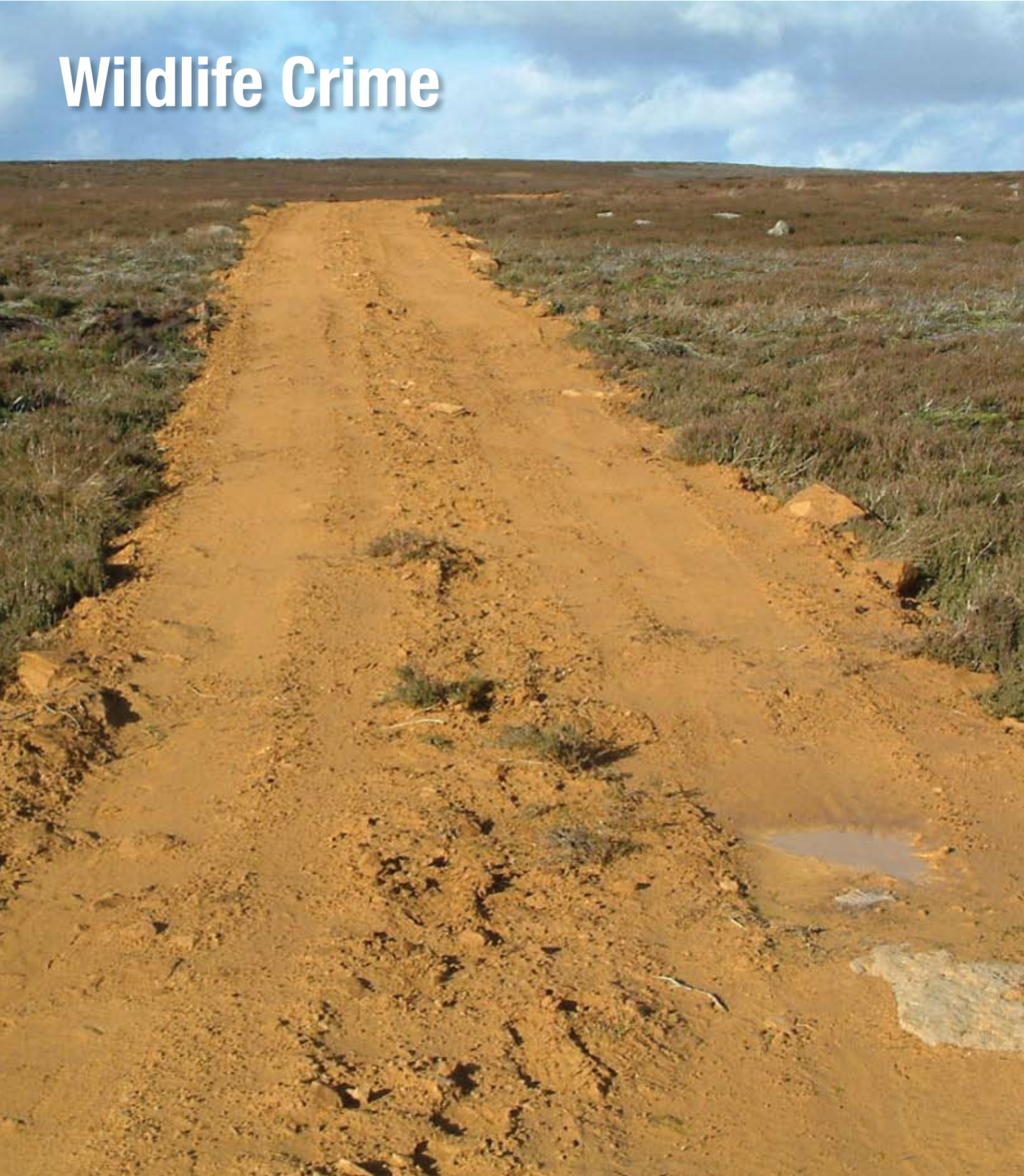




In Practice

Bulletin of the Institute of Ecology and Environmental Management

Wildlife Crime



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McParland Finn
British Ecological Society

Editorial

Wildlife – The Cinderella Crime?

Over one hundred people gathered in Leeds for the 2009 one day conference, to discuss wildlife crime. The majority of attendees were field surveyors - perhaps a measure of the uncertainty and vulnerability expressed by field practitioners. Or perhaps the fact that field workers are most likely to be the witnesses to a crime.

Wildlife crime encompasses a very wide range, from the 'merely' reckless one off event (failure to have a survey completed before clearance), to major organised criminal gangs. We are all aware of major crimes such as smuggling exotic species, but it was a surprise to find out that other crimes such as dog fighting can be part of systematic, serious, organised and repeated crimes. According to a speaker from the Lancashire Police force, their database shows that people involved in wildlife offences are often players in other major crimes. In some cases people specialise in offences to order, such as poaching or egg collecting; hare coursing and related events can be part of widespread unauthorised gambling. It is this factor that has enabled the Lancashire force to use prosecution for wildlife crimes to gain a conviction where there is insufficient evidence to prosecute a more serious offence (the 'Al Capone gambit' perhaps?).

Here I confess to an additional interest in this subject as a magistrate who sometimes hears wildlife crime cases. I might be involved at the start of a case, as a witness, and also, possibly uniquely amongst members, I also see the end result.

Some conference attendees expressed concerns about what action should be taken if a crime is suspected - should one automatically report a potential crime committed by a client, and what about client confidentiality? Would we be breaching a contractual obligation and liable to prosecution ourselves? There is the inevitable concern about the vulnerability to counter-suing. So what should we do?

The Institute's Code of Professional Conduct requires all members to act professionally. In addition, a consultant's Terms and Conditions should include reference to reporting wildlife crime, which if given to a client, acts as forewarning of any potential action and should prevent any potential breach of a client's confidentiality. Any licences in place make it incumbent upon the licence holder to act according to the law and to report breaches. It might not be appropriate in all cases to report an event to the police. Other action, such as advising a client as to the potential offence and guiding them to a better course of action might be more suitable. This might be done in association with the relevant statutory agency. In the end though, we are not lawyers and it might be necessary to seek the advice of a suitably qualified legal advisor.

One of the problems in presenting a court case is that the crime itself might erase evidence of ever having been committed, for example the presence of a bat roost in a building which has been demolished. It is important to record survey information accurately and to present it professionally in court. Wildlife crimes are taken very seriously in courts, but the evidence needs to prove the case 'beyond a reasonable doubt'. However, once a conviction is achieved there are options for magistrates to remove property (which might include vehicles or dogs) as 'proceeds of crime' and this can often be more of a punishment than a fine or a short prison sentence.

Coming full circle in this editorial, I have seen wildlife crime prosecuted, frequently successfully, but not often enough. It is still seen as a Cinderella offence (except in a few constabulary areas) and not enough resources are committed to it. It must be taken more seriously, prosecuted vigorously, and more resources given to tackling it.

Jacqui Green CEnv FIEEM
 Director, Green Environmental Consultants Ltd

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Cover image: Track constructed without the necessary consent on the North York Moors

Photography: Natural England

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

Wildlife Crime – Can Prosecutions Achieve Anything Useful?

Nicholas Crampton
Crown Prosecution Service Norfolk

This article is based on a talk given to the IEEM Conference in Leeds on 1 April 2009, which explored the contribution that prosecutions can make to the protection of biodiversity through the enforcement of environmental law, and wildlife crime more specifically.

First, however, it has to be acknowledged that any prosecution represents a failure, in that in most cases there has been ecological damage which the court procedures themselves will not remedy. Any benefit therefore will exist in contributing to voluntary compliance by individuals within society who may have an interest in breaching legal requirements.

To understand that contribution, we need to understand the roles of the court and the prosecutor, and I suggest these can be described as 'educative' or 'communicative'.

With any case, the prosecutor needs to assist the court at two levels. Firstly, to explain what has happened, but secondly, and arguably of more importance, to assist the court to understand the seriousness of the case, to provide information on the background or the context within which the case is set. The reason for this is that, in the event of a conviction, the court will need to choose a sentence from the range of options available, and the starting point will be the 'seriousness' of the case. This is not an excuse to present the case in the most graphic terms possible, but to present it in the most accurate terms.

But 'communication' has another dimension. By the sentence it imposes the court conveys a message to society at large about the view taken of the offence in question, how serious it sees it and what the range of penalties may be. Whilst such a message is not conveyed directly via court publicity, the media find court cases, and especially criminal ones, a continual source of interest, and wildlife cases seem to be particularly so. The potential beneficial effect of a prosecution is thus to communicate to those tempted to break the law what the penalty may be, thus having some deterrent effect by persuading some at least not to do so.

Sentencing is a two stage process, first the court weighs the seriousness of the offence committed, either following a trial or an admission of guilt, and determines an initial level for the sentence taking into account any aggravating features, and secondly adds in the mitigating features presented to it by the defendant. The presentation of the case by the prosecutor is thus vital in allowing the court correctly to perform the first stage of this process, and to consider what ancillary orders may be appropriate, e.g. forfeiture of items used to commit the crime, disqualification for driving and anti-social behaviour orders.

But as prosecutors we can only present details about the case that are disclosed within it. This means that we rely on witnesses not only to say what happened, but on 'experts' to evaluate the effects of what happened and provide other 'background' information. In a number of cases briefly described later I will try to show the vital contribution the latter can make, and how prosecutors can use their evidence.

Prior to 2002, the main wildlife offences which carried imprisonment were those prosecuted under the Control of Trade in Endangered Species Regulations (CITES) and animal cruelty cases. Then, penalties for offences under Part 1 of the Wildlife and Countryside Act 1981 ('WCA') were radically upgraded by the addition of six months imprisonment, making them of equivalent seriousness to any offence sentenced in a Magistrates' Court. That meant that the Court now had to determine in what circumstances prison was appropriate for the broad spectrum of wildlife crime: when was a crime against wildlife so serious that it justified sending a person to prison?

In the two or three years that followed, it became possible to see what factors the courts were regarding as important aggravating features, and indeed some cases were specifically prosecuted in order to see what view the court would take of certain features that were thought to be potentially important here. The approach can be set out as follows:

- *Evaluate the facts:* Gravity depends initially on '**Conservation status**' of species or habitat'.
- *Primary factors:* Endangered Species? Fragile or rare Habitat damaged? Ecological balance damaged? Conservation problem aggravated by crime?
- *Additional aggravating features:* Commercially driven? Breach of professional duty? International obligation to protect species or deter offending?
- *Other familiar aggravating features:* group activity, pre-planning, prevalence (either nationally or locally), repeat offending by the individual.

Using the above as a kind of grid or pattern, it is possible to ask which of them potentially applies to the case, and then set about obtaining the evidence to show that they do apply. It enables the court to have a rational basis for discriminating between 'facts' that are essentially similar. Thus the offence of 'intentionally killing a wild bird' will have a very different outcome where, for example, a chaffinch is shot by a young man with an airgun he is using for target practice as against a hen harrier is shot by a game keeper on a grouse moor. The former has no aggravating features, the latter involves a rare species, heavily protected, including by international provisions (CITES Annex A), killed by a man in the course of his employment protecting the commercial interests of his employer, and where 'crime' is reliably believed to be a major cause of the rarity of the species in England and Wales.

The same process also allows prosecutors to weigh the 'public interest' in prosecuting at all, or deciding if some lesser sanction is appropriate or indeed if 'advice' or an informal warning will suffice.

At this point it should be made clear that unless there is sufficient evidence that an offence has been committed and by an identified offender there will be no case. The Crown Prosecution Service Code for Crown Prosecutors, now adopted by most if not all 'public' prosecutors and several well-known 'private' ones, is quite clear. There has to be sufficient evidence that there is 'a realistic prospect of conviction', that such



The brown hare *Lepus europaeus*
Photo: www.wildstock.co.uk

is more likely than not when set against the test of 'beyond reasonable doubt' that the court will employ. This article therefore presumes that this first stage of the test has been met in any case under consideration when applying the 'public interest' criteria set out above.

So, how have the matters discussed above played out in practice? I have chosen three cases to illustrate these principles in action, all of which 'benefited' from substantial media publicity which communicated the court's message to the wider public.

Bluebells are a feature of a number of Norfolk woods, but were targeted by gangs of diggers sent out by unscrupulous bulb traders based in the Cambridgeshire Fens. In 2002 the police received several reports of such activity, and on one occasion four men were apprehended in the act of digging, several sacks of dug bulbs, forks and a lunch box being found with them! They admitted they were being paid to dig, and their addresses disclosed where they had come from. We found a biologist who described how bluebells, (not the Spanish variety or hybrids), are a globally rare species largely restricted to North West Europe, most of which is in the UK. Bluebells are protected from commercial use under Schedule 8 of the WCA, as well as from being uprooted under section 13(1) WCA. These offences had become imprisonable in February of that year. Could the court be persuaded to impose a custodial sentence?

Previous cases involving snowdrops had resulted in 'Community penalties' when prosecuted under the Theft Act or Control of Trade in Endangered Species Regulations (COTES). The offences were prevalent – woods in Norfolk were being regularly targeted, the offences were commercially driven, there was a need to protect internationally important species and its habitat, the offences were pre-planned and committed by a group. The

result was that prison sentences were imposed on two of those prosecuted, and another two narrowly escaped a prison term and those custodial sentences were upheld in the Crown Court on appeal, the Judge commenting that they were 'jolly well deserved'!

A similar approach was adopted later in 2003–05 to deal with the problem of 'illegal hare coursers', gangs of men up to a dozen or so with several dogs who roamed across East Anglia and other parts of the UK in vehicles looking for 'sport' in chasing hares. It is believed considerable sums of money can change hands, and the activity was often accompanied by damage to property and threats to landowners and their staff. The offence of day time poaching dates from 1831 and carries a fine, and had been treated as a minor property crime, the value of a hare or pheasant being small. Whilst many incidents were reported, there was no concerted police action, the offence deemed not serious in the grand scale of things. There were thus comparatively few prosecutions. However in 1994 the Game Laws (Amendment) Act 1960 had been amended to give the courts substantial powers of forfeiture of vehicles when this offence was committed by a group of five or more persons. As far as we could tell it had never been used! An approach was made to English Nature, one of whose scientific advisers provided a statement explaining the conservation efforts for brown hares, that they were a Biodiversity Action Plan species (along with grey partridges and black grouse) but alone among these species were threatened by 'criminal activity', i.e. illegal hare coursing. East Anglia was particularly important for this species. A case involving five men came before the King's Lynn Court, and the Court was invited to look at it from a conservation standpoint, and conclude that the case should be treated as a serious type of the offence,

and order forfeiture of the two vehicles whose details had been recorded. The Court did as it was requested, imposing fines up to £1,000 and forfeiting the one vehicle which had not been sold since the date of the offence (the other had been.) The media reporting of the case had dramatic results. Courts across East Anglia imposed similar sentences, some ordering forfeiture of the dogs involved, one Chief Constable organised an anti-poaching training session, three police forces set out force-wide procedures with resources and many more cases came to court. The number of reported incidents plummeted. And all this happened before February 2005 when the Hunting Act 2004 came into force.

Secondary poisoning of raptors is a major concern. This occurs where the target species, usually rodents, are eaten by for example foxes, buzzards or red kites, in the normal course of foraging. They are not the intended target. Pesticides in the UK are illegal unless 'Ministry approved', and such approval comes with a set of conditions which are helpfully printed on the container and thus known as the 'label conditions'. These are designed to allow the safe use of the compound by operatives and to limit the damage to the environment that indiscriminate use would otherwise cause. In the case of a number of rodenticides these conditions include one to 'search for rodent bodies' – clearly aimed at limiting secondary poisoning. Who is responsible for seeing that this is done, can they be held criminally liable?

The Control of Pesticide Regulations 1986 ('COPR') are enforced under the Food and Environment Protection Act 1985 ('FEPA') and contain clear duties on 'end users' and on 'employers', but in a landmark case in 2000 we had shown that liability for the failures of an employee could also attach to his middle and senior managers who were not end users or employers as defined. In another case in 2005 we sought to show that managers and employers could be held liable for an operative's failure to follow the label condition relating to searching for rodent bodies and that that had contributed to the deaths of raptors by secondary poisoning.

A 13 year old boy had enjoyed watching a pair of buzzards using a wood at the edge of his father's farm. But over one Christmas holiday both were found dead at the foot of a tree, apparently having simply fallen from a branch. Analysis showed one of the highest concentrations of difenacoum so far recorded. They were clearly victims of secondary poisoning. Enquiries revealed that on a neighbouring farm an elderly part time game keeper was using difenacoum at a pheasant feeding point a few hundred metres from where the dead buzzards were found. His bait boxes were perfect, but when questioned he admitted he had not been searching for dead rats, and the employer/supervisor accepted that no instructions had been explicitly given to him to do this, nor had his compliance with the label conditions been supervised. The elderly 'keeper was duly cautioned for his failure. But could the link to the dead buzzards be proved? The prosecution duly invited an expert on buzzards and another on rat behaviour and the effects of rodenticide anti-coagulant poisoning to advise. The former explained that buzzards have a very restricted range in the winter, especially if there is a ready food source to hand. The latter explained how rat behaviour changes as the rodenticide begins to work, making them somewhat slower, much more diurnal and prone to remain in the open, thus making them perfect lunch and dinner for buzzards which are not minded to travel too far! The conclusion was that these buzzards were 'extremely likely' to have consumed the rats which had eaten the difenacoum bait. The employer subsequently pleaded guilty to failing to provide instructions and accepted 'permitting' non-compliance with 'label conditions' by employee as an offence taken into consideration. Whilst the defence did not formally concede the point, we were able to claim that this was the first prosecution which was 'so directly tied to the very adverse consequences,



Common buzzard *Buteo buteo* killed by secondary poisoning

i.e. the death of birds of prey, which the label conditions are designed to prevent or mitigate'. The court imposed a fine of £2,000.

Both these COPR cases attracted considerable publicity. In the former case an article was written in the Country Landowners and Business Association Journal explaining the 'new' liability for managers, while in the second, the defendant produced character testimonials from several local landowners – who were thus made fully aware of the potential for prosecutions in similar circumstances even before the case was concluded!

Each of these cases demonstrates the importance of expert biological or ecological evidence. Whilst convictions may well have resulted without such evidence, the 'value' of the cases, and thus their success in terms of media reporting and their potential to inform and warn others, is entirely down to the contribution the experts made. Of course voluntary compliance is best, and there are additional ways of educating, influencing and persuading those tempted to cause ecological damage to our wildlife. But these need to be buttressed by the knowledge that if a prosecution is taken, the courts are liable to take these cases seriously and impose substantial penalties in serious cases.

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CITES and International Wildlife Crime

Colman O Criodain

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Introduction

The Convention on International Trade in Endangered Species of wild fauna and flora (CITES) came about as a response to growing international concerns about the manner in which demand for certain wildlife and wildlife products was undermining *in situ* conservation efforts in range States. The process began when the International Union for the Conservation of Nature (IUCN) adopted a Resolution on this issue at a meeting in 1963. The final text of the Convention was agreed at a special Conference attended by 80 countries in Washington DC in March 1973 and CITES entered into force on 1 July 1975. It now has 178 member countries, or Parties, as they are called¹.



Paphiopedilum is an Asian orchid genus, all species of which are on Annex A/Appendix I
Photo: Ronald Petocz/WWF Canon

The aim of CITES is best summarized in its preamble, which recognizes that international cooperation is essential for the protection of certain species of wild fauna and flora against over-exploitation through international trade. The Convention regulates trade in over 30,000 species but, for the vast bulk of these, commercial trade is permissible, subject to certain conditions.

CITES and the European Union

All the Member States of the European Union (EU) are Parties to CITES. Due to the absence of internal borders, and because implementation of the Convention requires coordination of certain environmental policy issues among EU Member States, it is enshrined in EU law. The principal relevant piece of EU legislation is *Council Regulation (EC) No 338/97 on the protection of species of wild fauna and flora by regulation trade therein*. There are a number of subsidiary Regulations

that elaborate or update on certain aspects² and that can be amended or replaced by the Commission in consultation with the Member States, avoiding the need to go back to the Council of Ministers. All of these Regulations have direct effect in Member State law; however, responsibility of issuance of permits or certificates, or for imposition of criminal sanctions, currently rests with the Member States.

The main EU Regulation lists species in four annexes (A, B, C and D), the first three of which correspond approximately to the three Appendices (I, II and III) of CITES.

Annex A

This Annex contains all the species listed in Appendix I of CITES – *i.e.* those that the Parties deem to be at most at risk of extinction. It also contains a number of other species. The most important category of additional species are those that, in addition to being listed on the CITES Appendices, are protected by the Birds and Habitats Directives (brown bear, wolf, European slipper orchid and many bird species).

Commercial trade in these species is normally forbidden. Exceptions to this prohibition include:

- trade for *bona fide* conservation purposes (captive breeding projects, educational use etc.); or
- trade in captive bred/artificially propagated specimens.

Even in these cases, however, there must be scientific advice that such trade will not be detrimental to the survival of the species in the wild.

Trade into and out of the EU requires the issuance of both export permits (or re-export certificates) and import permits. In addition, trade within the EU (even within a single Member State) requires issuance of internal trade certificates.

Examples of Annex A species include tigers, nearly all elephant populations, pandas, marine turtles, great apes, European birds of prey, and the more endangered species of parrots, lizards, cacti, cycads, orchids etc.

Annex B

This Annex contains the vast bulk of the species regulated by CITES and by the EU Regulations. Species are listed on this Annex for one of two reasons:

- regulation of trade in the species is necessary to prevent it from over-exploitation; or
- the species could be confused with other Annex A or Annex B species and so trade must be regulated for enforcement purposes (so-called 'lookalike species').

All species listed on Appendix II of CITES are included in Annex B unless they are already on Annex A. However, Annex B also contains additional species whose inclusion was deemed necessary by the EU on conservation or lookalike grounds.

Commercial trade in Annex B species can take place, subject to certain rules. CITES itself requires the issuance of export



White rhino *Ceratotherium simum* killed for its horn
Photo: Martin Harvey/WWF Canon

permits (or re-export certificates) for Appendix II species and one of the conditions for issuance of these export permits is the provision of scientific advice that the export will not be detrimental to the survival of the species in the wild. EU law goes further in that it also requires issuance of import permits, which can only be issued when the importing country has obtained its own advice that the import will not be detrimental. If that advice is negative, the case is referred to a Committee of Member States' scientists, after which no imports to the EU of the relevant species from the relevant country can take place until there is new information to demonstrate their sustainability.

Examples of Annex B species include a number of animal and plant families where there are rarer species on Annex A (such as parrots, chameleons, orchids and cacti), the hippopotamus, the walrus, a range of lizards, turtles, snakes, frogs etc., some medicinal plants (such as ginseng), certain fish (such as European eel and sturgeons) and a small number of commercially important timbers (such as ramin, mahogany and African teak). Unlike Appendix II, Annex B also contains four species that are deemed to be ecological pests (American bullfrog, red-eared slider, painted terrapin and ruddy duck). Import of live specimens of these species into the EU is illegal. However, opinion among EU scientists and others is divided as to the utility of this provision as a mechanism for addressing the problem of invasive alien species, some believing that separate legislation is required on this issue.

Annex C

This Annex contains almost all the species included on CITES Appendix III (if they are not already listed on Annex A or B). Appendix III allows individual countries to seek international cooperation in regulating exports of species of national concern. Species are listed for individual countries only. Those countries issue export permits but other countries must issue certificates of origin. Re-export certificates are issued as appropriate.

In addition, importers to the EU are required to complete an import notification. Examples include the African civet, which has been listed by Botswana, a number of endemic gecko species listed by New Zealand and the Himalayan poppy listed by Nepal.

Annex D

This Annex has no equivalent in CITES. It lists species where the EU considers that monitoring of imports is necessary. As in the case of Annex C species, importers to the EU are required to

complete an import notification so that the import levels can be monitored. The Annex includes a range of pet species (including ornamental pheasants and aquarium species) and some ornamental and medicinal plants.

The Scale and Impacts of CITES-Related Crime

It has been estimated that the scale of illegal wildlife trade is second only to that in drugs (though some studies also argue that the scale of the illegal arms trade is also greater). A figure of \$6 billion annually has been quoted for the estimated value of the trade. However, it is impossible to judge the scale of illegal trade with any degree of reliability because we have no way of knowing how much trade goes undetected. Furthermore, the range of products in trade, their uses, price variation, differing trade routes etc. make for a complex dynamic. Nevertheless, these estimates, even if they cannot be proven, go some way towards illustrating the scale of illegal trade and the threats it poses.

The species whose trade is regulated by CITES are sought after for a range of reasons. Some collectors are obsessive in their quest for very rare or newly described species of reptiles, birds or charismatic plant species (such as orchids, carnivorous plants, cycads or succulents). Some wildlife products (such as hunting trophies, rhino horns, ivory, caviar, etc.) are seen as status symbols in certain cultures or social circles. Many species are in demand for medicinal purposes; in some of these cases (such as tiger bone and rhino horn) the efficacy is questionable, to say the least, but others (African cherry, ginseng etc.) are of proven utility and are even used in the mainstream pharmaceutical industry. The timber species listed on Annex B (such as ramin and mahogany) are aesthetically attractive but they are also in demand by virtue of their practical properties.

Not All Trade is Bad!

It is important to emphasise that trade in these species is not intrinsically undesirable – quite the contrary in most cases. Nearly all Annex B species can sustain a certain level of commercial trade, provided it is properly regulated to ensure that export levels are non-detrimental and that illegal trade is minimized. Well-managed trade is the best possible incentive to preserve the habitat of the species and so it should be considered a desirable objective. Of course, in the case of Annex A species, this is not normally the case – at least for wild specimens. However, even here there are exceptions. A number of countries have managed to operate well-regulated trophy hunts for large mammals or crocodiles. These generate much-needed funds for conservation of these species and for the communities that live in proximity to them. EU legislation allows for imports of such trophies, subject to stricter than normal scientific criteria and on condition that they are not re-sold.

Nevertheless, the law can only go so far in ensuring that trade is legal and sustainable. The methods used to evade detection range include:

- provision of false information in order to obtain a permit (e.g. concerning the identity or source of the specimen, or the intended use);
- falsification of permits or certificates (for example, the illegal re-use of permits to smuggle new consignments of caviar); and
- outright concealment (well-documented examples include stuffing of live birds into cardboard rolls, smuggling of live eggs in special containers strapped to a person's abdomen, concealment of tiny frogs in film rolls, etc.).

It will be readily apparent that, once the trade in wildlife and wildlife products by-passes the regulatory channels, there is a risk of other consequences besides conservation-related ones. For example, whereas EU legislation lays down effective provisions for the transport of live specimens, illegally traded animals are often subject to considerable distress and associated high mortality (with the result that even greater quantities of specimens are required to meet demand). More seriously, there is no compulsion for smugglers to observe veterinary or phytosanitary rules; indeed, in the case of edible products, even basic food safety precautions are lacking.

EU legislation confers an enforcement advantage in that it requires issuance of import permits in the vast bulk of cases and these can only be issued after prior sight of the export permit. Nevertheless, vigilance on the part of customs and police remains a necessity.

Internet Trade

The importance of the Internet as a conduit for wildlife smuggling is growing. Use of the Internet is not illegal per se, provided the same documentary requirements are followed as for other trade routes. However, some traders use the Internet in an effort to avoid the need for any documentation at all. Indeed, one of the simplest forms of Internet fraud is the offering for sale of specimens that do not, in reality, exist – often using scanned copies of fictitious permits to entice a purchase. The money is handed over but the specimen never materializes. Where the intention is to sell an illegally obtained specimen, various means are used to evade detection, such as omission of the species' name from the advertisement but provision of a detailed description that makes it clear to interested purchasers what is really for sale.

Internet trade poses particular problems with regard to Annex A specimens that require internal trade certificates. EU law stipulates that the certificate must be issued by the Member State in which the specimen is located and this is frequently not the case.

Those engaged in the purchase of CITES goods via the Internet should bear in mind that, if the specimen is subsequently seized in the post, they may be held to account.

Not a Niche Crime

One of the difficulties encountered in combating CITES-related crime is that some administrations see it as a niche activity and leave the bulk of the responsibility for enforcement with specialized wildlife inspectorates. This is a misconceived and potentially dangerous approach. Evidently, wildlife inspectorates, with their knowledge of identification and care of specimens, play a vital role. However, they can only be effective when they have the full cooperation of police and customs. For their part, inspectorate staff often complain that priority is given to enforcement efforts directed at protection of native species and that CITES-listed species from other countries – which are often more endangered in global terms – are not seen as a major concern.

In fact, the threats posed by CITES-related crime can easily be under-estimated. Many of those engaged in such crime are highly organized, taking specimens and smuggling them to order, and not hesitating to commit murder in pursuit of their activities. In some cases, the relevant CITES offences are associated with wider criminal activity. For example, illegal trade in caviar, which is undermining the efforts of sturgeon range States to manage their stocks, is driven to a large extent by criminal gangs in Eastern Europe and the Caspian region that are engaged in a range of other crimes. Similarly, organized gangs in east and south-east Asia are thought to be behind a recent sharp rise in levels of rhino poaching in southern Africa. Institutionalised corruption can contribute to the scale of the



Caviar confiscated by customs officers at Heathrow Airport, United Kingdom

Photo: Edward Parker/WWF Canon

problem – ivory and bushmeat are often seen for sale in 'high end' shops and restaurants in certain cities in central Africa, even where this is nominally illegal. The cumulative impacts of all these problems is serious but it would be even worse were it not for the bravery of many frontline enforcement staff, who carry out their work at considerable risk.

Conclusions

To summarise, CITES-related crime should be taken seriously because it:

- contributes to the extinction of endangered species;
- undermines legitimate and sustainable wildlife trade;
- deprives exporting countries of legitimate revenue;
- is often associated with other criminal activity;
- contributes to weak governance;
- can spread dangerous or economically damaging diseases and pests; and
- can cause considerable distress to live animals that are often transported in inhumane conditions.

Those who knowingly purchase illegally obtained specimens should be seen as being as culpable as those offering the goods for sale in the first place. The same applies to those who knowingly facilitate such illegal trade, for example through advertising goods whose sale is manifestly illegal.

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Notes:

¹ At time of writing, Bosnia and Herzegovina being the most recent country to accede on 21 January 2009.

² An overview of the entire suite of EU CITES legislation may be viewed at: http://ec.europa.eu/environment/cites/legis_wildlife_en.htm, while a reference guide to the Regulations is available at: http://ec.europa.eu/environment/cites/pdf/2007_referenceguide2_en.pdf, with a shorter version at: http://ec.europa.eu/environment/cites/pdf/trade_regulations/KH7707262ENC.pdf.

Picking Bluebells and Blackberries: Plant Crime Fact and Fiction

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“They are all protected!” exclaimed a stout lady with labrador in tow, waving her walking stick at me menacingly. While I appreciated her concern for our flora, I had to explain gently why botanists sometimes need to pick plants and why I was not a criminal for doing so.

Plant crime seems to be top of the list for general misconceptions, judging by the erroneous guidance provided in some field guides and popular media reports. This article aims to clarify a few basic myths about wild plants and the law, focusing on English and Welsh law.

It is a criminal offence under s13(1)(b) of the Wildlife and Countryside Act 1981 (WCA) to uproot wild plants without authorisation from the landowner or occupier, but picking without permission is not prohibited, except in respect of the few generally very rare plants listed in Schedule 8 - with some exceptions that are relatively widespread, for example, the moss *Hamatocaulis vernicosus*. This is not an absolute ban, as picking, uprooting or damaging Schedule 8 plants may be permitted under licence from Natural England (NE) or the Countryside Council for Wales (CCW). There is also a defence available.



Blackberries
Photo: Jim Thompson

But what is often over-looked is that there are two parts to most criminal offences, the *actus reus* (guilty act) and the *mens rea* (guilty mind), and in the case of uprooting wild plants, this has to be intentional. Some offences, like speeding, do not require a *mens rea* and are therefore referred to as 'strict liability' offences. Most conservation and wildlife law texts do not highlight this basic point, presumably as they are written for lawyers (and not ecologists). Interpreting the law without remembering this can lead to errors, for example, if the *mens rea* of an offence is 'intention' only (and not also recklessness), advising clients that an offence may be committed if they kill a protected species by accident during construction operations is misleading. Personally, I wouldn't want to even go there as an ecologist, as interpreting what is an intentional or reckless act in any set of circumstances is notoriously complex, the case law precedent drawn in part from a multitude of murder and manslaughter cases. What amounts to 'intention' and 'reckless' is a classic essay question on law degrees - just like 'what is a species?' is a humdinger of a topic to test biology students!

It is also crucial to remember that the WCA provisions co-exist alongside many other laws, such as the criminal laws of theft and criminal damage, law relating to European protected species, law relating to designated sites (notably Sites of Special Scientific Interest) and the civil law. In contrast to wild animals, plants are always regarded in civil law as the property of the landowner.

In England and Wales, collecting parts of wild plants such as berries (but not the *whole* plant) without landowner permission is only theft if you 'do so for reward, for sale, or for some other commercial purpose' (s4(3) of the Theft Act 1968). In all cases the *mens rea* for theft also must be proved, that the accused dishonestly appropriated the item concerned and intended to permanently deprive the owner of their property.

Picking blackberries is a traditional countryside pleasure, but even on roadside verges berries do actually belong to someone (usually the Highway Authority), so even if taking a few for your own use is not theft, it could be a breach of the civil law. If you stray off a footpath and trespass, you cannot be prosecuted, as trespass is not a criminal offence, but could theoretically be sued by a landowner with the motivation and money to do so. The tort of trespass is an area of civil law that requires specific criteria to establish a claim by a landowner. The result for a blackberry picker who is held liable would be having to pay damages (to compensate the landowner for their loss), rather than a criminal record. I doubt that blackberrying has got to court as yet, but there may be other cases which are similar, and I suspect liability may depend on how many berries you carry off and whether you are running a successful jam-making business on the back of the landowner's produce! Until an issue is specifically tested in a court case, all you can do is ask a lawyer to research the point and provide a legal opinion.



A bluebell wood in Hampshire

Photo: Jason Reeves

Landowners can legally dig up and sell non-Schedule 8 wild plants, such as snowdrops and wood anemones, without needing any licence. I have seen regular adverts from nurseries in farming magazines, offering payment to 'thin out' woodland bulbs. For bluebells, their Schedule 8 protection extends only to sale or advertising to buy or sell, but sustainable commercial collecting is permitted by prior licence from NE or CCW. However, NE has only issued four wild bluebell seed or bulb collection licences since 2006 and two were for the same operator and two were renewals, so there are very few licensed bluebell nurseries.

The successful prosecution in 2007 of the nursery Eurobulbs UK for taking 200,000 bluebell bulbs from the Llyn Peninsula, North Wales was apparently the first case under the WCA bluebell provisions (rather than a prosecution under theft laws). In this case, the nursery obtained landowner consent to collect bulbs in return for bracken clearance work. The landowner committed an offence as the definition of 'sale' in s27(1) of the WCA includes barter or exchange. The nursery owner pleaded guilty, presumably as he was advised that he was arguably caught by the offence of selling anything 'derived from' wild bluebells without a licence, so his argument that he only sold plants subsequently cultivated from the wild stock (and not the wild plants themselves) may have failed. I suspect this activity is more widespread than a one-off case suggests and is largely going unnoticed.

In addition to the criminal laws in the WCA on bluebell collection for sale, landowners wishing to sell their spring bulbs also need to consider additional legislation if their land

is designated as a Site of Special Scientific Interest, and, for example, whether any agricultural regulations apply. NE is planning an awareness campaign, which will hopefully engage farming, landowner and horticultural organisations, to ensure the sustainability of wild bulb and seed harvesting. Promoting sustainable harvesting would help to conserve woodlands by giving the habitat an economic value and encourage active woodland management to promote wild plant growth.

Clare O'Reilly is a freelance botanist and qualified teacher, and was previously an environmental lawyer. She also sits on IEEM's Steering Group for the Skills Gap Project.

Clare is running a two-day Wildlife Law Workshop in November 2009. Details from enquiries@ptyxis.com or 01434 321199.

Please note that this article is for guidance purposes only and does not constitute legal advice.

With thanks to Jo Oldaker and Stuart Miller of Natural England.

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Fatal Attraction – Illegal Poisoning of Animals in Scotland

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Introduction

In Scotland, the suspected poisoning of wildlife, pets, livestock and beneficial insects (i.e. honeybees) is diagnosed by Science and Advice for Scottish Agriculture (SASA), a division of the Scottish Government's Rural Payments and Inspections Directorate. Operation of the Wildlife Incident Investigation Scheme (WIIS)^{1,2}, which was set up to monitor contamination and poisoning of wildlife following the legitimate use of agricultural chemicals, regularly reveals a most sinister practice: the deliberate and illegal attempt to poison animals.

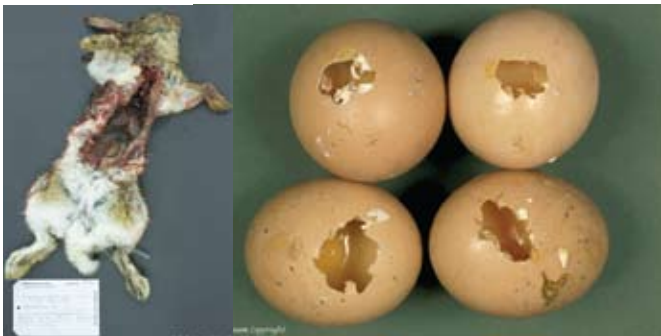


Figure 1. Typical baits laced or injected with toxic chemicals

The most common method employed by the 'poisoner' is to set poisoned baits (e.g. animal carcasses, meat or eggs) that have been laced with deadly poison (Figure 1). However, the use of baits is indiscriminate which means that any predator, scavenger, curious animal or even human attracted to these baits can be fatally exposed to the highly toxic substances involved.

Consequently, victims of illegal poisoning are as diverse as the wildlife found throughout Scotland and include species such as the golden eagle *Aquila chrysaetos*, white-tailed sea eagle *Haliaeetus albicilla*, common buzzard *Buteo buteo*, red kite *Milvus milvus*, peregrine falcon *Falco peregrinus*, fox *Vulpes vulpes*, badger *Meles meles*, pine marten *Martes martes*, stoat *Mustela erminea* and even pet cats and dogs which can also become victims of neighbourhood feuds (Figure 2).



Figure 2. A poisoned white-tailed sea eagle – Scotland's largest bird of prey

Poisons

Some agrochemicals (e.g. pesticides or biocides) are designed to kill a variety of invertebrate (e.g. insects) or vertebrate (e.g. rats) pests. The active ingredients of the different product formulations (e.g. the insecticide) can also be extremely toxic to aquatic species, birds, mammals and humans. Although 34 different chemicals have been detected and identified in various wildlife casualties and/or baits examined at SASA, six of these chemicals have been most prevalent. Table 1 contains details of these chemicals – i.e. aldicarb, carbofuran, alpha-chloralose, isofenphos, mevinphos, and strychnine (hydrochloride), and some of their typical product names and uses, current UK approval status and toxicity.

Table 1. Chemicals repeatedly detected in animal poisoning incidents in Scotland.

Chemical	Product names	Current UK approval	Toxicity Class ^b	Use
Aldicarb	Temik, Trident, Sentry	None	Extremely hazardous	Insecticide
Carbofuran	Yaltox, Yaltox-Combi ^a , Agrofuran, Throttle, Furadan	None	Highly hazardous	Insecticide
Alpha-Chloralose	Advanced Mouse Killer Box, Alphabird, Alpha Rapid, Slaymor Rapid M	Yes ^c	Moderately hazardous	Rodenticide, bird stupefying bait
Isofenphos	Amaze, Oftanol, Pryfon, Yaltox-Combi ^a	None	Highly hazardous	Insecticide
Mevinphos	Phosdrin, Mevindrin, Duraphos	None	Extremely hazardous	Insecticide
Strychnine	Strychnine	None	Highly hazardous	Mole control

^a Formulation contains carbofuran + isofenphos

^b World Health Organisation (WHO) Classification

^c Health and Safety Executive Approved products



Figure 3. Products and suspicious substances confirmed as containing carbofuran

However, carbofuran has emerged as the poison of choice in Scottish wildlife crime. Even though UK approval for use of products containing carbofuran was withdrawn in December 2001, it has been identified in 70% of all incidents categorised as 'Deliberate Abuse' by SASA during the period 2000-2008. Figure 3 shows examples of carbofuran recovered following field investigations of confirmed poisoning incidents.

Chemical Analysis

The chemical analysis of suspected victims, baits, suspicious substances and/or poisoning paraphernalia is extremely challenging, particularly because:

- hundreds of professional or amateur agrochemical products are commercially available and currently approved for use in the UK;
- products withdrawn from use in the UK several years ago are still accessible;
- analytical methods, techniques and instrumentation used must be capable of the detection and unequivocal identification of the poison (often present at very low concentrations) in a variety of sample types which are usually complex mixtures;
- experimentation employed and results obtained have to comply with strict quality control and health and safety guidelines and procedures; and
- chemical analysis data can be presented, scrutinised and challenged in associated court proceedings.

Preparation and analysis of test specimens can be straightforward (e.g. analysis of a seized chemical) but mostly involves several steps in accordance with disciplined test protocol:

Veterinary post mortem or examination of sick animals
>> Removal of test specimen(s) >> Extraction of chemical contaminant(s) from test specimen >> Clean-up of extract >> Analysis of final extract >> Confirmation of positive results:

1. *Post Mortems and veterinary examinations* are performed by professional vets who may identify an alternative cause of death or illness (e.g. disease, starvation or trauma). However, they can also submit specimens whenever they suspect exposure to chemicals. SASA specialists perform basic inspections of 'intact' carcasses submitted directly from other sources.
2. *Removal of test specimens* (e.g. liver, kidney, crop and stomach contents, blood, urine, etc.) is performed by professional vets or SASA specialists.
3. *Extraction of the test specimen* is performed by SASA specialists and generally involves processing the test specimen with a suitable solvent capable of extracting any chemical contaminants.
4. *Clean-up of solvent extract* is performed using analytical techniques such Gel Permeation Chromatography (GPC) or Solid Phase Extraction (SPE). This clean-up procedure is designed to remove any unwanted extractables (e.g. fats, proteins and ideally isolate and concentrate target chemicals).

5. *Chemical analysis of the extract* is performed by utilising Liquid Chromatography Mass Spectrometry (LCMS) and/or Gas Chromatography Mass Spectrometry (GCMS) techniques³. Both of these analytical techniques are capable of the detection, identification and quantitation of chemicals even if they are present at ultra-low levels in complex mixtures.
6. *Confirmation of positive tests* is mandatory in order to comply with our Quality Management System and to ensure that the identity and magnitude of any chemical(s) present in the test specimen are definite. This can involve repetition of steps 3-5 but always involves the use of an alternative and unique measurement parameter.

Stakeholders and what to do if you discover or suspect animal poisoning

There is a large and cooperative network of organisations and individuals dedicated to the detection, prosecution and ultimately the eradication of illegal poisoning of animals in Scotland and elsewhere. SASA is at the hub of this network which includes: Scottish ministers, various government departments, non-government organisations such as The Royal Society for the Protection of Birds (RSPB – Scotland) or The Scottish Society for the Prevention of Cruelty to Animals (Scottish SPCA), land owners and managers, police wildlife crime officers, the National Wildlife Crime Unit, Procurator Fiscal Service and members of the public.

Partnerships such as the Partnership for Action Against Wildlife Crime (PAW - Scotland) and the Campaign Against Illegal Poisoning (CAIP) exist to coordinate and promote the fight against wildlife crime and ensure enforcement of appropriate legislation such as:

1. Food and Environmental Protection Act 1985;
2. Control of Pesticides Regulations 1986 as amended;
3. Wildlife and Countryside Act 1981 as amended; and/or
4. The Possession of Pesticides (Scotland) Order 2005.

If you suspect animals have been poisoned or are at risk:

Call 0800 321600⁴ to report suspected poisoning - calls are free or contact the local police.

Do not touch suspected bait or dead casualties - warn others to keep away!

Cover the evidence if you can, but don't disturb it!

Make a note of location and details!

In the case of pets, ask your veterinary practice to refer the carcass, or relevant samples, to the local Veterinary Service of the Scottish Agricultural College. (Other animals may also be submitted via this route).

References

- 1 SASA Pesticides and Wildlife, www.sasa.gov.uk/pesticide_wildlife/wiis/index.cfm
- 2 Chemical Regulations Directorate, www.pesticides.gov.uk/environment.asp?id=58
- 3 Hunter K, Taylor MJ, Sharp EA, Melton LM and Le Bouhellec S (2004) *Journal of Chromatography B* **805**: 303-330
- 4 CAIP, www.pesticides.gov.uk/environment.asp?id=504

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Bats and Onshore Wind Farms: Site-by-Site Assessment and Post-Construction Monitoring Protocols

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The publication of Eurobats guidance for onshore wind farms (Rodrigues *et al.* 2008) has led to a wider awareness of the potential impacts of these developments on bats. This has culminated in the development of the current Natural England (NE) interim guidance (Mitchell-Jones and Carlin 2009). This guidance, adopted by Scottish Natural Heritage (SNH) and the Countryside Council for Wales (CCW), has led to the requirement for stringent surveys and assessments for any wind farm proposal before planning consent can be granted by planning authorities and government ministers. However, unlike birds, where detailed pre-construction survey and post-construction monitoring guidance is available, there is no methodological wind farm specific guidance for bats (Anon 2005, Anon 2009). It is hoped that this article will contribute towards developing national survey and post-construction monitoring methodology appropriate to all proposed and consented onshore wind farms.

Introduction

Wind farms are becoming an important source of power generation, and this is likely to increase in the future as the UK commits to lower carbon emissions. However, it is essential that potential ecological impacts are assessed before consenting to a new wind farm development. Impacts on most animals and habitats are generally considered to be synonymous with those associated with most other types of development. However, due to flight and associated behaviours, wind farms pose particular risks to birds and bats in addition to traditional impacts (e.g. habitat loss, disturbance, etc.). Assessment of impacts on birds has been based upon standardised and rigorous survey methods for a number of years, and post-construction monitoring guidelines were issued earlier this year (Anon 2005, Anon 2009). Although afforded enhanced statutory protection as European Protected Species, there are no national guidelines outlining standardised survey methods and post-construction monitoring techniques for bats at onshore wind farm sites, despite increasing evidence of negative effects and the mounting body of international academic publications discussing the causative mechanisms.

European guidance on assessing impacts and post-construction monitoring has been published by EUROBATS (Rodrigues *et al.* 2008). However, the methods suggested in this document are appropriate to continental scenarios, where bat activity levels may be particularly high. This is due to the occurrence of more diverse species and behaviours, including the potential for long-distance migration routes and higher swarming risks. Although the behaviour of bats in the UK has not been subject to the same level

of research as in mainland Europe, major migration routes are not currently known to occur within Britain.

NE produced an interim guidance document which presented a pragmatic interpretation of EUROBATS recommendations as applied to the UK in May 2008, updated in February 2009 (Anon 2008, Mitchell-Jones and Carlin 2009). This document presents loose methods for assigning risk to sites and collision risk to different bat species, but does not offer guidance on levels of survey effort. Survey methods follow Bat Conservation Trust (BCT) generic best practice guidelines, but these are not written with the unique effects of wind turbines in mind (Parsons *et al.* 2007). While the survey methods described are transferable, the level of effort suggested is not sufficient to inform a robust assessment of wind farm impacts.

Cook *et al.* (2008) proposed a generic survey methodology for the specific purpose of assessing the potential impacts of wind farms on bats. This methodology took a step towards a standardised protocol for ecologists undertaking these studies. However, there is a risk that this methodology could be interpreted as required for all sites, regardless of situation. It is essential that standardised methodologies allow ecologists to design a survey approach suited to the particular conditions of the site. Indeed, there are many locations in the UK where such intensive surveys would be disproportionate, needlessly dangerous (e.g. extensive sites in upland bog habitats in Scotland) and impossible (e.g. dense plantation woodland).

Post-construction monitoring is essential for gaining a greater understanding of the effects of wind farms on bats. Although NE guidance welcomes such monitoring, and recognises the necessity of standardised methods, little detail is provided. This article proposes a standardised methodology, developed as a pragmatic interpretation of EUROBATS guidance as applied to the UK (Mitchell-Jones and Carlin 2009, Rodrigues *et al.* 2008). These methods are presented for discussion, and it is hoped that they may contribute towards a national standardised methodology.

Site-by-Site Pre-Construction Survey Methods

Summary of General Approach

Cook *et al.* (2008) presented a detailed outline of survey methods to be employed for the assessment of potential impacts of wind turbines on bats. These methods present an excellent approach, and are considered here to be appropriate to wind farm developments. However, it is critical to ensure flexibility within the design, allowing ecologists to employ survey effort as appropriate to the site. It is proposed that surveys should involve the following stages:

1. identify survey area (200 m + rotor radius from proposed turbine locations [see Box 1] or potential development area if locations are not yet known);

Table 1. Criteria for assessing potential site risk.

Feature	Feature Risk Level		
	Low	Medium	High
Location	North Scotland	Central/South Scotland, North England and North Wales	South England and South Wales
Elevation	High elevation (>500 m)	Moderate elevation (200-500 m)	Low elevation (<200 m)
Situation	Exposed – high winds	Moderate winds	Sheltered – low winds
Habitat	Exposed upland habitats (e.g. bog habitats) Commercial forestry >100 m from suitable habitat features*	Exposed habitats (e.g. bog habitats, large scale farming) >50 m from suitable habitat features*	Suitable habitat features* within or adjacent to wind farm footprint
Roosts	No major hibernacula, breeding or maternity roosts within >500 m of turbine locations or potential development area	Major hibernacula, breeding or maternity roosts within 500 m of site, but not on or within 50 m of turbine locations or potential development area	Major hibernacula, breeding or maternity roosts on or within 50 m of turbine locations or potential development area
Species present**	<i>Myotis</i> spp. Long-eared bats Horseshoe bats	Common pipistrelle Soprano pipistrelle Barbastelle	Noctule Leisler’s bat Nathusius’ pipistrelle

***Suitable habitat features include, but are not restricted to woodland edges, deciduous or mixed woodland, waterbodies and linear features (woodland edges, hedgerows, treelines or rivers).**

****As published in NE interim guidance, based upon existing information concerning species specific behaviour and characteristics (Mitchell-Jones and Carlin 2009).**

2. desktop survey (noctule records within 20 km, all other bat records within 5 km);
3. habitat assessment (ideally extended Phase 1 Habitat Survey, but at least a site walkover to identify all potential commuting routes, foraging and roosting habitat);
4. identify roosts (within 500 m + rotor radius of proposed turbine locations [see Box 1] or potential development area, following BCT good practice guidelines (Parsons *et al.* 2007));
5. assess potential site risk; and
6. design and conduct automated, manual and targeted activity surveys (methods as described by Cook *et al.* (2008), survey effort as identified in stage 5).

This approach is largely identical to that described by Cook *et al.* (2008).

Minor differences include the suggestion that the desk study be extended to include all noctule records within 20 km (as opposed

to 15 km recommended previously). This is based upon experience gained in south Scotland, where noctules are poorly recorded, but thought to be rare. When assessing potential impacts on this species in these areas, consultees have requested that even very low levels of activity are placed in to the context of a 20 km radius, based upon historical records. Similarly, it is recommended that roosts are identified within 500 m of proposed turbine locations, placing the bat activity onsite in to a wider local context.

Ideally, an extended Phase 1 Habitat Survey would be conducted prior to bat surveys. This would allow the identification of features providing potential commuting routes, foraging and roosting habitat. In practice, it is likely that bat surveys will be commissioned before a Phase 1 Habitat Survey has been undertaken. In this case, reference to aerial photographs and an initial site walkover should identify these features, allowing an assessment of site risk to be completed.

Activity surveys should include automated surveys (elevated to as near rotor height as possible, or angled appropriately), walked manual transects, and targeted surveys. Surveyors should aim to come within 200 m of all potential turbine locations within the site during walked manual transects. Where a site consists of mature commercial forestry, it may be more appropriate to design transects that follow woodland edges, allowing assessment of effects of keyholing turbines (which effectively creates new woodland edge habitat). Targeted surveys would include commuting route surveys, as described by Cook *et al.* (2008), but may also include driven transects to cover wider areas. Such transects may be required to identify noctule lek sites, where this is suspected to be associated with observed, regular flight behaviour. It is important to ensure that regular behaviour is assessed in the context of sunrise and sunset times.

The only major difference is the addition of stage 5, where potential site risk is assessed prior to designing activity surveys. This stage allows survey effort to be appropriately tailored based upon the likely risk to bats at that particular site.

Box 1 – Calculating buffer distance between turbines and habitat features

NE interim guidance presents a formula for calculating the distance between turbines and habitat features (Mitchell-Jones and Carlin 2009). However, it may be difficult to obtain accurate height information for all habitat features, and features such as trees will change over the operational life of the wind farm (particularly fast growing conifers providing woodland edge habitat). In addition, wind farm designs inherently follow an iterative design process, through which constraints are taken in to account as they are discovered. Therefore, completing this calculation for each iteration would be onerous, and of limited value to any assessment. Instead, it is recommended here that the buffer simply extend from the rotor radius limit. This will always over-estimate any buffer from features shorter than a turbine, and is considered to be an appropriate and precautionary approach.

Table 2. Activity survey effort appropriate to site risk levels.

Survey design	Site risk level		
	Low	Medium	High
	Walked manual activity transects		
Frequency*	Three (Spring, Summer, Autumn)	Monthly (dusk or dawn)	Monthly (dusk or dawn alternating with bimonthly back-to-back dusk and dawn visits)
Number of sample points / ha	10	10	20
	Automated activity surveys		
Frequency of three day survey periods	Three (Spring, Summer, Autumn)	Three (Spring, Summer, Autumn)	Three (Spring, Summer, Autumn)
Number of sample locations / km²**	2	2	5

*Frequency of surveys during appropriate bat activity period. In most cases this will be April to October, but this activity season will be reduced further north. For example, May to September may be more appropriate for most Scottish sites.

**See Box 2.

Assessing Potential Site Risk

NE interim guidance presents a basic method with which sites may be assessed as either 'high' or 'low' risk for bats based upon various features. However, the guidance states that in reality, most sites are likely to lie between these two extreme risk levels. Furthermore, guidance does not suggest appropriate levels of survey effort for different risk levels. Table 1 provides a more detailed aid to assigning risk levels to sites. The results of data searches, site walkover and identification of roosts (or, at minimum, potential roosts) inform this assessment. Therefore, it is important that these are completed at as early a stage as possible.

It must be stressed that this table is only intended as an aid. In the absence of a realistic risk index that adequately considers all potential factors, the ultimate assessment of risk for a site relies upon the expert professional judgment of the ecologist and relevant statutory body. Species and high population densities will also affect the decision as to the level of survey effort required. NE guidance identifies which species are of particular risk of collision with wind turbines. It is suggested that these categories are used when deciding levels of activity survey effort, and not the rarity of the species themselves. Rare species that are less susceptible to mortality through the pathways unique to wind turbines will be fully assessed in terms of loss of habitat and/or roost locations. However, as small numbers of collisions may constitute a significant impact on small populations, it may be necessary to determine use of important habitat through targeted surveys where rare species are present in significant numbers.

Site size has not been included within the risk assessment criteria, as the size of a site does not have any bearing on the presence or absent of suitable habitat features for bats. An expansive site in the Highlands may have no suitable habitat features for bats, while a small site in southern England may offer many suitable features. However, the size of a site, and presence of suitable features within the site will clearly be considered when developing surveys, following potential site risk assessment.

Determining Appropriate Levels of Survey Effort

Using the criteria described above, an ecologist may assess the overall likelihood of a wind farm at a particular site presenting a risk to bats, using the same categories (i.e. low, medium and high). Although species specific surveys will be dependent upon species present, these risk categories can be used for determining the level of effort required for general activity surveys. Table 2 presents a guide for survey effort considered appropriate for the different risk levels.

Post-Construction Monitoring

There is currently a great level of uncertainty regarding assessments of impacts of wind farms on bats, due to a lack of research at existing developments in the UK. Increased understanding of the impacts through post-construction monitoring would allow for a greater level of certainty when assessing the potential impacts of future developments, and lead to more detailed and informed pre-construction survey guidelines. 'Experimental' mitigation methods are often proposed to offset potential impacts – for example by creating rich foraging habitats (e.g. manure piles or ponds) so as to attract bats offsite. Without monitoring and research, there is no way to know that any mitigation measures are effective. Therefore, post-construction bat monitoring should be an encouraged component of any wind farm Habitat Management and Monitoring Plan (HMMP) where impacts on bats have been identified, and required wherever mitigation measures are proposed.

The following proposed post-construction survey methodology was developed by the authors, and has been accepted for proposed wind farm sites in England. NE have also requested that other proposed wind farms incorporate bat monitoring in HMMPs and have referred to this methodology as submitted for previous developments.

It is proposed that monitoring surveys would be repeated during years 1, 2, 3, 5, 10 and 15 of the operational life of the wind farm. This would coincide with post-construction bird monitoring, in accordance with current SNH guidance. By conducting ecological post-construction monitoring concurrently, surveys and reports may be completed efficiently, and an overall picture of ecological impacts may be clearer.

Corpse Searches

Mortality data should be collected at four periods during the year, coinciding with different stages in bat lifecycles. These visits should be made during the following times:

- Spring – emergence from hibernation. Females in particular feed intensely in preparation for breeding;
- Early Summer – active maternity roosts;
- Mid-late Summer – mothers suckling; and
- Autumn – young fledge, and *Myotis* spp. exhibit swarming behaviour, during which they may be at particular risk of collision with turbines.

The precise timing of surveys would be dependent upon the latitude of the site, concurrent with activity survey periods.

Although noctule bats are not known to migrate in the UK, the spring and autumn mortality searches would ensure that the migration periods are covered should further research discover that this does occur at some level.

Each visit should involve searching for dead bats under turbines. For small developments or those in areas of high importance to bat populations or rare species, all turbines should be included within the search. Where developments are large, and sited in areas assessed as being of low importance to bats, a subset of turbines may be selected for search. In this case, an intelligent sample design would be preferable, targeting areas where bat activity was found to be or is likely to be higher. For example, turbines close to features thought to be of high value to bats should be chosen, as well as random turbines located in poor quality bat habitat.

A square search plot with sides equal to the maximum blade tip height should be marked around the base of each turbine (e.g. 100 m x 100 m for 100 m tip height). This plot will then be systematically searched for bat corpses by following defined transect routes or by using dogs trained to detect dead bats.

Any bat corpses should be collected and a post-mortem conducted to determine the cause of death. These data will contribute towards research exploring the mechanisms resulting in bat fatalities at wind farm sites.

Turbine number, bat species, age, evidence of barotrauma and/or evidence of collision and cause of death should be recorded for each bat corpse detected.

Calibration of detection rate will be required, and should follow SNH bird monitoring guidance methods, as applied to bats (Anon 2009).

Activity Monitoring

Monitoring of bat activity within the wind farm site may also be beneficial – particularly at locations where the risk of impacts on bats is considered to be of concern. Such monitoring may involve the utilization of automated bat detectors and manual activity transects. Automated detectors' locations and transect routes would preferably be synonymous with those used in the pre-construction survey, to allow a comparison to this baseline. A control site, of similar altitude and habitat composition should also be monitored, using identical methods.

Roost Monitoring

Where roosts have been located within 500 m of turbine locations, these should be checked during post-construction monitoring, employing the same methods as used for the pre-construction assessment.

Other Monitoring Methods

Other methods, such as infrared cameras and radar, have been suggested. For logistical reasons, it is impractical to use these at most wind farm sites and so it is not recommended that these form part of a standardised methodology. However, such techniques may be appropriate for sites where particular potential impacts have been identified and more detailed, targeted monitoring is required.

Conclusions

The nature and magnitude of potential impacts of wind turbines on bats are poorly understood. However, increasing evidence from around the world indicates that poorly sited wind turbines have the potential to cause significant negative effects through pathways unique to these developments. It is therefore important that assessments follow standardised and robust methods that can be tailored to the particular site, while allowing direct comparisons between sites by decision makers and for cumulative assessments. Furthermore, standardised post-construction monitoring is essential so as to inform research in to the particular

Box 2 – Designing automated bat survey detector locations

Cook *et al.* (2008) suggest that automated bat survey locations should be based upon turbine positions. This is not considered appropriate, as layouts may not be available and are likely to change as new constraints are discovered throughout the Environmental Impact Assessment (EIA) process. Therefore, an approach that samples the proposed development area is recommended here, and is dependent upon the size of the potential development area and the risk level of the site.

effects of wind farms on bats in the UK. It is hoped that the methods suggested in this article will promote discussion and move closer to national methods.

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Adder's-Tongue: A 13 Year Translocation Story

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Introduction

This paper reports the results of a successful large-scale translocation of adder's-tongue *Ophioglossum vulgatum* (Figure 1), a deciduous, rhizomatous, mycorrhizal (Sporne 1962) fern species often considered to be indicative of ancient, undisturbed habitats.



Figure 1. Adder's-tongue *Ophioglossum vulgatum*
Photo: Paul Smith

In 1994, ecological surveys relating to improvements for M5 Junction 12 (southern edge of Gloucester) identified a sward of species-rich grassland surrounded by the slip roads of that junction. The sward supported a range of species characteristic of unimproved, mesotrophic grassland including; common knapweed *Centaurea nigra*, cowslip *Primula veris*, glaucous sedge *Carex flacca*, grass vetchling *Lathyrus nissolia*, hairy sedge *Carex hirta*, meadow vetchling *Lathyrus pratensis* and oxeye daisy *Leucanthemum vulgare*. The additional discovery of an old record for adder's-tongue for the site led to the view that perhaps this was an area of old pasture which had become surrounded by slip roads during the construction of the motorway in the 1970s. Reference to the enclosure map for the Parish of Haresfield (dated 1815) and the Map of Haresfield Parish of 1831 supported the view in identifying an old field name which approximately applied to the area as it existed before the construction of the motorway, i.e. Great Russells Ground.

This name was used in the Environmental Statement (M5 Motorway, Junction 12 Improvement Environmental Statement

February 1994) as a means of raising the significance of this grassland area. It was considered that a habitat with a name would be regarded more significantly than an anonymous area of carriageway-locked vegetation. This strategy was found to be highly successful.

Adder's-Tongue *Ophioglossum vulgatum*

The Ophioglossales, the order to which adder's-tongue *Ophioglossum vulgatum* belongs, is represented by three genera and about 80 living species. In the British Isles, two species are fairly common, namely moonwort *Botrychium lunaria* and adder's-tongue. Two rarer species also occur in the UK, the small adder's-tongue *Ophioglossum azoricum* and the least adder's-tongue *O. lusitanicum*.

The morphology of adder's-tongue is described by Sporne (1962). Its fertile fronds have two distinct parts, the fertile part being in the form of a spike which arises at the junction of the petiole with the sterile lamina. Large numbers of spores are produced (as many as 15,000 in *Ophioglossum*). These germinate to produce a (usually subterranean) cylindrical, mycorrhizal prothallus (up to 6 cm long) which lacks chlorophyll and is dependent upon the presence of a fungal associate to grow.

Antheridia and archaegonia develop within the prothallus and the former produce large numbers of antherozoids. Following fertilisation, there is a delay in the development of the zygote, and in some species it may be several years before the first leaf appears above ground (Sporne 1962).

Distribution and Status

Adder's-tongue is regarded as a fern of ancient, undisturbed habitats. For example, Page (1988) considered its present habitats to be mostly those which have persisted over a very long period of human history.

The species is found on mildly acidic to base-rich soils in open woodland, meadows and damp pastures, under bracken *Pteridium aquilinum* on heaths, and on peat in regularly mown fen (Jermy, in Preston *et al.* 2002). It is tolerant of a wide range of soil types and also occurs in chalk downlands, old chalk and marl pits, sand-dune slacks, damp peaty sites, on light sandy soils and on the deep peat of fenland mowing marshes (Jermy and Camus 1991).

The species is distributed throughout the British Isles (Jermy and Camus 1991) but it has been lost from many lowland sites where the intensification of agriculture, grazing and drainage is believed to have contributed to its decline (Jermy 2002). Holland (1986) considered it widespread in Gloucestershire and often abundant in unimproved limestone and neutral grassland, rough grassland, wet meadows, woodland rides and old ridge and furrow meadows.



Figure 2. The junction supported not only a significant population of adder's-tongue, but also a good numbers of orchids
Photo: Karl Crowther

Great Russells Ground

A Ministry of Transport drawing (dated April 1971) showing the detail of Junction 12, then undergoing design, clearly showed the area of Great Russells Ground with the engineer's note reading 'Landscape Area – this area to be filled with unsuitable or surplus material to the direction of the engineer after the forming of the roadworks embankments.' Comparison of the site in the 1990s with this drawing made it very clear that the area known as Great Russells Ground had been artificially raised in level and supplied with 6 inch diameter filter drains in a herringbone pattern during the construction of the motorway. There was no doubt, therefore, that the area no longer contained ancient, undisturbed pasture and had been created by infilling with material from an unknown source in the 1970s. In consequence, the population of adder's-tongue could not have existed in-situ for more than 30 years (and most probably less) in 2000.

Reasons for Translocation

In 1994, the junction improvement scheme proposed was such that the area of sward could remain largely undisturbed and no further work was carried out. In 1999 however, concerns about the strength of certain bridge structures led to the need for a modification to the proposed scheme and a revised series of ecological surveys. As a result, it became possible to follow up the previous record of adder's-tongue at the site and to carry out spring and summer surveys. The result of these additional surveys was of ecological interest. Not only was the junction found to support a significant population of adder's-tongue, it was also shown to support good numbers of orchids, including common spotted orchid *Dactylorhiza fuchsii*, pyramidal orchid *Anacamptis pyramidalis* (Figure 2), bee orchid *Ophrys apifera* and wasp orchid *O. apifera* var. *trollii*. A similar assemblage was subsequently found to exist at M5 Junction 13, which has a significantly different engineering design.

The additional surveys identified the fact that parts of the species-rich grassland were likely to be lost as a result of the necessary junction improvements and that this would include a part of the adder's-tongue population. In order to assess the significance of this impact a more detailed botanical investigation was carried out. This provided the basis for a translocation strategy intended to minimise the loss of the species concerned.

Pre-Translocation Baseline

In order to estimate the proportion of the adder's-tongue population to be affected by the engineering works, it was first necessary to count and accurately map the distribution and extent of the plants within the site. This was done during early May 2000 with the aid of 'Trimble' differential GPS (dGPS) equipment, capable of recording a fixed point to an accuracy of around 0.5 m.

Firstly, a search was made for fronds of the plant and, where these were found, their location was marked with a cane (avoiding damage to the plant) and the position subsequently recorded using dGPS. It was found that the fronds often occurred as small clusters, for which the term 'colony' has been used - in effect a descriptive term for a subjective cluster of fronds (i.e. a population density node). Additional information recorded at each point comprised the number of fronds noted and the approximate area within which the 'colony' occurred (as a diameter in metres).

From this data, a plan was produced to show the positions of the various recorded colonies of adder's-tongue. An overlay of the scheme proposals was used to identify those populations likely to be affected by the proposed engineering works, and those within a 10 m wide buffer zone, which might also be affected. From this it was then possible to define donor sites from which fern colonies would need to be moved.

The results of the baseline counts are presented in Tables 1 and 2.

Table 1. Adder's-tongue colony/frond count: Scheme imprint only

	Colonies	%	Fronds	%
Within scheme	15	16.6	143	29.7
Outside scheme	75	84.4	338	70.3
Total	90		481	

Table 2. Adder's-tongue colony/frond count: Within 10 m of Scheme imprint ('buffer zone')

	Colonies	%	Fronds	%
Within scheme	28	31.1	205	42.6
Outside scheme	62	68.9	276	57.4
Total	90		481	

The data presented in Tables 1 and 2 suggested that an estimated 17-31% of 'colonies' and 30-43% of the total counted frond population would be affected by the scheme proposals.

Development of the Translocation Strategy

The relatively complex life cycle of adder's-tongue and the lack of evidence for any former large-scale translocation of the species led to the need to develop an appropriate strategy by which this might be achieved. The following issues were considered:

The species exists for parts of its life cycle in the following states:

- a chlorophyllous, rhizomatous sporophyte;
- spores within the soil; and
- a subterranean gametophyte.

It seemed reasonable therefore that a successful translocation would be facilitated by moving substrate in such a way that all three stages within the life cycle were salvaged at the same time. This led to the view that late autumn/winter would be the preferred timing.

A search through the heavy, lias clay in which the plants were growing demonstrated that it was difficult to find either adder's-tongue rhizomes (in the absence of fronds) or gametophytes within the soil profile. It was considered reasonable to assume, however, that all of these parts would exist within the top 50 cm of soil and excavations showed that few fibrous plant roots reached a depth of 50 cm within the adder's-tongue grassland. Consequently, the decision was made to attempt to move large turfs, ideally 2 x 2 m in area by 0.5 m thick, with the intention that this would include all parts of the fern life cycle (including its mycorrhizal fungus) and minimise disturbance within the turfs thus preserving delicate structures.

In order to maximise the chances of a translocation attempt being successful, a number of issues require proper consideration, one of these being the need to identify and properly prepare a suitable receptor site (Anderson 2003 discusses this issue). It is also important to ensure that the adoption of a particular receptor site does not in itself lead to additional undesirable ecological impact. In the present case, examination of the junction improvement designs and consultation with the engineers made it clear that it would be quite possible to retain certain areas of the junction's grasslands intact and that some of the less species-rich areas of these could, with adequate preparation, qualify as suitable receptor areas.

Choice and Preparation of Receptor Sites

In selecting and preparing potential receptor sites it was naturally appropriate to exclude any areas where adder's-tongue sporophytes had been found during the baseline surveys, together with all areas of species-diverse swards. Within the remaining areas, in order to maximise the chances of success, the following selection criteria were also adopted:

- Selection of areas within and among which variation of edaphic conditions could be maximised.
- Selection of areas with a range of aspects.
- Advance preparation of the receptor sites including creation of a perched water table within the soil profile through generation of a smeared clay base.

The philosophy adopted was that to maximise chances of success when moving a grassland plant species of imperfectly known ecological requirements, it is better to similarly maximise not only the number of phases within the lifecycle which are being translocated but also the range of conditions (within reasonably informed parameters) within the receptor site to which the organisms will ultimately become exposed. In order to achieve the first requirement it is necessary to time the operation with care, whilst to achieve the second requires a careful choice of receptor site locations. Ultimately three receptor sites (plots A, B and C) were prepared. The earthworks were carried out by Alaska Environmental Contracting Ltd whose modified vehicles and experience in grassland translocation were considered to be beneficial to the project.

In view of the reported association of adder's-tongue with damp grassland and its evident association with such in Great Russells Ground, it was considered that it would be beneficial to ensure that the receptor sites were furnished with perched water tables at the level of the base of the translocated turfs *i.e.* at a depth of 0.5 m. The contractor was instructed to firstly excavate the receptor sites to a depth of 0.5 m and to an area equal to the amount of turf to be translocated from the donor sites. During excavation of the receptor pit, the excavator 'bucket' was used to smear the clay base of the newly excavated receptor area in order to create an impervious seal and the desired perched water table. The turf and soil removed was stored temporarily adjacent to the donor areas on land that would subsequently lie beneath the scheme's disturbance footprint.

Harvesting and Translocation of Donor Turfs

Subsequent to completion of suitable receptor sites, donor turfs were collected using a 'fork and blade' excavator attachment specifically designed by the contractor (see Figure 3). Whilst it proved possible for this to be of the required 2 m width, technical factors meant that the hydraulically-operated cutting 'blade' only had a reach of 1 m (*i.e.* the actual size of the extracted turfs would be 2 m x 1 m). The procedure for excavation was as follows. After cutting a starting turf with a *c.* 45° angle, and thereby creating a working space in the sward, the operator was then able to push the 'fork' horizontally forward beneath the ground from the working space at a depth of 0.5 m for the required 1 m distance. The hydraulically operated 'blade' was then deployed to cut each turf free for removal (see Figure 3).

Turfs were immediately transported to the receptor site (in batches on a trailer), individually laid in place in the pit and then nudged into place with the excavator 'bucket'. No attempt was made to maintain the original spatial relationship of the translocated turfs to one another. Receptor plot A was also attended by a contractor employee who filled any gaps between the reinstated turfs with soil from a spade, whereas turfs in plots B and C were merely nudged together by the excavator driver. The resulting chequerboard at each receptor site was then finished by the Halcrow ecologists who trod the turfs down to minimise gaps between them.

Once the donor sites had been fully depleted and all turfs transferred to the receptor sites, the contractor reinstated these areas with the stored overburden removed from the receptor sites. Thus the donor turf of Great Russells Ground was finally reinstated at its new location.

Problems Encountered

Access issues and availability of contractors led to the translocation being carried out in January and February of 2001. Though this was considered a suitable time for the ecological



Figure 3. Donor turfs were collected using a 'fork and blade' excavator attachment specifically designed by the contractor
 Photo: Karl Crowther

parameters to be met, it posed some practical difficulties in terms of vehicle movements. Wet weather, including snow, led to the lias clay becoming soft. Consequently vehicle tracking was difficult and deep ruts developed in the route selected for transporting turfs between donor and receptor sites. Movement of vehicles between sites, and the need to keep them off the road, led to the formation of a wide, muddy track around the edge of Great Russells Ground. The route of transport had been selected to avoid areas of species-rich grassland and therefore this was not considered to be of major ecological concern. However, the conditions made transport difficult and slowed the process considerably.

Success of the Translocation

The translocation resulted in the creation of three receptor sites as follows:

- Plot A: 15 m x 4 m (60 m²)
- Plot B: 12 m x 12 m (144 m²)
- Plot C: 24 m x 14 m (336 m²)

A total of 540 m² of turf was translocated.

Fronds of adder's-tongue appeared within the translocated turfs in the season following the work. Subsequent monitoring of the receptor sites was, to some degree, hampered by team members moving on and changes in the various organisations responsible for the site as a whole. Nevertheless, the authors succeeded in gaining access to the site for monitoring purposes

and it proved possible to undertake mid-May counts of adder's-tongue fronds occurring within all three receptor sites during the years 2001, 2002, 2003, 2005 and 2006 (other post-translocation monitoring was also carried out but is not the subject of this paper).

In 2001 a simple count of the (small) number of fronds present in the whole of each plot was undertaken. However, from 2002 onwards a method of assessment was established that involved each plot being sub-divided into a series of 2 m squares. An initial systematic 'walk-over' was performed to search for fronds and each individual or (more generally) 'colony' of fronds was marked with a small cane (remembering that due to the capacity of adder's-tongue to re-produce vegetatively (e.g. Jermy and Camus 1991)) the number of fronds may exceed the actual number of individual sporophytes. Once the whole plot had been examined, the approximate location of each 'colony' was marked onto a plan and the number of individual fronds present at each node was recorded. This provided both an overall count of the number of fronds present and an approximate indication of their geographical distribution within each of the receptor sites.

Results are presented in Table 3 and Charts 1 and 2.

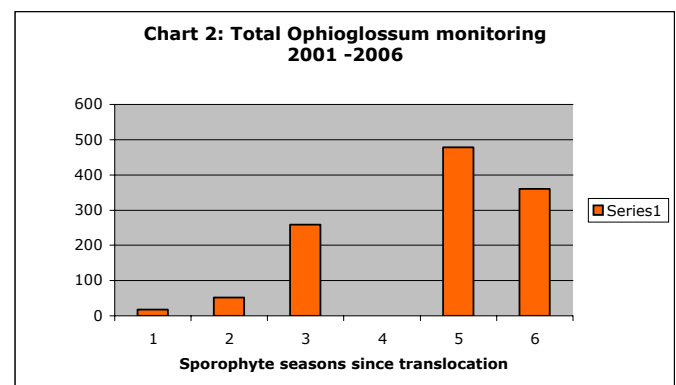
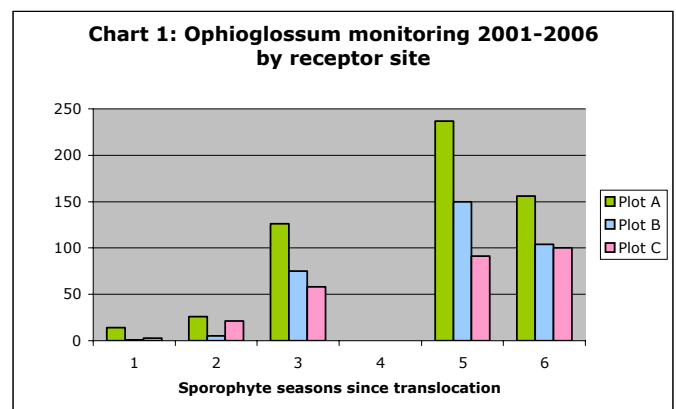


Table 3. Adder's-tongue counts in translocated turfs

Year	Date	Plot A		Plot B		Plot C		Total	
		Stations*	Fronds	Stations	Fronds	Stations	Fronds	Stations	Fronds
2001	10/07/01	-	14	-	1	-	3	-	18
2002	14/05/02	7	26	3	5	14	21	24	52
2003	16/05/03	16	126	15	75	26	58	57	259
2004	No data	-	-	-	-	-	-	-	-
2005	14/05/05	18	237	13	150	29	91	60	478
2006	20/05/06	21	156	12	104	29	100	62	360

*Stations refer to subjective clusters of fronds (population density nodes) within receptor sites

During 2001 and 2002, the fronds appeared stunted and 'stressed'. In 2003 and 2005, however, the adder's-tongue colonies appeared to overcome an initial post-translocation lag phase and increasing numbers of fronds appeared in the receptor sites. The 2006 count showed a decline in the number of fronds across Plots A and B (which dragged down the overall total, as shown in Chart 2), though a further small increase was noted in Plot C. In terms of geographical distribution, as might be expected, the pattern within each plot has been broadly comparable from year to year. Given that in the sixth growing season following translocation, good populations of adder's-tongue were present within the receptor sites, it would appear that the translocation method employed has proven reasonably successful.

Monitoring aside, one issue of concern during the initial years following the translocation was shrinkage of the turf edges, leading to the development of cracks between them. During the winter of 2003, some of the more obvious cracks were filled with topsoil from an adjacent area and in subsequent years there has been an impression that 'cracking' of the translocated sward has diminished.

Conclusions

The presence of adder's-tongue on motorway junctions constructed in the 1970s indicates that the species is not restricted to ancient meadows. Page's (1988) observations regarding abandoned lime workings are of interest in this regard. Page has pointed out that there is a local but perhaps widespread association of some ferns with sites of former lime-kilns and abandoned lime-workings. Around such disused areas, lime-waste often considerably base-enriches the surrounding patches of grassy turf which have subsequently become established. In these, adder's-tongue may now occasionally occur with unusual frequency.

The occurrence of adder's-tongue in such sites is usually confined to patches of moister and heavier soils, especially in slight hollows, and in moister patches of old quarry bottoms. It is not necessarily confined to workings of purely calcareous limestones. Page (1988) cites an example of a site of former extraction of magnesian limestone in County Durham where vigorous stands of adder's-tongue occurred in puddled hollows, apparently within degraded magnesium-rich limestone.

Page (1988) draws comparisons between the vegetation of similar sites and that of old, undisturbed, base rich pastures and concluded that the appearance of adder's-tongue in such areas presumably indicates conditions suitable for the establishment of new colonies through the arrival of spores and subsequent vegetative spread. It is in these observations that the similarity with the situation at the M5 Junctions is apparent. As pointed out earlier, Great Russells Ground represents species-rich turf on imported clay soil in an area highly disturbed in the 1970s. It would be of interest to determine if and why there is a similarity between the vegetation of M5 Junction 12 and that of old lime kiln sites. It might be speculated that waste concrete found its way into the junction's soil profile thus raising calcium levels and rendering the site suitable for the establishment of adder's-tongue.

Clearly there are many areas to be investigated further. Not least, a comparison is needed between those populations of adder's-tongue in the receptor site with those left *in situ* to determine any natural fluctuations in frond number which occur throughout Great Russells Ground. Nevertheless, the results of the preliminary six years monitoring indicate that the methodology utilised for the translocation of this species has been moderately successful. Such information is of value to the development of mitigation techniques which may be applied to a range of developments in an increasingly crowded Europe and

which may be important to the long-term conservation of many species, particularly those with complex life cycles.

The efficacy of the translocation and the discovery of adder's-tongue in such a disturbed environment demonstrates that the reason for the restricted distribution of some species is not always as clear as it seems and their apparent vulnerability to human endeavours is not always as severe as is believed. Certainly the botanical richness of M5 Junctions 12 and 13 is of interest with regard to the Highways Agency's biodiversity action plan and challenges the received ecological wisdom that, in terms of habitats, 'ancient semi-natural is best'. It also contributes to the growing recognition of the soft estate of the transport network as an important biodiversity resource with its own recognisable, ecological identity (Smith and Sangwine 2002). It emphasises the need for a detailed botanical understanding of the motorway and trunk road network to be developed if inadvertent ecological losses are to be avoided.

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Marnel Park – Accommodating Great Crested Newts within a Residential Development

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Summary

Marnel Park, Basingstoke, is a large residential development, promoted by David Wilson Homes (DWH), which lies adjacent to a great crested newt *Triturus cristatus* breeding pond. Extensive surveys were undertaken to inform an Environmental Statement (ES). The mitigation strategy currently being implemented includes phased relocation of newts, terrestrial habitat creation including two habitat corridors with novel road underpasses, creation of additional breeding ponds, amphibian-friendly road drainage systems and a Sustainable Urban Drainage Strategy (SUDS). Higher numbers of newts were encountered during the relocation process than expected from the surveys undertaken and habitat present. The findings also contradict recent research that relocation operations beyond 250 m of a breeding pond are hardly ever appropriate. Monitoring to date has shown no detrimental effect on the newt population, which may also be expanding, and that the habitat created is proving successful.

Introduction

The Marnel Park development site extends to some 32.2 hectares on the northern edge of Basingstoke. The site lies adjacent to Popley Ponds Site of Importance for Nature Conservation (SINC) which supports a breeding population of the protected great crested newt. Land on three sides of the pond has already been developed as residential housing. The Marnel Park site is allocated for residential development in the adopted Basingstoke and Deane Borough Local Plan 1996-2011 (July 2006). Land to the south-west of the site is also allocated for residential development and is currently being developed.

Prior to development, the site comprised predominantly arable land, with mature hedgerows on the eastern and northern boundaries of the site. Marnel Dell, a mature beech woodland, lies at the western corner of the site. Other than the hedgerows, the site did not appear to provide high potential as terrestrial habitat for great crested newts.

Planning Background

The Landmark Practice was commissioned by DWH in 2000 (prior to the publication of English Nature's Great Crested Newt Mitigation Guidelines in August 2001). A planning application and ES for the Marnel Park development, was submitted in October 2001. Following a Regulation 19 request, a Supplementary ES was submitted, giving additional information about the great



Great crested newt mitigation strategy providing high quality habitat and connectivity to open countryside

crested newt population of Popley Ponds and an assessment of the impact of the development on their habitat. Further work undertaken in consultation with English Nature to address the Regulation 19 request included:

- terrestrial, night time torchlight surveys during spring migration;
- bottle trapping of Popley Ponds and Kiln Farm Pond, approximately 2 km west of Popley Ponds;
- a terrestrial habitat suitability survey within a 1 km radius of Popley Ponds;
- suitability surveys of ponds in Carpenters Down Woods and to the north-west of Kiln Farm for their potential to support great crested newts (a few of these being further surveyed to assess whether or not they supported breeding populations of great crested newts);
- preparation of a newt mitigation strategy; and
- an assessment of the hydrogeology of the site, with particular reference to the potential impact on the hydrology of Popley Ponds.

A Flood Risk Assessment was undertaken in parallel to this, detailing the proposed SUDS for Marnel Park.

An ES Addendum was subsequently prepared in February 2004. This followed a second Regulation 19 request for additional information about great crested newt mitigation, a revised Master Plan following alterations to the development and submission of a great crested newt management plan.

Basingstoke and Deane Borough Council resolved to approve the outline planning application on 10 March 2004, subject to the completion of a S106 Agreement to include a Protected



Raising public awareness at Marnel Park

Species Management Plan. Outline planning permission was granted on 10 June 2004.

Survey Findings

The terrestrial habitat surveys found 34 adult and 54 juvenile great crested newts over 15 visits. Numbers varied between zero and 18 individuals (maximum of seven adults) and averaged approximately six newts (two adults) per visit. The surveys focussed on the hedgerows as likely dispersal corridors for the newts and the majority of the records were within 12 m of the hedgerows, mostly within 2 m. A few individuals were recorded up to 20 m from the hedgerow and up to 400 m from the breeding pond.

Bottle trapping at Popley Ponds produced a maximum of 29 adult great crested newts, equating to a medium sized population (English Nature 2001). It was acknowledged, however, that because potential egg-laying material was present throughout the pond and not concentrated around the margins, the standard survey method may underestimate the population size present. Accessibility problems also resulted in up to a fifth of the pond margin not being trapped. Poor environmental conditions during the spring migration, with barely any rain during April, may also have resulted in low numbers of newts reaching the breeding pond.

A count of 82 adult newts was recorded in 2003 by the Hampshire Amphibian and Reptile Group but using a higher density of traps throughout the pond, although still within the medium population size class. Surveys of Kiln Farm pond recorded a maximum of 16 adult newts, also representing a medium sized population.

The terrestrial habitat suitability survey revealed that, other than Popley Ponds SINC and its associated dense scrub habitat (approximately 1 ha), the surrounding habitat within 500 m is predominantly residential (approximately 74%), the remainder being arable. Just beyond the 500 m radius lie Basing Forest to the north, connected to Popley Ponds by a strong hedgerow and Marnel Dell woodland to the west.

The pond survey of the wider landscape identified two ponds with potential to support breeding great crested newts, and breeding was confirmed at both. Both ponds were at least 1 km from Popley Ponds and considered unlikely to form part of a metapopulation.

The hydrological studies concluded that the development of the Marnel Park site would not have a significant impact on the quality of the water source of Popley Ponds, the ponds being primarily fed by the underlying chalk aquifer.

Mitigation Strategy

The mitigation strategy, developed in consultation with English Nature, includes the creation of high quality terrestrial habitat

(species-rich grassland and scrub) with hibernacula and incorporates two 40 m wide habitat corridors through the site linking to open countryside beyond. To accommodate required site access, the corridors include novel underpasses beneath roads, two within the eastern corridor and one in the central corridor. These comprise a series of four, two metre by one metre deep box culverts, base dressed with loose earth, rubble and logs, and set at different heights relative to each other to provide differing moisture levels. The culvert system was designed due to the lack of evidence that great crested newts use standard amphibian tunnels, and their effectiveness is being closely monitored. The newt habitat is being created on a phased programme in advance of each phase of development, following Reserved Matters approval and under European Protected Species licences, so that the habitat is established prior to each phase of relocation and development.

The required road accesses were designed to minimise the breach of the eastern hedgerow, the access nearest the pond being modified from a roundabout to a simple T-junction. Amphibian friendly road drainage systems have been employed (channel drainage) with dropped kerbs to avoid trapping any newts within the road network. The scheme also incorporates SUDS to minimise any hydrological impact on the breeding pond.

Two new breeding ponds will also be created as enhancement measures, with the aim of establishing a link to the known breeding colony approximately 2 km west of Popley Ponds. The two balancing ponds will also be enhanced to provide further aquatic habitat.

Information regarding the importance of the great crested newt population, mitigation strategy and responsibility for management of the newt habitat is being provided to residents in Home Buyers' packs. Interpretation boards are also being provided at strategic points within the newt habitat. The development features a great crested newt mosaic, designed by local school children and the internationally-acclaimed artist Julieann Worrall Hood in a project sponsored by DWH.

Implementation

Development at Marnel Park commenced in August 2004. The eastern habitat corridor, including the two access points into the site, was created in advance of development commencing. The Phase II development area was left set-aside as interim newt habitat, and the Phase III/IV area remained under arable cultivation until 2006, the year prior to commencement of development there.

The eastern corridor was scheduled to have been completed in time for the 2005 spring migration. Due to the longer than expected relocation resulting from the unprecedented number of great crested newts encountered, and to delays in approval of the public highway works, the corridor works were not completed until April 2006. In the interim, an assisted migration



One of the three novel newt underpasses at Marnel Park

of great crested newts was undertaken during the 2005 and 2006 spring migration periods by pitfall trapping newts along the northern boundary of the development and releasing them to the south. The area of newt habitat immediately to the north of Popley Ponds (the breeding pond) was made available to the newts in July 2005, thereby providing additional terrestrial habitat.

Relocation of great crested newts from the central corridor and associated access corridor commenced in July 2006, to enable construction of the second habitat corridor. The central corridor was due to have been completed by the end of March 2007, but delays in ordering the culverts and consequent delays in undergrounding the electricity cables meant that this was not achieved. In order to speed up the establishment of the corridor and keep the development on track, a species-rich turf was sourced and approved for use by Natural England. The corridor was completed and made available to great crested newts in July 2007.

Relocation of newts within the Phase II and III/IV development areas commenced following completion of the central habitat corridor.

The results of each phase of relocation are tabulated below.

Phase	Timing ¹	Duration (days) ²	Adults relocated	Juveniles relocated
Phase I	Aug-Nov 2004 Mar-May 2005 ³	93	1,199 / 137 per ha	2,568 / 293 per ha
Central corridor	July-Sept 2006	53	14 / 3 per ha	1
Phase II	July-Nov 2007	86	259 / 96 per ha	2,380 / 881 per ha
Phase III/IV(pt)	Aug-Nov 2007	86	8	301 / 91 per ha
Phase IV(rem)	Feb-May 2008	69	12 / 3.2 per ha	39 / 10.5 per ha

¹ Relocation was only undertaken when conditions were deemed suitable according to English Nature (2001).

² Excluding 'unsuitable' days, Phase II took a total of 116 days, Phase IV (pt), 97 days and Phase IV (rem) 74 days.

³ Translocation in one compartment continued in spring 2005.

Each relocation phase took much longer than anticipated. English Nature (2001) advised a minimum of 60 days for a medium population size, as identified at Popley Ponds, rising to a minimum of 90 days for a high population.

The numbers of newts encountered during the relocations were also higher than anticipated. The baseline maximum adult count recorded of 29, would suggest an actual population size of between 96 and 1,450 adults (the adult count representing between 2 and 30% of the population, English Nature, 2001). 1,199 adults were captured from the Phase I area alone, which represents 11% of the terrestrial habitat available to the newts within 500 m (approximately 20.15 ha arable, the remaining 58.4 ha being residential). It is noted above, however, that it is considered that the baseline population size class may have been underestimated.

The density of newts encountered was also high. Published data for a site in Leicestershire (Oldham, 1994) gave the following densities of adult newts from different habitats: hedgerow, 250 per ha; garden, 175 per ha; pasture, 95 per ha; and arable, 20 per ha. The density of adult newts captured from the phases nearest the breeding pond (Phases I and II) were 137 and 96 per ha respectively. Newts were encountered throughout the field, well away from any hedgerows.

The above findings contradict popular opinion that arable fields are of low value to great crested newts. Analysis of National Amphibian Survey data (Oldham et. al. 2000) showed that newts occurred more frequently on land with low intensity use (e.g. scrub and woodland) than on pasture and arable. The use of pesticides on arable land can reduce terrestrial prey densities and ploughing, harrowing, etc. may inhibit dispersal, although hedgerows and woodland can provide dispersal, foraging and hibernation opportunities (Langton et. al. 2001). Recent analysis of mitigation projects involving trapping away from ponds (Cresswell and Whitworth 2004) showed that captures from woodland and to a lesser extent, boundary features (hedges, woodland/scrub edges, ditches, etc.), were consistently greater than other habitats with the effect magnified nearer to ponds. These data also indicated, however, that arable farmland with a high density of ponds can support substantial great crested newt populations.

Significant numbers of great crested newts were encountered between 250 and 500 m from the breeding pond - a total of 538 newts (163 newts per ha) for the Phase I area; 309 newts (predominantly juveniles) in the Phase III/IV (part) (92.5 per ha); and 51 newts (13.7 newts per ha per ha) in Phase IV (rem). This is contrary to the findings of Cresswell and Whitworth (2004), where analysis showed only small numbers of newts captured using drift fencing away from breeding ponds. Analysis of recorded captures were greatest within 50 m of a breeding pond with few captures made beyond 100 m, although a small number of projects recorded some captures on drift fences across linear features 150-200 m from breeding ponds. It should be noted, however, that very few of the projects analysed fully compartmentalised exclusion areas as described in English Nature (2001). The report concluded that at distances greater than 100 m from breeding ponds, there should be careful consideration as to whether attempts to capture newts are necessary, or the most effective option, to avoid incidental mortality and that, at distances greater than 200-250 m, capture operations will hardly ever be appropriate.

Monitoring

The peak counts of great crested newts recorded during population size class assessment surveys since 2003 is given in the table below. The highest count of 59 was recorded during the year following the commencement of development. The data in subsequent years would appear to show a decline, until 2008 when a maximum of 51 newts was recorded. From 2007, great crested newts have also been recorded in the balancing pond, with a peak count of 90 in 2008. It would appear that the development is not having a detrimental effect on the population, which may even be increasing. The combined data from Popley Ponds and the balancing lagoon represents a large population (English Nature 2001) as reflected by the relocation data.

Maximum Annual Counts of Great Crested Newts from Popley Ponds and the Balancing Lagoon.

Year	Popley Ponds	Balancing Lagoon
2003	29	-
2005	59	-
2006	30	-
2007	20	26
2008	51	90

Success of the road crossings, road drainage features within the vicinity of the road crossings, and use of the corridors are being monitored by a combination of direct observation on suitable nights during spring migration, pitfall trapping and deployment of artificial refugia. Twice-weekly evening visits



Belly patterns are recorded to track movement of newts

are undertaken after sunset during February-April, dependent on suitable weather conditions. The length of the corridors, the underpasses and the road drainage features within the immediate vicinity of the underpasses are systematically searched by torchlight. The belly patterns of individual newts encountered are recorded by flash digital photography, together with their location to enable tracking of the movement of individual newts. Drift fencing and pitfall traps are also placed at the southern ends of each underpass (the direction of Popley Ponds) and checked at least once daily in accordance with English Nature (2001). Any newts captured in pitfalls are released into dense vegetation within the newt corridors on the opposite side of the fencing. Great crested newts captured during the annual population size class assessment are also photographed for belly pattern analysis to boost capture rates and to confirm movement between the corridors and breeding pond.

Monitoring of the eastern corridor has shown that great crested newts are utilising the entire length of the corridor and newts have been shown to pass through the culverts in both directions. In 2008 the first newt passing through both the northern and southern culverts was recorded.

Greater numbers of great crested newts were recorded from the eastern corridor in 2008 compared with previous years and increased numbers were also recorded passing through the northern and southern culverts. The eastern corridor is also proving attractive to other amphibian species with both smooth and palmate newts being recorded. Numbers of common frogs encountered have increased as has breeding activity. The first evidence of toads attempting to breed was recorded in 2008 although no spawn was found.

Monitoring is due to continue for a minimum of 10 years following establishment of the newt habitat, balancing pools and new ponds.

Conclusions

- Caution should be exercised when interpreting population size class assessment data (survey data from the breeding pond indicated a medium population size. However, the relocation data and subsequent monitoring suggests a high population).
- The Marnel Park relocation data has shown that arable sites can support high populations of great crested newts.
- A significant number of newts were captured between 250 and 500 m of the breeding pond, even well out into the open field and caution should be exercised in interpreting the findings of Cresswell and Whitworth (2004).

- Four years of post commencement monitoring data has shown that the development is not having a detrimental effect on the great crested newt population and the population may even be increasing.
- Great crested newts are using the entire length of the corridor, have been shown to pass through the culverts in both directions and to pass through both culverts in the eastern corridor towards Popley Ponds. The population has also quickly exploited new breeding habitat, within one year of it being available. Greater numbers of newts were recorded within the eastern corridor in 2008 compared with the previous year and it is also proving attractive to other amphibian species suggesting that the mitigation has been successful.

Acknowledgements

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Cetaceans on Yorkshire Rivers – A Lesson in Ecological Recording

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People who work on the tidal sections of the Ouse and Aire in North Yorkshire report that they regularly see porpoises in the river; or rather they are so used to seeing them that they don't report them. Environment Agency and British Waterways staff, barge operators and other river workers all mention having seen porpoises – but only when asked. The problem is that records do not seem to have reached any of the national recording schemes and so, officially it seems, there are no porpoises in the river.

This omission came to light when Environment Agency ecologists were dealing with contractors applying to drill geological test holes in the river bed. As part of the works in rivers consent they were told to avoid undue vibration and sonic disturbance and to keep a watch for porpoises and cease operations if any were seen. Being diligent and wishing to do the right thing they consulted marine mammal experts, who after checking said there were no records of porpoise or other cetaceans in the river!

This caused Agency ecologists embarrassment and a major concern. Previous applicants wanting to dynamite old underwater bridge piles had been refused, since amongst other things the risk to porpoises and other marine mammals would be too great. Now it transpired that we had been accepting reports from our own Agency staff but these sightings had never been verified, the evidence was entirely anecdotal.

All cetaceans are European Protected Species (EPS) under the EU Habitats Directive, a designation that has taken on even greater importance following a review in 2007 of how the Directive was being implemented. This found that the UK Government were in breach of their duties under the Directive and more rigorous enforcement was required to ensure harm or disturbance was avoided. It has now become essential to determine whether porpoises or other cetaceans do occur regularly in the river system.

The North and East Yorkshire Ecological Data Centre (NEYEDC) were contacted but they had no recorded sightings on file, only anecdotal reports that were impossible to verify. The Whale and Dolphin Conservation Society (WDCS) and the Sea Watch Foundation (SWF) had no records at all. We were also told that it was highly unlikely that there were porpoises this far inland. Indeed when consulting maps showing the recorded distribution of species such as harbour porpoise *Phocoena phocoena* they were recorded as 'scarce' in the middle section of the North Sea (Harris and Yalden 2008). It began to look as if people were mistaking seals or floating debris for porpoises, so there was a need for a critical appraisal of the situation.

Dynamics of a Yorkshire River

The Yorkshire Ouse narrows to less than 50 m in some places and there is public access on both banks. Most of the land immediately adjacent to the tidal sections of the river is dominated by flood defence banks owned by the Environment

Agency, which has a policy of encouraging public access. However the rivers edge has been thickly planted with willows, mostly osiers *Salix viminalis*, which screens the river from the bank for long sections on both sides.

The river is tidal up to Naburn Lock, just downstream of York. This major structure was built in 1757 to aid navigation, but in 1698 the river was generally regarded as tidal up to Poppleton, just north of York (Briden 2001).

However, at certain times and in certain conditions, the river may have been tidal up to Linton on Ouse, some 12 km upstream of York, to a point where a very minor watercourse, Ouse Burn Beck, joins the River Ure and the river changes its name to the Ouse, indicating a muddy tidal river. However, much would depend upon tidal conditions and geomorphic changes over the centuries.

Common seals *Phoca vitulina* have been known to reach Linton Lock in recent years (to the delight of anglers) passing through or perhaps around Naburn Lock, through York and up to near the maximum natural tidal limit. Whilst there have been no reports of cetaceans beyond Naburn it could be that people were seeing seals in the tidal part of the river and reporting them as porpoises.

The creation of Naburn Lock and the consequent imposition of an artificial tidal limit means that the tidal influence is still strong up to this point. Whilst it seems a long way inland to us we must bear in mind that the flat arable dominated landscape of the southern Vale of York and Humberhead Levels is a very artificial one, maintained by flood banks, drainage ditches and pumps. Its natural condition would be a patchwork of tidal floodplain, pools and marshes, bogs and fens with low islands. That said, the rivers and creeks would have been far shallower than the deep single channel of today and navigation was known to be difficult for sea going vessels. It would also have been difficult for any cetaceans.

The North Sea tide entering the narrow confines of the Humber Estuary, and then confined still further by artificially narrow channels of the Ouse, Aire, etc. rushes in from low to high water in two hours and then drops over ten hours. The tides carry a great deal of sediment, most of which is washed in from the rapidly eroding Holderness coast, immediately to the north of the Humber.

The circulation of water within the estuary is such that the incoming salt water and marine sediment is pushed toward the north bank by the Coriolis effect of the Earth's rotation and so enters the Ouse and Aire. The outflow and much of the fresh water is pushed toward the south bank, so the tidal marine influence is greater on the Ouse and Aire than on the Trent.

There is also a great deal of woody debris floating in the river, which moves up and down with the tide. British Waterways staff report a recent increase in such debris, which may be the result of alder root disease and a recurrence of Dutch elm disease, so it could be that floating wood bobbing on the current was being mistaken for marine mammals.

Seeking Credible Evidence

Anecdotal reports are by their nature imprecise. To be credible we needed first hand reports that stated exactly what was observed, where and when and to be able to assess the experience and credibility of the observers. Ideally we needed reports of close up views with photographs or a report from an experienced whale watcher or at least someone who clearly knew the difference between a porpoise and a seal.

A corpse would be even more definite confirmation, but given the tidal nature of the rivers and the dense willow cover along the banks spotting and recovering a body would be difficult, unlike most coastal strandings.

Our first move was to circulate local Agency and British Waterways staff to obtain verifiable sightings. An immediate response from Fisheries Scientist Paul Frear, drew attention to a local newspaper article of March 2003 with a photograph of two porpoises at Cawood, some 15 km down stream of York (*Yorkshire Post*). He also produced two old photographs; one of early 20th century salmon fishermen who had caught a small cetacean in their nets at Naburn, 6 km from the centre of York. The image was of a small porpoise or possibly a dolphin. Another shows a larger cetacean apparently referred to as a 'white whale', caught in the Ouse, displayed on a cart.

Two Flood Risk Management officers also reported close views of two porpoises surfing the bow wave of a stoning barge on the lower Aire in April 2005. This is said to be unusual behaviour for porpoises so it could be that they were simply running before the boat in the shallow water. They said the boat crew were distinctly unimpressed since it was a regular sight to them. A record of a call out of the Humber Rescue service dated 3 April 2003 reported that the objects spotted near the M62 Ouse Bridge turned out to be porpoises, which they had seen close up.

Other reports were also collected of sightings in recent years and to top it all the marine mammal expert who had originally drawn to our attention the lack of recorded sightings apparently saw a porpoise whilst carrying out a watching brief for the geological test drilling project, previously mentioned. These recent records confirmed that people were seeing cetaceans in the rivers rather than seals or inanimate objects, and sightings seemed to indicate that these animals were present in the river in spring, if not at other times of year.

The Ouse is a major fish migration route and whilst conditions are very muddy they are suitable for animals that hunt by echo location. It is assumed that they are hunting and the spring sightings fit with the movement of salmon *Salmo salar*, smelt *Osmerus eperlanus* and late running river lamprey *Lampetra fluviatilis*.

We also received further support from the NEYEDC who put us in contact with Colin Howes of Doncaster Museum in his role as mammal recorder for the Yorkshire Naturalists' Union, who has been collecting archival evidence of harbour porpoise in the tidal reaches of the Humber Estuary. He had put together a comprehensive list of sightings between 1687 and 2003 with records from the Hull, Trent, Idle, Ouse, Wharfe, Aire, Don and Eaubeck. Some of these records were of animals 20-30 miles up river from the estuary. He had also published articles in the Yorkshire Naturalists' Union Bulletin and in numerous local publications over many years.

These included earlier references to a fight between the Abbot of Selby's men and those of William de Aton over the body of a porpoise they had killed in the Ouse and another to the Bishop of Durham's claim to all whales washed up at Howden, once a port situated where the Ouse and Aire met the Humber Estuary. This indicates that cetaceans were a recognised feature of the Yorkshire rivers in medieval times.

Many records involved stranded animals or corpses washed up on the coast, with a few in the Humber Estuary and fewer still on the inland rivers.

Examining the Evidence

Whilst historic records abound there has been little scientific observation of cetaceans in the Yorkshire rivers, so what conclusions can we draw from the evidence so far?

- Cetaceans do occur in the Humber tributaries and are most likely harbour porpoise, although other species may occur.
- Their occurrence has been relatively frequent in recent years and not confined to stray individuals or unusual sets of circumstances.
- Their appearance is probably seasonal and associated with fish migration, but this does not rule out a more permanent presence.
- The muddy nature of the water and the fact that rivers such as the Ouse are lined with dense planted willow means that cetacean species will often go un-noticed, even in the narrow sections.
- When granting licences and permissions or setting conditions for activities in or adjacent to the tidal rivers regulators such as the Environment Agency should assume the presences of cetaceans, although more work is needed to determine seasonal distribution.

The problem remains that the reports we collected were unsystematic and although they confirmed the presence of cetaceans in the rivers they shed little light on behaviour, numbers of animals involved or their movements. We could not even be certain that all the sightings were of harbour porpoise, although this seems the likely species.

The harbour porpoise is notoriously hard to study and there are serious gaps in our knowledge. They are probably under recorded in terms of cetacean records, being a small species with a low dorsal fin it must often pass unnoticed through the muddy waters of the east coast, the Humber and its tributaries. Animals that are moving and acting purposefully, as opposed to those that are distressed or lost, do not tend to draw attention to themselves.

Evidence of a Vanished Cetacean Fauna?

However, there remained an intriguing possibility that other cetaceans were involved and this was highlighted by a brief article on the WDCS website. Researchers from Durham University have identified evidence, confirmed by DNA analysis, of bones from bottle-nosed dolphins *Tursiops truncatus* from an Anglo-Saxon site at Flixborough in North Lincolnshire. The find indicates that local people had been eating these animals, but whether this was a regular occurrence or an opportunist catch is far from clear.

Colin Howes was quick to point out that this does not constitute evidence that bottle nosed dolphins really were a regular feature of the Humber Estuary. The Flixborough remains could easily represent an opportunist catch of stranded animals that had become lost on entering the shallow waters. The nearest surviving resident population is currently in the Moray Firth, over 400 miles to the north and this is a very different environment to the shallow, muddy Humber.

There have been no records of this species in the Humber since 1892, but this and earlier records and the Durham research is a further indication that cetaceans are part of the natural fauna of this estuary, at least on a seasonal or occasional basis, and

perhaps other British east coast estuaries such as the Tyne, Tees, Wash, Thames and others.

Even more intriguing are records of killer whales *Orcinus orca* following salmon into the Humber as far up as Goole (Clarke and Roebuck 1881 as reported in Delany 1985). Recent reports that orcas have been seen in the estuary has led to speculation that these were the 'grampus' (great fish) mentioned in historic records as far up as the Ouse, that were killed by fishermen to protect fish stocks (Pickles pers com).

Conclusions

This brief article does not pretend to explore the ecology of cetaceans in the Yorkshire rivers, rather it aims to demonstrate the enormous gaps in our biological records, where even a group of European Protected Species can go officially unrecorded in a densely populated part of the UK. This case also demonstrates that non-ecologists will often see things that many professional ecologists will miss, but may be unaware of the significance of what they are seeing or how to report and record it.

Even for experienced professionals there are pitfalls, as illustrated in this case, since records are not always held in the most obvious places. Local records may not reach national recording schemes and whilst there is a move to centralise local records in data centres there is a question of which local data centre will hold certain records. In this case the most comprehensive records were held by the Doncaster Museums Data Centre (not the most obvious place to look for whale and dolphin records).

Differences in recording systems may mean that it is not easy to translate and transpose data between schemes. For example, strict, scientific observational recording schemes that are designed for sea watching by experienced observers do not generally suit the anecdotal reports of inexperienced observers.

Historic records are very important and can provide crucial evidence of the assumed natural distribution of species. However, they may not distinguish which species were present in the modern sense of a species definition. The distinction between porpoises ('pig fish' so called because of their blunt, rounded snout) and dolphins ('fish' with a beaked snout) was blurred before modern taxonomy was developed. Even scientific archaeological information is open to differing interpretations.

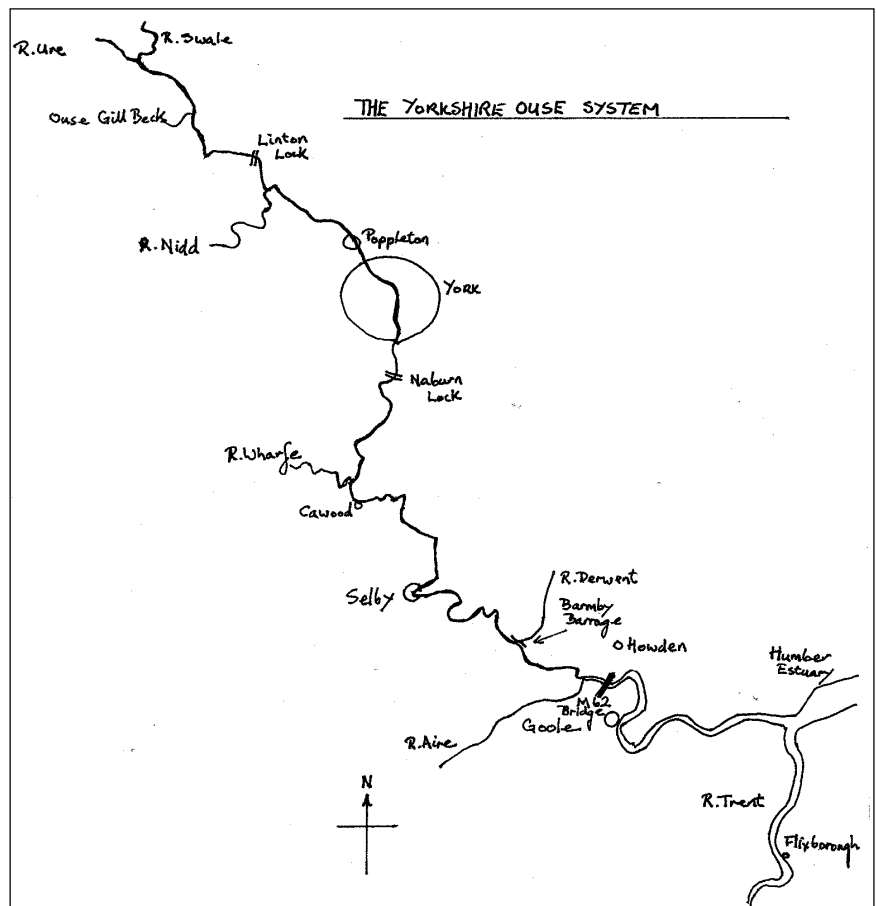
We live in a country in which we tend to assume there will be few surprises in terms of ecology and we are lucky enough to have some of the best and most comprehensive recording schemes available and some excellent observers, both amateur and professional. However we should also remember that when considering species distribution, an absence of evidence is not necessarily evidence of absence.

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The views expressed in this article are not necessarily those of the Environment Agency.

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An Approach Towards the Valuation of Species - A Retrospective View?

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In 1967 I was recruited to a newly created section within the Nature Conservancy (about six years before that organisation was re-formed into the Nature Conservancy Council (NCC) and the main part of the Institute of Terrestrial Ecology). This new section was intended to be involved with major planning schemes, such as proposals for estuarine barrages, reservoirs, airports and new towns, together with more widespread changes in land use, rather than with the day to day management of nature reserves or advisory work at a local scale.

The post that I had held previous to this had been in the landscape section of a County Planning Department and had been involved mainly with urban and suburban trees and woodlands. While in that post I had published a rudimentary system for placing relative values on the contribution that trees and woodlands make to the visual quality of landscape. This system, which was later adopted and re-issued by the Tree Council, has (thus far) been the only such system which has been accepted in a court of law in the UK. The most recent amendment was issued in June 2008, under the auspices of the Tree Council and published by the Arboricultural Association under the title of *Visual amenity valuation of trees and woodlands: the Helliwell System*. The basis of this system is the allocation of scores for a range of factors which are relevant to the visual amenity value of a tree or woodland. The scores for a particular tree or woodland are then multiplied together to obtain an overall score for that tree or woodland. If required, a monetary conversion factor (which has been agreed by the Tree Council) can then be applied to convert the numerical score to a monetary figure.

Other systems for valuing trees, which are more widely used in other countries, take their starting point from the cost of purchasing and planting a tree. This would appear to risk confusing cost with benefit and appears to be a dubious method of assessing the value of a fully grown tree.

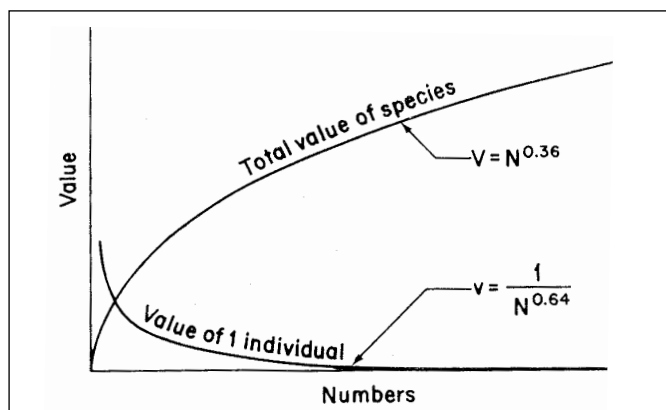


Figure 1. Relationship between the number of individuals and the total value of a species (V = relative value, N = number)

Soon after my move to the Nature Conservancy, it was suggested by the head of the Coastal Research Team that I might try to develop a comparable valuation system for wildlife. My initial reaction was that it would be impossible, as the variables involved were very numerous and complex. However, I did try to develop some ideas based on a postulated relationship between the number of individuals, the overall relative value of a species, and the value of one individual within that species (Figure 1). This was tested in a small study by Sinden and Windsor (1981), who found that this approach gave a good fit with the subjective assessments of conservationists in relation to a number of hypothetical examples. Ratcliffe (1977), in his nature conservation review (p11), noted that 'Recent studies, such as that by Helliwell (1973) indicate the kind of advances in approach which may lead to a more consistent and satisfactory methodology of evaluation of nature conservation interest'.

However, when I carried out (on contract to the NCC in 1981) a survey of five possible locations for a new nuclear power station, the response was that while NCC intuitively agreed with my ranking they would not be able to use my calculations at a public inquiry, as they did not fully understand them and they thought that my approach was not sufficiently accepted or tested. (In the event, none of these five sites were proposed.)

My main paper on this subject (Helliwell 1973) was listed in the references in *Guidelines for Baseline Ecological Assessment* (Institute of Environmental Assessment 1995), but does not appear to have been used explicitly within the text.

What is the basis of this approach? To take an example; if it were proposed to alter a coastal area so that it became less suitable for marine invertebrates and wading birds but more suitable for freshwater invertebrates and wildfowl, a method would be needed which would enable some sort of reasoned assessment to be made as to the relative importance of the predicted losses and gains. How much more valuable are 1,000 wintering dunlin than 500 wintering dunlin, for example, and how does this value compare with the value of 200 resident mallard or 10 great crested grebe? Similarly, how would one value 100 early purple orchids in comparison to 100 cowslips; or 1,000 cowslips, or 10 oak trees, or three pairs of lesser spotted woodpeckers?

Such questions need to be answered if possible, even if only in very rudimentary form. They need not necessarily be related to the value of wildlife to the local economy. Nor are they related specifically to the visual conspicuousness or attractiveness of the species, or its value for food or medicine. These questions are more fundamentally related to the conservation of biodiversity, on a local and global scale, regardless of the current existence or absence of a local tourist trade or the 'cuddle factor' of the species involved.

There are many ecological matters involved in such questions; such as the viability of small isolated populations, the size of the organism, the overall abundance of the species, the genetic characteristics of the particular population, and the genetic singularity of the species. It is perhaps understandable that a proportion of people in the Nature Conservancy in the 1960s

(and in particular some of those based at Monks Wood Experimental Station) were not in favour of attempting to place any sort of relative or absolute value on wildlife. They thought that only an expert could make decisions as to whether one site or one species was more or less important than another. However, in the absence of any underlying methodology, each case is then totally dependent on the whim of the 'expert' (if one is available) and their powers of persuasion.

Over the intervening years there has been an increased emphasis on legally protected species, Biodiversity Action Plan (BAP) species, and Red Data Book species. This is in line with Figure 1, but ignores species which are not rare or threatened enough to be listed under any of these categories, and says nothing about the relative value of different numbers of individuals of a species at a particular site.

Just as in other branches of economics, no approach or methodology is likely to be perfect, but without some workable approach to the assessment of the relative importance of different populations of plants and animals or areas of habitat it is difficult to see how the interests of biodiversity can be sensibly and logically considered.

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The Natural Capital Initiative

Valuing our Life Support Systems

The first meeting of the Natural Capital Initiative, Valuing our Life Support Systems, was held in London from 29 April - 1 May 2009. Influential speakers - including Lord May of Oxford, Professor John Beddington, Government Chief Scientific Adviser, Graham Wynne of the RSPB and Helen Phillips of Natural England - discussed the challenge of putting a price on the environmental goods and services, which we need to survive.

During the speeches and workshops several themes emerged. The need for greater inter and multi-disciplinary working was picked up by speakers and participants, as was the need for a better language to communicate the concept of ecosystem services. Empowering and enabling communities to take action to secure the services they want from their environment was a key message, possibly involving innovative new models of taxation. Another theme was the need for greater evidence of the role of biodiversity in providing ecosystem services, and the need to understand which ecosystem services are being provided in particular areas.

Presentations from Tesco, Eurostar, Centrica, Water UK and the National Farmers Union highlighted private sector action towards improving its impact on the environment. Business responds to consumer demand, but Richard Brown, CEO of Eurostar, stressed that business should also be leading the way and not waiting for legislation to force companies to take action.

Reports from the event will be posted on the Natural Capital Initiative website (www.naturalcapitalinitiative.org.uk). The organising partners of the Natural Capital Initiative are the Institute of Biology, Centre for Ecology and Hydrology, British Ecological Society and the Science Council.

The Natural Capital Initiative is:

- Informing the Government's implementation of the ecosystems approach - a framework for looking at whole ecosystems in decision making and valuing the services they provide.
- Identifying gaps in science, policy and implementation that inhibit an ecosystems approach.
- Working with government, parliament, agencies, NGOs, the private sector, scientific bodies and the wider public.

The link between the health of the environment and the health of the economy is becoming clearer. We do not yet understand the true value of all the services the environment provides us with – the natural capital so vital to our well-being. This means we cannot make well-informed decisions about how to manage the environment.

For example, farmers produce high volumes of vegetables, fruit, grains and biofuels - which contribute to the economy - using fertilisers and pesticides. Conventional economics tells us the value of the agricultural end products, but not the cost of the process to environmental goods and services such as clean water or the control of pests by natural predators.

The economic value of reducing greenhouse gases in our atmosphere is better understood. Many businesses now evaluate which operations they need to continue that pollute the environment and which they can change. The emissions trading programme is responsible for this change. It allocates a certain number of carbon credits to businesses and if they don't use them all, they can sell them to other companies. However, if they use more they are fined by the European Union.

There is a need to start understanding the value of other services the environment provides us with and develop frameworks that let us make better-informed decisions. This is something the UK Government has recently committed to.

Natural England Standing Advice for Protected Species and Ancient Woodland

Sue Beale

Environmental Planning Adviser, South East Region - Eastern Area Team, Natural England

Natural England has been carrying out a pilot study over the past six months, August to December 2008, of issuing standing advice for protected species and ancient woodland to selected Local Planning Authorities (LPAs) and this has now been extended to include all 72 authorities in the south-east region. The aims of the standing advice are:

- to assist LPAs in the protection of species and ancient woodland;
- to streamline the determination process with respect to protected species; and
- to secure the best outcomes for the natural environment.

It is hoped that the standing advice will also reduce the quantity of planning consultations that Natural England receive that are of poor quality and simply require a standard response. This will allow Natural England to focus on cases that will achieve the greatest environmental gain.

Protected Species Standing Advice

In the areas to which the advice applies, Natural England will **no longer comment** on applications that are submitted without the relevant protected species surveys if there are no other issues involved, nor will they comment on scoping surveys which recommend further surveys when those further surveys have not been undertaken and submitted. Natural England advises that applications which are likely to affect protected species but which are submitted without species surveys **should not be validated**. For applications where full and complete surveys have been submitted, the LPA should consult their in-house or retained ecologist.

Natural England should still be consulted on:

- applications affecting other wildlife and landscape designations not covered by standing advice;
- applications requiring an Environmental Impact Assessment;
- applications which are likely to damage features of a Site of Special Scientific Interest; and
- applications likely to have a significant effect upon a Special Conservation Area (SAC), Special Protection Area (SPA) or Wetland of International Importance under the Ramsar Convention (Ramsar sites).

The advice has been designed to be used by LPAs, developers, ecologists and other partner organisations to ensure all relevant ecological surveys are included with applications where there is reasonable likelihood of a species being affected.

The protected species standing advice provides information on the legislative background to protected species, particularly in

terms of the LPA's responsibility and the forms of protection provided under domestic or European legislation. The presence of protected species is a material consideration when considering a planning application. It is essential that the presence or otherwise of a protected species and the possible impacts of the development are established prior to the granting of planning permission. The advice is simple to use as it is accompanied by a checklist for validation officers and a flow chart to aid the decision making process.

Ancient Woodland Standing Advice

The ancient woodland standing advice has a wider remit in terms of supplying information not only on planning applications but also on how protection of ancient woodland can be included in Local Development Frameworks (LDFs). The advice includes a brief resume of the legislative background focusing on the LPAs obligation under Planning Policy Statement 9 (PPS9) not to grant planning permission for any development that would result in the loss or deterioration of ancient woodland unless the benefits of the development outweigh the loss of the woodland habitat. There is a definition of ancient woodland, a resume of the ecological value and landscape importance of ancient woodland and methods by which ancient woodland can be identified.

In order to assist the LPAs in making an assessment of impacts on ancient woodland, information is provided as to the effects of development within woodland and that on adjacent land. A checklist is included, which can be used to assess the impact of an individual application on ancient woodland and should be used when deciding whether or not to grant planning permission.

Examples are given where landmark decisions have been made in terms of the value attached to ancient woodland and what is judged within a development to outweigh this value. In addition, sample conditions are provided which can be attached to the granting of planning permissions which may mitigate partially for the effects of a development on ancient woodland. The measures that can be used to protect ancient woodland through development control are included in a flowchart which can be used in conjunction with the checklist.

What is Standing Advice?

Standing advice has a clear status in the planning system, it is a material consideration in the determination of an application in the same way as a letter from Natural England on the same subject. In accordance with the Government guidance in Circular 06/2005, when determining an application for a development which is covered by the standing advice LPAs must take the advice into account.

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Ecology Legal Update

Penny Simpson

Lawyer specialising in the natural environment, DLA Piper UK LLP

Over 2008 and 2009 to date there have been a number of court judgements which will be of interest to ecologists. This article seeks to provide a summary of them.

Caselaw on Appropriate Assessment for Natura 2000 Sites

Introduction

There were a number of legal cases in 2008 focusing on the requirement under the EU Habitats Directive to undertake 'appropriate assessments'. The following focuses on two of them.

This requirement kicks in where a plan or project is being proposed in a location (land or marine) which 'is likely to have a significant effect on a European site', *i.e.* a site designated for conservation either under the Birds or the Habitats Directives (also known as Natura 2000 sites). In that situation, the rules of the Habitats Directive require that an 'appropriate assessment' be undertaken by the authority competent to grant consent for the plan or project. An appropriate assessment is an assessment of the implications for the site from the plan or project looking specifically at the impact on the site's conservation objectives.

The appropriate assessment procedure is a strict one. The authority undertaking the appropriate assessment may only allow the plan or project to proceed if they decide, based on the assessment, that there will be no adverse impact from it on the Natura 2000 Site. If they decide that there will be such an impact, or even that they cannot be sure one way or the other, they have to refuse consent for the plan or project, subject only to rare exceptions which satisfy certain strict legal tests.

In law, the duty to undertake appropriate assessment falls on the competent authority, not the project promoter. However it is prudent and good tactics for the project promoter itself to carry out a shadow 'appropriate assessment' in order to allow it to identify appropriate mitigation and to put itself into a good position to 'lead' the competent authority through the process. It is normal, for example, for a project promoter to include in its Environmental Statement (produced under the separate Environmental Impact Assessment regime) the information and conclusions relevant to the appropriate assessment.

The Dilly Lane Case: How to make the consent process simpler and faster?

An important judgement was handed down in April 2008 in the case known as 'Dilly Lane' (*R v Secretary of State for Communities and Local and others, ex parte Hart District Council* [2008] EWHC 1204 (Admin)).

This High Court case was a dispute between the Secretary of State, who made a decision to grant a planning application when it was appealed to him; and the Council which had earlier refused to grant permission for that planning application.

The Council had refused the 'Dilly Lane' planning application which had proposed 170 dwellings, an informal recreational area, a footpath and a cycle path. The basis of the refusal was that the development in its view 'would have a likely significant effect' on a nearby Natura 2000 site (a Special Protection Area (SPA)). Therefore an appropriate assessment was required. But it said there was insufficient information before the Council to allow the Council to undertake an appropriate assessment.

The Secretary of State (SoS) took a different view. He decided that the development 'would not be likely to have a significant effect' on the nearby Natura 2000 site so that appropriate assessment was not required.

This fundamental difference in view was because the SoS decided that it was acceptable to take into account at the screening stage (*i.e.* when assessing whether the project 'was likely to have a significant effect' on the Natura 2000 Site) the 'mitigation measures' which the promoter had put forward. The Council had taken the view that such mitigation measures were not relevant to the question of whether there was a 'likely significant effect' but rather they were relevant only to the second stage where the appropriate assessment is carried out.

The Court decided that the SoS was correct: avoidance or mitigation measures can, as a matter of law, be considered at the screening stage of an application.

The implications of this for project proponents/developers is that by taking heed of this case, it may be possible to speed up the consenting process as follows:

- where a project may have an impact on a Natura 2000 site, it would be prudent to do all the work upfront to identify what the impacts might be and to assess them thoroughly;
- design into the project appropriate mitigation measures;
- in doing so, and with the backing of the Dilly Lane judgment, it might be possible to persuade the competent authority, at the early screening stage, that there is not likely to be any significant effect from your project on a Natura 2000 site;
- if the competent authority agrees then the consenting process for your project should be far more straightforward, as no 'appropriate assessment' will be required.

However, it is important to be aware that the application of this case has uncertainties. It is only a High Court case and does not have the authority of a Court of Appeal or House of Lords case. Also the case involved a set of unusual circumstances where there was never any question of there being a direct effect on the SPA (the concern instead was to do with there being indirect effects due to increased visitor pressure on the SPA as a result of new residents using the SPA for recreation/dog walking) and the mitigation proposed was designed not to lessen the impacts but to avoid them altogether. It may be that the case would be more difficult to rely upon where there are direct effects (*e.g.* land take from a Natura 2000 site) and/or where mitigation will not entirely avoid the impacts.

What does a local authority need to do in discharging its 'appropriate assessment' duty to ensure a robust decision?

A further 2008 case (R v Redcar and Cleveland Borough Council, ex parte Lewis [2007] EWHC 3166 (Admin)) has considered what a local authority has to do to meet its duty to carry out an 'appropriate assessments'.

This was a case where the claimant (Mr Lewis), a homeowner in Redcar, applied for judicial review of the local planning authority's (LPA) decision to grant outline planning permission for a mixed residential and leisure development on land near to his home. The development site was close to a Natura 2000 site. Mr Lewis argued that the local authority had failed properly to comply with its legal duty by (i) failing to make an appropriate assessment; and (ii) by failing to ascertain that the development would not adversely affect the integrity of the Natura 2000 site.

Mr Lewis lost the case on the conservation/appropriate assessment point, but there are some important lessons to be learnt from the judgment.

These lessons apply to local planning authorities and other competent authorities who have the duty to carry out appropriate assessments. However it is very important that developers and their advisers (e.g. consultant ecologists) also understand the implications of this so as to ensure that their clients obtain robust decisions from the relevant authorities which are then less likely to be challenged successfully by way of judicial review.

The lessons from the case are as follows:

- There is plenty of 'best practice' guidance on how an appropriate assessment is best undertaken by the competent authority, i.e. by the drafting of a long and detailed report. However this case points out that there is in fact no prescribed form for an appropriate assessment and that an appropriate assessment can take the form of an iterative process whereby the LPA takes into account, considers and addresses relevant information provided over time both by the applicant and the statutory consultees such as Natural England and the Environment Agency.
- Even though there is no prescribed method for an appropriate assessment, the LPA should ensure that a full written record is made of its appropriate assessment, even if this amounts to a relatively short document.
- Where concerns have been raised by Natural England or the Environment Agency about information relevant to the assessment provided by the developer, the LPA needs to address those concerns and deal with them.
- The LPA's document recording the appropriate assessment should, as a minimum, state:
 - that it is a record of an appropriate assessment undertaken by the LPA;
 - that an appropriate assessment has been undertaken in accordance with Regulation 48 Conservation Regulations 1994;
 - the conclusion reached by the LPA that the proposal is likely to have a significant effect on the European site(s) (either alone or in combination with other plans or projects) and that the project is not necessary for the management of the European sites;
 - that the appropriate assessment has been made in view of the sites' conservation objectives;
 - the way in which the appropriate assessment has been carried out, i.e. by reference to correspondence

with, and information provided by, both the applicant and Natural England/the Environment Agency and how concerns raised by Natural England and the Environment Agency have been addressed; and

- (with reasons) the LPA's conclusions as to whether, taking into account any conditions and the manner in which the proposal is to be carried out, it can be ascertained that the proposal (either alone or in combination with other plans or projects) will not adversely affect the integrity of the European sites.
- The planning officer's report should also be clear in setting out the legal test which the LPA needs to concern itself with, i.e. at the bullet above.
- The reasons given by the LPA for the planning decision also need to include the conclusion reached as regards this legal test.

Biodiversity Duty and PPS9

The Buglife Case 2009: Court of Appeal

The Court of Appeal on 28 January 2009 released its judgement in relation to a case brought by Buglife - the Invertebrate Conservation Trust (R (on the application of Buglife) v Thurrock Thames Gateway Development Corporation [2009] EWCA Civ 29).

Buglife sought to quash a decision of Thurrock Thames Gateway Development Corporation to grant planning permission to a development company on the insect-rich site of a former power station in Thurrock. Permission was granted and Buglife brought a judicial review against the decision in the High Court.

Buglife lost at the High Court and appealed to the Court of Appeal. The Court of Appeal did not look favourably on the case and has upheld the decision of the High Court so that the planning permission stands.

At the High Court, Buglife had focussed on the s40 biodiversity duty of the Natural Environment and Rural Communities Act 2006. I am told by Buglife that they continued to make arguments about s40 in the Court of Appeal. However, the Court of Appeal chose to focus on three main concerns:

1. That planning permission was granted without first examining possible alternative locations, as is required under Planning Policy Statement 9 (PPS9) (paragraph 1(vi)).
2. Planning permission was granted before the planning authority had satisfied themselves whether the desirability of protecting the site for its wildlife was clearly outweighed by the need for the development - also a requirement of PPS9 (para 16).
3. The planning authority failed to ensure that the mitigation measures proposed were subject to, and part of the, environmental assessment, particularly in relation to the necessity in this case to have a phasing plan in relation to the mitigation which should have been subject to environmental assessment before permission had been granted. The feeling was that the experimental and provisional mitigation measures put before the planning authority were not sufficiently clear to allow the authority to come to a decision on harm to species or their habitats.

The Court of Appeal however accepted the opposing view that PPS9 should not be read as if it were a statute. The judge in the High Court had said that a 'benevolent construction' should be given to planning decisions and to the reports of planning officers. The Court of Appeal said there had to be strict limits to that benevolence. Nevertheless, the Court of Appeal said that, whilst a phrase by phrase analysis of PPS9 did not appear



West Thurrock Marshes is home to several UK BAP invertebrate species, including the brown-banded carder bee *Bombus humilis*

Photo: Sam Ashfield

in the officer's report or in the minutes of the planning meeting, considerable evidence on the main issues arising from PPS9 were however available and were sufficiently analysed by the authority and by Natural England. In particular, the Court of Appeal drew comfort from the fact that Natural England, whilst originally unhappy about the development proposal, ultimately withdrew its objection albeit perhaps reluctantly.

In relation to alternatives, although the issue was barely considered in the officer's report, there were obvious advantages of this application site for the proposed distribution depot and the authority was entitled to take the overall view that it did. There was no sentence by sentence analysis of PPS9 but its overall tenor was not ignored with the adverse effects being carefully analysed. In relation to phasing, the authority was entitled not to require a complete blueprint of phasing in advance of grant of planning permission.

The Court of Appeal has therefore demonstrated that there does not have to be a line by line scrutiny of planning permissions to assess detailed compliance with PPS 9. Consideration of the larger picture and the main issues should not be defeated by over attention to detail with the risk of thereby 'losing the wood for the trees'.

This is a disappointing judgment for conservation organisations and is likely to be relied upon by developers where PPS9 is unhelpful to their projects and to schemes. However it does tend to demonstrate the weakness of reliance on policy to deliver conservation benefits and the Court of Appeal's judgment may therefore be able to be used as a spring board to lobby for stronger statutory protection.

Environmental Impact Assessment

Is Environmental Impact Assessment (EIA) required for modifications to existing development?

A significant judgment has emerged from the High Court on 19 February 2009 relating to the rules about when EIA needs to be applied in the case of proposed modifications (e.g. changes or extensions) to existing developments. The judgment is in the case of *R (on the application of Baker) v Bath and North East Somerset Council* [2009] EWHC 595 (Admin).

Many readers will be aware that the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (1999 Regulations) set out two types of

development which must be subject to an EIA before a decision can be made whether to grant planning permission:

1. those 'Schedule 1' projects which **always** require an EIA; and
2. those 'Schedule 2' projects which require an EIA **only** when they meet certain specified criteria or are to be carried out in a sensitive area; and where they are likely to have significant effects on the environment.

However, the regulations also specify the circumstances in which **modifications to existing developments** may need to be subject to EIA, i.e. when any change to or extension of development in Schedule 1 or Schedule 2 may have significant adverse effects on the environment and certain thresholds apply **to the change or extension (and not to the development as changed or extended)**.

The court has stated that the rules in the 1999 Regulations applying to Schedule 2 changes or extensions to existing developments do not implement accurately the EIA Directive. As noted above, the 1999 Regulations require EIA to be applied to modifications/changes to existing development where the modification/change meets certain thresholds, rather than when the existing development as changed or extended meets those thresholds. The High Court has reviewed the European court caselaw and has decided that this is the wrong approach. The correct approach is to consider **if the development as changed or extended meets the relevant thresholds**. This approach ensures that cumulative impacts of the existing development together with its proposed changes are taken into account.

We need to wait to see if this judgment is taken to the Court of Appeal.

However, assuming this judgment stands, it will mean that the 1999 Regulations will have to be amended and that many more proposals to alter existing developments will therefore become subject to EIA requirements because the local planning authority will have to focus on the development in totality, i.e. taking into account the proposed modification, rather than focussing on the modification in isolation. This will create a lot of extra work for local planning authorities and for developers. Ecologists need to be aware of this when considering the need for EIA.

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2009 Autumn Conference Protected Areas

10-12 November 2009

Center Parcs, Elveden Forest, Brandon, Suffolk IP27 0YZ



Full details will be available shortly at:

www.ieem.net/conferences.asp

Photo credits: Wilf Fenton, Nick Jackson, Derek Lord and Jason Reeves

IEEM Spring Conference 2009: Wildlife Crime

Nick Jackson AIEEM
Education and Professional Development Officer, IEEM

IEEM's spring conference took place on 1 April 2009 in Leeds. The aims of the conference were to enable delegates to leave being able to correctly identify different types of wildlife crime and also to effectively report any such crimes to the relevant authority.

Edward Coulson, a lawyer with Robin Simon LLP, began the day by defining the topic, identifying the relevant legislation and setting the context for the event. He covered the origins of the statutory protection of wildlife - the Game Acts of the 19th century (which were aimed at the preservation of proprietary interests in game) and continued by talking about the changing emphasis during the second half of the 20th century, concentrating mostly on the Wildlife and Countryside Act 1981.

The next speaker was **Alan Roberts**, Investigative Support Officer with the Police National Wildlife Crime Unit (NWCUC). Alan provided delegates with information about what the Government's priorities are in relation to wildlife crime (what areas are being focused on); how the NWCUC gathers intelligence; enforces the legislation; and educates people to prevent future wildlife crime. He explained that the government's wildlife crime priorities for the upcoming year, 2009-10, are:

1. bat persecution;
2. badger persecution;
3. CITES endangered species;
4. freshwater pearl mussels;
5. raptor persecution; and
6. poaching.

Colman O'Críodáin from WWF International, spoke about the Convention on International Trade in Endangered Species of wild fauna and flora (CITES). Colman explained the history of the Convention; how it is financed; the scale of CITES related crimes; and explained the different flora and fauna that are covered under CITES. He also showed some of the more novel smuggling methods used by criminals to avoid detection by customs (including bird eggs strapped to a person's torso, reptiles transported in hollowed out books, and even the 'pigeons down the trousers' technique!)

The role of statutory nature conservation organisations (SNCOs) was covered by **Pete Charleston**, a retired police officer who was seconded to work with the Countryside Council for Wales, the first secondment of a police officer to any conservation organisation in the UK. The enforcement and advisory roles of the SNCOs were described and Natural England's draft enforcement policy and strategy were briefly covered. Pete also spoke about the Partnership for Action against Wildlife crime (PAW) which is a multi-agency body working to reduce wildlife crime by raising awareness and promoting effective enforcement.

The roles and responsibilities of local authorities were covered by **Steve Moon MIEEM**. He talked about planning policy and legislation relevant to local authorities, such as the Planning Policy Statement 9 (PPS9) and the Natural Environment and Rural Communities Act 2006. He explained the duties and legal compliance with legislation

when undertaking council activities which may impact on protected wildlife (using the example of highway maintenance staff mowing a grass verge and killing five different species of reptiles).

Simon Brockington, Head of Conservation at the Marine Conservation Society, was the first speaker after lunch and covered wildlife crime in the marine sector. He talked about the UK Marine Bill, biodiversity protection (or lack thereof), the current fisheries crisis (over-fishing) and the growing problem of marine litter. The combined effect of these factors has been to cause more species of conservation concern to occur in the sea than on land.

Godfrey Williams, Fisheries Policy Manager with the Environment Agency (EA), spoke on wildlife crime within the freshwater sector. He outlined the duties and enforcement powers that the EA have, mostly in relation to breaches of environmental permits they issue. He also talked about the Fish for the Future Programme (which he manages) which aims to develop and implement a significant package of new and extended migratory and freshwater fisheries legislation.

Paul Cantwell, Wildlife Management Advisor with Natural England (NE), gave a talk on wildlife crime in the terrestrial sector. NE are responsible for the regulatory enforcement of offences relating to Sites of Special Scientific Interest (SSSIs); illegal heather and grass burning; agricultural work that affects uncultivated land or semi-natural areas; and breaches of wildlife licences (European Protected Species). Paul also gave some practical examples highlighting what NE has done in the past when protected habitats are damaged or destroyed.

PC Duncan Thomas, a Wildlife Officer with Lancashire Police spoke next. He outlined his role as a wildlife officer including the overseeing of all wildlife incidents within Lancashire and co-ordinating the partner agencies. Using some rather gruesome images at times, Duncan showed delegates some of the outcomes of wildlife crime including dog fighting, badger baiting and trapping/shooting of birds of prey. He explained the processes involved when a member of the public reports a suspected wildlife crime and the steps the police take to gather evidence for an effective prosecution.

Nicholas Crampton, Senior Crown Prosecutor with the Crown Prosecution Service (CPS), spoke last. He outlined the role of the CPS and how they get the best out of a case. He explained the role of the prosecutor in court, assessment of the seriousness of crimes and also spoke about criminal liability for employee's failures (for example leading to secondary poisoning of birds).

The presentations from this conference are now available on the IEEM website (www.ieem.net/ieemspringconf2009.asp). I would like to thank all the speakers for their time and presentations and hope that the delegates found it a useful and interesting day. I would also like to thank McParland Finn Insurance Brokers (who provide the IEEM's professional indemnity insurance scheme) for sponsoring the conference.

IEEM's next conference is taking place on 10 - 12 November 2009 in East Anglia and will be on the subject of Protected Areas. Further details and the programme will be available on the IEEM website shortly.

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Best Practice Awards 2009

Entries are still open for the 2009 IEEM Best Practice Awards.

Entries that demonstrate best practice whilst contributing to the five objectives of IEEM are welcomed from all sectors of the ecology profession including the public, voluntary and consultancy sectors. Projects of any size will be considered. At least one IEEM member must have been involved in the project.

The five objectives of IEEM are:

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

The deadline for entries is 30 June 2009.

For more information and an application form please visit:
www.ieem.net/awards.asp



Institute News

Annual Conference 2009

The IEEM Autumn Conference 2009 will be on the theme of Protected Areas and will be held on 10-12 November 2009 in Thetford, Norfolk. More information, including the programme and online booking, will be available shortly at www.ieem.net/conferences.asp.

If you are interested in presenting a paper at this conference please contact Nick Jackson (nickjackson@ieem.net).

At the conference we would like to have a display of your protected area photographs, the best of which will be used on the cover of the December edition of *In Practice*. For more information contact Jason Reeves (jasonreeves@ieem.net).

Workshops 2010 Proposals

Are you interested in running a training workshop in 2010? If yes, please contact Nick Jackson (nickjackson@ieem.net).

Best Practice Awards 2009

After two successful years the IEEM Best Practice Awards will again be running in 2009. More information along with an entry form is available at www.ieem.net/awards.asp. The deadline for submissions is 30 June 2009.

Direct Debits

Now is the time to set up your Direct Debit payments for your 2009/2010 subscription. Direct Debit payment saves you £10 on your annual subscription. The form is available in the members' section of the website and must be returned to the IEEM office by 31 July 2009. Every year we do get members who would like to pay by Direct Debit but find that they have missed the deadline.

Staff Changes

IEEM will be sorry to lose the services of **Gemma Langdon-Saunders** who has been with IEEM for over two and a half years. She has been responsible for keeping the finances of the Institute in good order, a good deal of administrative work and for developing a number of special projects. Gemma will be starting a teacher training course shortly and we wish her well.

Stacey Travers will be leaving IEEM to take up work with more emphasis on research. She has made a very helpful contribution to the development of the Sections and the workshops and conferences during her time with the Institute.

IEEM President-Elect

We are now looking for a President-Elect, who will succeed Steve Ormerod in November 2010 but who will be elected at our AGM in November this year. If you know of someone who you think would be suitable, please contact Jim Thompson (jimthompson@ieem.net). We have not had an election for a President for some time and this would be good for IEEM democracy.

Can You Help Us Reach 4,000?

Yes – we are nearly there but we just need that extra momentum to get us to the 4,000 mark. Our target is to exceed it by the time of the Autumn Conference. This is a call to all members to encourage their colleagues to apply. At a time of job shortages, membership of a professional body could really make a

difference and IEEM is increasingly recognised as *the* Institute to be in.

IEEM Patrons

With the recent passing of Professor Tony Bradshaw and Sir Martin Doughty, the ranks of IEEM Patrons have become depleted. Any ideas for potential candidates would be welcome. Please contact Jim Thompson (jimthompson@ieem.net).

Call for Committee Members

Your support on Committees is essential to the functioning of the Institute; will you volunteer? The Committees of the Institute are populated by the membership and serviced by the Secretariat. The following Committees need you:

- Membership Admissions Committee
- External Affairs Committee
- Professional Affairs Committee

For more information on the various Committees and an application form please visit www.ieem.net/governance.asp.

Order of Post Nominals

A recently appointed Fellow asked this question. Needless to say the answer is not that clear and reminds me of trying to find a definitive view on when to use the 's' or the 'z'. I was under the impression that anything chartered came first but the Engineering Council is quite clear that CEng comes after university degrees. So the answer is university degrees in order of grandeur followed by chartered memberships followed by membership of other professional bodies, e.g. BSc MSc PhD DSc CEnv FIEEM FLS MIBiol. There is no order for professional bodies but generally people put first what is most important to them.

Mike Roberts CBE

As a rather late report on the New Years Honours list for 2009, IEEM is pleased to announce that Professor Mike Roberts has been awarded a CBE. He was Director of NERC's Institute of Terrestrial Ecology for 10 years from 1989 and the NERC's Centre for Ecology and Hydrology from 1989 to 2001. He has recently retired as Chief Executive of the Central Science Laboratory. He has managed a wide range of research projects in land use, conservation of biodiversity and environmental pollution – many congratulations.

Recognition of the work of IEEM members in the Queen's Birthday and New Years Honours is a good way of acknowledging the contribution that the profession can make to Society. So if you can think of any members whose contribution might make them eligible have a look at the link below which explains all the procedures for nomination and the criteria on which they are based.

www.direct.gov.uk/en/Governmentcitizensandrights/UKgovernment/Honoursawardsandmedals/DG_067917

Wildlife Crime Seminar

Following on from the feedback from the conference it has been decided that the most useful way to develop the Professional Guidance Series document on Wildlife Crime would be to hold a seminar. More information will be available later, but if you would like to be involved please register your interest at enquiries@ieem.net.

New Fellows

Council, at its meeting on 2 April 2009, approved five new Fellows, bringing our total up to 34 – congratulations to all five!

Dr Peter Cosgrove

Peter is Principal ecologist with the EnviroCentre, UK. He previously worked as an independent consultant freshwater ecologist and for the Cairngorms National Park Authority. Peter is one of the foremost authorities on the Freshwater Pearl Mussel and its conservation. He has also been involved in consultancy work especially with water voles, is an accomplished ornithologist and has been called as an expert witness as such at public inquiries.

Paul Doyle

As an independent consultant of Alba Ecology Ltd, Paul has been instrumental in raising and maintaining the standard of ecological survey and EIA, particularly in relation to wind farms. Before that he set up the Natural History Education Centre based at Aberdeen University. His research has had far reaching application in the restructuring management of forests and also the understanding of the North Sea Environment. Locally he contributed to the production of the LBAP for NE Scotland and nationally to the standard bird survey methodology.

Peter Jepson

Peter is a specialist ecological advisor with Lancashire County Council and has been employed by that authority in an ecological capacity for about 20 years. His work includes: development of ecological briefs, developing, revising and maintaining the Biological Heritage Site's guidelines, development of planning policy, contributing to the Biodiversity Action Plan and developing the biological data system and Biological Records Centre.

Dr William Latimer

William has over 30 years experience in applied ecology, academic research and teaching. He is Regional Director, Environment for Faber Maunsell. He has experience in environmental assessment, research and management, water resources and management, and a wide range of overseas projects. He has published 15 papers in scientific journals on topics ranging from acoustic behaviour to mitigation banking and biodiversity assessment at the local scale for EIA.

Dr Roland Randall

Roland has taught Biogeography and Environmental Management at Cambridge University for over 35 years. He is an expert on the ecology, geomorphology and management of coastal vegetated shingle and spearheaded the national survey of coastal vegetated shingle for the JNCC. He is also a practical conservationist running two small farms with rare breed livestock and contributing to local Wildlife Trusts and the Rare Breeds Survival Trust.

The Scottish Section Committee recently came up with a list of potential new Fellows which the Secretariat then contacted with a prompt that they should submit a Fellowship application. Several then responded and have been approved or are being processed. The North West Section did something similar so congratulations to both Sections. If every Section could follow their example and draw up a list of potential Fellows in their area, I am sure that a significant rise in the number of Fellows would result. Don't forget though they do have to be members and have made an outstanding contribution to ecology and environmental management. The details on how to apply and what might be involved once approved as a Fellow are on the website.

Obituaries

Héloïse Collier MIEEM

It is with great sadness that we report the untimely death of Héloïse Collier. Héloïse joined IEEM in 1991 and many members will have appreciated the training workshops she ran on plant and tree identification. Since 2002 she had been serving on the Membership Admissions Committee and her experience and wise counsel will be greatly missed. Following her BSc in Geography with Botany in Aberystwyth, Héloïse gained a postgraduate diploma in cartography at Glasgow University and practised as a cartographer. She later completed an MPhil in Ecology at Sussex by original research into plant succession in a quarry. She carried out survey and mapping for Surrey Wildlife Trust and the National Trust before becoming self-employed. Education was important to her in the widest sense. From undergraduate lecturing at university level to adult continuing education courses, from illustrated talks and guided walks for interested groups to map-reading skills and safe walking procedures to adults and girls in the Guide movement. The last point is indeed poignant. Héloïse was very involved in the Guide movement and it was whilst at a Guiding conference in Edinburgh that she died so unexpectedly. She had a sense of adventure and on her last birthday did a parachute jump for charity. Anyone wishing to add to her efforts may send a donation in her memory to St Dunstons (www.st-dunstons.org.uk). We are grateful for her many contributions and we will miss her.

Héloïse Eve Collier MIEEM (1948-2009)

Sir Martin Doughty

Members of IEEM will deeply regret the passing of one of our Patrons, Sir Martin Doughty.

Much has already been written which reflects the high regard in which he was held by many friends and colleagues across a very broad spectrum from politics to wildlife conservation and protected areas. The obituary by Roy Hattersley in *The Guardian* and the tribute by Helen Phillips on the Natural England website describe his contribution in many ways. In IEEM we were proud to have him as a Patron and we salute the many contributions he made to both the work and aspirations of IEEM members. His father had been on the famous mass trespass on Kinder Scout, which in many ways led to the setting up of the 1949 National Parks and Access to the Countryside Act. As Chairman of the Peak District National Park he saw all too well the link between the major conurbations of Manchester and Sheffield and the need for access to the Countryside. As Chair of English Nature and then Natural England which brought together the two sides of the 1949 Act, you felt that he was able to put the case for our subject areas in the inner circles of government and with formidable credibility. His most recent appearance at an IEEM function was at the presentation of the IEEM Medal to Sir David Attenborough in December 2006, at which he talked of the challenges ahead for Natural England shortly after its formation. You realised then what a remarkable and approachable man he was. His regrettably short contribution as Chair of Natural England will indeed be a hard act to follow.

Graham Martin Doughty (1949-2009)

Ireland Section News

Biodiversity Data Centre Event

On 17 April 2009, in the beautiful surroundings of the Carraiganore Waterford Institute of Technology (WIT) Campus, the National Biodiversity Data Centre hosted a successful event in conjunction with the Irish Section of IEEM.

This small and informal event was attended by members and prospective members of IEEM. It showcased the many interesting initiatives currently being undertaken by the Centre such as the National Invasive Species Database, the National Vegetation Database, the Waterbeetles of Ireland and the Irish Butterfly Monitoring Schemes. Interactive maps have been developed for these projects and the maps and their supporting data are invaluable tools to ecologists working in Ireland. It is also hoped that decision makers and planners will utilise this data effectively to facilitate sustainable planning decisions. As part of these projects it is essential that the Centre continues to receive information and data from ecologists, so if you have

any records that you think might benefit the centre, please send them in.

The Irish Section of the IEEM would like to thank Dr Liam Lysaght and other staff of the Centre for a very informative day and we look forward to future collaborative events. For more information on projects being carried out by the National Biodiversity Data Centre or to send in your records, check out their website at www.biodiversityireland.ie.

Noreen McLoughlin MIEEM



Invasive Species Survey 2009

There is a need to know what invasive species we have in Ireland and where exactly they are. The National Invasive Species Database collates such information and makes it freely and easily accessible through an online interactive GIS mapping system.

Currently, historical records are being collated for some of Ireland's 'most-unwanted' invasive species. Historical records are vital as they allow us to track the invasion and pattern of spread of the introduced species along with making predictions of future potential spread and invasion sites. The 'earlier the better' in detecting the arrival of an invasive species is also crucial to increase the effectiveness of eradication or control. Early detection requires the timely submission of a valid record. To support this, the Data Centre has set up an all-island Invasive Species Survey. The survey will focus on collecting records for eight of Ireland's invasive and most unwanted species.

This project will:

- raise awareness of invasive species;
- update the distribution map for these eight species;
- provide a baseline of their distribution which can feed into surveillance and monitoring programmes;

- allow for the early detection of species not previously recorded in an area; and
- encourage standardised recording.

The active participation of all professional and amateur recorders is needed to make this a success, so get out your historical records and make records for new sightings and submit them through the Data Centre's invasive species website: <http://invasivespecies.biodiversityireland.ie>. Just click on the invasive species survey tab for more information or contact coflynn@biodiversityireland.ie.

Table 1. Invasive Species Survey – the eight focal species

	Taxon Name	Common Name
1	<i>Azolla filiculoides</i>	Water Fern
2	<i>Crassula helmsii</i>	New Zealand Pigmyweed
3	<i>Elodea nuttallii</i>	Nuttall's Waterweed
4	<i>Hydrocotyle ranunculoides</i>	Floating Pennywort
5	<i>Myriophyllum aquaticum</i>	Parrot's Feather
6	<i>Fallopia japonica</i>	Japanese Knotweed
7	<i>Impatiens glandulifera</i>	Himalayan Balsam
8	<i>Heracleum mantegazzianum</i>	Giant Hogweed

The Future of Freshwaters

A Joint IEEM/FBA Conference



16 - 17 September 2009
University of Warwick

www.ieem.net/conferences.asp



Partnership News

European Federation of Associations of Environmental Professionals

EFAEP recently held its General Assembly (GA) in Bilbao, Spain. This was attended by Mike Barker, Jim Thompson and Jason Reeves as Co-ordinator. The meeting was preceded by a very full day's seminar on waste and climate change which was arranged by the host organisation, Ategrus. This had a particularly good Spanish attendance.

The GA has a largely administrative role – it approved the final accounts for 2008 and agreed some priorities for 2009. EFAEP continues to grow and we were pleased to welcome IEEMA as a new member, bringing the total UK contingent to four. The Portuguese organisation, APEA, also made a very welcome return to the fold. Attendance at the Green Week in Brussels and taking part for the first time in the ISO standards organization with observer status was approved. The GA also heard of contacts being made at senior level with European Commission Officials and with an MEP and how influence at the European level is slowly growing.

The European Network of Environmental Professionals (ENEP) also continues to grow and now has over 1,000 subscribers. Don't forget as an IEEM member you can submit your details to this database and it could be a useful means of advertising your area of expertise or for finding suitable contacts. This is free to all IEEM members. See website details below.

There are now three focus groups in operation – young professionals, green week and climate change plus the ongoing work of the EMS (environmental management systems) working group.

There was much discussion on how to involve more of the members rather than the Executive Committee. EFAEP is now at the point where it has grown significantly but now needs to take stock and define the way forward. Much of this will fall to the next GA which will be held in London on 18 September 2009.

For more information about EFAEP and the latest newsletter please visit the website.

www.efaep.org / www.environmentalprofessionals.eu



Delegates at the General Assembly in Bilbao

Society for the Environment

We are pleased to report that the Society (SocEnv) continues to flourish with the recession showing little sign of affecting the numbers of Chartered Environmentalists (CEnv).

Members will probably be aware that the post of Chief Executive is currently being advertised and hopefully a successful appointment will soon be made. At the meeting in April, IEEM Council endorsed Eirene Williams and Jim Thompson as representatives on the SocEnv Board and Alex Tait on the Registration Authority. These individuals will be confirmed at the AGM on 17 June 2009, which will be followed by a reception at which the guest of honour will be Jonathon Porritt. The names of IEEM members recently admitted as chartered environmentalist are listed below and there is now quite a queue of those waiting to be interviewed – but keep sending those applications in.

The following members have recently been approved as Chartered Environmentalists: Dr Iain Adderton, Miss Victoria Allen, Dr Oliver Barnett, Mrs Samantha Cheater, Miss Katherine Cooper, Mrs Laura Covington, Dr Rachel Holmes, Miss Rhian Leigh, Mr Tom Mallows, Dr Stuart Otway, Miss Sacha Rogers, Mr Jonathan Panter, Mr James Patmore, Miss Victoria Smith, Miss Claire Wilmer.

Later this year an online Directory of Chartered Environmentalists will be launched and all CEnvs are encouraged to sign up. The Directory will be live on the SocEnv website and will be free to individual CEnvs. The tool will provide a comprehensive source of environmental expertise and would be available for employers, policy makers and the public to search for environmental professionals across the array of specialist areas and disciplines that SocEnv comprises.

Please e-mail Kerry Geldart (kerry.geldart@socenv.org.uk) to express your interest in being included in the directory.

www.socenv.org.uk

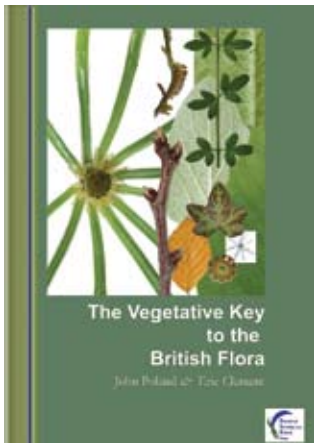
Countdown 2010

IEEM and the British Ecological Society (with support from the Parliamentary Office of Science and Technology, the UK Overseas Territories Conservation Forum, and Countdown 2010) are currently in the process of organising an event in Parliament for this autumn. The event will raise the profile of IEEM and the BES in Parliament and will highlight the 2010 biodiversity target.

There will be a meeting of European Partners of Countdown 2010 in Brussels on 24 June 2009. This annual event is an opportunity to get up to date and to exchange and compare activities on how the message is being carried forward. Last year IEEM was awarded a certificate in recognition of its work to promote the 2010 message – all IEEM activities have the Countdown 2010 logo on display. The Parliamentary Seminar is certain to gain the warm approval of the delegates attending.

www.countdown2010.net

Recent Publications



Vegetative Key to the British Isles

Author: J Poland CEnv
MIEEM and E Clement
ISBN: 978-0-9560144-0-5
Available from: NHBS
(www.nhbs.com)
Price: £25.00

This is the botanical equivalent of discovering warp drive! Due to the novel structure of the keys, it is possible to identify a plant in three turns of a page and in under 60 seconds!

This book is the first ever *comprehensive* key to vegetative vascular plants of *any country in the world*, covering a staggering 3,000 species, including just about all of our naturalised non-native species, and some hybrids and infraspecific taxa. It is a must-have standard text for all ecologists conducting any type of vegetation survey, including Phase 1 and assessing sites for UK BAP habitats.

The keys work particularly well for conifers (now the best key available for this group) and grasses. There is a full glossary illustrated by beautiful photographs of leaf shapes, sections and other details. A few plant groups cannot be identified without flowers or fruit, such as *Callitriche*, and in these cases the key includes the diagnostic non-vegetative characters.

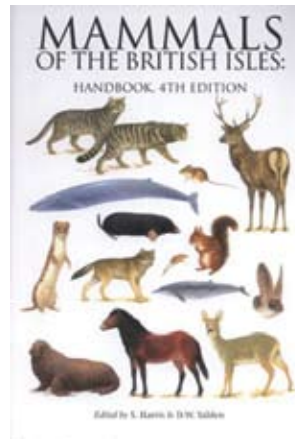
This is an academic flora, so not aimed at beginners. However, anyone doing NVC surveys (and therefore presumably used to Stace's *New Flora of the British Isles*) should easily cope with the new technical terms and the detailed observations required to use the keys successfully.

Careful study is demanded of a range of neglected yet useful features, like vascular bundle arrangement (dots on the cut end of a leaf stalk under x20 magnification) or hair types (there are 14!). Users will also need to get to know what the authors mean by certain characters, for example, *Centaurea nigra* does not key out unless you agree that the hairs are 'cottony', which is rather subjective. Experience is also required to know how far you should go – the key ambitiously separates some critical taxa, such as subspecies of *Festuca rubra*, and some very similar vegetative specimens, such as *Puccinellia* species. In these few cases, the key often relies on habitat type (sometimes unreliable) or has overlapping characters. Less experienced users may feel tempted to make firm identifications in these tricky cases, rather than accepting that the material they have cannot be named. It would have been helpful if the approximate level of confidence in these cases could have been indicated, as clearly some identifications using the key are much more likely to be 100% correct than others.

But these points should not detract from the scale of this space-age achievement – especially as John Poland dedicated five years of his life to the project on a voluntary basis, and is still just 29. Ecologists who decide not to bother with botany, thinking it takes too long to become competent, should take note! It is also a prime example of the power of mentoring between an expert and an enthusiastic co-worker, who now must be one of the leading botanists of his generation.

With thanks for comments on conifers to Cameron Crook MIEEM (TECDC).

Clare O'Reilly MIEEM



Mammals of the British Isles

Author: S Harris and
DW Yalden
ISBN: 9780906282656
Available from: The Mammal
Society
(www.abdn.ac.uk/mammal)
Price: £70.00 (with free P&P,
normally £9)

This handbook of British mammals is a well established reference source for all aspects

of information on the mammals occurring in Britain and Ireland. Over 100 of the leading mammalogists, mostly members of The Mammal Society, have contributed to this revision. It presents an authoritative summary of our current knowledge for all who need it: not only students and academics, but also planners, conservationists and naturalists. The text covers appearance, distribution, ecology and behaviour of all land and sea mammals, a history of the mammal fauna, habitats and their mammalian communities, extinct and introduced species and mammals and the law. The publication benefits from a superb collection of colour plates, some excellent colour photographs of mammal behaviour, and a range of new maps and diagrams.



Natura 2000 - Successful, Flexible, Modern: Facts and Findings

Author: WWF Germany
Available from: WWF
(www.panda.org)
Price: free download

This WWF Germany publication provides an up-to-date overview of Natura 2000. The cornerstone of the EU's biodiversity policy,

the Natura 2000 network, comprises some 25,000 sites throughout the EU's 27 Member States. The publication looks at the progress made by Natura 2000, and illustrates the suitability and potential of Natura 2000 as a modern and flexible framework with which to halt the loss of biodiversity in the EU.

The publication includes the following sections:

- **First Successes** - Natura 2000 is the cornerstone of the EU's biodiversity work and although the overall trend in halting the loss of biodiversity is continuing there are positive trends for some species, and the recovery of some of the large carnivores is also an encouraging indicator;
- **Flexible Management** - Natura 2000 allows adjustments in conservation objectives and management plans which is needed to address, for example, the future impact of climate change; and
- **Modern Assessment of Impacts** - Natura 2000 does not look at the type of a project, but only its actual impact on the site in need of protection and guarantees ecological sustainability while allowing for economic development.

In the Journals

Jim Thompson CEnv MIEEM, Jason Reeves AIEEM and Gemma Langdon-Saunders

Sponsored by



British Ecological Society

D M Bergstrom *et al.*

Indirect effects of invasive species removal devastate World Heritage Island

Journal of Applied Ecology 2009, **46**: 73-81

Owing to the detrimental impacts of invasive alien species, their control is often a priority for conservation management. Although the potential for unforeseen consequences of management is recognized, their associated complexity and costs are less widely appreciated.

Using a combination of population data from of an invasive herbivore, plot-scale vegetation analyses, and satellite imagery, the authors show how a management intervention to eradicate a mesopredator has inadvertently and rapidly precipitated landscape-wide change on sub-Antarctic Macquarie Island. This happened despite having an integrated pest management framework. Following eradication of cats *Felis catus* in 2001, rabbit *Oryctolagus cuniculus* numbers increased substantially although a control action was in place (*Myxoma virus*), resulting in island-wide ecosystem effects.

The results highlight an important lesson for conservation agencies working to eradicate invasive species globally; risk assessment of management interventions must explicitly consider and plan for their indirect effects, or face substantial subsequent costs.

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A M A Franco *et al.*

Surrogacy and persistence in reserve selection: landscape prioritization for multiple taxa in Britain

Journal of Applied Ecology 2009, **46**: 82-91

A principal goal of protected-area networks is to maintain viable populations of as many species as possible, particularly those that are vulnerable to environmental change outside reserves.

This study identifies landscape-scale priority areas for conservation of priority species from several taxonomic groups, using the Zonation software. 'Indicator groups' such as BAP species were only partially successful as predictors of priority areas for other taxonomic groups. For instance BAP birds were good surrogates of all bird species. Threatened butterfly species were not particularly good surrogates for conserving all butterfly species. Therefore, the identification of priority areas for biodiversity conservation should include information from all taxonomic groups available. Larger areas should be protected to account for species not included in the analyses. Conservation solutions based on data for many different species, and particularly those species with narrowly defined ranges, appear to be most effective at protecting other rare taxa.

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M Schaub *et al.*

When to end releases in reintroduction programmes: demographic rates and population viability analysis of bearded vultures in the Alps

Journal of Applied Ecology 2009, **46**: 92-100

Reintroductions are commonly used for re-establishing self-sustainable populations in formerly inhabited areas. They are expensive, and thus, it is worth performing a thorough demographic analysis of current and likely future population trajectories to guide strategic decisions on release policy.

Bearded vultures *Gypaetus barbatus* were exterminated from the Alps in the late 19th century, mainly due to human persecution.

To re-establish them, captive-bred young have been released annually since 1986. Since the first successful breeding in the wild in 1997, the population has increased to nine pairs in 2006. It is not known, however, for how long releases should be continued to obtain a self-sustaining, viable population.

The authors developed a model to provide essential information to optimize decision-making within a major reintroduction programme. From a demographic viewpoint, releases of captive-raised bearded vultures can be ceased in the Alps. The resources freed could be redirected towards a close demographic surveillance of the free-ranging population, with periodic evaluation of its viability and the option to release birds if deemed necessary. Birds available from the captive stock could be used for reintroductions in other areas where the bearded vulture is extinct.

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O Duriez *et al.*

Estimating survival and movements using both live and dead recoveries: a case study of oystercatchers confronted with habitat change

Journal of Applied Ecology 2009, **46**: 144-153

Animals facing partial habitat loss can try to survive in the remaining habitat or emigrate. Effects on survival and movements should be studied simultaneously since survival rates may be underestimated if emigrants are not considered, and since emigrants may experience reduced survival.

The authors analysed movements and survival of adult wintering oystercatcher *Haematopus ostralegus* in response to the 1986–1987 partial closure of the Oosterschelde in the Dutch Delta. This reduced by one-third the tidal area of this major European wintering area for waders.

They developed a model allowing simultaneous estimation of survival and movement between sites using a mixture of data (live recaptures and dead recoveries). They used a two-step process, first estimating movements between sites followed by site-specific survival rates.

Most birds were faithful to their ringing site. Winter survival was negatively affected by winter severity and was lowest among birds changing wintering site (*i.e.* moving outside of the Oosterschelde).

During mild winters, survival rates were very high, and similar to before the closure in both changed and unchanged sectors of the Oosterschelde. However, the combined effect of habitat loss with severe winters decreased the survival of birds from changed sectors and induced emigration.

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S J Ormerod and I Durance

Restoration and recovery from acidification in upland Welsh streams over 25 years

Journal of Applied Ecology 2009, **46**: 164-174

Streams affected by acid deposition should now be recovering biologically, but long-term assessments are scarce. The authors used the experimental catchments at Llyn Brianne, Wales, to evaluate trends over 25 years (1981–2005) in the chemistry and macroinvertebrates of acid moorland and forest streams restored by liming relative to those responding 'naturally' to reduced deposition.

Mean H⁺ concentrations in acid moorland streams fell by c. 15–16 $\mu\text{equiv.L}^{-1}$ over the study, increasing mean winter pH by 0.8–1.3 units to pH 5.6–6.1. Liming moorland streams in 1987 and 1988 increased mean pH to 5.5–6.4, but differences from naturally recovering streams diminished over 12–18 years.

In limed and acid moorland streams, changes in invertebrate composition were consistent with recovery, and near-identical. Four acid-sensitive species, from a local pool of 29, increased significantly in abundance or occurrence.

Mean H⁺ in acid forest streams declined by 8–15 $\mu\text{equiv.L}^{-1}$, but mean winter pH increased by only 0.4 units and remained too acid for invertebrate recovery. Climate affected the recovery pattern. After accounting for time trends, wet winters increased acidity in moorland and forest streams sufficiently to offset 21–41% of the total 25-year decrease in H⁺ concentration.

These data from one of the world's longest running experiments on acidification confirm that upland British streams are recovering, but ecological effects are marginal and vary with land use. Conifer forest streams at Llyn Brienne remain too acid for sensitive invertebrates, while moorland streams are still at risk from acid events. In this example, liming had few long-term benefits compared with natural recovery, and the authors suggest that natural recovery should be a key, general criterion in evaluating the outcomes of ecological restoration.

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C Westphal, I Steffan-Dewenter and T Tscharnke
Mass flowering oilseed rape improves early colony growth but not sexual reproduction of bumblebees
Journal of Applied Ecology 2009, **46**: 187-193

Pollination is a vital ecosystem service, which is endangered by the ongoing declines of pollinators including bumblebees *Bombus* spp., which are important generalist pollinators in agricultural landscapes. Most studies focussing on the conservation of bumblebees have investigated the effects of local flower-rich habitats on density and diversity. However, bumblebee densities do not necessarily correlate with the colonies' reproductive success (i.e. the presence or absence of males and/or queens).

The authors analysed the effects of oilseed rape *Brassica napus* on the growth and sexual reproduction of *Bombus terrestris* colonies. Thirty-two young colonies were established and monitored in different resource environments represented by 16 landscapes with large or small amounts of oilseed rape. As an indicator of colony growth, weight gain was used, which was strongly correlated with the numbers of brood cells in the colonies.

The colonies gained significantly more weight in study areas with large amounts of oilseed rape particularly during early colony stages but they did not reproduce more successfully. The frequencies of colonies that produced males and/or queens did not differ between the two resource environments. This may be due to food plant scarcity later in the colony cycle. Conservation measures should enhance food plant availability in agricultural landscapes, particularly during the colony establishment in spring and the reproductive phase in mid- to late summer.

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J Krauss, T Alfert and I Steffan-Dewenter
Habitat area but not habitat age determines wild bee richness in limestone quarries
Journal of Applied Ecology 2009, **46**: 194-202

Limestone quarries can act as important secondary habitats for a range of endangered wild bee species. However, the relative influence of quarry habitat area, habitat age and within-habitat diversity on the conservation value of these secondary habitats is mainly unknown.

The authors assessed species richness and abundance of wild bees by variable transect walks in 24 limestone quarries ranging in size from 0.01 to 21.2 ha. Species traits such as social status, resource specialization and nesting substrate were used to define functional guilds of bees.

41% of all wild bee species known from southern Lower Saxony, Germany, were found in the quarries. Total species richness increased with habitat area but not with habitat age even over an age range of over 120 years. Solitary species were more strongly affected by decreasing habitat area than social species but response did not differ with respect to habitat age.

Maintenance and management of secondary succession of these sites should be given high priority in species conservation plans and operations such as filling or flooding such quarries should be prevented.

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A Bischoff, G Warthemann and S Klotz
Succession of floodplain grasslands following reduction in land use intensity: the importance of environmental conditions, management and dispersal
Journal of Applied Ecology 2009, **46**: 241-249

Classical ecological theory predicts a succession towards plant communities that are determined by environmental conditions. However, in ecological restoration, species composition often remains different from the predicted target community, compromising the success of restoration measures.

The authors analysed the relative importance of environmental conditions, management and distance to source populations for floodplain grassland succession following re-conversion from intensive to traditional use. The study was established at 33 grassland sites in central German river valleys.

The species composition of the successional grassland was mainly determined by elevation, total soil nitrogen, distance to remnant species-rich grasslands and frequency of mowing or grazing. Elevation and distance were negatively, and frequency was positively related to the occurrence of late successional species.

Colonization by the indicator species pepper saxifrage *Silau silaus* and saw-wort *Serratula tinctoria*, was dependent on the distance to source populations and was slow, reaching only 40 m and 15 m after 15 years. Thus natural colonization will only be successful if source populations of the target species are adjacent to the restoration sites. Artificial introduction techniques are recommended to overcome dispersal barriers.

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C Vanpé et al.
Access to mates in a territorial ungulate is determined by the size of a male's territory, but not by its habitat quality
Journal of Animal Ecology 2009, **78**: 42-51

Territoriality is commonly associated with resource defence polygyny, where males are expected to gain access to females by anticipating how resources will influence female distribution and competing for resource-rich sites to establish their zone of dominance.

This hypothesis was tested in European roe deer *Capreolus capreolus* by simultaneously assessing the influence of resources on female distribution and the influence of female distribution on male distribution and breeding success using paternity analyses.

Females did not fully distribute themselves among male territories in relation to resources. As a result, relative female abundance in a male's territory depended on territory size, but not on its habitat quality. In turn, relative female abundance in a male's territory determined, at least partially, his breeding success.

Male territory size, and hence access to females, was partly determined by male body mass (all males) and by residual antler size (subadults only). This suggests that large antlers may be important to young males for establishing their first territory, which is then usually retained for all subsequent reproductive seasons.

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G Eichhorn *et al.*

Skipping the Baltic: the emergence of a dichotomy of alternative spring migration strategies in Russian barnacle geese

Journal of Animal Ecology 2009, **78**: 63-72

Since the early 1990s, an increasing proportion of barnacle geese *Branta leucopsis* bound for breeding sites in the Russian Arctic delay their departure from the wintering quarters in the Wadden Sea by four weeks. These late-migrating geese skip spring stopover sites in the Baltic traditionally used by the entire population.

Individual geese from an arctic colony tracked by satellite or light-level geolocators during spring migration in 2004 and 2005 predominantly followed the new strategy, but a minority still maintained the traditional pattern. Despite a spread of more than 50 days in departure date from the Wadden Sea, both early and late departing females laid their eggs within the same short time-window.

The spread of these new migration routines coincided with a strong increase of overall numbers and the exploitation of new spring staging resources in the Wadden Sea. Counts from Estonia demonstrate that numbers have levelled off recently at the Baltic staging sites, suggesting that the capacity of these staging sites in spring has been reached. Although onset of spring affects migratory timing in barnacle geese, it cannot explain the observed delay in departure from the wintering grounds.

The authors suggest that the new migratory strategy has evolved in response to increased competition for food at spring staging sites in the Baltic. According to an analytical model of optimal migration, the geese should skip the Baltic whenever the energy deposition rate falls below 88% of the Wadden Sea value.

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C Both *et al.*

Climate change and unequal phenological changes across four trophic levels: constraints or adaptations?

Journal of Animal Ecology 2009, **78**: 73-83

Climate change has been shown to affect the phenology of many organisms, but these shifts are often unequal across trophic levels, causing a mismatch between the phenology of organisms and their food.

In a long-term study, the authors showed that between 1988 and 2005, budburst advanced (0.17 d.yr^{-1}), while between 1985 and 2005 both caterpillars (0.75 d.yr^{-1}) and the hatching date of the passerine species (range for four species: $0.36\text{-}0.50 \text{ d.yr}^{-1}$) have advanced, whereas raptor hatching dates showed no trend.

The caterpillar peak date was closely correlated with budburst date, as were the passerine hatching dates with the peak caterpillar biomass date. Hatching dates for the avian predator were not correlated with the peak availability of fledgling passerines. As a result, the match between food demand and availability deteriorated over time for both the passerines and the avian predators.

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F B Kraus, S Wolf and R F A Moritz

Male flight distance and population substructure in the bumblebee *Bombus terrestris*

Journal of Animal Ecology 2009, **78**: 247-252

Bumblebees are important pollinators in natural as well as agricultural ecosystems. Estimates of foraging range, population size and genetic population structure so far have been based on worker samples alone. The authors included both males and workers in a population genetic analysis to infer the contribution of males to these important ecological parameters.

There was a significant genetic subdifferentiation between the male and the worker population. Based on the colony numbers, they estimated the flight range of males, which ranged from 2.6 km to 9.9 km, much further than worker flight ranges. Bumblebee-mediated pollen flow will therefore be much further than expected based on the foraging range of workers alone if males also contribute to pollination.

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H Jacquemyn *et al.*

Flora of the British Isles

Biological Flora of the British Isles: *Orchis mascula* (L.) L.

Journal of Ecology 2009, **97**: 360-377

The main topics are presented within the framework of the Biological Flora of the British Isles: distribution, habitat, communities, responses to biotic factors, responses to environment, structure and physiology, phenology, floral and seed characteristics, herbivores and disease, history and conservation.

As in most other European countries, *Orchis mascula* (L.) L. (early purple orchid) has declined in the British Isles, although it is not at threat of extinction at a national level. Most sites from which it has been lost are in central England and Scotland. Most losses have been caused by woodland clearance and coniferization, intensification of grassland management and ploughing. The cessation of traditional coppicing practices has also led to a decline. Since the species is slow to colonize new forest stands or grasslands, management should focus mainly on conservation of ancient forest habitats and grasslands in which fertility is moderate to low and grazing is absent or low in intensity. Restoration of traditional coppicing practices could also lead to higher chances of the species flowering and surviving in the long-term.

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B Arroyo *et al.*

Hunting habitat selection by hen harriers on moorland: Implications for conservation management

Biological Conservation 2009, **142**: 586-596

The authors examined habitat used by hunting hen harriers *Circus cyaneus* at three study sites in Scotland to find out if foraging patterns differ between sexes, sites, and stages of the breeding period. They modelled time spent hunting in focal plots as a function of habitat and nest proximity. They found that male hunting intensity (time spent hunting per hour of observation and km^2) varied between sites and breeding periods, being lower during the nestling than the incubation period. Habitat use patterns were mostly consistent between study sites, which is important for developing species management recommendations applicable over the species' range. Males avoided improved grassland, and selected areas of mixed heather and rough grass. The effect of nest proximity was small. In contrast, the authors found that females hunted mainly within 300-500 m of the nest, with a small additive effect of vegetation cover, preferring areas of fragmented heather. Habitat management to benefit foraging harriers will involve creating (or maintaining) mosaics of heather-grassland around nest areas. It might also be possible to manipulate habitat to reduce conflict in areas where harrier predation on red grouse is

important. However, it would be necessary to test whether these manipulations might also influence harrier nest distribution.

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Z G Davies *et al.*

A national scale inventory of resource provision for biodiversity within domestic gardens

Biological Conservation 2009, **142**: 761-771

People are increasingly disconnected from nature due to urbanisation. To counteract this, the UK government has been actively promoting wildlife gardening. However, the extent to which activities are conducted and the level of resource provision for biodiversity (e.g. food and nesting sites) within domestic gardens remains poorly documented. The authors generated estimates for a selection of key resources provided within gardens across the UK. They estimate that 22.7 million households (87% of homes) have access to a garden and the average garden size is 190 m², extrapolating to a total area of 432,924 ha. Although substantial, this coverage is still considerably less than that of statutory protected areas. Approximately 12.6 million (48%) households provide supplementary food for birds. Gardens also contain 2.5-3.5 million ponds and 28.7 million trees, which is just under a quarter of all trees occurring outside woodlands. The important contribution domestic gardens make to green space infrastructure in residential areas must be acknowledged, as their loss will impact biodiversity conservation, ecosystem services, and the well-being of the human population.

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L A Harrington *et al.*

American mink control on inland rivers in southern England: An experimental test of a model strategy

Biological Conservation 2009, **142**: 839-849

The authors used a large-scale field experiment to test the effectiveness of a specified mink removal strategy, identified through earlier modelling work, in reducing the relative abundance of mink. They found that mink removal could be effective in reducing mink populations with four months or less of trapping per year, over only 2-3 years, but that for small sites (c. 20 km) a flexible, reactive approach, coupled with continual monitoring for mink presence is necessary. Survival of reintroduced water voles at four sub-sites within their mink removal sites suggested that the reactive mink removal strategy adopted in this study was sufficient for water vole protection.

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M D Callier *et al.*

Macrofaunal community responses to marine-related pollution on the south coast of England and west coast of France

Journal of the Marine Biological Association of the United Kingdom 2009, **89**: 19-29

In recent years, the increase in the use of coastal waters for recreation has led to a growing number of marinas and the concerns about their environmental impacts. Although marinas may act as an artificial reef, increasing habitat complexity, environmental patchiness and biological colonisation, they also pose a risk of invasive species introduction through the ballast waters or fixed on the hulls of the boats moored in them. A bigger concern however, is the accumulation of contaminants that is potentially very high in marinas. Of all the pollutants associated with marina-related activities, trace metals are the most important.

The aim of this study was to investigate the effects of perturbation arising from two marinas: Southsea Marina on the south coast of England and Minimes Marina on the Atlantic coast of France. Overall, it was found that trace metal concentrations were greater in Southsea Marina compared to Minimes. This could be explained by the lower boat density at Minimes, its

larger entrance and the dredging activities. From their other studies, both marinas show that they are having an impact on the benthic communities, particularly due to the high level of contaminants in the inner basins. The variations in both marinas show that there is a need for each individual marina to be assessed to better determine the environmental impacts on the benthic environment.

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M K S Lilley, J D R Houghton and G C Hays

Distribution, extent of inter-annual variability and diet of the bloom-forming jellyfish *Rhizostoma* in European waters

Journal of the Marine Biological Association of the United Kingdom 2009, **89**: 39-48

There is increasing evidence that a combination of climatic factors and human induced change within the marine environment is increasing the prominence of jellyfish abundance worldwide. However, fundamental knowledge of their distribution and inter-annual variability is lacking. *Rhizostoma* is a known large bloom forming jellyfish in Northern Europe.

The data, collated from studying historical reports, local and national newspaper archives and aerial survey data, revealed distinct hotspots where regular *Rhizostoma* blooms appeared to form, with other sites characterised by occasional abundances and a widespread distribution of infrequent observations. The particular physical, climatic and dietary variation conditions are not always clear but most commonly the areas of high bloom tend to be semi-enclosed areas that receive substantial freshwater and nutrient input from rivers.

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C D Trowbridge and W F Farnham

Regional comparisons of *Codium* (Chlorophyta) assemblages in the northern versus southern English Channel

Journal of the Marine Biological Association of the United Kingdom 2009, **89**: 255-268

Alien species of fish, algae and invertebrates are becoming more important components and interactors in marine communities. In some cases non-indigenous species (NIS) are detected by functional changes in species interactions. The spread of NIS is visually obvious, similar to the establishment of the brown alga *Sargassum muticum*. The incursion of NIS can be particularly cryptic, especially when they are similar, morphologically, to resident species. An important example of such cryptic invaders is the Asian green macroalga *Codium fragile*, originating from Japan, which has appeared on temperate shores worldwide. The first recognised record for the British Isles was 1939 in Devon. During the 20th century, *Codium fragile* proliferated on north-western and north-eastern Atlantic shores.

This study surveyed three major regions of north-eastern Atlantic shores: the mainland of southern England, the Isle of Wight and the Channel Islands. Surveys were carried out on the intertidal rock pools emergent substrata for the invasive *Codium fragile* and native congeners at 38 sites in the target region.

At most sites surveyed in the UK and Channel Islands, native *Codium* spp. were equally or more abundant than the invasive *Codium fragile*. Differential oceanographic conditions might account for the cross-channel differences in *Codium* assemblages. Overall, simplistic explanations of algal distributional constraints are not easy. Past accounts have recorded anthropogenic effects, ecological interactions or alternative oceanographic explanations such as tidal patterns, tidal ranges and tidal streams.

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News in Brief

Crimes Against Bats

In 2001 the Bat Conservation Trust (BCT) embarked on a project to collect data on crimes against bats in the UK. The information gathered shows that, despite legal protection, crimes against bats are still occurring at an alarming rate. Building development and maintenance accounts for two thirds of bat crime incidents, with three quarters of reported incidents taking place at bat roosts. The results of this project have led to bats being added to the police wildlife crime priority list in 2004 and the conservation of bats and offences against them is now a priority of the Partnership Against Wildlife Crime for 2009.

Defra Draft Guidance

Defra has published new draft guidance on *SSSIs and National Nature Reserves in the subtidal area*. The draft guidance explains how the Marine and Coastal Access Bill amends the Wildlife and Countryside Act 1981 to clarify the seaward boundaries for Sites of Special Scientific Interest (SSSIs) and National Nature Reserves, and their relationship with MCZs. In addition to this, Defra has also published a revised version of *Selection and designation of Marine Conservation Zones*. Both sets of guidance are available from the Defra website at www.defra.gov.uk/marine/biodiversity/marine-bill/guidance.htm. Defra expects to produce a further iteration of the draft guidance during the summer, to take account of comments and any changes to the Marine and Coastal Access Bill as it progresses through Parliament.

National Parks – Bigger and Better?

Natural England has announced that it will re-start its work on identifying possible extensions to the Yorkshire Dales and Lake District National Parks. Work by Natural England has shown that there are large areas between the Yorkshire Dales and Lake District National Parks that are worthy of landscape protection and could be candidates for National Park status. Areas such as the Howgill Fells, the Orton Fells and the fells from Shap to Whinell, are among several very special landscapes in the area that people recognise and value, but that are not formally protected at national level.

New Project to Protect Wildcats

The Cairngorms Wildcat Project has been launched with the aim of giving the endangered Scottish wildcat greater protection. About 400 pure-breds are thought to be left, with their survival threatened by cross-breeding with domestic cats. The project involves raising awareness, neutering feral domestic cats and 'wildcat-friendly' predator control. The Cairngorms National Park (which is seen as a stronghold for the species), Forestry Commission Scotland, the Highland Wildlife Park's owners the Royal Zoological Society of Scotland, the Scottish Gamekeepers Association and Scottish Natural Heritage are involved in the new project.

Large Wind Farm Project Under Way

Work is under way off the east coast of England to build 48 wind turbines to generate electricity as part of a government bid to meet renewable energy targets. The £420 million project at Gunfleet Sands, off Clacton, is designed to provide 20% of the electricity needs of Essex. Foundations have been driven in to the sea bed for the 48 turbines, four and a half miles offshore. Attempts to increase renewable power generation have been hit by the credit crunch but at Gunfleet Sands all the funding is in place and it is due to be completed next year.

Bat Conservation Ireland Surveys 2009

Members in Ireland may be interested in participating in a variety of Bat Conservation Ireland monitoring surveys - these include brown long-eared monitoring, the All Ireland Daubenton's

Bat Waterways Survey and the BATLAS 2010 project. Please contact Bat Conservation Ireland for more information (www.batconservationireland.org).

Orchid Ireland Survey

The Orchid Ireland Survey is a four-year project, which aims to update our knowledge on the status and distribution of native orchid species on the island of Ireland. The active participation of all botanical recorders, orchid enthusiasts and naturalists is needed to make this a success. Recorders are encouraged to submit detailed information of their sightings. To help recorders, a series of field based training courses in orchid identification will be held and a specially written book to aid field identification, plus project recording cards, are currently being published. Further information is available from Dr Damian McFerran (damian.mcferran@nmni.com).

Wildlife Manuals for Ireland

Irish Wildlife Manuals is a series of contract reports relating to the conservation management of habitats and species in Ireland. The volumes are published on an irregular basis by the National Parks and Wildlife Service. For more information visit www.npws.ie/en/PublicationsLiterature/IrishWildlifeManuals.

60 Years: National Parks and Access to the Countryside Act

This year we celebrate 60 years since the National Parks and Access to the Countryside Act 1949, which led to the creation of National Parks and Areas of Outstanding Natural Beauty. During National Parks Week, from 27 July to 2 August, there will be many special events to enjoy the past, present and future of all the National Parks. See your local National Park website for more information.



Providing Excessive Mitigation or Compensation for a Mitigation Licence

Natural England is aware that some ecologists and applicants believe that by proposing excessive mitigation and compensation it will help secure a great crested newt mitigation licence more quickly. This is not true. Natural England expects proposed mitigation and compensation to be proportionate to the impacts of the planned works on the great crested newt population. This should be sufficient to offset the damaging effects of the project. Any additional mitigation or compensation is welcome, but crucially these additional proposals will not make up for shortcomings in the licence application. Ecologists should be mitigating against the effects the planned works may have on the population, and not simply to try to obtain a licence. More information at www.naturalengland.org.uk/ourwork/regulation/wildlife/default.aspx.

Listen Out for Corncrakes

Corncrakes have begun to return to the UK and the National Corncrake Survey hopes to establish whether the recovery of corncrake in Britain continues into 2009 and also to find out if the species has managed to extend its range beyond the main core area of the Hebridean islands. The public will be able to call in on special hotline numbers to submit their records of

the species. However, corncrakes are difficult to survey, and the best method for identifying them is by listening for the distinctive 'crek crek' call given by singing males. The birds are particularly vocal throughout June, especially during the night. Anyone who hears a corncrake calling is urged to call: 01767 680551 (England and Wales), 0131 311 6500 (Scotland), or 028 9049 1547 (Northern Ireland).

TEEB Phase II

Phase II of *The Economics of Ecosystems and Biodiversity* (TEEB) aims to develop and apply the framework presented in the TEEB Interim Report. This second phase specifically targets national and local level policy makers, businesses and consumers. Interested stakeholders are requested to submit evidence on the economic consequences of biodiversity loss. Evidence can be submitted until 31 August 2009. For more information visit http://ec.europa.eu/environment/nature/call_evidence.htm.

LIFE+ 2009 Call for Proposals and Information Workshops

On 15 May 2009 the European Commission published the 2009 call for LIFE+ proposals. It has also published a list of information workshop dates. More information at <http://ec.europa.eu/environment/life>.

MEPs Ban Seal Products

The European Parliament has voted to ban imports of seal products, which come mainly from Norway and Canada. The European Commission had proposed a partial ban coupled with clear labelling of products to show that they contain culled seals, but the European Parliament said this was not enough. Inuit communities in the Arctic will be exempt from the new rules and the marketing of seal products would still be allowed from 'hunts traditionally conducted by Inuit and other indigenous communities and which contribute to their subsistence'.

Unite Invasive Alien Species Management in Europe

Recent evidence suggests that Europe is home to more than 11,000 alien species. A new study summarises available information in this area and proposes that Europe unites its fragmented activities by establishing a single body to manage this ever-increasing problem more effectively. The European Commission has released a Communication that proposes the development of a European Strategy on Invasive Species. It outlines different policy options for tackling the problem in terms of adapting and better use of existing legislation as well as creating new legislation. For more information see http://ec.europa.eu/environment/nature/invasivealien/index_en.htm.

Portuguese Men o'War in the Mediterranean Sea

Swept by westerly winds through the Gibraltar Strait from their north Atlantic habitat, Portuguese Men o'War *Physalia physalis* have been sighted off Spain's favourite beaches for the first time in 10 years. Men o' War are propelled by currents and winds and if these head inland, the species end up on the coast. Colonies of Portuguese Man o' War resembling a sea of plastic bags have been sighted off the Cabo de Gata, the rugged Andalusian coastline near Almeria, and along the Costa del Sol between Cadiz and Malaga. The creature's trailing tentacles carry a potentially lethal poison, 10 times stronger than an ordinary jellyfish.

Call for UK to Create a World Marine Park

The Chagos Conservation Trust has launched a booklet, *The Chagos Archipelago: Its nature and the future*, to start a discussion on a programme 'to create one of the world's greatest conservation areas' in the little-known British Indian Ocean Territory. The archipelago, a UK Overseas Territory in the central Indian Ocean, is described by scientists as comparable with the Galapagos Islands or the Great Barrier Reef in environmental and scientific importance. The Chagos

Conservation Trust set out the 'preliminary proposals for discussion' in the booklet and an accompanying paper, *Science in Chagos*, with a launch at the Royal Society. Drawing on best practice from other sites, the aims are to protect nature (including fish stocks), to benefit science, to support action against damaging climate change, to be compatible with security and be financially sustainable, and to provide employment opportunities. The Trust points out that the British Government has for many years already committed itself to managing the territory as if it were a natural World Heritage Site and has taken significant measures to put this into effect.

Local Participation in Biodiversity Monitoring

Monitoring species and habitats is essential to sustain biodiversity. A recent Danish study published in *Conservation Biology* has classified different monitoring schemes based on levels of community participation. The classifications could help conservation leaders identify the most appropriate schemes for different situations. Maintaining biodiversity is an important goal of European environmental policy and the EU is a contracting party to the CBD. Developed countries routinely monitor the status of species or habitats. However, less monitoring takes place in developing countries, largely because they receive less state funding. International environmental agreements require participants to monitor their natural resources, but there is no system to guide countries on how to develop these schemes. The study proposes five categories of monitoring schemes, defined by levels of participation in the local community. They suggest that conventional scientific accuracy tends to increase with greater involvement of professional researchers, as does the capacity to inform national and international monitoring schemes. On the other hand, more local involvement reduces costs and speeds up decisions about the recommendations that arise from the monitoring results.

Polish Wildlife Exhibition in London

We are all aware of the significant biodiversity in central and eastern Europe so those close to London might like to visit a superb photographic exhibition on the wildlife of Poland. It is on the South Bank east of Waterloo Bridge but Irish members may have already seen it in Dublin. The photographs are by Artur Tabor and the exhibition is staged by the Wild Poland Foundation. For more information please visit www.wildpoland.org.

Southern Glaciers Grow Out of Step with North

The vast majority of the world's glaciers are retreating as the planet gets warmer. But a few, including ones south of the equator, in South America and New Zealand, are inching forward. A new study in *Science* shows that for the last 7,000 years New Zealand's largest glaciers have often moved out of step with glaciers in the northern hemisphere, pointing to strong regional variations in climate.

Risk Managers Could Learn From Ecology

A senior Bank of England official has said that financial risk management and regulation should cast aside many elements of traditional finance theory and learn lessons from ecology, the spread of diseases, biology and engineering. The official has said that studying the ecology of rainforests and fish stocks was needed because other disciplines had a more advanced understanding of complex networks. He said that the panic and system-wide collapse in the face of a 'relatively modest' shock would have been easier to predict had much of the theory of finance not been lagging behind ecology by a generation.

Tauro-Scatology and Celebrity Ecology

This issue of *In Practice* sees our special correspondent meeting Basil O'Saurus, our very own Professor of Tauro-Scatology, somewhere in the media heartland of central London.

You're looking very smart today, Prof, in your sharp suit, black, open-necked shirt and designer shades. Hardly typical attire for an environmental consultant, is it?

Not yet, but who knows how we might dress, once I've changed our public image.

So, how are you going to do that? And why are we standing in Wardour Street?

One question at a time, please. We're in Soho because I've just pitched an idea for a new primetime television series to an independent production company. Think, for a moment, how many professions have been glamourised in television series – how many kids wanted to be forensic scientists before *CSI* came on air? Think about how *Bonekickers* tried to glamourise archaeology. *Silent Witness*, *Casualty*, *Spooks*, *Cracker* - the list goes on and on. And they all have two things in common.

What's that?

An unusually high proportion of attractive, sharply-dressed practitioners compared to the real-life profession, and an ability to solve even complex problems within an hour. Less, if they are on a commercial channel, as we're always being diverted by adverts.

But no-one, yet, has made a television series about environmental professionals. I was sitting in the back row of the Spring Conference on Wildlife Crime, and suddenly I had the idea. The scriptwriters will invent a government agency that sounds vaguely plausible – *Wildlife Investigation Team* sounds good – and set them a task every week.

Pitch it to me, Prof.

Imagine the scene: a glamorous, Prada-dressed environmental consultant and her impossibly-handsome, Versace-suited colleague, driving their Audi convertible down country lanes, and standing by devastated badger setts with the wind blowing gently through their perfect hair, barely a smudge on her Manolo Blahniks or his Gucci loafers, brows furrowed in concentration as they wonder who could have committed this heinous crime...

...an average day for most IEEM members, in other words...

Not quite. Because this group of public servants never ever sit around and bitch about the upcoming, or ongoing, or recently-completed, re-organisation.

A TV series with no sense of realism, in other words. But carry on with your plot synopsis...

We then stir in a couple of remarkable coincidences that get us close to a suspect in a country house straight off the cover of *Country Life*. The viewers know from the outset that the developer who lives here is a rogue because he wears some flashy body jewellery and something about him makes the viewer smell too much aftershave. He, of course, denies everything and has a good alibi, so we need to cut to the laboratory scene.

What's that?

One of our leads takes a sample of something – the viewer doesn't quite see what – and the scene shifts to a laboratory with lots of equipment with flashing lights and computer screens and a slim analyst clad in a laboratory coat that hugs the figure like no lab coat has ever hugged a body before, wearing heels like no-one who has ever worked in a laboratory for hours at a stretch would wear. She – it doesn't have to be a 'she' but in going for the middle-aged male demography and a lingerie shot in *GQ* may well boost our ratings – puts the sample into one of these complicated instruments. She then furrows her brow (essential... bearing in mind my blatantly sexist agenda outlined above – it means *GQ* can describe her as 'thinking men's crumpet') and gives our protagonist a vital, alibi-busting clue.

At this stage, does anyone ask about the uncertainty associated with the analysis or mention words like 'replication' or 'contamination'? Or 'PACE' or 'chains of custody'?

You could try that on our scriptwriter, but he'll probably furrow his brow (there's a lot of this about) and say that he'd love to increase the scientific veracity of the storyline but he has to edit ruthlessly to make it fit into an hour. Anyway, back to the plot... at some point during the next 20 minutes, our glamorous female environmental scientist needs to reveal just a little more cleavage than is usual for an IEEM member in the course of her daily work, after which we need a car chase before our rogue developer is cornered, confronted with the evidence and admits to being the sett-disrupter.

Sounds good. What will happen?

Applications for environmental science and ecology courses will rocket. And, there's even a chance of selling the idea to a US television company, in which case we get even more glamorous protagonists, at least one of whom wears a shoulder holster.

...and then the backlash starts...

Something like that. An IEEM member is interviewed on *Women's Hour* and says that real life is not all like *Wildlife Investigation Team*, then a rival TV company commissions a fly-on-the-wall documentary about ecologists. The unit that is the focus of this series includes at least one 'personality'...

...the quotation marks are significant here...

...who develops a sideline opening supermarkets at the weekend and who crops up on *Celebrity Big Brother* two years later with what appear to be surgically-enhanced breasts...

All plausible and one dreadful implication...

What's that?

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Our clients work in various sectors from power and renewables, to property, defence, regeneration, transport and utilities. Our work includes Ecological Impact Assessments (often as part of EIAs), advising clients on protected species issues and on how to take account of ecology in their activities, habitat management planning, habitat and species surveys, and biodiversity policy studies. You will be a competent and experienced field naturalist with a track record in ecological impact assessment, protected species mitigation and habitat management.

You must be able to show that you can devise and implement creative and practical ways of addressing nature

conservation issues in relation to development projects such as wind farms; transport projects; regeneration and property etc and you must have good report writing skills.

You will have a relevant ecological or environmental degree and typically we would expect someone to have around 7 years' relevant experience to have the skills and knowledge to be successful in this role, but depth and breadth rather than length of experience will be considered when making recruitment decisions. Candidates must also have a track record in managing a team and be competent at business development and winning work.

Appointment will also be considered at Associate Director grade for more experienced candidates. For further information on this vacancy or to apply, please visit www.entecuk.com (Planning and Environmental Appraisal). Applications can be made on-line or by contacting the Recruitment team directly at recruit@entecuk.co.uk or (0191) 272 6386.

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How should I apply?

We welcome applicants with proven ability in senior level consultancy or demonstrable non consultancy ecological experience. Please give us a call for more information 01865 883833 or visit www.bsg-ecology.com



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To find out more about this unique opportunity, telephone Michael Woods on

07778.496872 or send an e-mail for further details to michael@michaelwoodsassociates.co.uk

Closing date for applications: 26 June 2009.



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Pine Marten Conservation Ecology Training

Dates: 14/15 October 2009
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 Trainers: Johnny Birks (Swift Ecology) and John Martin (Myotismart)
 Location: Galloway Forest, south-west Scotland

Galloway Forest has been the focus of much recent research on this enchanting mammal, which has been recently added to the national BAP list. Artificial den boxes within the forest have been utilised by pine martens for several years.

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Lisa Kerslake lisa.kerslake@swiftteology.co.uk or call 01926 642541

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New and Prospective Members

APPLICANTS

If any existing Member has any good reason to object to someone being admitted to the Institute, especially if this relates to compliance with the Code of Professional Conduct, they must inform the Executive Director by telephone or letter before **10 July 2009**. Any communications will be handled discreetly. The decision on admission is usually taken by the Membership Admissions Committee under delegated authority from Council but may be taken directly by Council itself. IEEM is pleased to welcome applications for Membership from the following:

APPLICATIONS FOR FULL MEMBERSHIP

Ms Joanne Allen-Hamilton, Miss Frances V Attwood, Ms Annemarie Greenwood, Dr Eleanor J Hewins, Dr Hugh A Knott, Mr Andrew May, Mr Paul Moorhouse, Mrs Susan Morgan, Mr Richard Mundy, Mr Steven J Peters, Mrs Frances Randerson, Mr Garry Riddoch, Dr Odette Robson, Dr Duncan Sivell, Miss Jennifer R Trendall, Dr David T Tudor, Mr Denis J Vickers

APPLICATIONS FOR ASSOCIATE MEMBERSHIP

Ms Diane Armitage, Mrs Sarah R Candlin, Ms Marie-Ange Chevrier, Dr Sergiu Cristofor, Miss Sinead Lynch, Prof Carmen Postolache, Miss Rachel E Price, Prof Angheluta Vadineanu

ADMISSIONS

IEEM is very pleased to welcome the following new Members:

FULL MEMBERS

Miss Rebecca Bohane, Mr John A Bayley, Ms Louise Bond, Ms Julie K Bowen, Miss Rachael J Brady, Dr Simone K Bullion, Mr Colin Bundy, Dr Katharine R Cole, Mr Jeremy G Crompton, Mr Gavin Eaton, Ms Hanna Etherington, Mr Joshua QZ Evans, Dr Kerry Evans, Ms Sinead Gavin, Dr Joanna Girvan, Mr Geoff Hamilton, Ms Victoria Hughes, Ms Sarah Jennings, Dr Grant H Jones, Mr Alexander McLauchlan, Mr William R Meek, Dr Ian B Oldham, Mrs Lisa Roberts, Mr Craig Rockliff, Mr Alan Ross, Mrs Colette Sales, Miss Rosalind F Salter, Mr Andy R Swan, Ms Andrea Taylor, Miss Kelly Thomas, Mr Matthew J Thomas, Mr Stuart G Thomas, Miss Lisa M Wade, Mr Robin M Ward

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Mr Ross Ahmed, Mr Stephen V Atkins, Mr Christopher J Barker, Mr Tom Collins, Mr James O'Donoghue, Mr Reginald Ord, Mr Trevor Ord, Mr Richard K Sloman, Mr Phil Watkins

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UPGRADES

The following have successfully upgraded their Membership:

UPGRADES to FULL MEMBERSHIP

Miss Elaine Austin, Mr Alistair Blackshaw, Mr Scott Cafferty, Mr Trevor D Codlin, Mr Giles Coe, Dr Philip M Corney, Mrs Katie M Critchley, Mr Frank Daly, Mr Matthew Davies, Mr Adam Denard, Mrs Claire Denard, Miss Rebecca Dollery, Mr Benjamin M Driver, Miss Anna E Dudley, Mr Gavin Eaton, Dr Rachel A Freer, Miss Stephanie Gadal, Mr Christopher J Gaughan, Miss Emily Greenall, Dr Caroline Gregory, Miss Lorna I Harris, Miss Laura M Hicks, Miss Jenette Howard, Mr Patrick Howard, Miss Kate E Hunt, Miss Susan M Jones, Mr Ben Kimpton, Mr Robert Masters, Mr Thomas McArthur, Mr William G Miles, Mr Stuart D Moodie, Miss Kim A Olliver, Miss Helen M Parish, Mr David A Parsons, Miss Huma Pearce, Mr Tom M Reynolds, Mr Brady Roberts, Mr Lyndon F Roberts, Miss Nadine A Rolls, Miss Claire A Rogers, Miss Betsabe Sanchez, Dr Charlotte E Sanderson, Miss Laura J Sanderson, Dr Holly Smith, Mr Timothy J Smith, Miss Rebecca White, Mr I William Woodrow

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UPGRADES to GRADUATE MEMBERSHIP

Mr John F Ankers, Mr Jonathan P Byrd, Miss Lucy E Clarke, Miss Klare Holland, Mr David Norfolk, Miss Amy L Roberts, Mrs Joanna C Shipton, Miss Theresa Stewart, Mr Nicholas White

Forthcoming Events in 2009

IEEM Conferences

DATE	EVENT	LOCATION
16 - 17 September	IEEM/FBA Conference – The Future of Freshwaters	University of Warwick
17 September	Scottish Section Conference and AGM - Species reintroductions: philosophy, issues and implications (Site visit - beaver reintroduction site in Knapdale)	Cairnbaan Hotel, near Lochgilphead, Argyll
10 - 12 November	IEEM Annual Conference and AGM - Protected Areas	Center Parcs, Suffolk

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

IEEM Training Workshops

24 June	Bumblebee Identification and Ecology	East of England
24 June	Identification of Grasses	Scotland
1 July	Lake Survey Techniques	Scotland
8 July	Invasive and Non Native Plants	Wales
9 July	Rare Arable Flora	Yorkshire and the Humber
16 - 17 July	The History, Ecology and Management of the European Beaver	South West England
20 - 22 July	Working with Crayfish - Stage II	Yorkshire and the Humber
4 August	Sedges for NVC in the Field	North East England
7 - 9 August	Working with Crayfish - Stage I	Yorkshire and the Humber
1 September	Using a Vegetative Key	South East England
2 - 4 September	Working with Crayfish - Stage II	Yorkshire and the Humber
3 September	Freshwater Invertebrates Identification and Survey Skills	West Midlands
8 September	Identifying Fungi	Scotland
8 September	Can Modern Intensive Farming and Farmland Birds Co-exist?	East of England
9 September	Practical Action for Water Voles	East of England
10 September	Survey and Identification: Upland Heath and Blanket Mire Flora	North West England
14 September	Macro-fungi Identification	South West England
15 September	Hazel Dormouse Ecology and Conservation	South West England
15 September	Are you Compliant with the NERC Biodiversity Duty?	East Midlands
16 September	Phase I Habitat Survey	East of England
17 September	Pipelines and Ecological Issues	Yorkshire and the Humber
22 September	Identifying Fungi	Scotland
28 September	An Introduction to Bat Survey, Impacts and Mitigation	Scotland

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

IEEM Section Events

24 June	Yorkshire and Humber Section Event - Grazing in Action	Low Carr Farm, Pickering
7 July	North East England Section Event - Field meeting on mitigation for the Great Crested Newt	Newton Aycliffe Industrial Estate
16 July	North West England and West Midlands Sections Joint Event - Restoration of lowland heath and other habitats to safeguard the Silver Studded Blue butterfly	Prees Heath Common Reserve, near Whitchurch, Shropshire
22 July	Yorkshire and Humber Section Event - Demonstration of new information portal for desk study searches	North and East Yorkshire Ecological Data Centre, York
14 October	Welsh Section Event - Biological data and ecological consultants: the role of the recording network in Wales	Intec, Parc Menai, Bangor, Gwynedd

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