be taken seriously. Would you like to know an interesting fact?

I get the feeling that I don't have much choice ...

Not many people know this, but there is no evidence that any insurance company survived the extinction of the dinosaurs at the end of the Cretaceous period with its assets intact.

Fascinating, Prof. O'Saurus. Absolutely fascinating. In fact, I might even go so far as to say 'unbelievable'.

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Strategic Environmental Assessment and Biodiversity

*Helen Byron, MIEEM and
Zana Juppenlatz, MIEEM*

Introduction

This article introduces Strategic Environment Assessment (SEA): the concept, requirements of the EU SEA legislation and how this is being implemented in the UK. It highlights the potential of SEA for biodiversity protection and introduces a current initiative to produce guidance on considering biodiversity in SEA.

What is SEA?

SEA is a systematic process for evaluating the environmental consequences of policies, plans and programmes. It is widely accepted as a valuable means of integrating environmental considerations into strategic decision-making. In facilitating integration, SEA has the potential to both promote more sustainable decision-making and to strengthen and streamline project level EIA. The EU has adopted a Directive on SEA: **Directive 2001/42/EC, on the assessment of the effects of certain plans and programmes on the environment¹ referred to as the “SEA Directive”**. This Directive has to be transposed into UK law by 21 July 2004.

What is the objective of the SEA Directive and what will it require?

The objective of the SEA Directive is to provide a high level of protection for the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes, with a view to promoting sustainable development.

The Directive will require environmental assessment of certain plans and programmes which are likely to have significant effects on the environment. Authorities which prepare and/or adopt a plan or programme that is subject to the Directive will have to:

- prepare an environmental report on the plan or programme’s likely significant effects on the environment
- consult environmental authorities and the public
- take the environmental report and consultation comments into account in decision-making
- monitor implementation of the plan/programme to identify unforeseen effects and enable remedial action to be taken.

The Directive sets out a minimum environmental assessment framework and it is left to Member States to set out the detailed requirements and to either integrate these requirements into existing procedures or to establish specific new procedures.

Which plans and programmes will require SEA?

The UK Government expects the Directive to have the greatest impact on planning and land use plans, although a number of other plans and programmes, including those for the transport, water, agriculture, forestry, fisheries and energy sectors will also be affected.

More specifically, the Directive applies to “plans and programmes” which national, regional or local authorities (public sector bodies and a limited number of private sector bodies - principally privatised utility companies) are “required” to produce

and/or adopt. No detailed explanations of the terms “plan” or “programme” are given in the Directive, but EU guidance suggests they will be regarded as the same thing and it is likely that the terms will be interpreted widely. For a plan or programme to be “required”, an authority must have little or no discretion as to whether or not it prepares the plan or programme. The Directive will apply to plans and programmes whose preparation starts after 21 July 2004. It will also apply to those plans and programmes started before this date, but not completed until after 21 July 2006.

SEA will be mandatory for:

- plans and programmes which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use and which set the framework for future development consents of project types listed in the EU Environmental Impact Assessment (EIA) Directive; and
- plans and programmes requiring appropriate assessment under the Habitats Directive.

Other plans and programmes which set the framework for development consent of projects (which are not limited to project types listed in the EIA legislation) require SEA if screening indicates they are likely to have “significant environmental effects”. SEA is also only required for minor modifications to plans and programmes in the categories which generally require mandatory SEA and those for small areas at local level where screening determines that they are likely to have “significant environmental effects”. Screening can be carried out on a case-by-case basis and/or by specifying categories of plans/programmes. The Directive sets out criteria to be used for screening and these include effects on internationally and nationally designated sites.

The Directive does not require SEA of:

- policies
- financial or budget plans and programmes
- plans and programmes whose sole purpose is for national defence or civil emergency
- plans and programmes produced under the current programming rounds of the Structural Fund and Rural Development Regulations

How is the Directive being implemented in the UK?

In the UK the SEA Directive will be implemented by four sets of Regulations – a single set for each of England, Wales, Scotland and Northern Ireland. In due course Scotland intends to go beyond the requirements of the SEA Directive and introduce SEA for a wider group of plans and programmes and for strategies, via primary legislation. Although implementing legislation is not yet in force some initial guidance on implementing the Directive has been published. For example, guidance on SEA in the planning sectors in England² and Scotland³.

Biodiversity in SEA

Biodiversity is an important aspect of the environment that must be considered in SEAs - its consideration is expressly required by the SEA Directive.

SEA has the potential to:

- help implement biodiversity policy – by ensuring that plans and programmes are consistent with biodiversity policy including international obligations and national, regional and local Biodiversity Action Plans
- help ensure the requirements of protected sites, habitats and species are met in plans and programmes
- identify opportunities for biodiversity enhancement to be built into plans and programmes e.g. creating new habitat
- enable an ecosystem approach to be taken in strategic decision-making
- encourage involvement of biodiversity stakeholders in plan/programme making processes
- encourage positive planning for biodiversity.

Guidance on Biodiversity

Many plans and programmes have potentially significant effects on biodiversity. To help ensure that biodiversity considerations are adequately addressed in SEAs, English Nature, the Environment Agency, Countryside Council for Wales and RSPB are producing specific guidance on biodiversity in the SEA process. A consortium of consultants is currently producing this guidance⁴ and the final version will be published by early Summer 2004.

As biodiversity will not be the primary concern of many of those implementing SEAs the intention is for the guidance to be clear, practical, accessible to non-biodiversity specialists and adaptable for use in training, capacity building and awareness raising. The guidance will provide a centralised source of tools and techniques and sources of information to support practitioners in consultation, data gathering, identification, evaluation, prioritisation, mitigation and monitoring impacts of plans and programmes.

The guidance aims to:

- Clarify the legal and policy context and need for compliance with the UK's national and international biodiversity obligations and undertakings, including the Convention on Biological Diversity and Biodiversity Action Plans
- Be applicable to and provide best practice recommendations on implementing SEA within the UK central government and different devolved administrations
- Emphasise that biodiversity considerations must be given sufficient weight
- Elucidate development processes that can affect biodiversity positively and negatively eg. loss/gain of habitats, fragmentation/linkage of habitats, gene pool isolation/extension, road kill, loss/increase in prey populations etc
- Address SEA's application to plans and programmes outside the land use planning system, many of which will have important implications for biodiversity
- Meet the needs of different parties involved in the SEA process, decision-

makers, consultees, specialist advisers and those responsible for ensuring the quality of SEAs

- Emphasise the need for preventing net biodiversity losses and aiming for net biodiversity gains and provide guidance on appropriate targets and indicators
- Provide guidance on identification of "significant impacts" which trigger the need for SEA
- Highlight best practice for assessing, mitigating and monitoring biodiversity impacts
- Highlight best practice in public consultation, engagement and reporting on impacts, mitigation and monitoring of plans and programmes
- Clarify the relationship of SEA with different forms of environmental assessment: Appropriate Assessment, Sustainability Appraisal and EIA.

Further information and Workshop

For further information about the biodiversity guidance please contact Ian Smith, Head of Development and Regional Policy at English Nature (Tel: 01733 455215; email: ian.smith@english-nature.org.uk)

A Workshop is being planned in conjunction with RSPB, EN, EA and CCW, and supported by ADAS and IEEM on the SEA and biodiversity guidance and will be held in London in June 2004. More details on the Workshop will be circulated as they become available.

- 1 http://europa.eu.int/comm/environment/eia/full-legal-text/0142_en.pdf
- 2 http://www.odpm.gov.uk/stellent/groups/odpm_planning/documents/page/odpm_plan_026670.pdf
- 3 <http://www.scotland.gov.uk/library5/planning/eadp-01.asp>
- 4 South West Ecological Surveys, Oxford Brookes University and Levett-Therivel sustainability consultants





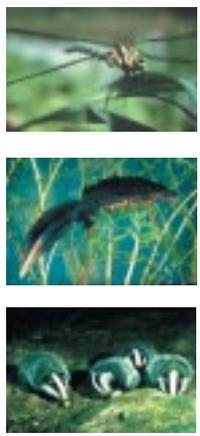
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Supporting The Wildlife Trusts

Upland Ecology, Tourism and Access – IEEM Conference report

Nick Jackson

This was the Institute's 18th conference and covered issues relating to the achievement of biodiversity, recreational use of the uplands, tourism and rights of access. It was held in Buxton, Derbyshire on 25th – 27th November 2003.

Following dinner on the first evening, IEEM's most recent Fellow, Professor Robert Marrs gave his Fellows lecture. This talk gave the delegates an excellent introduction to the subject area and laid out some of the main issues relating to Upland Ecology. The landscapes currently present in the uplands are the product of more intensive management, and the current Agri-Environment schemes have been developed to maintain them. It is Professor Marrs' view that we are "at a point where, at least in some places we can take a more enlightened view, and attempt to implement more radical approaches, designed to develop different types of upland biotopes". His talk included current research looking at a 10-year long restoration project designed to control bracken and restore upland moorland vegetation in an experimental area of Derbyshire.



Conference audience

The first day of the conference was split in half. In the morning the speakers talked about policies for upland management and in the afternoon the delegates attended field visits to local sites in the Derbyshire uplands.

Ian Condliffe from DEFRA kicked off the morning session talking about the current agricultural policies for the uplands. His talk included the reform of the common agricultural policy (CAP), agricultural waste regulations, the water framework directive and common land legislation.

Unfortunately David Townsend (English Nature) who was the speaker in the second slot of the morning was unable to attend the conference so Alistair Crowle MIEEM also from English Nature spoke on his behalf about the importance of the uplands for wildlife conservation. He highlighted the physical size of English upland habitats, looked at some of the rare species found on moorlands with numbers that have previously been in decline and how we are starting to see the re-emergence of these species such as the hen harrier.

Iain Wright from the Macaulay Institute spoke next with a socio-economic view of the uplands and covered issues such as farming, shooting (grouse and deer), forestry, water catchments, recreation and tourism. He said that the uplands bring a huge amount of money to the country and a careful balance needs to be found between the ecological, economic and social values of the uplands.

Michael Starrett from the Europarc Federation (Federation of National and Nature Parks in Europe) gave the last talk of the morning session and gave a European perspective to the conference. He talked about the promotion of protected areas as models for sustainable development, promoting the concept of trans-frontier protected areas as a contribution to international co-operation and a more positive and "implementation focused" approach to the habitats directive.

During the afternoon session the following field excursions took place:

- Kinder Scout - footpath restoration, bare peat restoration, fires, sheep exclusion and management, cattle management
- High Moor / Pigford Moor - restoration of *Molinia* to mixed shrub heath (early and later stages)
- Blacka Moor - 75 years with nearly no grazing – how the moor has developed
- Ramsley and Barbrook Reservoirs, Eastern Moors - recently decommissioned and now being restored to different habitats: early stages of habitat development
- Gardom's Edge - archaeology and history of the moor and its vegetation: how people used the landscape from the Bronze Age onwards
- Sites around New Mills - several urban fringe sites in the uplands with high visitor pressure. The Torrs, valley woodland, grassland site and visitor centre
- Pavilion Gardens - A walking tour of the historical and architectural heritage of Buxton and a visit to the recently refurbished Pavilion Gardens



Colin Buttery receiving his gift from Sue Bell for his service to IEEM

The AGM took place at the end of the afternoon and Colin Buttery was presented with a gift for his hard work as the Treasurer of IEEM over the last 4 years. Alex Tait has now taken over this role. The President's reception and conference dinner followed the AGM and special guests at the dinner included representatives from the local Wildlife Trusts, The Peak District National Park Authority, Local Government and other Professional Institutes. Both Peter Beale and Penny Anderson were presented with gifts as thanks for their parts in organising the conference. The lack of after dinner entertainment was noticed this year so I am pleased to report that the traditional Ceilidh may return at the next residential conference.

The second day was broken down into two parts: the morning session looked at issues relating to the achievement of biodiversity targets in the uplands; and the afternoon session looked at issues relating to tourism and recreational use of the uplands.

The morning session started with a talk on 'favourable condition' by Alistair Crowle MIEEM. This subject was a very interesting one as the government has stated that it wants 95% of SSSI's by area to be in 'favourable condition'. The two biggest causes of unfavourable condition are overgrazing and moor burning so this is a major concern in the uplands.

Dylan Bright from the West Country Rivers Trust spoke next about the ecological importance of streams and rivers. He talked about ecosystem approaches in upland dominated catchments, the Water Framework Directive, run off causing more acidic water and the plight of the Atlantic salmon whose numbers are in decline.

The next two speakers talked about the impacts of burning in the uplands. Graham Tucker MIEEM and Peter Gilchrist AIEEM both spoke of the benefits and drawbacks of using fire as a management tool for clearing large areas of vegetation. They both studied post wildfire management and natural vegetation regeneration to understand how moorland vegetation re-establishes. Fire-influenced plant communities have developed, which are dominated by those species of plant that have adaptations that enable them to survive fires or rapidly regenerate afterwards.

Penny Anderson MIEEM then spoke about the restoration of dense *Molinia* grassland to dwarf shrub. She showed slides of some of the fascinating new machinery and techniques used to restore upland habitats.

The afternoon session started with Geraldine McGowan MIEEM speaking about the ecological impact of skiing resorts in Scotland and the techniques employed to minimise the impact that such resorts would cause to the environment.

The second speaker of the afternoon was Chris Dean from the Moors for the Future project. One of the aims of this project is to restore and conserve moorland sites most damaged by fire, access and recreational pressures and the talk outlined how this was / will be achieved.

Stephen Trotter from the National Trust then spoke about the management of access and habitats in an upland environment. He talked about why access is so important, the impacts of access (erosion of footpaths etc.) and how access is managed (path repairs and alternatives).

Bob Cartwright from the Lake District National Park Authority spoke next about the importance of the economic value of tourism and recreation in the Lake District. He gave the recent foot and mouth disease crisis as an example of how the tourism industry was badly affected.

The conference finished with a summary from former IEEM President David Parker MIEEM from the Countryside Council for Wales. His talk "Managing the uplands – where do we go from here?" summarised much of the information that was disseminated over the two days and included the CAP reform, social inclusion, retaining rural communities and the achievement of favourable condition.

The conference proceedings are being edited at the moment and will be available soon. They will be sent out to all members of IEEM and any non-members who attended. The conference was well received by all of the delegates and I would like to thank Peter Beale MIEEM, Penny Anderson MIEEM and her staff, and the Training Education and Career Development committee for their hard work to make this event the success it was.

Nick Jackson is the Education and Professional Development Officer at IEEM.



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Bridging the Gap

Fred Slater MIEEM

Introduction

After thirty years working with the Welsh educational environment, I am still waiting for the wheel of taxonomic skills to revolve full circle. The recent interest within the IEEM and BES has hopefully helped to oil the movement towards recovery, but I fear that the rust of years of neglect will take some time to clear away. Thirty years ago, Professor Philip Waring, eminent plant physiologist and my then boss, was Head of the Department of Botany & Microbiology at what is now Aberystwyth University, (but was then The University College of Wales, Aberystwyth - and woe betide anyone who missed out the definite article!) and he believed that anyone leaving the Botany Dept., whether as full blown ecologist or those who worked with oat coleoptiles, should be proficient in plant identification. Postgraduates were dragged away from their plant hormones to demonstrate to undergraduates that they knew their upland grasses or sand dune legumes. Today the Department of Botany is, like most of its cousins, no more, and I doubt if many postgraduate students, at Aberystwyth or elsewhere, would care to have their taxonomic skills put to the test.

I later crossed the Cambrian Mountains to work for what is now the Cardiff School of Biosciences at Cardiff University and run their field station in mid-Powys. Two and a half decades of departmental and larger scale merger at Cardiff, have left whole organism biology as a very narrow band in a very wide spectrum of biomedical dominated activity. Botany, Zoology and Pure & Applied Biology departments are but a hazy memory in the minds of ageing academics, and even I, a traditionally trained botanist, have far more publications on non-botanical than botanical topics. Taught biology, like so many other things, changes with "progress" and fashion. However, conservative values of retaining the best from the past while not being averse to change, could be a useful non-political maxim where the genome is king.

"Well", I hear some astute readers of *In Practice* saying, "in such a genomic dominated environment it's no wonder that Clare Pugh found that her Ecology degree course content at Cardiff did not fit her for a suitable job" (IEEM, 2002). As a field ecologist I have nothing but sympathy for her cause, but, had she attended almost any similar degree course in the UK, the same complaint, that she was not being trained for the work that professional field ecologists do, would probably ring equally true. It is not Cardiff, but general "progress" and fashion, and not just in 2002, but was also the case in 1992 and even 1982! Having worked closely, for many years, with the Countryside Council for Wales and its predecessors, I have heard time and time again the cry for field botanists, or indeed anyone with any taxonomic skills! For many years the response to this call has brought to mind words like "voices" and "wilderness".

In my own defence I have always done my best to try to enthuse students with the excitement of field work - and a few have responded, ironically, the best botanists have gone on to become leading entomologists or herpetologists! A lesson here perhaps, in that there may be a taxonomic mindset in which the understanding of species of whatever taxa, brings in itself satisfaction to the right individuals. But good intentions and a few high flyers do not address the real problem.

With this background in mind and over a period of several years, a number of us at Cardiff investigated the possibility of an MSc course preparing ecology students for a career in environmental consultancy and the like. However, the demise of our MSc in Applied Hydrobiology, which, for many years, had provided rich pickings for employers in the water industry, lead to a reluctance to dip any more toes into this taugh postgraduate water.

If the problem were to be addressed at Cardiff, it was clear that it would have to be at the undergraduate level. If one were just starting out on the design of a new degree course, then the obvious pathway would be from the bottom up, begin in year one and progress the scheme through to the final year. I was faced with an existing modular structure where my most realistic option was to introduce a final year module for our BSc in Ecology & Environmental Management. Many months, meetings, committees and a 14 page Teaching and Learning Outcomes form later, I had approval for "Assessing the Environment" but with doubts expressed that it could have the academic rigour conducive with a level three (i.e. final year) course. Official approval, I would realise later, was the easy bit, as the module I had to create would have to break the mould of conventional level three biology courses.

The module's structure is somewhat idiosyncratic, reflecting my perception of what employable characteristics an ecologist might need, based on my two decades and more of ecological consultancy work and public inquiries with leading consultancies, covering from bats, to botany, to badgers, to birds, through amphibians and crayfish, to otters, both in the UK and elsewhere. Reassuringly, my views on course content reflected quite closely the survey results reported by Samantha Hillcox in *In Practice* 42, 2003.

The Course

My original concept was a lecture course supplemented by a one-week field course. But there were problems in fitting in yet another field course into the physically available slots that must be consecutive with either the beginning or end of the summer vacation or at Easter. Making virtue out of necessity, I arranged for four two-day residential field excursions to be timetabled, one early in the autumn semester, one in mid-March and two as late as possible in the teaching period (i.e. mid/late April).

On the first two-day excursion in late September, which takes place before formal lectures begin, the students receive notice of the taxonomic skills they will be expected to attain before the final two-day session when they will be given practical tests to assess these skills. They will need:

- To be able to identify on sight just over 100 plant species, including their scientific names, from a given list including groups of woodland, wetland, upland, bog, and old grassland plants, as well as trees and shrubs, rushes, sedges and grasses, ferns, mosses and liverworts and lichens. The main criteria for inclusion in the list are that the species are common and characteristic of that group or are key to interpreting that habitat and that these are plants that I can show them in a mainly mid-Wales context and so does exclude, for example, purely on grounds of practicality, lime rich habitats of which we have none readily available. Most of the most important plant species are included but some account has been taken of plants that, although important, will not be readily identifiable in late September or by late April.
- To be proficient in the identification of all the terrestrial small mammals likely to be caught in mid-Wales (identification of larger mammals is taken as read); be proficient in the use of Longworth traps and in the subsequent handling and processing of the catch; be aware of the names of all the British bat species and be able to identify specimens in the hand using conventional keys. Initially, a selection of bat calls, from a heterodyne detector plus the songs of ten common birds, were provided on the university's computerised teaching base, Blackboard. What we failed to realise initially, was that, although students can access the system remotely on their own computers, those that rely purely upon the equipment in the university's computer labs have - for perfectly understandable reasons - no sound provision! As there is no room for inequality, this facility has, for now, been shelved! However, Blackboard contains all the background material and keys for the identification of all the plants and animals on which they will be assessed.
- To be able to identify and sex all British amphibians and reptiles.

On this same occasion they are given a written assignment to review methods of assessment for a species group or habitat not covered in practical detail in the course. We considered long and hard how much emphasis to place on bird identification in the field, particularly song, and came to the conclusion that, by the age of 20, there is such a void between those that can and can't identify birds, that emphasis on other groups would be of more value.

1. Lecture course

Armed with our expectations of them, the students now begin the lecture course. Because of the additional eight days of field sessions, the formal lecture course consists of only ten lectures - as opposed to the more usual 20 - and is made up as follows:

- Lecture 1 - Overview of the course
- Lecture 2 - The why and how of assessment for badgers, reptiles and birds
- Lecture 3 - Ecology, identification and assessment of bats
- Lecture 4 - Ecology, identification and assessment of amphibians
- Lectures 5 & 6 - Phase 1 surveys and introduction to NVC surveys (p.m. NVC field exercise)
(Dr Tim Rich)
- Lectures 7 & 8 - Wildlife law and European legislation
- Lectures 9 and 10 - EIA etc. with examples of "real" consultancy projects
(Dr Mike Wells, NPA)

In order to maximise the validity of the course we bring in external professionals where possible and utilise specialist internal staff if appropriate e.g. amphibian lecture given by post doc with PhD in amphibian ecology. In 2003 it was hoped to have an additional lecture/practical on waxcap fungi but unfortunately, due to the unpredictability of nature, the plants did not appear at an appropriate time!

2. Two-day field excursions

These are timetabled to take place over a Thursday and Friday either at the School's Field Centre at Llysdynam in mid-Wales or in Cardiff. Each of the two-day field excursions normally includes at least two (normally informal) lectures.

The first excursion takes place at Llysdynam within the first week after the students return in the autumn. After introductory material has been handed out we begin a "botanical expedition" within the locality to show them the last of the summer plants, hopefully before the first frosts of autumn. A few days earlier the same group will have visited the Centre on a Land Use & Conservation Ecology course and the opportunity then to identify bog and upland grassland plants is not missed!

The students are then shown how to "tin" for reptiles, in 2003 utilising an actual slow-worm relocation project. The afternoon is spent in training in otter survey techniques plus identifying a few river plants and bat roost observation takes up the evening. The second day begins with badger survey techniques followed by a session with lower plants and a return to Cardiff.

The second excursion in mid-March, is included to concentrate on amphibian ecology. At this time all the widespread UK species should be present and day and night surveys are undertaken. The opportunity is also taken to demonstrate a few bird recording techniques including the use of mist nets and any spare time is taken up identifying plants, especially trees in winter - a favourite time to be asked to undertake botanical surveys!

The third excursion is usually based in Cardiff and gets the students to look critically at a proposed development. In 2003 we took proposals to develop, for housing, a reservoir site at Llanishen within Cardiff. The students visited the site and critically discussed on the ground the proposed development in the light of the knowledge they had gained from the course. We returned to the university, and, armed with the ecological consultants' report, we divided the class into groups, asking each group to critically assess one aspect of the consultants'

report, to write, by the following day, their own short critique and use it as evidence in our own (not very!) "public inquiry". This, to many, was the best part of the course, perhaps because the following week they returned to mid-Wales and after day one of revision they faced fifty pots of plants and an assortment of live and preserved mammals, amphibians and reptiles to be identified!

Conclusions

No one, single-handed, is going to pretend to bridge the ecological skills gap. At best any basic course can only be one of many stepping-stones towards the final goal. To do the job thoroughly requires a structured modular approach spread through the undergraduate years or an accredited postgraduate course as suggested by the IEEM and BES.

Students thought this course was one of the most demanding of all their final year modules, which quelled the complaint that it may not have been a demanding enough! My hope is, that by utilising other opportunities in earlier undergraduate years, the botanical vocabulary necessary for the professional ecologist can be drip fed in a fairly painless way, so that, in future years, our ecology graduates will at least know which species are protected by law, that *Carex* doesn't just come in bottles and that *Glechoma* is not a disease of the eyes.

The course I describe offers breadth but lacks depth. It does not train candidates in all the skills they require but I hope it points them in the right direction and at interview they can describe their botanical skills as more than "an afternoon on a field course looking at hedges". Roll on the full revolution of the taxonomic wheel.

Fred Slater is Director of Cardiff University's Biosciences Field Centre at Llysdynam in mid-Wales.



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recruitment@justecology.co.uk www.justecology.co.uk
 Deadline: 30 April 04

In the Journals

Compiled by
Jim Thompson and
Joel Bateman



British Ecological Society

The Journal of Applied Ecology is often at its most useful when it concentrates on a particular theme. In the last edition of 2003 the theme was 'Meeting the ecological challenges of Agricultural change' This collection of abstracts includes several from that edition.

S. J. Ormerod, E. J. P. Marshall, Gillian Kerby and S. P. Rushton.

Meeting the ecological challenges of agricultural change: editors' introduction

Journal of Applied Ecology 2003, **40**: 939 - 946

The overview of the editors in such compilations is often of interest in itself. Apart from pointing out that a significant number of papers in Applied Ecology have been devoted to issues surrounding this theme, they list them under the following headings: major multi-factor studies, specific studies on nutrients, effects of pesticides, drainage, crop choice and rotation, grazing patterns, habitat modification, habitat restoration and positive biodiversity management (the largest section) and transgenic plants. So anyone wanting an introduction to the subject area would do well to start here. They point out that the global need for agricultural production has never been greater. Nor has it ever been more complex due to the needs to balance global food security, optimum production, technological innovation, the preservation of environmental functions and the protection of biodiversity.

Ecologists now have very substantial experience of agricultural systems. They can understand, recognize and sometimes predict, at least qualitatively, the effects of pesticide applications, fertilizer use, drainage, crop choices and habitat modifications on farmland organisms, agro-ecosystems or other ecosystems influenced by agricultural land.

In instances of greater uncertainty, for example under changing climates, the investigative skills and experience of ecologists are even more crucial in problem solving. Just to re-inforce this point, the authors list 77 references related to the subject.

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David Kleijn and William J. Sutherland.

How effective are European agri-environment schemes in conserving and promoting biodiversity?

Journal of Applied Ecology 2003, **40**: 947 - 969

This paper reviews a variety of European wide studies that tested the effectiveness of agri-environment schemes. These schemes compensate farmers financially for any loss of income associated with measures that aim to benefit the environment or biodiversity. There are currently agri-environment schemes in 26 out of 44 European countries. Agri-environment schemes vary markedly. However, the main objectives remain comparable including: reducing nutrient and pesticide emissions, protecting biodiversity, restoring landscapes and preventing rural depopulation. The paper reveals that the uptake of agri-environment schemes is highest in areas of extensive agriculture where

biodiversity is still relatively high but unfortunately is lowest in areas of intensive agriculture where they could be of most value because of the low biodiversity. Approximately 24.3 billion Euros have been spent on agri-environment schemes in the European Union (EU) since 1994. An unknown proportion of this money has been spent on schemes with biodiversity conservation aims.

The authors carried out a comprehensive search for studies that test the effectiveness of agri-environment schemes in published papers or reports. They only found 62 evaluation studies originating from just five EU countries and Switzerland. Most of the studies came from the Netherlands and the United Kingdom, where until now only 6% of the EU agri-environmental budget has been spent. Other studies were from Germany, Ireland and Portugal.

In most cases the research design was inadequate to assess reliably the effectiveness of the schemes and a third contained no statistical analysis. Many of the experiments were designed weakly and biased towards giving a favourable result. The most common design was a comparison of biodiversity in agri-environment schemes and control areas. The experimental problem could be addressed by collecting baseline data, comparing trends or changes in biodiversity between areas with and without schemes or by pairing scheme and control sites that experience similar environmental conditions.

This paper shows that because of a lack of robust evaluation studies a general judgement of the effectiveness of European agri-environment schemes cannot be achieved. The authors suggest that in the future, ecological evaluations must become an integral part of any scheme, including the collection of baseline data, the random placement of scheme and control sites in areas with similar initial conditions, and sufficient replication. Results of these studies should be collected and disseminated more widely, in order to identify the approaches and prescriptions that best deliver biodiversity enhancement and value for money from community support. This paper includes at the end 122 cited references, an invaluable source of information on this topic.

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Agri environment schemes
Halvergate Marshes

L. P. Wickramasinghe, S. Harris, G. Jones and Nancy Vaughan.

Bat activity and species richness on organic and conventional farms: impact of agricultural intensification

Journal of Applied Ecology 2003, **40**: 984 - 993

The intensification of agriculture within Europe has been the cause of decline of many bat populations. This paper compares organic farming with conventional methods. The authors hypothesised that agricultural intensification based on high levels of agrochemical use has been a factor in bat population declines. Bat activity and species richness were compared on matched pairs of organic and conventional farms.

The results add to the growing evidence from published data on the wildlife benefits of organic farming, by demonstrating that the total bat activity was significantly higher on organic farms than on conventional farms. The dominant species on both farm types were *Pipistrellus pipistrellus* and *Pipistrellus pygmaeus*. Significantly more bat passes were recorded over water on organic

farms than on conventional farms. Foraging activity (quantified in two ways: total feeding buzzes and feeding buzzes per pass) was significantly higher on organic farms than on conventional farms. The paper highlights the fact that bats can be considered as bioindicators of agricultural change. The differences in bat activity between farm types may reflect features such as taller hedgerows and better water quality on organic farms. Higher foraging activity also suggests that habitat quality in terms of prey availability is greater on organic farms. Less intensive farming benefits bats, and as the number of organic enterprises increases it may help to reverse declines in bat populations.

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Pipistrelle bat

P. A. Stephens, R. P. Freckleton, A.R. Watkinson and W.J. Sutherland.

Review: Predicting the response of farmland bird populations to changing food supplies.

Journal of Applied Ecology 2003, **40**: 970 - 983

I generally find the practicality of a review of a review difficult. This is a wide ranging one with a further 77 references. The background is that agricultural developments over recent decades have had significant negative effects on wildlife. Modern European agriculture faces many further developments in technology, finances and climate. A framework for predicting the consequences of these developments and for informing management that mitigates previous depredation of wildlife is essential.

Field trials, monitoring and experimental approaches- invaluable though they are - are time consuming and expensive. So predictive modelling, using computer simulations, is essential for assessing the likely impacts of novel management practices.

Many agricultural developments are likely to have impacts on the availability of food for farmland wildlife. The paper reviews modelling techniques that are available for predicting the consequences of changing food supplies for farmland birds, a group already shown to be sensitive to agricultural management.

The authors focus on two broad types of simulation modelling: phenomenological approaches (using aggregative responses or full population models), and behavioural depletion models (including daily ration and functional response approaches) and the strengths and weaknesses are assessed.

They conclude that daily ration models probably represent the most useful form of simulation modelling for farmland birds. Few phenomenological population models link demography explicitly to food supply and collecting data on these links should be a priority of autecological studies.

Predictive models of biodiversity response should be more widely used when considering proposals for agricultural developments or agri-environment schemes.

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J.-C. Clément, R. M. Holmes, B.J. Peterson and G. Pinay.

Isotopic investigation of denitrification in a riparian ecosystem in western France.

Journal of Applied Ecology 2003, **40**: 1035 - 1048.

Nitrogen (N) loss from agricultural fields and urban areas to stream and groundwaters is a world-wide environmental problem. Excessive nitrogen loading is partly responsible for eutrophication of fresh water and estuarine ecosystems, while elevated nitrate in drinking water has consequences for human health. Under certain conditions, riparian zones improve water quality by removing groundwater nitrate before it enters adjacent stream ecosystems. Nitrate decline along riparian flow paths is most often attributed to denitrification activity and vegetation uptake, but spatio-temporal distributions and rates are difficult to establish.

The authors used natural ¹⁵N techniques in two riparian wetlands with differing vegetation to distinguish between the two processes responsible for reducing nitrate fluxes. They collected groundwater and above-ground vegetation samples along riparian transects where hydrology and groundwater chemistry had been investigated previously.

By measuring the natural abundance distribution of nitrogen isotopes in both the groundwater nitrate and riparian plant tissues along the transects, they attempted to determine to what extent the groundwater nitrate decline observed in these two riparian sites with contrasting vegetation resulted from denitrification and/or plant uptake.

Denitrification was predominantly responsible for nitrate retention even when the water table was low.

This isotopic approach provided evidence of seasonal variation in the occurrence of denitrification, and helped to delimit the area where denitrification was most active. Both plant uptake and denitrification contributed to the observed nitrate decline. The isotopic approach described in this paper is a useful diagnostic tool for easily identifying actual denitrification locations where groundwater nitrate removal is taking place. It should allow investigation at a landscape scale of the spatio-temporal patterns of biogeochemical hot spots where denitrification rates are disproportionately high relative to the surrounding area. This could provide a sound basis for landscape management and restoration in the context of diffuse nitrogen pollution control.

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G. J. Inglis and N. Gust

Potential indirect effects of shellfish culture on the reproductive success of benthic predators

Journal of Applied Ecology 2003, **40**: 1077 - 1089

As fish stocks are ever more depleted and fish farming is being applied to species such as cod, the need for information of the ecological effects of fish farming must surely grow. Shell fish farming is another widespread activity with environmental implications. This paper deals with the environmental assessment of the direct impacts on natural assemblages in the vicinity of shell fish farms.

The authors investigated the potential indirect effects of long-line mussel *Perna canaliculus* farms on the demography of an important benthic predator, the sea star *Coscinasterias muricata*. Surveys beneath four active farms, an abandoned farm and three unfarmed areas of seabed in Pelorus Sound, New Zealand, described the direct effects of mussel culture on the distribution and abundance of sea stars and other benthic consumers. These data were used to calibrate a model that simulated the fertilization success of sea star populations in farmed and unfarmed areas of the bays.

Deposits of living mussels and mussel shells covered up to 55% of the seafloor beneath farm sites, but were absent from soft sediments at unfarmed sites. Mean densities of sea stars were up to 39 times larger at active farm sites than in unfarmed areas and were correlated with the abundance of living mussels on the seafloor.

Within individual farms, the distribution of sea stars was highly aggregated; in unfarmed areas, sea stars were widely dispersed. The simulations indicate that, because of the extremely clumped distributions of sea stars, spawning individuals at farm sites would on average have substantially greater fertilization success than those foraging in areas where farms are absent and total zygote production could be as much as 1500 times greater than in unfarmed areas.

This study demonstrates that increased farm development could result in occasional outbreaks of populations of sea stars over a broader area than the farmed location. Without appropriate monitoring, such events are likely to be dismissed as rare, natural phenomena rather than a consequence of shellfish culture.

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R. A. Stillman, A. D. West, J. D. Goss-Custard, R. W. G. Caldwell, S. Mcgrorty, S. E. A. Le V. Dit Durell, M. I. G. Yates, P. W. Atkinson, N. A. Clark, M. C. Bell, P. J. Dare and M. Mander.

An individual behaviour-based model can predict shorebird mortality using routinely collected shellfishery data.

Journal of Applied Ecology 2003, **40**:1090 - 1101

The debate over the interaction between shellfishing and shorebirds is long-running. Behaviour-based models predict how animal populations are influenced by environmental change from the behavioural responses of individual animals to this change. These models are a potential tool for addressing shellfishery problems, but to be of value they must produce reliable predictions using data that are readily available or can be collected relatively quickly.

The authors use such data on a behaviour-based model for the oystercatcher population of the Wash, UK, for 1990-99 using data from shellfishery (mussels and cockles), shorebird and climate monitoring schemes. Many oystercatchers were observed and predicted to die when only a fraction of the available food was consumed. Within the model at least, this was because interference competition excluded the least dominant birds from part of the food supply and the least efficient foragers died before the food supply was fully depleted. A simplified model, which excluded interference and individual variation, incorrectly predicted that all birds survived in all years. Models that exclude these two components of behaviour will tend to underestimate the effect of mussel and cockle food shortage on oystercatchers. Shellfishery management based on such predictions may cause high oystercatcher mortality rates even though enough food would appear to be reserved for the birds.

This study shows how a behaviour-based model can predict annual variation in oystercatcher mortality using data routinely collected from the Wash. The principle on which the model is based, that animals behave in order to maximize their chances of survival and reproduction, applies to any system, and the necessary shellfishery, bird and climate data are widely available. The model can be used to advise how to manage shellfisheries, by predicting the proportion of the stock that needs to remain unfished in order to maintain low oystercatcher mortality rates.

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J.T. Lundholm and D.W. Larson

Temporal variability in water supply controls seedling diversity in limestone pavement microcosms.

Journal of Ecology 2003, **91**: 966 - 975

This is an interesting paper in which, using a glasshouse experiment designed to imitate field conditions in species rich limestone pavement habitats, the authors examined the effects of temporal variability and total quantity of water provided on seedling species richness, evenness and composition within a single growing season. Limestone pavements can experience considerable extremes of drought and flooding.

Temporal variability was altered by varying the frequency at which water was added while keeping the total quantity of water constant. Low temporal variability was created by high frequencies of water addition. High variability was associated



**Causse Méjean France
Limestone Pavement**

with more extreme fluctuations between droughted and flooded conditions. Species richness was greatest in higher quantity and lower variability treatments. Lower species richness under more temporally variable conditions was attributable to both random extinctions due to reductions in total community density and species-specific differences in mortality.

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R. Brys, H. Jacquemyn, P. Endels, F. van Rossum, M. Hermy, L. Triest, L. De Bruyn and G. D. E. Blust.

Reduced reproductive success in small populations of the self-incompatible *Primula vulgaris*.

Journal of Ecology 2004, **92**: 5 - 14.

Habitat fragmentation and the resulting decline in population size can affect biotic interactions and reproductive success of plant species. The authors investigated the impact of habitat type, population size, morph type and frequency, plant density, floral display and predation on different reproductive components in 16 populations of *Primula vulgaris*, a rare, declining species in Belgium.

Although habitat type accounted for significant variation in population size, there was no relation between habitat type and either reproductive and vegetative characteristics. Population size, however, strongly affected reproductive success, such that plants in small populations produced significantly fewer fruits per plant and seeds per fruit, and therefore fewer seeds per plant. No significant difference was found between morph types for any reproductive characteristic, nor an interaction with population size. Within populations, individual plants varied tremendously in size and floral display. Total number of fruits per plant significantly increased with floral display, but the highest fruit set per flower was found at intermediate flower number.



primrose

The proportion of fruit suffering pre-dispersal predation per plant significantly increased with floral display, but this did not offset the potential fitness gains of

producing a large display, but this did not offset the potential fitness gains of producing a large display. The paper demonstrates the need for a greater understanding of the relationship between population characteristics and reproductive components.

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V. Vandvik.

Gap dynamics in perennial subalpine grasslands: trends and processes change during secondary succession.

Journal of Ecology 2004, **92**: 86 - 96.

Revegetation of gaps may affect the floristic composition of subalpine grasslands during secondary succession. Six hypotheses concerning overall effects, gap-size and edge effects, and changes in these during secondary succession, were tested in mountain areas in Norway.

These landscapes currently consist of patches of formerly grazed or mown vegetation that are in intensive use as well as some in traditional use, and others in different stages of secondary succession after abandonment.

In a field experiment, large (625 cm²) and small (39 cm²) gaps and controls were established in a replicated successional series (0, 10 and 40 years after abandonment). Colonization modes were quantified in year 1, and the floristic composition was monitored twice yearly over four growing seasons.

A majority (74%) of the species were affected by gaps, but their responses are not consistent across successional stages. Species that recruit into gaps primarily as seedlings, and locally rare species, become relatively more dependent on gaps for local population persistence during succession.

These experiments give insight into the effects of gap revegetation processes for community composition and population persistence in these perennial grasslands. During secondary succession, changes in disturbance regime affect the gap revegetation processes and the probability for local population persistence for gap-enhanced species.

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C.C. Wilmers, R.L.Crabtree, D.W.Smith, K.M. Murphy and W.M.Getz.

Trophic facilitation by introduced top predators – grey wolf subsidies to scavengers in Yellowstone National Park.

Journal of Animal Ecology 2003, **72**: 909 - 916.

This paper may be useful in considering the implications for the possible introduction of the grey wolf into Scotland. Yellowstone National Park has made quite a feature of this exercise in biodiversity enhancement which is now some 10 years old. Grey wolves are often a source of carrion for other species by partially consuming their prey. The authors observed the consumption of 57 wolf-killed elk (*Cervus elaphus*) and determined the percentage of edible biomass eaten by wolves from each carcass. They found that the percentage of a carcass consumed increases as snow depth decreases and the ratio of wolf pack size to prey size and distance to the road increases. In addition wolf packs of intermediate size provide the most carrion to scavengers.



Elk, Yellowstone National Park

The authors found that wolves increase the time period that carrion is available and change the variability in scavenge from a late winter pulse dependent primarily on abiotic conditions to something that is relatively constant across the winter and primarily dependent on wolf demographics. Wolves also decrease the year-to-year and month-to-month variation in carrion availability. By transferring the availability of carrion from the highly productive late winter to the less productive early winter and from highly productive years to less productive ones, wolves provide a temporal subsidy to scavengers.

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F. Mougeot, S. M. Redpath, R. Moss, J. Matthiopoulos and P. J. Hudson.

Territorial behaviour and population dynamics in red grouse *Lagopus lagopus scoticus*. I. Population experiments.

Journal of Animal Ecology 2003, **72**: 1073 - 1082.

According to the 'territorial behaviour' hypothesis, population cycles of red grouse are caused by delayed density-dependent changes in the aggressiveness of territorial cocks. The paper deals with a replicated population experiment testing assumptions of this hypothesis.

The authors used testosterone implants to increase aggressiveness of cocks for 3 months during autumn, when recruitment and territory establishment take place. On two moors located in northern England, and on two 1-km² areas within each moor, adult cocks were implanted with testosterone on an experimental area and with sham implants on a control area.

During the first autumn, the testosterone treatment prevented recruitment of young cocks into the territorial populations. This reduced breeding density and altered the age ratio among territorial cocks, and possibly levels of kinship. If so, the 'kinship' hypothesis predicted that density and recruitment should continue to differ between testosterone-treated and control areas.

Grouse density remained significantly lower on the experimental than on the control areas for two consecutive breeding seasons. In the second autumn, testosterone was not implanted but the recruitment rate remained significantly lower and cock density continued to decline more on the experimental than on the control areas.

The results suggest that cocks continued to be aggressive and to maintain large territories for at least a year after aggressiveness was increased experimentally, and therefore that autumn aggressiveness is influenced by previous territorial contests.

The experiment validates key assumptions of the 'territorial behaviour' hypothesis for red grouse cycles.

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J. Matthiopoulos, R. Moss, F. Mougeot, X. Lambin and S. M. Redpath.

Territorial behaviour and population dynamics in red grouse *Lagopus lagopus scoticus*. II. Population models.

Journal of Animal Ecology **72**: 1083 – 1096.

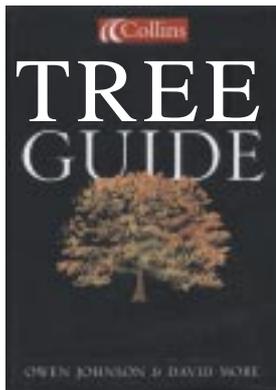
This paper follows on from the previous one in which the authors set up a model of the interaction between population density and aggressiveness. A flexible function describes how aggressiveness changes from year to year as a function of population density. At low densities animals are tolerant to conspecifics and aggressiveness falls from one year to the next. Conversely, at high densities aggressiveness rises.

In the model, current aggressiveness is set by aggressiveness in the previous year, and modified by last year's population density (first version) or by current population density (second version).

The two versions of the model gave fluctuations that differ in period and amplitude. The more abrupt the transition from tolerant to intolerant behaviour with increasing density, the more likely are cycles to occur. The authors show how the new models offer a more general way of examining red grouse population dynamics.

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Recent Publications



Collins Tree Guide

Author: O. Johnson AND D. More

Available from: Collin's website

www.collins.co.uk

Cost: £25 Hrd Back

ISBN: 0007139543

The Collins Tree Guide is a fully illustrated guide to the trees in Britain and non Mediterranean Europe. The book itself is a new edition of a well loved classic but there is certainly a difference. It contains species descriptions including details of shape, height, the appearance of leaves, bark, buds and

flower, as well as similar trees and variants and any other information you could ever need to identify species.

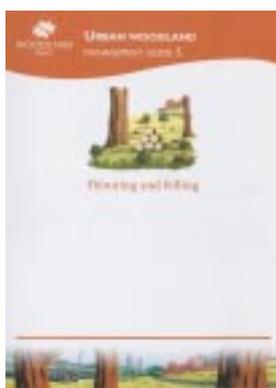
The introduction section contains illustrations of the main leaves, buds, and firs you are likely to find, and these provide the starting point for identification by leading you to a 'key' species.

Within each tree family the guide lists the key species and highlights the most important features to look for when identifying a particular tree from that family. Each individual species is clearly described and a detailed illustration is given on the same page.

This book covers all the tree species found outside the major arboretums, from the olive tree to the eucalyptus. The illustrations are annotated with essential identification features, and the text highlights the most important things to look for to aid fast and accurate identification. There is also coverage of all the species native to Southern Europe.

I think this book is best summed up in the publisher's words: "The combination of definitive text and superb illustrations make this book one of the most important tree guides to have appeared..."

I recommend this book to anyone, but especially those who have trouble with their identification skills of trees.



Urban Woodland Management Series

Guide 5 'Thinning and Felling'

Author: Woodland Trust

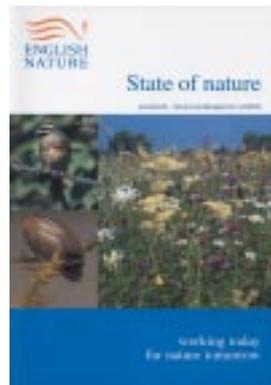
Available from the Woodland Trust website

www.woodland-trust.org.uk/policy/publications.htm

This Guide is one of a series produced by the Woodland Trust as a resource for managers creating or managing urban woodland. Others include, Damage and misuse, Litter and fly-tipping, Complaints and queries, Tree planting and woodland creation, which have been reviewed in previous In Practice issues.

This book considers the basic principles for planning and felling operations in urban woodlands and how the presence of people living next to urban woodlands may present challenges for site managers when wanting to carry out operations.

It highlights issues that need to be given particular consideration in the urban situation that may differ to those found in a rural setting. The booklet assumes background knowledge of woodland management including the practice of thinning and felling along with the legal and planning requirements. Because of the need for prior knowledge the booklet is most recommended to those who work within this sector. However, as with the rest of the series, the booklets are of interest to all especially if you live near urban woodlands.



State of Nature 'Lowlands - future for wildlife'

Author: English Nature

Available from: English Nature

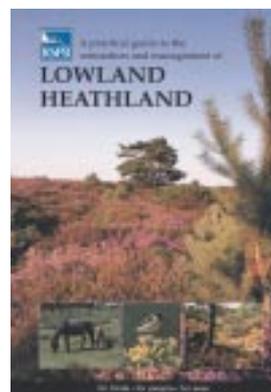
www.englishnature.gov.uk

ISBN: 185716783X

This report describes the state of nature in Lowland England, and examines how a variety of pressures impact upon habitats and species. It identifies conservation success achieved through positive action, and stresses the importance of working in partnership. It demonstrates that a landscape scale approach

to nature conservation is essential, but can only be delivered by involving people more actively, through integrating policies more effectively and through successful partnership at regional and local levels. It illustrates how the approach described in England Biodiversity Strategy - of delivering wildlife gains through working in partnership across sectors - can be put into action.

The book considers the current state of lowland nature and the pressures it is under and then moves onto the future lowland landscape and then onto people policies and partnerships. This is a very informative read and is full of excellent colour photos and diagrams highlighting the issues.



A Practical Guide to the Restoration and management of lowland heathland

Author: N. Symes and J. Day

Available from: RSPB www.rspb.org.uk

Cost: £19.95

ISBN: 0903138867

Lowland heathland has been in decline for decades and is now a fragmented remnant of its former extent. Much of the remaining lowland heathland in Britain has suffered neglect, but restoration programmes are now in place in many areas. This book is key guidance detailing information on techniques for restoring, maintaining and monitoring

lowland heathland habitats. It covers the range of management issues affecting dry heath, wet heath, mires and associated grassland and open water habitats in Britain.

The guide is split into six chapters. Chapter 1 sets the scene by providing background to the importance, character and history of lowland heathland. Chapter 2 covers heathland communities and wildlife describing the vegetation communities and their inter-relationships, and it summarises the status and ecology of important species. The book then continues by looking at planning for management (Chapter 3), describes the management techniques used to restore and maintain lowland heathland (Chapter 4), and techniques for monitoring Chapter 5. The book closes with a selection of case studies illustrating a range of key management issues and the techniques that have been used to resolve them (Chapter 6). In the comprehensive suite of appendices useful information about management costing and grant opportunities, and example condition assessment forms can be found.

Overall this book will be of value to conservation managers, advisers, funding officers, planners and strategic decision makers involved in decisions involving lowland heathland.

Institute News

Who's who in IEEM - 2004

In order to help communication within the Institute, I am now listing the names of and contact e-mails of members of Council and the various IEEM Committees. If you wish to raise an issue with a Council or Committee member, you will be most welcome to do so.

The Council members and office bearers are as follows:

President (IEEM Company Director)

Sue Bell, BSc, MSc, MIBiol, MIEEM. Principal Environmental Specialist, Scott Wilson (Scotland) Ltd. Sue was elected as President in November, 2002 for a two year term until the AGM in 2004 As President Sue is ex-officio member of all committees and chairs Council and the F&GP Committee - sue.bell@scottwilson.com

President Elect

Dr Chris Spray, MA, Ph.D, MBE, MIEEM became the new President -elect. He will take over from Sue Bell at the AGM in 2004 and so has this year to become familiar with the workings of IEEM - chris.spray@nwl.co.uk

Vice- President (IEEM Company Director)

William Manley, BSc, MPhil, PGCE, MIEEM, Principal Lecturer: Countryside Management, Royal Agricultural College, Senior Consultant: GFA-RACE Partners Ltd - will.manley@royagcol.ac.uk

Secretary (IEEM Company Director)

Robin Buxton, BA, B.Phil, D.Phil, MIEEM, Chairman, The Northmoor Trust - Robinbuxton@compuserve.com

Treasurer (IEEM Company Director)

Dr Alex Tait BA, DPhil, MIBiol, MIEEM, County Ecologist, East Sussex County Council - alex.tait@eastsussexcc.gov.uk

List of Council Members

- Mr Mike Barker** Environment and Product Quality Team Manager, Southern Water Services Ltd
mike.barker@southernwater.co.uk
- Dr Peter Beale** Director, Sunflower International
beale@eclipse.co.uk
- Dr Tim Bines** Ecological Management Consultant, Parnassia
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- Dr Nick Carter** Director of Development, British Trust for Ornithology
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- Ms Kathy Dale** Senior Ecological Consultant, Northern Ecological Services
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- Mr Richard Graves** Technical Director, Faber Maunsell
richard.graves@fabermaunsell.com
- Mr David Jamieson** Director, BTCV, Scotland
d.jamieson@btcv.org.uk
- Ms Hilary Ludlow** Ecologist and Landscape Scientist, The Landscape Science Consultancy
landscicon@tinyworld.co.uk
- Mr Steve Pullan** Project Officer, Department of Environment, Food and Rural Affairs
steve.pullan@defra.gsi.gov.uk
- Ms Karen Regini** Environmental Consultant
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- Dr John Rose** Senior Lecturer, Sheffield Hallam University
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- Dr Peter Shepherd** Partner, Baker Shepherd Gillespie
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- Dr Janet Swan** Director, RSK ENSR Environment Ltd
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- Dr Andy Tasker** Director, Warwickshire Wildlife Trust
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- Dr Eirene Williams** Principal Lecturer, University of Plymouth, Seale Hayne
ewilliams@plymouth.ac.uk

Current Committee Members

The Chairman of the Committees are shown in bold type.

Finance and General Purposes Committee

Ms Sue Bell

Dr Robin Buxton
Dr Andrew Cherrill
Mr Kim Harding
Mr William Manley
Mrs Jenny Neff
Dr Christopher Spray
Dr Janet Swan
Dr Alex Tait

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External affairs Committee

Mr Mike Barker

Ms Debbie Bartlett
Dr John Box
Dr Jon Capel
Dr Nicholas Carter
Ms Elizabeth Charter
Mrs Nicola French
Mr Robert Frith
Mr James Gillespie
Mr Paul Goriup
Ms Jenny Heap
Mrs Elizabeth Johns
Dr Lawrence Jones-Walters
Ms Zana Juppenlatz
Mr William Manley
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Membership Admissions Committee

Dr Matthew Clarke
Dr Paddy Coker
Mrs Heliose Collier
Mr David Collins
Ms Claire Cornish
Mr Toby Gibbs
Mr Richard Graves
Dr David J. Hill
Mr Julian Jones
Dr Albert Nottage
Mr Steven Pullan
Dr Pat Rae
Mr Paul Rooney
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Ms Jacqui Green
Mr Thomas Keatley
Dr Martyn Kelly
Mr Mark Lang
Ms Hilary Ludlow
Ms Karen Regini
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Dr Susan Swales
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Mr Kim Harding	K.Harding@macaulay.ac.uk
Mr Paul Kirkland	pkirkland@butterfly-conservation.org
Mr James Lewis	
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Ms Elaine Reid	
Dr Annie Say	annie.say@naturalcapital.co.uk
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Ms Fiona Corby	Fiona.Corby@defra.gsi.gov.uk
Mr David Feige	DFeige@northumberland.gov.uk
Mr Steven Pullan	steve.pullan@defra.gsi.gov.uk

Developments in Ireland

We are still exploring possibilities for the first meeting of members in Ireland and hope to be able to report on this soon. Watch out for further announcements on the website.

Patrons

IEEM Patron, the Earl of Selborne has been appointed Chairman of the Trustees of the Royal Botanic Gardens, Kew in succession to Lord Blakemore.

Professional Development Programme

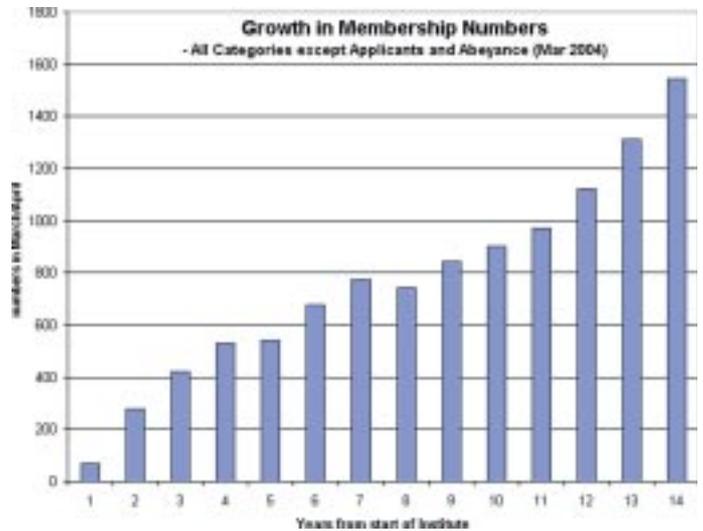
The Professional Development Programme seems to have proved exceptionally popular this year with quite a number of courses being already filled. This really is a case of booking early to avoid disappointment. This programme is an ideal way of meeting some of the CPD requirements of the Institute.

Continuing Professional Development

Members will be aware that this is the third year of the IEEM CPD programme. It is a requirement that the CPD is undertaken but I sense that this is regarded by some as yet another burden on top of an already over busy life. Keeping up the record on a regular basis is really the answer. The requirement is to demonstrate that 10 hours structured and 10 hours unstructured have been met. It's not really very much but we know it causes some headaches. Do remember though that when we come to processing members for the Society for the Environment to become chartered environmentalists, it will be a requirement to demonstrate a CPD record. This is common to all of the Constituent Bodies of the Society.

Membership Renewals

I am afraid that my call for prompt payment of renewal subscriptions was not well heeded - what's new?! But the good news is that most members renewed in the end. This, together with the high rates of new membership applications means that the overall numbers are rising rapidly and may even reach the 2000 mark this year. The growth in numbers since the start of the Institute is shown below which is a very encouraging picture.



IEEM 2004 Conferences

The programme for the **Spring Conference** is advancing well and the programme will be available shortly. The date is 18th May 2004 and it will be held at Hamilton House, London - near Kings Cross Station. The theme will be **Renewable Energy – is it ecologically friendly?**

The location and theme for the **Autumn Conference** has now been agreed. It will be held on the 9 – 11th November at the Royal Clifton Hotel in Southport and will broadly follow the format of previous years with delegates assembling on the evening of the 9th and 2 full days to follow. The theme will be **non urban aspects of habitat restoration**. Paul Rooney and Pam Nolan have agreed to be the local organisers and to come up with some interesting excursions. This should prove to be a popular event – put it in your diary now! If anyone is able to offer a paper, especially on the practical aspects or examples relating to the theme of restoration it would be most welcome - we can't promise to include it until we get to the final planning stages but we have had several included in previous conferences.

Planning Conferences – long term

Anyone who has attended an IEEM Conference will know that they are usually very friendly affairs which combine a good chunk of material to digest on the chosen theme but with an underlying practical approach. We particularly aim to cover issues that are relevant to the needs of the day but we rely on members for suggestions for topics, speakers and sometimes some help locally. The key to successful conferences is long term planning so if you have any ideas on themes for 2005 or beyond please let the Secretariat (Nick Jackson) know as soon as possible. Any ideas will be considered by the TECDC Committee but it can take quite a while. Even if you have just an idea do let the Secretariat know. Someone else may have thought of the same thing or it could be a part of something else already in the planning stage – you never know. But it can be very frustrating if you have started the ball rolling and you then find it can't fit into the IEEM programme for whatever reason. Suggestions for any joint events do need to be made particularly well in advance. Ideally anyone with an idea should be able to suggest a brief title, state who the likely audience might be, the approximate timing, the questions that the event should address and what the outcomes might be.

Making the Voice of the Institute felt

Members may like to know that the Institute is now regularly consulted on a variety of issues and tries to respond where possible. Since the External Affairs Committee was revived responses on the following issues have been submitted:

- Agri-environment Schemes Framework Document - a Consultation on the Future of Agri-Environment Schemes
- Biodiversity Indicators- Web Consultation Document
- Biodiversity Matters: - Draft Strategy for Scotland's Biodiversity
- Future of the United Kingdom's Air Transport Network
- Comments on the Protection of Boundary Features and Amendment of the Hedgerow regulations 1997 Consultation Document
- Legislative Proposals for Integration of the Habitats Directive Provisions on Conservation of European Protected Species into the Land-use Planning Regime
- Proposals for Changes to Agri-Environment Schemes in Scotland
- Protection of Boundary Features and Amendment of the Hedgerow Regulations 1997 Consultation Document
- Technical Amendments to the Conservation (Natural Habitats &c.) Regulations 1994
- Trunk Road Estate Biodiversity Action Plan
- Water Resources (EIA) (England And Wales) Regulations 2002
- Review of Badger Licensing Procedures for England and Wales

New Fellow – Dr Peter Bridgewater

I am pleased to report that Council unanimously approved **Dr Peter Bridgewater**, BSc, PhD, D Res Mgmt, FLS, MIEEM as the 12th Fellow of the Institute at its meeting in March.

Peter is currently Secretary General of the Convention on Wetlands (Ramsar) and has held a succession of influential posts in ecology and environmental management in the UK, Australia and worldwide. He has played major roles in organisations such as the UNESCO MAB programme, the International Whaling Commission and IUCN. He featured prominently in the session on linkages in the landscape/seascape at the World Parks Congress in Durban, South Africa. Readers of In Practice will recall his contribution to the last edition on the Ramsar Bureau.

News of Members

Richard Graves, Chairman of the Membership Admissions Committee and Council Member has recently been promoted to Technical Director of Faber Maunsell –congratulations!

Christine Welsh & Sally Monks, both members of the Committee of the Scottish Section of IEEM are in training to run in the Edinburgh Marathon on 13 June 2004. Christine is running her second marathon for Guide Dogs and trains in the hills and forests around Fort William. Sally will be running her first marathon for the Scottish Motor Neurone Association and trains in Edinburgh. They will both be pleased to receive support from members of IEEM.

Kilimanjaro

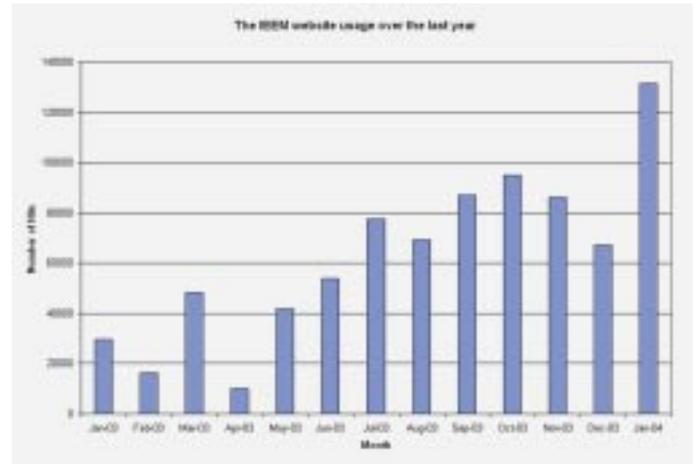
Well the not so obvious connection here is our Secretary, Dr Robin Buxton. Viewers of High Adventure on Channel 5 on 16th March will have seen the stunning scenery around this, the highest mountain in Africa and still a potentially active volcano. The mountain is surrounded by tropical rainforest which might be thought to be at risk due to potentially reduced water supply or a catastrophic change in Kilimanjaro itself. The water supply in question was a glacier high on the mountain which is retreating at quite a rate. The team concluded that the survival of the vegetation was not critically dependent on the water from that source, rainfall being more significant. Also, although nearby mountains had essentially collapsed there was no evidence to support that this was likely for Kilimanjaro in the foreseeable future. It was excellent to see an IEEM member so deeply involved in such a high profile project.

In Practice

Regular readers of In Practice will have noted that this edition looks a little different. Any reactions to the new style would be appreciated as we will probably want to make further changes in future editions.

IEEM Website

The IEEM website continues to receive a very large number of hits each month. There is also very clear evidence that it is being used extensively for searches for ecological services – reports confirming this would be most welcome in the Secretariat. Members will be aware that the site has undergone extensive development and work is now in hand to provide the means to provide information for members in the members only section. This will start to be developed in the next month or so, once a few technical difficulties have been resolved. Members will have noticed that the Draft Guidelines for Ecological Impact Assessment have been on the website for some time. The final version may be subject to significant change so do please be aware of this when using it.



Looking to the Future – the IEEM Business Plan

Over the last few months, Council and the Committees have been developing a business plan to take us forward for the next few years. This is a vital part of any organisation. The exercise is expected to be completed by the June Council, having taken into account various submissions and the membership survey of three years ago.

Society for the Environment

Just at the moment there is still nothing further to report other than the application for a Royal Charter is currently being processed by the Privy Council Office – look out for further announcements on the IEEM website soon.

EFAEP

The European Federation of Associations of Environmental Professionals is developing at an active pace and, through various working parties, is now starting to formulate ideas for European wide environmental issues. A conference has been proposed for December 2004 at the Pollutec Exhibition in Marseille with the theme of Health. Pollutec is rather like the ET2004 exhibition. This may be of interest to some members. IEEM is rather more tightly focussed on issues like biodiversity than most other members' organizations and so it will probably be often the case that themes outside our area of expertise are likely to feature. One issue under active discussion is the creation of a database of environmental expertise across Europe – the details of how this might be achieved have yet to be fully worked out but is likely to include similar details as on the IEEM website. Again this will be by consent of a member only and there may be issues relating to the Data Protection act which still have to be resolved.

Obituary

The Institute is sorry to report the death last Autumn of Peter Guest, a long-standing member of IEEM and employee of the London Wildlife Trust.

News in Brief

Company pleads guilty to damaging river habitat

Occupiers of a quarry near Bodmin were fined £13,000 and ordered to pay £6,000 costs when they pleaded guilty to causing damage to a nationally and internationally important wildlife site in Cornwall in a hearing on Monday 16 February 2004, at Liskeard Magistrates' Court. The company was also ordered to carry out restoration works at their own expense.

Ennstone Breendon Limited, based in Derbyshire, occupies Hantergantick Quarry, part of which lies within the River Camel Valley and Tributaries Site of Special Scientific Interest (SSSI) near Bodmin.

The Court heard how in March 2003, a contractor carried out stone crushing at Hantergantick Quarry without the supervision of Ennstone Breendon Limited. Although a buffer zone had been established as a condition of a planning permission granted in 1998 to protect the SSSI, material from the quarry was tipped close to the river. This caused damage to over 1,700 square meters of bankside vegetation and polluted the De Lank River.

Information from English Nature Website www.englishnature.gov.uk

A Toolkit for River Conservation

A team of leading experts in freshwater ecology are celebrating the launch of a comprehensive set of handbooks and guidelines setting out best practice for conservation of rivers throughout the European Union.

The publication of LIFE in UK Rivers Project is the fruit of four years of research, field-based trials, and painstaking detective work to unravel for the first time, the complicated relationships between 13 threatened animals and plants and the quality of the environment they depend on for their survival.

Sponsored by five agencies led by English Nature, the Project sets out best practice for all other EU Member States that have river Special Areas of Conservation. The UK proved an ideal outdoor laboratory, as scientists investigated a complicated matrix of conditions in rivers from the Endrick by Loch Lomond to the Hampshire Avon in the south, and the Teifi in Wales. For more information please contact English Nature website www.englishnature.gov.uk

Renewables Information Campaign

Key decision makers will be the focus of a new campaign to raise awareness of the renewable energy sector, DTI minister Stephen Timms recently announced. The campaign - 'It's Only Natural' - will seek to inform planners, investors and the wider community of the potential of renewable energy.

This first stage will centre on the South West and provide additional support and information on renewable energy to planners in the region. It will also target the financial community by highlighting the investment potential of the renewable sector.

£4 Million for Biodiversity and Education

Environment Minister, Elliot Morley, recently announced that 57 projects from voluntary groups right across urban and rural England are to benefit from renewed grants worth approximately £4 million. The money from Defra's Environmental Action Fund will help support important biodiversity and education work.

For more information contact Defra website www.defra.gov.uk

Baby bats are booming (Winter 2003)

Some of the most northerly colonies of one of the UK's rarest bats have broken new birth records, thanks to conservation efforts in Pembrokeshire. A total of 263 greater horseshoe bat births were recorded this year at three colonies at Stackpole, Slebech and Llwyngwair, which account for about 7% of the total UK population. Overall birth figures in the area have trebled in the last 15 years – in

the 1980s a long term decline in species numbers had even raised fears of extinction. For more information please contact the Countryside Council For Wales website www.ccw.gov.uk

Plans for Glen Nevis

A £3.5m strategy for the management of the Glen Nevis area over the next five years is to receive a contribution of £810,000 from Scottish Natural Heritage. The proposals, developed by the Nevis Partnership, include the repair of some badly eroded upland footpaths, improvements to low level paths and supporting community events and projects in the area. The SNH money will also go towards improvements to recreational facilities and interpretation, and an enhanced Countryside Management Service, focusing on management of the natural heritage, access infrastructure and interpretation for visitors. This service will also be involved in the promotion of responsible behaviour, one of the key elements of the new Access legislation.

For more information please contact SNH website www.snh.gov.uk

National Register of Deer/Vehicle Collisions :

Please help to build this New Database

Every day deer are killed and injured on British roads. It has been estimated that there are well in excess of 30,000 vehicle collisions involving deer annually. In addition to presenting one of the major welfare issues affecting deer, such collisions also lead to substantial damage to cars, numerous human injuries and some human fatalities. Although deer collisions have been a problem for many years, there has been no system for central collection of information on such incidents; this has not only hampered sound assessment of the scale of the problem, but has also made it extremely difficult to formulate effective management.

There has been pressure for a national register and research into improved roadside measures aimed at reduction of such accidents and finally the Deer Collisions Research Project was given the go ahead last year with lead funding from the Highways Agency, and administered via the Deer Initiative; and in June 2003 the Scottish Executive agreed funding to enable extension of this work to incorporate Scotland.

The information will help research into accident blackspots and deterrents aimed at preventing such incidents.

For further information on the project and for on-line reporting please go to www.deercollisions.co.uk alternatively send email to info@deercollisions.co.uk



Red Deer

Scotland's newest NNR is rocky road to learning

A world renowned geological site in Wester Ross is to become a centre for environmental education in English and Gaelic, following its declaration as Scotland's newest National Nature Reserve (NNR). Knockan Crag, 12 miles north of Ullapool has for the last 30 years helped to introduce geology to the wider public, as well as being an important training ground for students of geology.

To mark the declaration, owner of the site, Scottish Natural Heritage (SNH), is launching a new schools education pack for Knockan Crag, available in Gaelic and English, and local schools are to be presented with their own copies. The Knockan Crag story dates back about 480 million years. It is part of the Caledonian mountain-building episode, when a great mountain chain was raised up, and ran through Norway, Scotland, Ireland and the Eastern USA (there was no Atlantic Ocean then). Intensive pressure split the crust, with older rocks pushed upwards and westwards over younger rocks. This 'overthrust', called the Moine Thrust, runs up the west of Scotland and is very well-exposed at Knockan.

Common Standards Monitoring

In February, the JNCC officially launched their 'Common Standards for Monitoring Designated Sites: Guidance for Setting and Assessing Conservation Objectives'. Developed over six years this is a system for reviewing the desired state for interest features on Statutory sites; its aim is to achieve 'favorable condition' for all features for which a site is designated. The guidance is available on the web at www.jncc.gov.uk/csm. One or two groups which are not yet complete e.g. invertebrates, will be added as they become available.



Basking Shark

Seas fit for Life - Can you help?

The Marine Conservation Society would welcome support in reporting sightings of basking sharks and turtles. Special report forms for **Basking Shark Watch** and **Turtle Watch** are available on their website. The Leatherback turtle's diet consists largely of jellyfish. Recording sightings of jellyfish swarms or beach strandings will contribute to the Society's **National Jellyfish Survey**. An ID guide is available from the MCS and the recording form can be found on their website www.mcsuk.org

Divers are asked to record sightings of Fanshells for the Society's **Fanshell Conservation Project**, and also to participate in their national Seasearch Project. Information from www.seasearch.org.uk

The Liveable City Awards

The Corporation of London's Liveable city awards are annual awards for organisations demonstrating best practice in sustainable business and promoting sustainable communities the City and beyond.

The awards are made by an expert judging panel and supported by the Sustainable City Forum and seven of the City's leading livery companies. The Awards are judged across three core categories: environment, social and economic impact, with eight different categories.

For the second year running ISIS Asset Management was announced overall winner as a result of its outstanding entry in the Sustainable and Ethical Investment category of the Awards.

For more information about the awards please contact the Corporation of London PO Box 270, Guildhall London EC2P 2EJ.

Four great rivers forge a common future

Four of Europe's major rivers are set to receive a major boost of a 12 million Euro programme to clean up their waterways.

The rivers Mersey, Ruhr, Neckar and IJssel will see a series of ten demonstration projects launched along their banks that will set a new benchmark for riverside regeneration by creating sustainable environments for local communities that have suffered from the effects of post industrialisation.

Funded by the EU's Interreg IIIb initiative, Artery is a partnership of five regions and is a three year programme that will focus on four common themes: Public participation, regional strategies, public awareness and public and private partnerships. The ten projects include a new coastal reserve at Speak Garston on the Mersey estuary, an innovative public bathing area set alongside the banks of the Ruhr and a renovated windmill on the IJssel in Holland.

For more information about this project visit the Artery website www.artery.eu.com or phone Frank Bothmann the Project Manager on 0049 201 206 9680.

Conserving ancient trees

Ancient trees are all too often only seen as dangerous and dying, particularly those that still survive in town, but, as all keen ecologists know, nothing could be further from the truth as the latest case study published from the National Urban Forestry Unit describes. Conserving veteran and ancient trees, case study 41, looks at the community campaign in Wolverhampton to save the Tettenhall Lime. This ancient tree was in danger of being felled because it was seen as a threat to the local people.

With support from the community and the help from tree experts at the Ancient Tree Forum and English Nature, the tree was identified as being an important living landmark, more than 300 years old, rich in wildlife, of little or no threat to public safety and with considerable life expectancy.

A decision was made to conserve the tree and with help from the National Lottery Fund an ornamental fence has been constructed.

For more information please contact the NUFU www.nufu.org.uk

EEP - Awards 2004 Environmental innovation for Europe

For the second year in succession EEP, the European Environmental Press of which the Environment Magazine is a founder member, is offering a prize based on evaluating technical innovation in Europe. This will be undertaken in collaboration with Pollutec (rather similar to the ET exhibition series held in the UK) and in collaboration with EFAEP - the European Federation of Associations of Environmental Professionals of which IEEM is a member. The closing date for entries is 20th April 2004.

Contact Environnement Magazine - EEP awards 2004, 38, rue Crois-des-Petits-Champs 75001, Paris. Tel: 0033 1 53 45 91 73, Fax: 0033 1 53 45 96 54 - Françoise Sabin - f.sabin@victoires-editions.fr

PROSPECTIVE MEMBERS OF IEEM

IEEM is pleased to welcome applications for membership from the following:

If any existing member has any good reason to object to someone being admitted to the Institute, especially if this relates to compliance with the Code of Professional Conduct, they must inform the Executive Director by telephone or letter before 26th April, 2004. 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.

Full Membership Applications

Mr Michael T. Atkin, Dr Andrew J. Barker, Mr Alan M. Bell, Mr Anthony C. Blunden, Mr Cain Blythe, Mr Daniel Bright, Mrs Anne R. Bunker, Mr Jonathan A. Burney, Mr Frank Burke, Mr James P. Byrne, Mr Henry M.N. Campbell-Ricketts, Miss Philippa A. Caswell, Mr Ian E. Crosher, Mr Simon Curson, Dr Philip A. Eades, Miss Lyn Eccles, Mrs Roberta M. Epps, Dr Philip M. Fermor, Mr Christopher Formaggia, Mr Owain D. Gabb, Mr John M. Gallacher, Mr James A. Garry, Miss Drusilla Hall, Mr Robert P. Harley, Mr Neil R. Harvey, Mr Nicholas E.J. Heasman, Miss Amy J. Hinks, Dr Katherine L. James, Miss Suzanne M. Jones, Mr Shane G. Larkin, Mr Cameron M. MacIver, Miss Joanna Marshall, Mr David Martin, Mr David H. MacArthur, Miss Helen S. Miller, Ms Fleur M. Oliver, Mr Richard W. Parkinson, Ms Sarah Pemberton, Miss Emma J. Pollard, Ms Diana L. Pound, Mr Stuart H. Priestley, Mr Oliver Prudden, Dr Katy E. Read, Mr Keith Seaman, Miss Victoria J. Sibley, Miss Tracy Stanley, Mr Simon Taylor, Dr Hilary S.C. Thomas, Mr Peter J. Wells, Mr Stephen Wilson, Mr Daniel H. Wrench.

Associate Membership Applications

Miss Alison Aldous, Mr Jon B. Allen, Mr Christopher Baker, Miss Angela K. Bond, Miss Sarah J. Bristow, Miss Katherine E. Brown, Miss Sarah H.E. Brown, Mr David A. Broughton, Miss Jennie Caddick, Miss Elizabeth J. Cartwright, Mr Gary Cole, Miss Janet H. Collins, Miss Rebecca Collins, Mr John P. Cottingham, Miss Ruth E. Cove, Miss Emma Coverdale, Miss Melanie J. Durant, Mr Jonathan L. Durward, Miss Kym Cherie Edwards, Miss Emma N. Green, Dr Wendy M. Hinks, Miss Jenette Howard, Mr Jeremy J. Ison, Miss Eleanor P. Jones, Mr Paul D. Keeling, Miss Katharine J. Land, Mr Glenn J. Langler, Miss Sarah L. Mansbridge, Mr Anthony A. Marshall, Mr Noah T.A. Mims, Miss Alison E. Morse, Miss Alison Nasta, Mr Graham G. O'Mahoney, Miss Catherine O'Riordan, Miss Emma R. Ogden, Mrs Anna L. Outlaw, Mr Rhys D. Owen-Roberts, Mr Stewart Parsons, Mr Lee Penrose, Miss Kate L. Priestman, Miss Kari R. Radbourne, Miss Sarah F. Ryan, Mr David T. Scholefield, Mrs Susan M. Searle, Mr John Simmons, Miss Sarah C. Simons, Mr Adrian R. Spankie, Miss Harriet Vaight, Miss Madeline Warriner, Miss Judith A. Weightman, Miss Eleanor Weir, Miss Rhiannon L. Whitworth, Dr Andrea Wilcockson, Miss Dawn A. Wilde, Ms Suzanne A. J. Wilkinson, Miss Rebecca Willetts, Miss Lorraine Wilson, Mr Graeme M. Worsley, Miss Lisa R. Wright.

New Admissions to IEEM

IEEM is very pleased to welcome the following new Members:

Full Members

Dr Jon Baker, Ms E. Clare Collier, Mr George W. Dodds, Ms Marie-Claire A. Edwards, Mr Alun Evans, Ms Joanne Goodyear, Mr Peter D. Greenslade, Mr James Heslop, Ms Rebecca Hutchinson, Mr Patrick J. Lehain, Mr Marc Naura, Mr Timothy B. Norman, Mr Damian C.F. Offer, Mr Jonathan M. Rau, Mr Paul J. Scott, Mr Jonathan Shelley, Mr Peter J. Sibley, Mr Jonathan R. Woods, Mr Nicholas J. Woods.

Associate Members

Mr Barry Anderson, Mr Brian Arneill, Mrs Susan Bartlett, Mr Olaf S. Booy, Mr Dominic S. Burton, Miss Sarah Cane, Mr Alastair J. Chapman, Miss Rachel M.L. Cowan, Mr Ian W. Craft, Mr Benjamin J. Driver, Mr Paul S. Fisher, Miss Jennifer A. Gardner, Mr James P. Gilbert, Mr Derek J. Gow, Mr Jonathan Guarnaccio, Mr Mike J. Harris, Mr Gerard J. Hawley, Mrs Patricia A. Hilton, Miss Sophie I. Hine, Mr Paul Holton, Mr Simon T. Humphreys, Miss Veronica M.V. Lawrie, Mrs C. Sian Mitchell, Miss Caroline Munns, Mrs Sally Murray, Miss Jackie Nicholson, Mr Andrew R. Perry, Miss Sarah A. Postlethwaite, Mr Benedict J. Rose, Miss Victoria M. Rose, Mr Keith A.A. Ross, Dr Matthew J. Shepherd, Mr Matthew Vesey, Mr Valery Votrin, Miss Natalie Walker, Ms Donna L. Warren, Miss Harriet S-E Webb, Mr Stephen P.B. West, Miss Rosie Whicheloe, Mr Stephen G. Wilson.

Affiliate Members

Mr James D. Campbell, Ms Monica J. Gillespie, Mr David Grant, Miss Anja Nonnenmacher, Mr Justin C. C. Prigmore, Mr Phil Weaver, Miss Jenny Whitcher, Mr Steven Whitcher.

Student Members

Miss Eunice D. Akpabey, Miss Lisa M. Banfield, Miss Catherine Barlow, Miss Tania L. Beatty, Miss Catherine R. Bradley, Miss Sarah R. Childs, Mr Trevor J. Hall, Miss Sahran Higgins, Miss Catherine A. Holley, Mr Natsuki Okamoto, Miss Clare Pugh, Miss Katie H. Randall, Miss Catherine J. Stamp, Miss Frances A. Steel, Miss Laura J. Thorpe, Mr Steven P. Tod, Ms Sarah J. Tunstall, Mrs Lesley J. Withall, Mr Jonathan Woods.

The following have successfully upgraded their Membership from Associate to Full

Mr Jeremy E. Bailey, Miss Laura Cox, Miss Suzanne Glencross, Mr Andrew Harrison, Mr Peter Hoy, Mr Trevor Mansfield, Miss Louise C. Mapstone, Mr Tim Palmer, Mr Paul A. Phillips, Miss Nicky Richardson, Mr Michael C. Robinson, Mr Richard Roe, Mr Andrew Saunders, Miss Katrena Stanhope, Mr Guy M. Stone, Mr Hayden Torr, Mr Barry P. Whittle.

The Course programmes for 2004 for the Centre for Alternative Technology, Field Studies Council, Losehill Hall, Plas Tan-y-Bwlch and BTCV are all now available. Each offers a wide range of courses that might be of interest to IEEM members. Information from:

Centre for Alternative Technology: Further details about each course can be obtained from Joan Randle.
Tel: 01654 703743, Fax: 01654 703605, E-mail: joan@cateducation.demon.co.uk.

Field Studies Council: For a copy of the FSC Courses 2004 brochure, contact FSC head Office, Preston Montford, Montford Bridge, Shrewsbury, Shropshire, SY4 1HW. Tel: 01743 850 674, Fax: 01743 850 178, E-mail: fsc.headoffice@ukonline.co.uk. website www.fieldstudiescouncil.org

Losehill Hall: Details from Losehill Hall, Peak District National Park Centre, Castleton, Hope Valley, Derbyshire S33 8WB
Tel: 01433 620373, Fax: 01433 620346, E-mail: training@losehill.u-net.com.

Plas Tan-y-Bwlch: Details from: Plas Tan-y-Bwlch, Maentwrog, Blaenau Ffestiniog, Gwynedd LL41 3YU. Tel: 01766 590324, Fax: 01766 590274, E-mail: Plastanybwlch@compuserve.com.

BTCV Courses: - practically based. Details from: BTCV Training Programmes Unit, Red House, Hill Lane, Great Barr, Birmingham B43 6LZ. Tel: 0121 358 2155, Fax: 0121 358 2194, E-mail: ETN@ukgateway.net

5 April. The Restoration of Battersea Park. Fitzroy Square London. A lecture by Jennifer Ullman, Head of Parks for Wandsworth.
Details from: office@londongardentrust.org and www.londongardentrust.org

14 April. Scottish Biodiversity at the Garden. Royal Botanical Gardens Edinburgh. A family oriented day with an evening lecture from Sir Crispin Tickell entitled 'the Effects of climate change on the Environment'.
Details from: Jo Newman e-mail: jo.newman@snh.gov.uk

15 April. Science for Biodiversity. Scottish Biodiversity at the Garden. Royal Botanical Gardens, Edinburgh. For those interested in the science underpinning conservation of biodiversity.
Details from: Jo Newman e-mail: jo.newman@snh.gov.uk

15 - 16 April. 'The Wash Revisited'. Estuarine and Coastal Studies Association's Local Meeting.
Details from: bob.earl@coastms.co.uk

16 - 18 April. Mammal Society's 50th Easter Conference. University of Leicester. Details from www.mammal.org.uk

5 May. Enhancing New Plantations with Woodland Wildflowers. Milton Keynes. This course will explore and demonstrate proven techniques for the establishment and maintenance of woodland wildflowers introduced into young and mature plantations.
Details from: Mike Street 01908 233600. mstreet@mkparks.co.uk

6 May. Identifying Freshwater Invertebrates in Lowland Habitats Astonbury Wood Nature Reserve, Hertfordshire. This workshop will introduce and develop identification skills for a range of aquatic invertebrates down to group level initially and then species level where there is time.
IEEM Workshop

12 May. Freshwater Surveying. Perth, Scotland This workshop will introduce current techniques used for evaluating aquatic habitats. Methods will include Macrophyte Sampling, River Corridor Survey, River Habitat Survey and SERCON.

12 May. North East Section Meeting. 'Great Crested Newts and other Amphibians' 2.00pm, Broken Scar Water Treatment Works, Nr Darlington
Details from: steve.pullan@virgin.net

13 May. Using Bryophytes as Habitat Indicators. Orpington, Kent. Bryophytes are much under-valued guides to many habitat conditions. This is an introduction to the more widespread or distinctive heathland, woodland and grassland species, their ecology and identification in both field and laboratory. **IEEM Workshop.**

18 May. IEEM SPRING CONFERENCE; 'Renewable Energy - is it Ecologically Friendly?' . Hamilton House, Mabledon Rd, Euston.

20 May. Introduction to NVC Surveying for Woodlands. Northamptonshire This course is intended as an introduction to the National Vegetation Classification - Woodland Surveying.
IEEM Workshop

22 May. National Moth Night.
Details from www.nationalmothnight.info

22 May. The archaeology of ancient woods and wooded landscapes. Norfolk Park, Sheffield.
Details from i.d.rotherham@shu.as.uk

26 May. Identification of Neutral Vegetative Grasses. Somerset This workshop covers a high proportion of the large range of grasses occurring in neutral grassland. **IEEM Workshop**

27 May. Identification of Neutral Vegetative Grasses. As above

3 - 5 June. The ecology and management of *Rhododendron ponticum*, an invasive species or a neglected native Sheffield Hallam University, City Campus, Sheffield.
Details from i.d.rotherham@shu.ac.uk

7 - 9 June. (2 nights) Identification of Sedges. Malham Field Centre, Yorkshire. Almost one third of the British Carices (24 species) can be found within two miles of Malham Tarn, in calcareous flushes, calcareous grassland, fen and acid habitats. **IEEM Workshop**

9 June. Introduction to Geological Conservation. Wren's Nest NNR, Dudley, West Midlands. In England alone there are about 1400 SSSIs, which include a notified geological interest. They represent sites of international and national importance. **IEEM Workshop**

14 June. Basic Introduction to Grasses. Settle, North Yorkshire. Survey work often includes the requirement to identify grasses, a group which many find difficult. **IEEM Workshop**

15 June. Basic Introduction to Grasses. As above.

14 - 16 June. Ecology & Management of Large Native Pinewoods: Past, Present and Future. Inverness area.
Details from: www.BritishEcologicalSociety.org/articles/groups/forest/

21 - 24 June Landscape and ecology of trees and forests. Royal Agricultural College, Cirencester. Habitat fragmentation and the potential impact of human induced climate change are encouraging a move away from site based protection to recognition of the importance of landscape scale processes.
Details from www.woodland-trust.org.uk or www.iale.org.uk.

9-11 November IEEM CONFERENCE & AGM, Southport 'Restoration Ecology'

For details of all IEEM Workshops contact Nick Jackson Tel: 01962 868626; E-mail: nickjackson@ieem.demon.,co.uk
or Website: www.ieem.org.uk