

inpractice

Issue 83 | March 2014

Marine and Coastal Ecology

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Underwater Noise in
the Marine Environment

Intertidal Discovery Project

Digital Photography
and Biological Recording

Welcome

From the New Editor

Welcome to the March 2014 issue of *In Practice*. It is with great pleasure that I take this opportunity to introduce myself as your new Editor.

When I applied for the job, I was asked to submit a critique of *In Practice*. This was a bit daunting; I was familiar with the publication and I thought it was very good – that's one of the reasons I wanted to get involved. I talked to a number of members and wasn't surprised to hear that same view repeated again and again. Different people enjoyed different sections for different reasons and there were some great ideas for new things we might do but, overall, the message was simple: Jason has been doing an excellent job! Good for CIEEM but it didn't make the critique very easy to write.

Publishing, like environmental management, is changing rapidly with traditional publications challenged by digital media. People are busier than ever and have less time but ever-higher expectations. Different audiences want different things. There is a risk that printed publications are left behind, appear outdated and go unread.

This presents both challenges and opportunities for *In Practice* – to respond and adapt to the evolving needs of you, the members, whilst delivering value through diverse, useful, highly professional and engaging content.

The opportunities are many. With the rise of digital communication, *In Practice* is freed from the constraints of having to deliver everything that members need to know. Sitting within a broader communications strategy, *In Practice* can focus on content that is best delivered in print, distinct from what you receive via email or can find online. Importantly, there are many opportunities to add value and deliver coordinated membership support via a mix of web-hosted and printed media, supported by practical events.

In Practice is already well liked, with a nice balance of news, information and technical features. The ongoing challenge is to respond and adapt to different sectors of the membership whilst retaining those features that readers expect and rely on and that give *In Practice* its identity.

Printed publications have a longer gestation than digital content, again bringing both risks and opportunities. Although longer lead-in times mean that content and themes can be planned around future events – with opportunities for synergy – the challenge is to maintain topicality.

The special feature articles are well suited to print and this issue includes some thought-provoking material about the challenges of marine and coastal management whilst also raising awareness of some innovative approaches to gathering baseline data in this difficult environment. The next issue will focus on freshwater ecology and we look forward to some equally stimulating articles.

This issue also sees the introduction of a new 'Meet the Author' feature that aims to highlight some of the interesting stories behind the articles we publish, as well as giving an insight into the many twists and turns that careers in ecology and environmental management can sometimes take. I hope you enjoy the first 'interview' and I'd welcome your views on this or any other features that we publish – or indeed on any aspect of *In Practice*.

In Practice is a flagship of what the Institute stands for - an advertisement to the world of the high standards that CIEEM sets for ecological and environmental management. I am delighted to be part of the team, working alongside Jason and the Editorial Board to produce a publication that will give you an interesting, informative and entertaining read.

Gill Kerby

In Practice Editor

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Information

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Select Committee says Government must do more to protect biodiversity in Overseas Territories

The Environmental Audit Committee says that the UK Government is failing to adequately protect the globally significant biodiversity of the UK Overseas Territories (UKOTs), despite its international treaty commitments to protect those unique species and habitats.

<http://www.parliament.uk/business/committees/committees-a-z/commons-select/environmental-audit-committee/news/publication-of-ukots-report/>

Select Committee launch new inquiry on HS2 and the environment

The Environmental Audit Committee is launching an inquiry on environmental protection in Phase-I of HS2.

The Government produced an Environmental Impact Assessment and consulted on it between April and May 2012. This allowed it to publish a Draft Environmental Statement for consultation in May 2013, and a Final Environmental Statement (in 5 volumes) for consultation in November 2013 alongside an HS2 Hybrid Bill which allows the construction of the line and acquisition of the land needed.

<http://www.parliament.uk/business/committees/committees-a-z/commons-select/environmental-audit-committee/news/hs2-and-the-environment/>

National Wildlife Crime Unit funding secured for 2 more years

The UK Government has committed to funding the National Wildlife Crime Unit (NWCU) until 2016.

<http://www.cieem.net/news/167/national-wildlife-crime-unit-funding-secured-for-2-more-years>

Science and Technology Committee report on women in science

Despite clear imperatives and multiple initiatives to improve diversity in science, technology, engineering and mathematics (STEM), women still remain under-represented at senior levels across every discipline. There is no single explanation for the lack of gender diversity in STEM; it is the result of perceptions and biases combined with the impracticalities of combining a career with family. The Committee recommends that diversity and equality training should be provided to all STEM undergraduate and postgraduate students. It should also be mandatory for all members of recruitment and promotion panels and line managers.

<http://www.publications.parliament.uk/pa/cm201314/cmselect/cmsctech/701/701.pdf>

Potential impact of ash dieback on UK wildlife

A recently published scientific report has explored what might happen if Chalara infection and associated ash dieback led to widespread death of nearly all ash trees within the UK. It reports that it is likely that there would be a high negative impact on some populations of plant and animal species that use ash trees for feeding/breeding or as a habitat. The study, commissioned by the Joint Nature Conservation Committee (JNCC), has discovered that 1,058 species have an association with ash: 12 birds, 55 mammals, 78 vascular plants, 58 bryophytes (mosses, liverworts and hornworts), 68 fungi, 239 invertebrates, and 548 lichens. Of these, 44 (29 invertebrates, 11 fungi and 4 lichens) were found to only occur on ash trees, while a further 62 were described as 'highly associated' with ash and rarely found on other tree species. Besides identifying at-risk species, the report gives a preliminary assessment of tree species that could provide an alternative host for plant and animal species associated with ash.

<http://www.hutton.ac.uk/news/potential-impact-ash-dieback-uk-wildlife>

Law Commission publishes invasive non-native species report

The Law Commission has published its report *Wildlife Law: Control of Invasive Non-native Species*. This is the first item to be delivered from the Law Commission's Wildlife project, which is due to be completed in the autumn of 2014.

<http://lawcommission.justice.gov.uk/areas/wildlife.htm>

Tiny bat crosses the North Sea

A *Nathusius' pipistrelle* bat, ringed in the UK, has been found in the Netherlands, 600km from where it was ringed; providing the first record of a bat crossing the sea from the UK to mainland Europe. Bat experts in the Netherlands and the UK are working together to learn more about this remarkable journey and its implications for bat conservation and offshore windfarms.

http://www.bats.org.uk/news.php/233/tiny_bat_crosses_the_north_sea

BS8601 on Subsoil now published

BS 8601:2013 'Specification for subsoil and requirements for use' has now been published. BS 8601:2013 specifies requirements for the classification, composition and use of subsoils that are moved or traded for creating soil profiles intended to support plant growth.

<http://shop.bsigroup.com/ProductDetail/?pid=000000000030209662>

ALGE publish report on Ecological Capacity and Competence in English Planning Authorities

The Association of Local Government Ecologists (ALGE) has published 'Ecological Capacity and Competence in English Planning Authorities: What is needed to deliver statutory obligations for biodiversity?' The report shows that many local planning authorities do not currently have either the capacity and/or the competence to undertake the effective, and in some cases necessarily lawful, assessment of planning applications where biodiversity is a material consideration.

<http://www.cieem.net/news/158/alge-publish-report-on-ecological-capacity-and-competence-in-english-planning-authorities>

Literature review and analysis of the effectiveness of mitigation measures to address environmental impacts of linear transport infrastructure on protected species and habitats (NECR132)

Natural England is responsible for ensuring that England's unique natural environment, including its flora and fauna, land and seascapes, geology and soils are protected and improved. As the Government's statutory nature conservation adviser it is a statutory consultee in planning. Natural England commissioned this research to establish a strong evidence base for the advice it gives regarding environmental mitigation for linear transport schemes. The work focuses on mitigation used to ameliorate on-site impacts.

<http://publications.naturalengland.org.uk/publication/6184646404472832>

Updated Improvement Plan for planning and licensing published

Natural England has released the latest iteration of its regulatory improvement plan. The updated Improvement Plan document for Planning and Licensing recognises the wide-ranging scope of the regulatory role that Natural England has to play. The latest Plan contains information on the work Natural England is taking forward with the Environment Agency as part of the Triennial Review Action Plan; further information on our Single Voice engagement with Local Enterprise Partnerships and an update on a range of services and products that Natural England provide to developers and local authorities. Andrew Wood, Natural England director of science, evidence and advice, said considerable progress had been made since the initial Improvement Plan was approved in Autumn 2012.

<http://www.naturalengland.org.uk/ourwork/regulation/betterregulation/improvementplanjan2014updatefeature.aspx>

New warning system to find 'alien' invaders in Welsh seas

A new warning system is being developed that could reduce the damage caused to Welsh marine industries and native wildlife by non-native species in coastal waters. Early detection will also make attempts to eradicate invasive species easier as their numbers would not be as large or as widespread. The system will be developed in an 18 month project led by Natural Resources Wales in partnership with the School of Ocean Sciences at Bangor University.

<http://naturalresourceswales.gov.uk/our-work/news/133703/?lang=en#UwJeOoW8SBE>

Welsh Government Tree Health Strategy

The Welsh Government recently published its Tree Health Strategy. The key objective of the Strategy is to: 'Preserve the health and vitality of trees and woodlands in Wales through strategies which exclude, detect, and respond to, existing and new pests and pathogens of trees, whether of native or exotic origin. Take proactive measures to reduce the impact of pests and diseases on trees and woodlands in Wales.'

<http://wales.gov.uk/topics/environmentcountryside/forestry/documents/tree-health-strategy-wales/?lang=en>

Review of Scottish wild fisheries management

The Scottish Government has now asked outgoing Scottish Natural Heritage Chairman Andrew Thin to chair an independent review of wild fisheries management in Scotland. The aims of the review are to:

- Develop and promote a modern, evidence-based management system for wild fisheries fit for purpose in the 21st century and capable of responding to our changing environment.
- To manage, conserve and develop our wild fisheries to maximise the sustainable benefit of Scotland's wild fish resources to the country as a whole and particularly to rural areas.

<http://news.scotland.gov.uk/News/Review-of-wild-fisheries-management-83f.aspx>

Northern Ireland consultation on shorter, simpler planning policy

Environment Minister Mark Durkan has launched a consultation on shorter, simpler planning policy for the North. The Minister has announced a 12-week public consultation on the single Strategic Planning Policy Statement (SPPS), which consolidates over 20 separate planning policy statements into one. With regard to fracking, SPSS puts in black and white, for the first time, as policy, that there should be a presumption against the exploitation of fracking until the Department is satisfied that there is sufficient and robust evidence on all environmental impacts.

<http://www.northernireland.gov.uk/index/media-centre/news-departments/news-doe/news-doe-040214-durkan-unveils-shorter.htm>

Northern Ireland outlines steps to tackle changing climate

The Department of Environment has published Northern Ireland's first ever Climate Change Adaptation Programme. The Programme provides a cross departmental response to the potential risks and opportunities from our changing climate. The Climate Change Risk Assessment for Northern Ireland, which was published last year, provided an assessment of the risks to Northern Ireland of the current and predicted impacts of climate change. The Risk Assessment identified flooding as one of the priority climate change risks facing Northern Ireland. It also highlighted a number of risks that threaten people, property, critical infrastructure and important natural habitats.

<http://www.northernireland.gov.uk/index/media-centre/news-departments/news-doe/news-doe-january-2014/news-doe-290114-durkan-outlines-steps.htm>

Birds and Windfarms: an Updated Analysis of the Effects of Windfarms on Birds and Best Practice Guidance on Integrated Planning and Impact Assessment

The RSPB has recently produced this report for the Bern Convention, which updates one produced for the Convention in 2003. It updates the analysis of the scientific literature and provides a much larger section on EIA, spatial planning and project development best practice.

<https://wcd.coe.int/ViewDoc.jsp?id=2064209&Site=&BackColorInternet=B9BDEE&BackColorIntranet=FFCD4F&BackColorLogo=FFC679>

EEA priorities in 2014

At the European Environment Agency, 2014 marks the start of a new 5-year work programme and a new set of environmental policy priorities. Late last year the European Union approved its 7th Environmental Action Programme (EAP), which sets out the priorities of environmental policy-making in the EU for 2014-2020. Entitled 'Living well, within the limits of our planet', it puts a particular focus on ensuring a healthy environment and resource efficient economy for human well-being.

<http://www.eea.europa.eu/highlights/new-year-new-focus-eea>

Bat populations recovering according to largest ever European study

Bat numbers increased more than 40% between 1993 and 2011, after declining for many years, according to a new report by the European Environment Agency (EEA), which considers the state of bat populations in a handful of countries across Europe. The EEA report on bats is the most comprehensive study yet made of European bat population trends, studying 16 of the 45 bat species found across the continent. The study is the first to compile data from ten existing monitoring schemes in nine countries, building a prototype European-scale indicator of bat population trends. Surveyors counted and catalogued bats hibernating at 6,000 sites in nine different countries. Overall these species appear to have increased by 43% at hibernation sites between 1993 and 2011, with a relatively stable trend since 2003.

<http://www.eea.europa.eu/highlights/bat-population-recovering>

New TEEB study for Agriculture and Food

The TEEB Secretariat with support from UNEP World Conservation Monitoring Centre (WCMC) organised a scoping workshop in Brussels from 22-23 January 2014, to develop the structure and define the content for a forthcoming study entitled 'The Economics of Ecosystems and Biodiversity (TEEB) for Agriculture and Food (TEEB-AF)' intended to provide a comprehensive economic evaluation of the eco-agri-food systems complex.

<http://www.teebweb.org/connecting-the-dots-that-link-ecosystems-agricultural-and-food-systems/>

Introduction to the Marine and Coastal Management Special Feature

Dealing with Uncertainty and the Precautionary Approach in the Marine Environment

Tim Norman CEnv MCIEEM, Mike Barker CEnv FCIEEM and Mike Smith
NIRAS Consulting Ltd

This article draws on NIRAS Consulting's experience in successfully supporting our clients' marine projects, particularly for offshore wind development. What often makes these project complex, apart from their size, is the environmental uncertainties present within the marine environment. In the article, we look at how these uncertainties can be dealt with in EclA and what this means for the precautionary principle.

Introduction

The marine environment is recognised as presenting more physical challenges to work than most terrestrial environments. Much less is known about the distribution of marine life than of terrestrial ecosystems, and acquiring new information can be very expensive and time-consuming. The Marine And Coastal Ecological Impact Assessment (EclA) Guidelines¹ promote a scientifically rigorous approach, but recognises that EclA relies on ecologists using their professional judgement, particularly in dealing with uncertainty. The Guidelines also set out that where there are uncertainties within the EclA, a precautionary approach should be taken in accordance with recognised national guidance (for example, SNIFFER



A series of current research programmes to define monitoring systems for sea mammals aim to establish sub-sea noise protocols in the UK



Voluntary survey schemes such as SeaSearch gather information on seabed habitats and associated marine wildlife in Britain and Ireland

2006²). This means that the process of rigorous assessment within the marine environment holds many challenges to professional ecologists.

Ecological Uncertainty in the Marine Environment

Our knowledge of the coastal and offshore territorial waters of the UK is improving through projects such as UKSeaMap 2010³, which has recently updated a seabed habitat map for the entire UK continental shelf area. In addition, there are voluntary survey schemes such as SeaSearch⁴, which aim to gather information on seabed habitats and associated marine wildlife in Britain and Ireland through the participation of volunteer recreational divers. However, there remain significant data gaps and uncertainties. For example, new habitat classes for the deep-sea area are still being proposed and considered. JNCC and others are currently contributing to work within OSPAR's⁵ Biodiversity Committee to identify species and habitats in need of protection.

There are a series of current research programmes to define monitoring systems and establish priorities in the UK. These are presently concentrating on habitats, seabirds and cetaceans (whales, dolphins and porpoises) including research programmes to establish sub-sea noise protocols⁶. Our, often poor, understanding

of the distribution, behaviour and ecological requirements of marine mammals, fish and seabirds makes accurate evaluations and assessments of developments in the marine environment difficult.

There are a number of compounding factors that increase our ecological uncertainty and which relate directly to the physical nature of the marine environment, including:

- Many species are highly mobile and/or migratory;
- Seasonal and irregular shifts in population distributions and densities based upon prey availability;
- Changing patterns of climatic influences (just when we thought we understood).

In relation to a framework of priority species and habitats, almost all marine elements are currently drawn from the twin European Directives⁷ with little differentiation on status below that international level. This situation contrasts with the onshore environment, where EclA is well established and understood, using more robust and accepted survey methods. These surveys are supported by an existing baseline context with a large number of tiered statutory and non-statutory designations. This baseline information is comparatively data-rich for both terrestrial habitats and a wide range of associated taxonomic groups.

Using Professional Judgement to Deal with Uncertainty in EclA

The Marine And Coastal EclA Guidelines⁸ acknowledges that we know much less about the marine environment and the distribution of marine biodiversity. The guidelines highlight that undertaking EclA in the marine environment is challenging and recognises that ecologists will need to rely on their professional judgement. These judgements *"should be made on the basis of an objective assessment of the best information available"*.

Professional ecologists, whether within the Developers' project team, advising as consultants, representing the Statutory Nature Conservation Bodies (SNCBs) or the conservation NGOs, should all be using the EclA guidelines to ensure that their judgements are *"based on available guidance and information, together with advice from experts familiar with the project's location and/or the distribution and status of the ecological features being considered"*. This becomes more difficult where there is no expert consensus and where available information is too thin to be reliable, even after extensive survey efforts over a number of years.

Regulatory bodies, such as the Marine Management Organisation (MMO), CEFAS and the regional Inshore Fisheries and Conservation Authorities (IFCAs) are working towards dealing with uncertainties in EclA. Through a programme of targeted research, to support the delivery of their operational functions⁹, the MMO are providing much needed evidence and guidance. One such project includes the development of a strategic framework for the scoping of cumulative effects of marine activities on the environment and socio-economic receptors – a project which NIRAS are leading on and yet another area of uncertainty within the marine environment.

Habitat Regulations Assessment (HRA) and the Precautionary Principle

In the UK marine environment most of the designations relate to European designated sites¹⁰ and the protected species associated with these designated sites ('Features of Interest'). The potential for adverse effects is often therefore set out both within an Environmental Statement and

then examined in more detail as part of a Habitats Regulations Assessment (HRA). The Habitats Directive requires the application of the 'Precautionary Principle' within the associated Appropriate Assessments and this principle sits uncomfortably with the levels of uncertainty found within marine EclAs.

This principle is applied such that the HRA requires a precautionary approach to both evaluation and assessment. For example, over the last 10 years marine EclA for offshore wind has become incrementally more complex and more involved as our evolving ecological understanding has highlighted how very little we used to know. In NIRAS, we have noticed an incremental ratcheting up of the detail required within the information used within EclA and HRA, and then even more at Examination.

Rapidly Evolving Practice – Offshore wind power as a case study

The United Kingdom became the world leader of offshore wind power generation in October 2008 when it overtook Denmark. This generating capacity has grown incrementally since the beginnings in 1999 and Round 3 has nine offshore zones where projects are currently in the assessment and consenting stages. There are significant ecological considerations within the application process and therefore professional ecologists are necessarily involved in many aspects of the industry.

New survey and assessment approaches are being applied to meet the consenting requirements for offshore wind development. Because ecology is often a key determining factor for offshore wind projects, the role of professional ecologists is highly influential and requires a strong level of responsibility. We therefore have to apply good and accepted practice to assess such complex issues. Due to the fast-moving pace of the industry, good practice is rapidly evolving and as a profession we need to keep abreast of innovative approaches and tools now in use.

The intellectual challenges required for all in the consenting process is demanding; new approaches and new tools, particularly around ecological risk assessment, are being developed 'on the hoof'. The EclA



Offshore Wind Farm in North Sea

Guidelines encourage, where possible, a collaborative approach to dealing with uncertainties and stresses the benefits of early consultation to minimise the risk of misunderstanding or controversy. We have found that, although difficult, the assessment process can also provide an effective environment for problem-solving difficult and uncertain impacts associated with major infrastructure projects, such as offshore wind. These outcomes can then

be directly applied to the remaining Round 3 projects. Much also has direct applicability to other ecological assessment and lessons should be learnt from the novel elements arising from the offshore wind sector and from other developments around our coasts.

Notes

- 1 The Marine And Coastal Guidelines For Ecological Impact Assessment In Britain And Ireland CIEEM 2010.
- 2 SNIFFER (2006) Guidance on the Application of the Precautionary Principle: Overview and Practical Guidance Documents UKCC05.
- 3 <http://jncc.defra.gov.uk/page-2117>
- 4 Wood, C., Solandt, J-L., Duncan, C. and Lightfoot, P. (2014). Seasearch – a national SCUBA diving project providing evidence for marine conservation and training in marine species identification and survey skills. *In Practice*, **83**: 13-18. <http://www.seasearch.org.uk/>
- 5 Convention for the Protection of the Marine Environment of the North-East Atlantic ('OSPAR Convention').
- 6 Neves, S., Boltwood, K., Baker, A. and Pace, F. (2014). Underwater noise in the marine environment. *In Practice*, **83**: 10-12.
- 7 Wild Birds Directive (Council Directive 79/409/EEC or 2009/147/EC) and the Conservation of Natural Habitats and of Wild Flora and Fauna (the Habitats Directive - EC Directive 92/43/EEC).
- 8 The Marine And Coastal Guidelines For Ecological Impact Assessment In Britain And Ireland CIEEM 2010.
- 9 Including marine planning, licensing of marine activities, marine conservation and fisheries management.
- 10 Comprising Special Protection Areas (SPAs), as classified under the Wild Birds Directive and Special Area of Conservation (SAC), as designated under the Habitats Directive.

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Underwater noise in the marine environment

Silvana Neves, Kate Boltwood, Andrew Baker MCIEEM and Federica Pace GradCIEEM
Baker Consultants

Underwater noise in the marine environment is a matter of increasing concern for the regulators and, as a consequence, for the industry. More and more companies are now required to monitor their emissions and conduct extensive baseline surveys pre- and post-construction to establish whether noise has a significant impact on EU protected species. This article will examine the new challenges that ecologists have to face to assess whether the criterion for Good Environmental Status is met for the underwater noise descriptor.

Introduction

The EU Marine Strategy Framework Directive (MSFD) requires member states to achieve good environmental status (GES) by 2020 so as to maintain biodiversity in their seas. GES is defined in the MSFD as “...the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current

and future generations”. The document lays out eleven criteria to determine GES, with one relating to the introduction of energy (including underwater noise)¹ (European Commission 2008). The UK has transposed the MSFD into domestic law, through the Marine Strategy Regulations 2010, assessed the current condition of our seas and set targets for all eleven criteria (CEFAS 2012).

The introduction of sound is likely to disrupt the marine environment because sound travels great distances through water. Therefore, before any development proceeds, it is necessary to gain an understanding of the baseline sound scape. An environmental impact assessment must be carried out and underwater noise measurements should be taken.

Developments such as new harbours, offshore windfarms, installation of electrical cables underwater, marine mineral dredging, or even the introduction of new ferry routes, will generate noise at each stage of the work. These might include dredging, pile driving, use of sonar, or noise from the use of vessels during the operations phase. Each operation will have its own acoustic signature that must be identified and quantified. These data can be fed into sophisticated models that take into account substrate type, bathymetry, water temperature, salinity and sea state.

In UK waters, targets for restricting noise levels have been set but some aspects are still under discussion. It is still unclear whether fixed noise levels for different activities should be set or whether a more

flexible approach should be implemented that will rely more on expert knowledge. By contrast, the German government has responded to the MSFD by putting an exact sound exposure level limit of 160 dB re 1 μ Pa outside a 750 m radius for pile-driving operations (BSH 2013).

This example demonstrates how regulation of noise (particularly impulsive noise) in the marine environment will impact heavily upon industry. Pile-driving operations used in both the oil, gas and renewables industry could be seriously affected. Clearly, there is a need to establish precise monitoring protocols for measuring marine noise, both to determine ambient noise and to assess new impacts.



Deploying SM2M acoustic recorder



NAREC platform



Together with researchers from Newcastle, Bristol and Exeter Universities, Baker Consultants is part of the Bio-Acoustic Research Consortium (BARC). BARC is conducting interdisciplinary research to standardise methods of data collection and to measure the effects of noise in the marine ecosystem. With funding from the Natural Environment Research Council, the project was set up to bring together industry and research to establish protocols. As part of this work, Baker Consultants has been deploying marine acoustic recorders at the National Renewable Energy Centre (NAREC) test site for renewable energy to assess the impacts of underwater noise generated during pile driving at the ecosystem level.

The introduction of strict regulations in Germany has led the offshore industry to develop new mitigation measures to reduce propagation of noise. A reduction in received sound levels can be achieved by using double-walled tubes that surround monopiles and/or the use of bubble curtains. Mitigation measures also involve the use of acoustic deterrent devices for both cetaceans and seals. Companies may also be required to follow a 'soft start' procedure at the beginning of pile driving (starting with low energy and slowly increasing). These measures aim to drive animals away from the area to avoid exposure to loud sounds.

Acoustic monitoring and survey

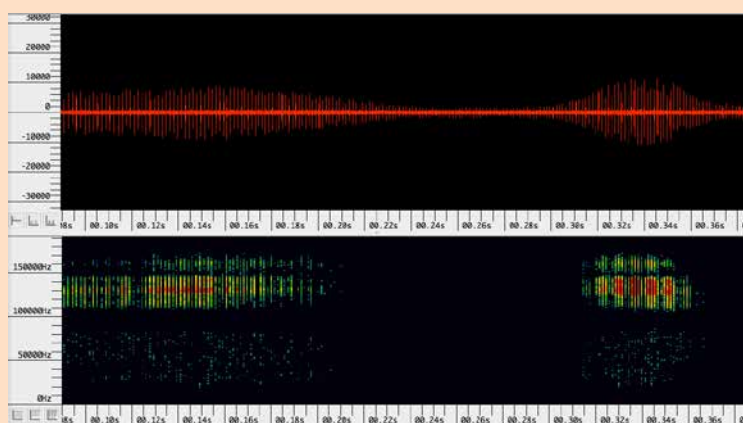
The study of underwater noise and its effects has been aided by the advent of a variety of relatively inexpensive instruments that can be deployed for long periods of time. Known as passive acoustic monitoring devices, these instruments detect changes in pressure in the water due to the propagation of a sound wave and convert it into an electrical stimulus that is recorded on the device. Once properly programmed, the instrument can be used remotely with only occasional servicing, e.g. quarterly. This type of device can record ambient noise and at the same time detect the high frequency vocalisations of marine mammals, such as the harbour porpoise *Phocoena phocoena*. Passive acoustic monitoring is just one of many survey techniques used to assess the impact of development on marine ecosystems. It requires minimal human

Marine mammals are key players when assessing the impacts of underwater noise on the ecosystem because they raise a lot of public concern. Whales, dolphins and seals, for example, rely heavily on sound and certain noise sources have the potential to cause mass strandings (Cornwall Wildlife Trust Marine Strandings Network and British Divers Marine Life Rescue 2009).

Sound is used in many aspects of a marine mammal's life cycle from foraging (echolocation clicks that dolphins use to find a prey (Verfuss *et al.* 2009)) to mating (songs of some baleen whales such as the humpback whale *Megaptera novaeangliae* (Smith *et al.* 2008)), to intra-species communication (such as the whistles that bottlenose dolphins *Tursiops truncatus* use to convey individual identity (Janik *et al.* 2006)).

It is likely that anthropogenic noise will have an impact and might cause behavioural changes. These could be temporary or permanent, direct (e.g. avoidance of an area) or indirect (e.g. prey might leave the affected area causing changes to foraging behavior (Wright *et al.* 2007; Wright and Kuczaj 2007)).

Pile driving, for instance, can generate underwater sound pressures of more than 230 dB re 1 μ Pa. Such sounds may disturb marine mammals and even cause dangerous physiological effects at close range (Madsen *et al.* 2006).



Echolocation clicks

Feature Article: Underwater noise in the marine environment (contd)

intervention and can be used when weather conditions are highly adverse. Other survey methods include visual surveys of marine fauna from a boat where trained observers record the presence and number of animals seen during previously determined transect routes followed by the vessel. This type of survey is usually accompanied by a towed hydrophone that can detect and record the vocalisations of the animals seen by the observers and also any missed by them. The data can be used to estimate local populations of marine mammals. One major constraint of this type of survey is its weather-dependence since it requires good weather conditions during daylight periods and is much more expensive and time consuming than passive acoustic monitoring.

One of the key challenges of acoustic monitoring is the analysis of large volumes of heterogeneous data in relatively short periods of time (the German regulator normally requires initial reporting of pile-driving operations within 48 hours).

Within Europe there is a lack of coordination between member states on how to measure trans-boundary issues. The Crown Estate will shortly publish a review on good practice for measuring underwater noise, giving practical guidance on how to carry out surveys and set up the monitoring equipment. As yet there is no publication detailing specific guidance for marine mammals across Europe. Ecologists must rely on guidance from individual governments (where it exists) and the expert knowledge of marine biologists. The lack of knowledge exchange can mean equipment that is most fit for purpose may be overlooked by a regulatory body.

First and foremost, regulatory bodies, developers and scientists need to agree the sampling protocols necessary to establish baseline conditions. Part of Baker Consultants' work at BARC has been to investigate sampling regimes to see if small samples of data are representative of the baseline conditions. For example, do we need to record 24/7 or will a sample of 10 minutes in each hour give us the same understanding of the acoustic profile? Long deployment periods generate large amounts of data that must be analysed quickly and efficiently. Fortunately, the

development of new software is making this task more cost effective.

Increasingly sophisticated modelling tools are available to analyse underwater noise impacts. These new, more complex models should lead to a better understanding of how noise is generated during the different phases of development, by different equipment and in different localities. In turn, this should improve our assessment of the impacts on the marine ecosystem.

Developments in the marine environment are often international in nature with cumulative impacts that cross national boundaries. For example, the planned level of offshore wind development in the North Sea has the potential to produce significant changes in the marine soundscape. While European Community law is increasing awareness of noise pollution, there is an urgent need for the convergence of policy and guidelines so that noise impacts can be dealt with using methods that are both cost effective and based on robust science.

Notes

1 Full list of criteria available from European Commission (2008) http://ec.europa.eu/environment/water/marine/directive_en.htm



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References

- Cornwall Wildlife Trust Marine Strandings Network and British Divers Marine Life Rescue (2009). *Report on the mass stranding and rescue of common dolphins in Porth Creek, the Percuil River, Falmouth, SW England, June 2008*. CWT Marine Strandings Network. <http://www.bdmlr.org.uk/uploads/documents/reports/bdmlr-cwtmsn-report-may09.pdf>
- BSH (2013). *Investigation of the Impacts of Offshore Wind Turbines on the Marine Environment (StUK4)*. Hamburg. <http://www.bsh.de/en/Products/Books/Standard/7003eng.pdf>
- CEFAS (2012). *Marine Strategy Framework Directive consultation: UK Initial Assessment and Proposals for Good Environmental Status*. CEFAS.
- European Commission (2008). *Marine Strategy Framework Directive (2008/56/EC)*. http://ec.europa.eu/environment/water/marine/directive_en.htm
- Janik, V. M., Sayigh, L.S. and Wells, R.S. (2006). Signature whistle shape conveys identity information to bottlenose dolphins. *Proceedings of the National Academy of Sciences*, **103**: 8293-8297.
- Madsen, P. T., Wahlberg, M., Tougaard, J., Lucke, K. and Tyack, P. (2006). Wind turbine underwater noise and marine mammals: implications of current knowledge and data needs. *Marine Ecology Progress Series*, **309**: 279-295.
- Smith, J.N., Goldizen, A.W., Dunlop, R.A. and Noad, M.J. (2008). Songs of male humpback whales, *Megaptera novaeangliae*, are involved in intersexual interactions. *Animal Behaviour*, **76**: 467-477.
- Verfuss, U.K., Miller, L.A., Pilz, P.K.D. and Schnitzler, H.U. (2009). Echolocation by two foraging harbour porpoises (*Phocoena phocoena*). *Journal of Experimental Biology*, **212**: 823-834.
- Wright, A.J., Aguilar Soto, N., Baldwin, A.L., Bateson, M., Beale, C.M., Clark, C., Deak, T., Edwards, E.F., Fernández, A., Godinho, A., Hatch, L.T., Kakuschke, A., Lusseau, D., Martineau, D., Romero, L.M., Weilgart, L.S., Wintle, B.A., Notarbartolo-di-Sciara, G. and Martin, V. (2007). Anthropogenic Noise as a Stressor in Animals: A Multidisciplinary Perspective. *International Journal of Comparative Psychology*, **20**: 250-273.
- Wright, A. J. and Kuczaj, S. (2007). Noise-Related Stress and Marine Mammals: An Introduction. *International Journal of Comparative Psychology*, **20**: 1-1.

Seasearch – a national SCUBA diving project providing evidence for marine conservation and training in marine species identification and survey skills

Chris Wood, Jean-Luc Solandt, Calum Duncan and Paula Lightfoot MCIEEM
Marine Conservation Society

Figure 4. Seasearch National Coordinator Chris Wood recording pink sea fans. Photo by Richard Morton.

Seasearch is a national project that trains volunteer SCUBA divers to record marine species and habitats, providing a cost-effective source of verified data to inform the conservation and management of the marine environment. In addition to using Seasearch data in desk studies, CIEEM members may participate in the project, benefit from reasonably priced training courses, use the high quality Seasearch identification guides, and join Seasearch's growing social network community where expert marine biologists freely

share their knowledge with others. This valuable project has received funding from various regional and national sources over the years, but ongoing funding is vital to maintain the coordination network that makes Seasearch so successful. This article aims to raise awareness amongst CIEEM members of how they could benefit from the Seasearch project, and how they could play a role in securing its future either by active participation or simply by helping this message to reach a wider audience.

Introduction

New marine legislation calls for a well-managed, ecologically coherent network of Marine Protected Areas (MPAs) in UK seas. This emerging network consists of six types of MPAs designated under international, European and national legislation:

- Natura 2000 Sites: Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) established under the EC Habitats and Birds Directives.
- Sites of Special Scientific Interest (SSSIs) established under the Wildlife and Countryside Act 1981 and the Nature Conservation (Scotland) Act 2004.
- Ramsar Sites established under the 1971 Convention of Wetlands of International Importance.
- Marine Conservation Zones (MCZs) designated through the UK Marine and Coastal Access Act 2009.

Feature Article: Seasearch – a national SCUBA diving project providing evidence for marine conservation and training (contd)

- Scottish Marine Protected Areas to be established under the Marine and Coastal Access Act 2009 and Marine (Scotland) Act 2010 for offshore and inshore sites respectively.
- Marine Conservation Zones (MCZs) in Northern Irish territorial waters under the Marine Act (Northern Ireland) 2013.

One of the challenges in establishing and managing this network is the paucity of data on the habitats and species occurring around our shores. Seasearch (www.seasearch.org.uk) is a UK- and Ireland-based citizen science programme for volunteer SCUBA divers which helps meet these data needs and can play a part in monitoring the MPA network. The Seasearch database is one of the largest of its kind, containing over 400,000 species records and 41,000 habitat records, which have been through rigorous validation and verification processes at a local and national level. The data are made freely available for research, marine spatial planning and public interest.

In addition to contributing to the evidence base for marine conservation, Seasearch raises awareness of marine biodiversity and conservation issues amongst the diving community and provides an opportunity for participants to add purpose to their diving and learn more about the wildlife and habitats they see underwater. This is achieved through a progressive training system, the publication of identification guides, and crucially by establishing a friendly community in which novices can learn from more experienced participants, many of whom have a professional level of identification and survey skills.

Background: recording marine wildlife and habitats for >25 years

Seasearch was developed in the mid-1980s through collaboration between the Marine Conservation Society and the Nature Conservancy Council to contribute data to the Marine Nature Conservation Review that took place from 1987-1998. Early Seasearch surveys focussed on Wales, Dorset, Sussex and West Scotland, but in 1999 a National Seasearch Steering Group was formed to expand the project. The steering group comprises the Marine Conservation Society, the Wildlife Trusts, all

UK Statutory Nature Conservation Bodies, the main diver training organisations, the Marine Biological Association and independent experts.

Thanks to funding from the Heritage Lottery Fund, a National Coordinator was appointed in 2003 to help maintain consistency and quality as the project expanded. There is now a network of regional coordinators covering the whole UK coastline, the Republic of Ireland (in partnership with the Irish Underwater Council), the Isle of Man and the Channel Islands.

Survey methodology and data

Seasearch volunteers record the species, habitats and human impacts they see on their dives by filling in Observation or Survey forms. The Observation form is fairly straightforward and quick to complete, yet still captures valuable information giving an overview of the site as a whole. The Survey form is more detailed and allows volunteers to record multiple habitats with a separate list of species for each habitat.

Seasearch has also developed specific methodologies for recording species and habitats of conservation importance. These include the two UK species of sea fans (*Swiftia pallida* and *Eunicella verrucosa*), fireworks anemones *Pachyserianthus multiplicatus*, skate and ray egg cases, and sea grass beds.

Most data is collected on Seasearch organised survey dives which target areas of conservation interest or gap filling. Individuals and dive clubs also contribute

data from dives carried out independently, and we adopt the motto 'Any dive can be a Seasearch dive'.

The total number of forms increased to over 2,000 per year in 2010 and 2011. Since then overall numbers have dropped but the proportion of Survey forms increased to 44% of the total in 2013 (Figure 1).

The forms are validated and verified by regional coordinators, who have first-hand knowledge of their local marine environment and the skill level of the recorders. They interpret the biological and environmental data on survey forms to assign biotopes to the dive sites using the Marine Habitat Classification for Britain & Ireland v04.05 (Connor *et al.* 2004). Data is entered into regional Marine Recorder databases, which are then merged into a single national Marine Recorder database, which is checked again by the National Coordinator before it is sent to the statutory conservation agencies and made publicly available via the National Biodiversity Network Gateway (<https://data.nbn.org.uk>).

Seasearch coordinators and volunteers use the Seasearch dataset on the NBN Gateway to support their recording activities, for example to check the known distribution of a species as an aid to identification or verification, to target survey efforts towards data-deficient areas, or to target monitoring efforts towards sites that support key species or biodiversity 'hotspots'. The NBN Gateway Interactive Map enables users to overlay MPA boundary datasets with records

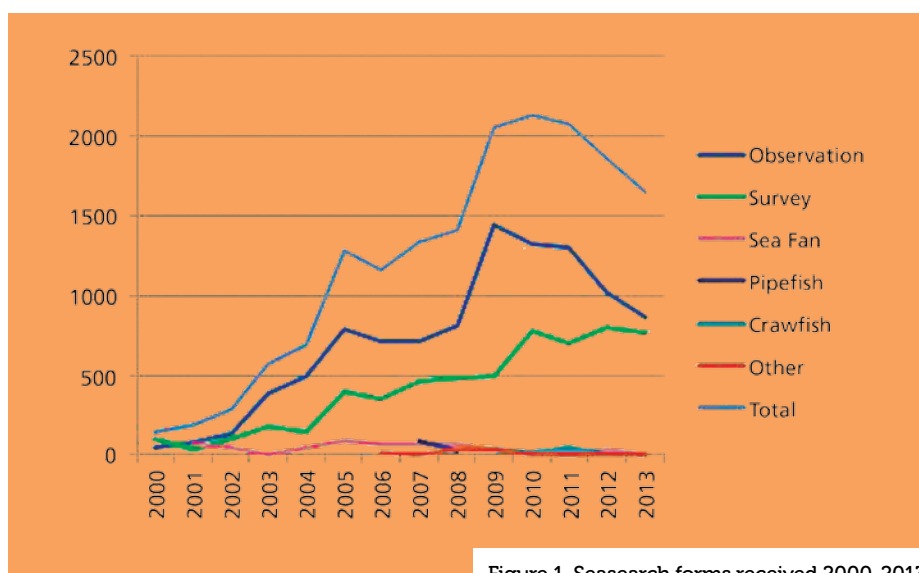


Figure 1. Seasearch forms received 2000-2013.



Figure 2. Seasearch course participants recording data from a video dive.

of species of conservation importance in order to see how well current and proposed protected sites 'capture' known areas of marine biodiversity.

Currently, digitisation of data from paper forms takes place over winter, when the sea conditions are less favourable for diving, and the data becomes publicly available in spring of the following year. However, Seasearch is currently setting up online recording facilities for its volunteers using Indicia, the open source toolkit for developing biological recording websites and apps (www.indicia.org.uk). This will bring many benefits, including storing photographs and verifiers' comments as part of records and making the data available more quickly to inform decision making (Calow *et al.* 2013).

Training and Identification Guides

Seasearch offers a progressive training system that supports the survey methodology. The entry level Observer course teaches participants the skills they need to complete Observation forms. Once they have gained experience and confidence at the Observer level, many participants progress to the Surveyor level. In order to gain Seasearch certification, trainees must also have a number of forms checked and 'signed off' by a tutor, and for the Surveyor certification they must

complete an online species identification test. Specialist courses help participants to develop skills in the identification of more difficult groups, or specialist topics such as underwater photography or MPA monitoring. The courses are delivered by trained Seasearch tutors and specialists in their field and are highly cost-effective.

There are 40-50 courses each year with a wide geographical distribution (Figure 2).

The training programme is backed up with a highly regarded series of photographic identification guides aimed at ensuring a reliable level of identification skills, including awareness of species that cannot be identified to species level *in situ*, and of similar-looking species that can be confused. There is a general introductory guide aimed at new recorders (Wood 2007, re-published with amendments 2013) and specialist guides covering Seaweeds (Bunker *et al.* 2010), Bryozoans and Hydroids (Porter 2012) and Anemones and Corals (Wood 2005, 2nd Edition 2013) (Figure 3). A guide to Sponges and Sea Squirts is currently in preparation.

Seasearch volunteers benefit from being part of a friendly community, in which skills and knowledge are shared. Increasing use of digital photography and social media has also brought huge benefits in developing identification skills and improving data quality (see Morris, this issue). A number of regional or taxon-

specific Seasearch Facebook groups have been set up where volunteers can post photos and get help with identification, often triggering interesting discussions about the species in question.

Seasearch does not provide training in dive skills. Seasearch participants must already be certified to BSAC/ScotSAC Sports Diver, PADI Advanced or equivalent level, and to have completed at least twenty dives, ten of which must have been in UK or Irish seas.

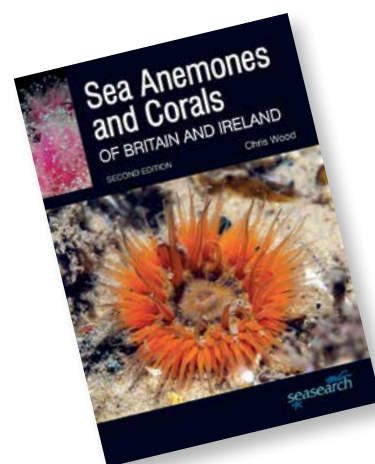


Figure 3. The latest Seasearch ID Guide - Sea Anemones and Corals of Britain and Ireland, 2nd edition.

Diving into Conservation: how Seasearch is making a difference

A survey of over 200 Seasearch volunteers carried out in February 2013 revealed that having their data used to support marine conservation is a major motivating factor for participants. Over 50% stated that they are a member of an environmental or nature conservation charity and 78% said that gathering data to inform the designation of Marine Protected Areas was important to them as a reason for getting involved in Seasearch.

The Seasearch project is increasingly focussing survey efforts on existing and candidate MPAs, as well as priority habitats and species. An example is the pink sea fan *Eunicella verrucosa* (Figure 4).

Seasearch surveys established the geographical range as the Channel Islands, South West England and Wales (east Dorset to north Pembrokeshire), and southern and western Ireland as far north as Donegal. Condition surveys pinpointed

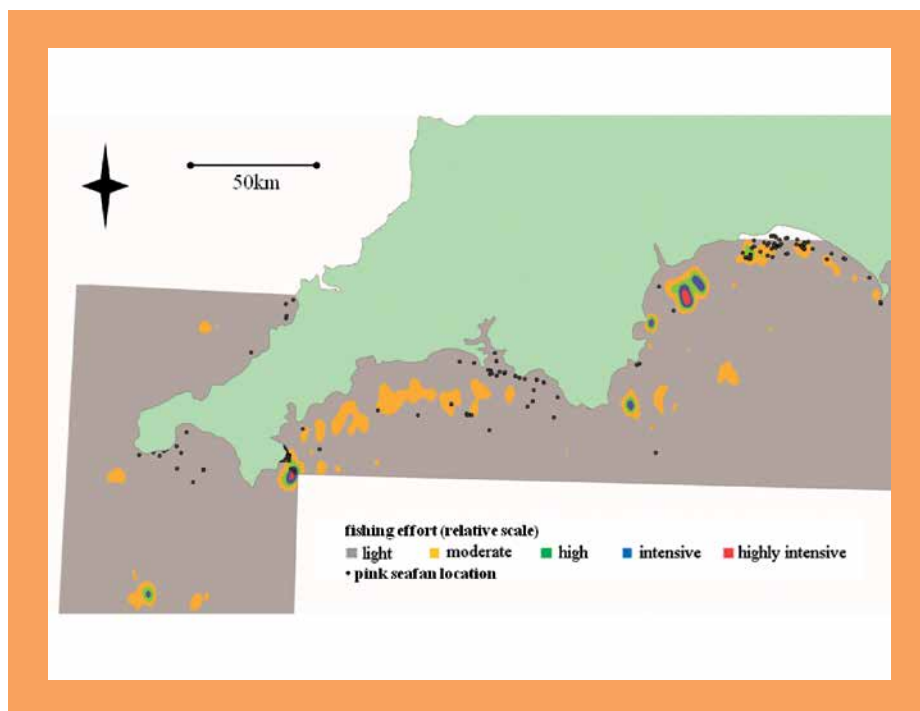


Figure 5. Seasearch pink sea fan records overlaid with bottom-towed fishing effort data (relative scale). The overlap is particularly concentrated over the reefs of Lyme Bay [fishing effort data from the Marine Fisheries Agency, and sea fisheries observations] (after Lumbis 2009). Contains Ordnance Survey data © Crown copyright and database right [2013].

areas where sea fan populations were threatened by disease (Lundy and south Devon), or by damaging fishing practices (Lyme Bay). Re-surveys of areas affected by the disease showed how slow the recovery process has been and the low level of recruitment outside the stronghold areas of Lyme Bay, south Devon and Cornwall. Epiphytic and opportunistic species on sea fans were also recorded, especially the priority sea fan anemone *Amphianthus dohrnii*, and molluscs *Tritonia nilsodhneri* and *Simnia hiscocki*.

Seasearch monitoring of pink sea fan populations in Lyme Bay between 2001 and 2006 coincided with a well-recorded increase in scallop fishing intensity in the area of reefs dominated by the species (Figure 5).

Seasearch surveys reported pink sea fans dislodged from the soft sandstone ledges in Lyme Bay, and washing up between the reefs in sediment-dominated areas. Devon and Dorset Wildlife Trusts and Natural England called for restrictions on scallop fishing in the area, citing evidence of the loss of pink sea fans to the scallop dredgers. The issue was resolved at ministerial level in 2008 on evidence

that the entire reef feature was at risk of damage, and that the site qualified as a Special Area of Conservation that would eventually necessitate controls on damaging fishing practices (Lumbis 2009). Following protection under UK law in 2008, the site became a European Marine Site in 2010, largely due to the contribution of Seasearch data allied to mapping work by The Wildlife Trusts and Natural England.

Seasearch empowers local people to secure protection for marine sites that are important to their community. Following Observer training in 2003, divers from the Community of Arran Seabed Trust (COAST) carried out Seasearch dives throughout Lamlash Bay, Isle of Arran, to support their ultimately successful proposal for a Community Marine Conservation Area in north Lamlash Bay, the only one of its kind in Scotland. Effectively a No-Take Zone, it was set up using a Statutory Instrument under the Inshore Fishing (Scotland) Act 1984. Following Surveyor training in 2006, more detailed records were returned from throughout the Firth of Clyde including targeted surveys in the south of Arran, much of the latter supporting the evidence

base for a proposed Marine Protected Area successfully submitted by COAST to the Scottish MPA project.

Seasearch surveys have also been carried out to map distributions of rare species such as crawfish *Palinurus elephas*, fan shells *Atrina fragilis* and the fireworks anemone *Pachycerianthus multiplicatus*. Crawfish populations were decimated by divers and tangle net fishing in the 1970s and 1980s. Most records now come from Ireland, where collection by divers is banned, and from Pembrokeshire; however, recent Seasearch surveys in the No-Take Zone at Lundy Island have shown glimpses of recovery. The fireworks anemone is a Scottish Priority Marine Feature. Seasearch surveys for this species were carried out between 2009 and 2013 in Loch Shira, upper Loch Fyne, Loch Goil, Loch Creran and Loch Duich, revealing hotspots (e.g. Loch Beg) and trends, such as possible poor recruitment in upper Loch Fyne. Such information is useful for informing management decisions regarding possible MPAs for this species at these sites.

Contribution to designation processes of new Marine Protected Areas

Marine Protected Areas are a key tool for ensuring the sustainable use and conservation of marine biodiversity and ecosystems. Inshore MPAs in England have increased from 4% to about 25% of coastal waters since 2009 (Jones 2012). Wales already has 30% of its coastal waters in European Marine Sites. Northern Ireland is embarking on an MPA programme that should see the number of designated sites increase in the future. In Scotland, 33 MPA proposals were consulted on in autumn 2013 for possible addition to the current suite of European Marine Sites and other area-based measures, potentially increasing coverage of the emerging Scottish MPA network from 12% to 23% of coastal waters.

Data provided by Seasearch has played an important role in this process (Figure 6). For example, evidence to support the establishment of reef, sea cave and vulnerable sandbank habitat sites under the Habitats Directive was provided by Seasearch data allied to sidescan sonar or drop-down camera surveys.

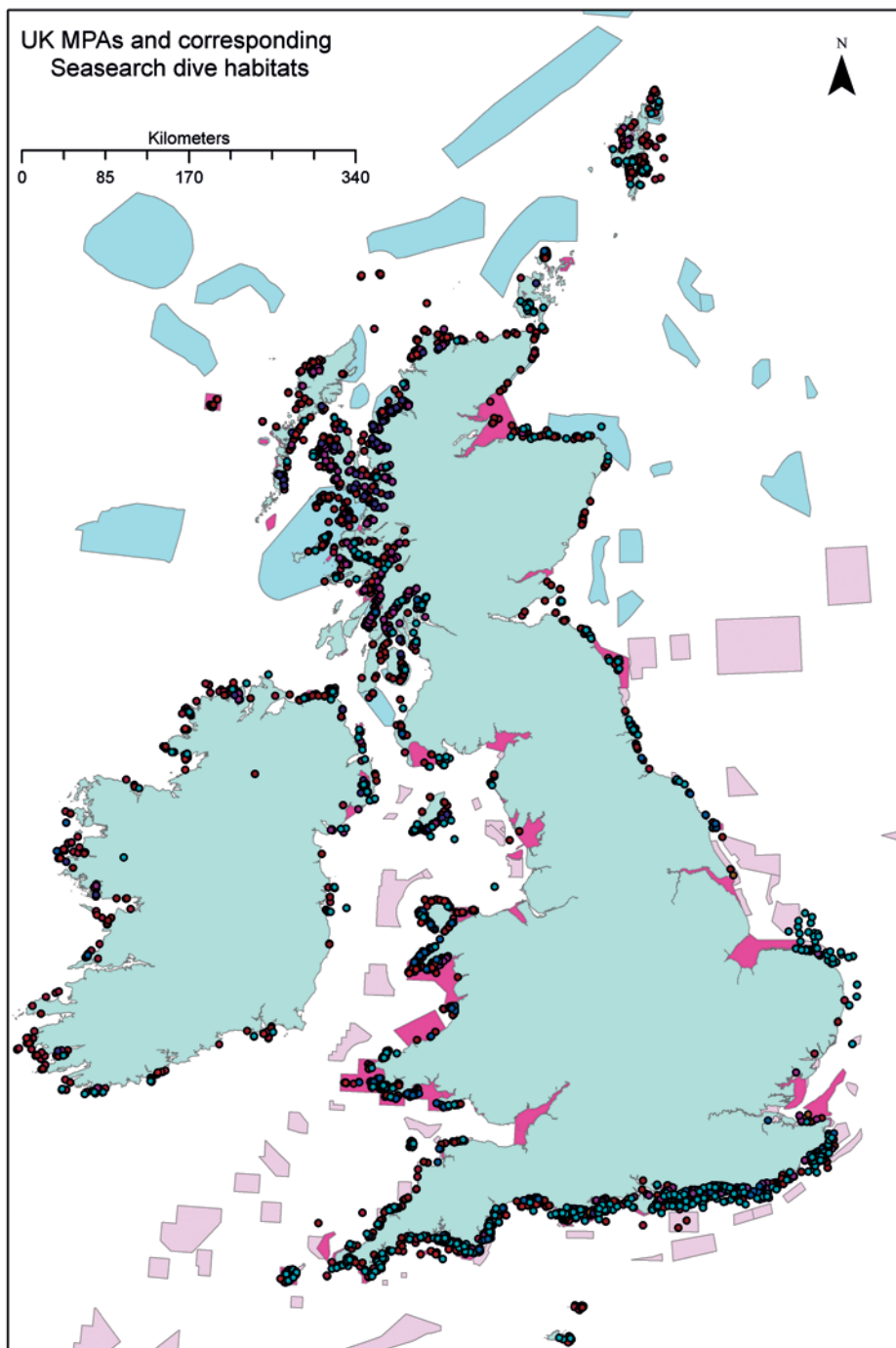


Figure 6. A composite image of 127 proposed MCZs in English waters (and UK waters adjacent to England and Wales), Scottish MPAs in Scottish waters (and UK waters adjacent to Scotland) and marine SACs throughout UK inshore waters, including Wales and Northern Ireland. The point data shows where Seasearch surveys have been carried out. Contains Ordnance Survey data © Crown copyright and database right [2013].

All Scottish Seasearch data is an integral part of the GeMS (Geodatabase of Marine features in Scotland) dataset, used to underpin the search for possible Scottish MPAs. Seasearch data, combined with social data collected by the Marine Conservation Society, underpinned seven third party MPA proposals submitted by

MCS to the Scottish MPA process, four of which were put forward for consultation (Upper Loch Fyne, Loch Sween, Loch Sunart and Loch Duichs, Long and Alsh). Seasearch data also contributed to the evidence base for a further three possible MPAs (South Arran, Small Isles and Northwest Scotland sea lochs) and has

helped increase knowledge at existing European Marine Sites, including Isle of May, Luce Bay, Berwickshire and North Northumberland Coast and, informed by northern sea fan *Swiftia pallida* surveys, Firth of Lorn SAC.

However, Seasearch data has not always been used to its fullest potential. In November 2013, Defra designated 27 of the 127 Marine Conservation Zones proposed by stakeholders during a two-year process in England. Seasearch data was used throughout the stakeholder-led process to inform the location, size, boundaries and conservation objectives of the recommended sites. Later, Seasearch provided targeted information and datasets to inform the designation and management of the proposed MCZs, which included detailed survey reports for 13 MCZs (Figure 7).



Figure 7. A Seasearch report illustrating the species and habitats recorded inside the Kingmere MCZ.

These reports were made publicly available via the Seasearch website and sent to Natural England, Inshore Fisheries and Conservation Authorities (IFCAs) and local MPs to show the value of the sites. Of those 13, only four sites have been designated: Skerries Bank and Surrounds, Torbay (southwest); Kingmere (east); Blackwater Colne and Crouch (both in East Anglia).

Much Seasearch data are georeferenced to a high level of precision and confidence, and are accompanied by verifiable photos of species and habitats of conservation importance. Seasearch divers increasingly use towed GPS to map the location and extent of features such as the North

Feature Article: Seasearch – a national SCUBA diving project providing evidence for marine conservation and training (contd)

Norfolk Chalk Reef, the longest in Europe. Unfortunately, the current data management system used by Seasearch - Marine Recorder - is not optimised to support this type of data. This led to some of the data not being used during the later stages of the MCZ process, despite calls from scientists and conservation NGOs that the precautionary principle should apply. However, the online recording system under development for Seasearch will support storage of photos and upload of GPX files from towed GPS as part of records, which should ensure that the data are given the confidence they merit.

Final Thoughts

Seasearch provides valuable data, a high quality training programme and identification resources. With annual running costs of under £100,000, the Seasearch programme is excellent value, but these costs must be covered to ensure the sustainability of the project.

Seasearch does not derive income from its data, which is made freely available in accordance with the wishes of the Seasearch steering group and volunteers. One volunteer said *"I think that private and public sector data users should give some kind of support to the organisations that provide data from volunteers, but I don't think that the data should be withheld from those organisations, in case this results in poor decision making"*.

Long-term funding is in place in some areas, but in others the project depends on ad hoc funding from a variety of organisations. Sales of ID guides and other materials are an important source of revenue but by far the greatest level of support comes from the participants who meet all the costs of equipment, insurance and travel themselves.

One participant summed up the value of the Seasearch project in the following words: *"Seasearch is an essential, grass roots conservation effort impacting on current understanding and legislation of the marine environment. I would like to see wider awareness of it in the public at large."*

It is hoped that this article will raise awareness of Seasearch among CIEEM members and, through them, to a wider audience so that its importance is appreciated and its future can be secured.

Information about the Marine Conservation Society can be found at www.mcsuk.org

Further information, downloadable reports, contacts and dates for courses and surveys can be obtained from the Seasearch website: www.seasearch.org.uk

Scottish MPA Data Confidence Assessments including Seasearch data are available from the Scottish Natural Heritage website: www.snh.gov.uk

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References

Bunker, F., Brodie, J., Maggs, C. and Bunker, A. (2010). *Seasearch Guide to Seaweeds of Britain and Ireland*. Marine Conservation Society, Ross-on-Wye.

Calow, J., Nicholls, D. and Calow, G. (2013). NatureSpot: a web-based tool for supporting biological recording and mapping across the counties of Leicestershire and Rutland. *In Practice*, **82**: 32-34.

Connor, D.W., Allen, J.H., Golding, N., Howell, K.L., Lieberknecht, L.M., Northen, K.O. and Reker, J.B. (2004). *The Marine Habitat Classification for Britain and Ireland Version 04.05* (internet version: www.jncc.gov.uk/MarineHabitatClassification). Joint Nature Conservation Committee, Peterborough.

Jones, P.J.S. (2012). Marine Protected Areas in the UK: challenges in combining top-down and bottom-up approaches to governance. *Environmental Conservation*, **39**: 248-258.

Lumbis, R. (2009). *Distribution of Southwest England inshore fishing effort and the Pink seafan, Eunicella verrucosa (Pallas, 1766) between 1990 and 2007*. University of Plymouth, Plymouth.

Porter, J. (2012). *Seasearch Guide to Bryozoans and Hydroids of Britain and Ireland*. Marine Conservation Society, Ross-on-Wye.

Morris, R. (2014). Digital photography and biological recording: opportunities and pitfalls based on a study of hoverflies (Diptera, Syrphidae). *In Practice*, 28-32.

Wood, C. (2007, republished with amendments 2013). *Seasearch Observer's Guide to Marine Life of Britain and Ireland*. Marine Conservation Society, Ross-on-Wye.

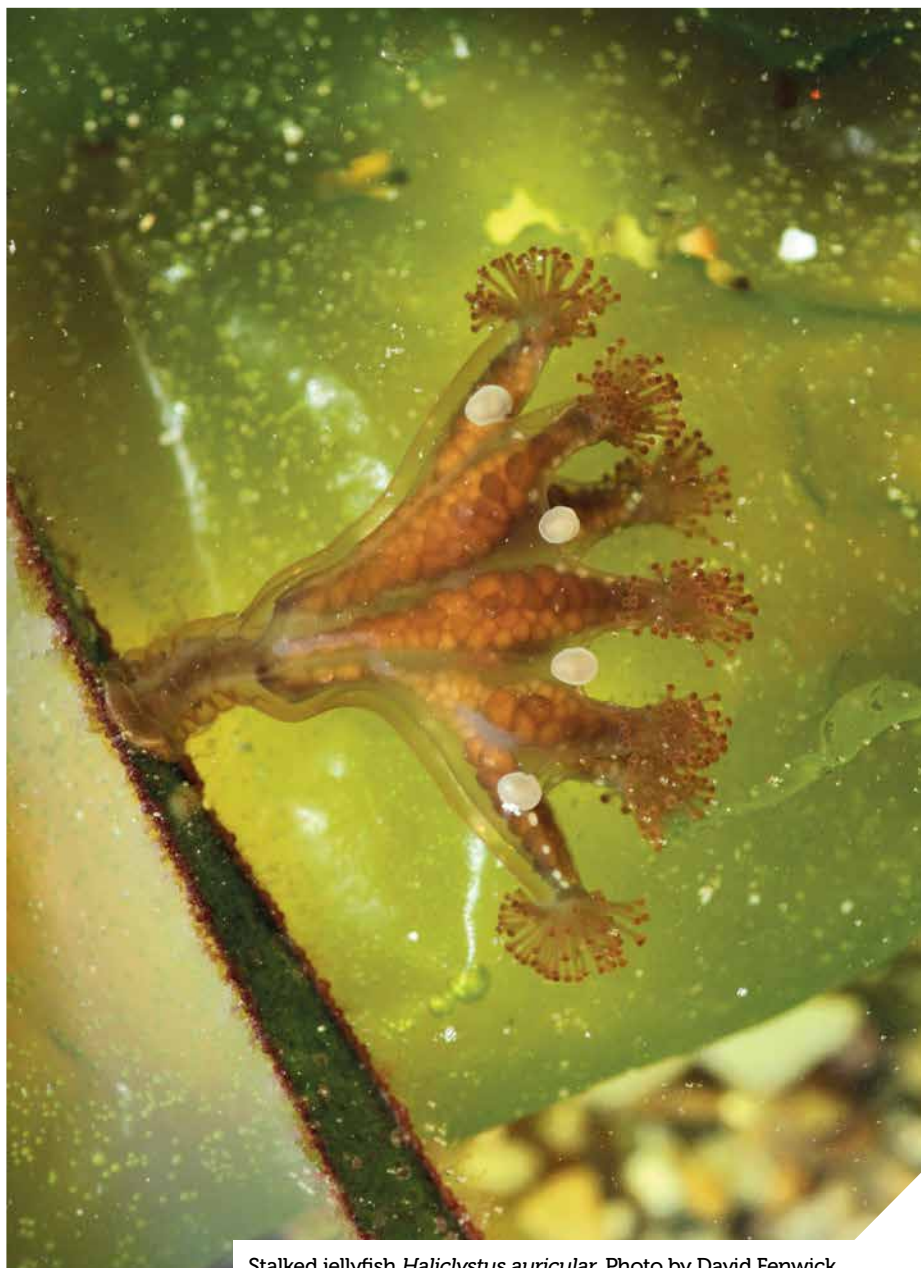
Wood, C. (2005, 2nd Edition 2013) *Sea Anemones and Corals of Britain and Ireland*. Wild Nature Press, Plymouth.

Intertidal Discovery Project – Coastal survey and mapping for conservation and public benefit in Cornwall

Martin Goodall MCIEEM, Carolyn Waddell and Catherine Wilding
Cornwall Wildlife Trust

Intertidal Discovery is a ground-breaking project that aims to survey and map the intertidal habitats along the entire north coast of Cornwall. Data collected by the Project is being used to produce interactive online maps to aid in marine planning and environmental monitoring, as well as to underpin local and national marine conservation strategies.

In the UK there is a desperate need for baseline marine data. Monitoring in the marine environment is high on the Government's agenda and there are many new and exciting opportunities for CIEEM members as environmental professionals. Hopefully this overview of the Intertidal Discovery Project will get you thinking about large-scale monitoring, methodologies and the best methods of sharing and disseminating results.



Stalked jellyfish *Haliclystus auricular*. Photo by David Fenwick

Feature Article: Intertidal Discovery Project – Coastal survey and mapping for conservation and public benefit in Cornwall (contd)

The Intertidal Discovery project is run by Cornwall Wildlife Trust and the Environmental Records Centre for Cornwall and the Isles of Scilly, and is on track to complete a total baseline survey of the 450 km north Cornish coastline by June 2014.

'More for less'

Ultimately everything comes down to money. While this might seem like a brash statement, in the marine environment conservation is often expensive, so the ability to prioritise conservation management efforts is very important. Decision-making can be difficult, controversial and sensitive, hence judgement must be steered and underpinned by strong evidence.

In 2011, a national evidence-gathering exercise recommended the designation of 127 Marine Conservation Zones in England, under the Marine and Coastal Access Act (2009). However, in 2012 the UK Government's scientific advisors argued that only 31 sites were deemed to have a sufficient evidence-base on which to potentially secure this high level of protection. Of these, only 27 sites received designation in November 2013.

Anyone who has spent time at the Cornish coast, perhaps snorkelling or rock-pooling, will know how beautiful the marine environment can be, and what a fascinating variety of species are present. That's all well and good, but when it comes to conservation management and legal designations it is essential to be able to turn general appreciation and anecdotal accounts into robust scientific evidence.

Evidence

Evidence of change in the marine ecosystem can exist in many formats.



Bedruthan Steps. Photo by Caz Waddell

It could be historic descriptions about the sea; an ad-hoc species record from a member of the public; a structured scientific survey (e.g. a marine phase II survey); a dive survey (e.g. a Seasearch dive); or footage from the very latest combination of camera and sonar technology to create 'maps' of the seabed (e.g. multi-beam images, drop-camera videos or remotely operated vehicles).

The Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS) and Cornwall Wildlife Trust (CWT) hold a wealth of information about Cornwall's marine habitats and species. Most of these data come from specialised surveys or records from dedicated individuals. It is a truly fantastic resource but it is not publically available, and is only of limited use to those making management decisions relating to large geographical areas (as illustrated during the recent MCZ consultation process).

Cornwall has the longest coastline of any county in England and, while the north coast of Cornwall receives millions of visitors a year, we know surprisingly little about the marine ecology of this iconic region. To address this, and to provide much needed information about the ecological state of our coastline, a project called 'Intertidal Discovery' was set up in June 2012 by ERCCIS and CWT.

Intertidal Discovery Project

Intertidal Discovery is a two-year project that aims to survey and map the intertidal habitats found along the entirety of Cornwall's north coast, made possible by funding from the SITA Trust's Enriching Nature Programme. We are working towards a number of important objectives including:

- the production of a comprehensive map showing all intertidal habitats along 450 km (over 280 miles) of Cornwall's north coast;
- public access to three key datasets on species, habitats (biotopes) and non-native species;
- a detailed report on the current status of Biodiversity Action Plan (BAP) habitats, together with a prioritised management plan for each;
- the provision of robust scientific data to marine planning authorities and statutory bodies.

In order to disseminate the project data effectively, we are creating a new marine website, which will include interactive maps and codes of conduct to educate and inform the public. We are also committed to outreach work with partner organisations (Cornwall Inshore Fisheries and Conservation Authority, Natural England, Cornwall Council, Polzeth and St Agnes Voluntary Marine Conservation Areas) to suggest practical and prioritised management recommendations for habitat protection.

Data collection

The project team and volunteers have now surveyed over 98% of Cornwall's north coast using Intertidal Biotope Mapping. This method follows protocols created by the JNCC and the Countryside Council for Wales (now part of Natural Resources Wales), and allows us to gather evidence relating to large areas of land or sea where it would be impractical to attempt data collection on all the species present. This approach has been recognised as the best method for collecting broad-scale, baseline data for intertidal areas (Wyn *et al.* 2006), and allows the results to be utilised as widely as possible.

The team use hand-held computers in the field to produce GIS habitat maps, assess the site characteristics, take detailed target notes and geo-referenced photographs, and produce comprehensive species lists for each area of survey. This use of technology enables us to dramatically reduce the office time needed to collate the data for analysis and eventual dissemination.

Alongside our intertidal work, we undertake trials to ground-truth inshore sub-littoral habitats using a 100 m drop-



Conducting foot surveys for the Intertidal Discovery Project. Photo by Caz Waddell

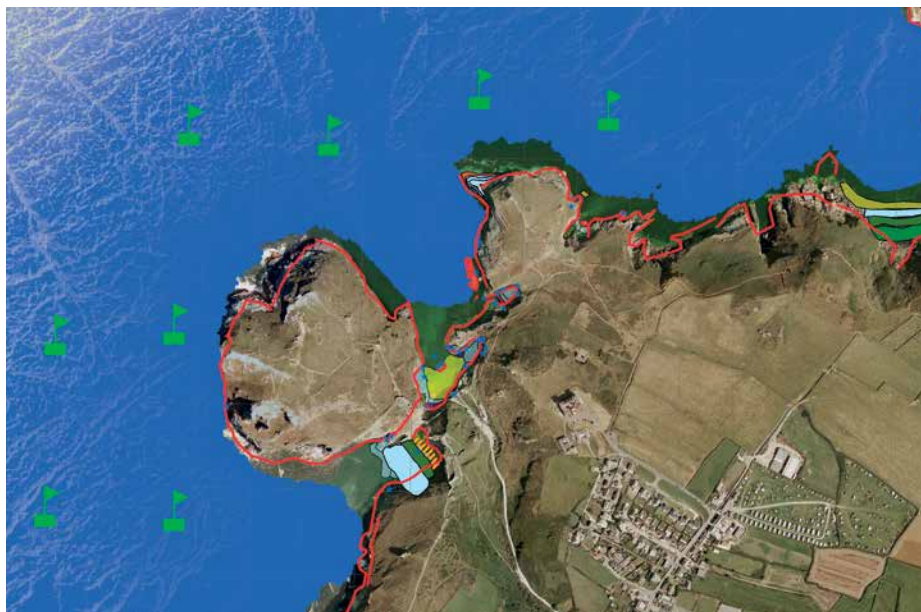


Figure 1: Location of a Drop-Camera Run. Photo by Martin Goodall

of volunteers who have given over 3250 hours of their time to the Project since June 2012. In financial terms this has been valued as a contribution of over £35,000.

Initial results

Over the last 18 months, Intertidal Discovery has surveyed and mapped approximately 440 km of Cornwall's north coast. For the first time, we have been able to establish the extent of six major BAP habitats in the region, as well as the range and extent of almost 100 more common intertidal habitats and over 200 individual species.

The most frequently recorded biotopes are mussel and/or barnacle communities on high-energy littoral rock. From the 2004 JNCC list of almost 200 biotope codes



Drop-Camera Image – *Laminaria* bed

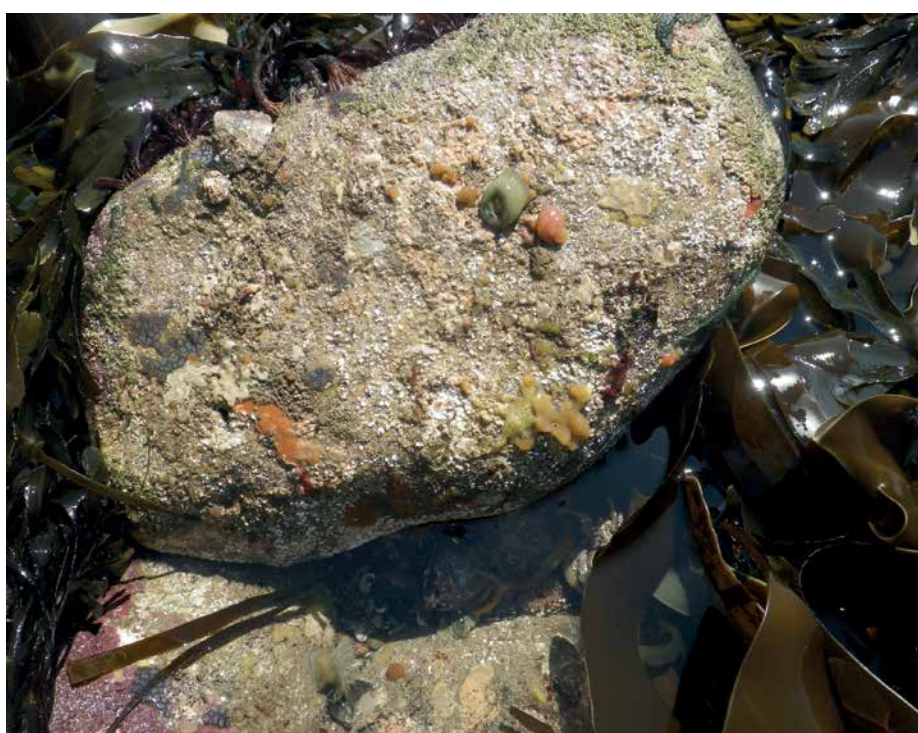


Falmouth Marine School students. Photo by Catherine Wildling

camera with lighting and cage array. This involves dropping a video camera over the side of a boat and collecting high quality video footage of the seafloor (Figure 1). As the images are geographically referenced we can analyse this footage to identify and map the extent of some seafloor habitats. The full method follows the mapping European seabed habitats (MESH) methodology (White *et al.* 2007).

In addition, we are working to develop more efficient sediment survey methods and we are in consultation with the relevant statutory authorities to look into the potential of adopting these methods nationally as part of ongoing MCZ condition monitoring assessments.

Underpinning this survey effort, our training programme for local volunteers and students teaches survey techniques, GIS mapping, data analysis and management, evidence dissemination and habitat/species identification (all long-term, transferable skills). We now have a dedicated group



Intertidal Underboulder Community. Photo by Steph Davis



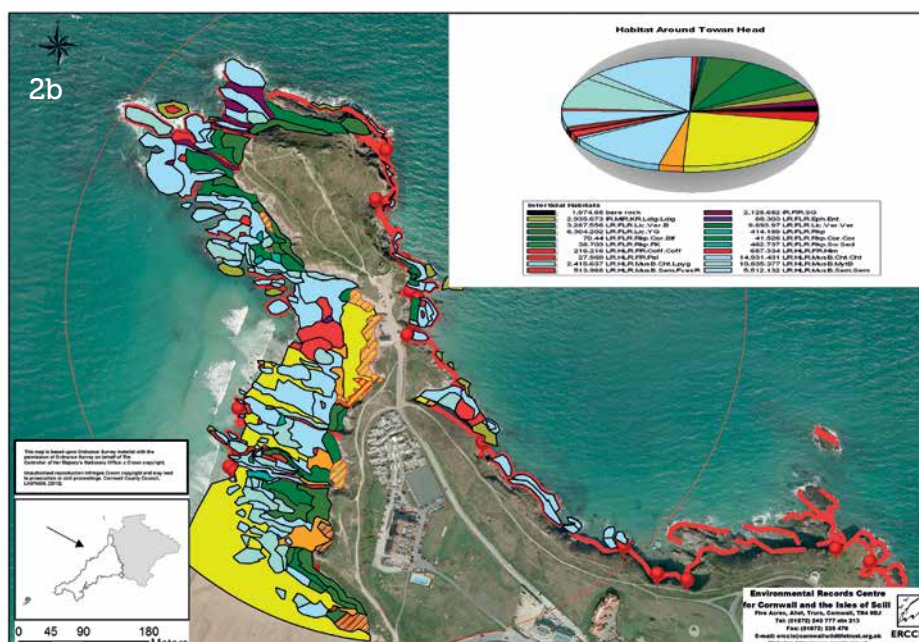
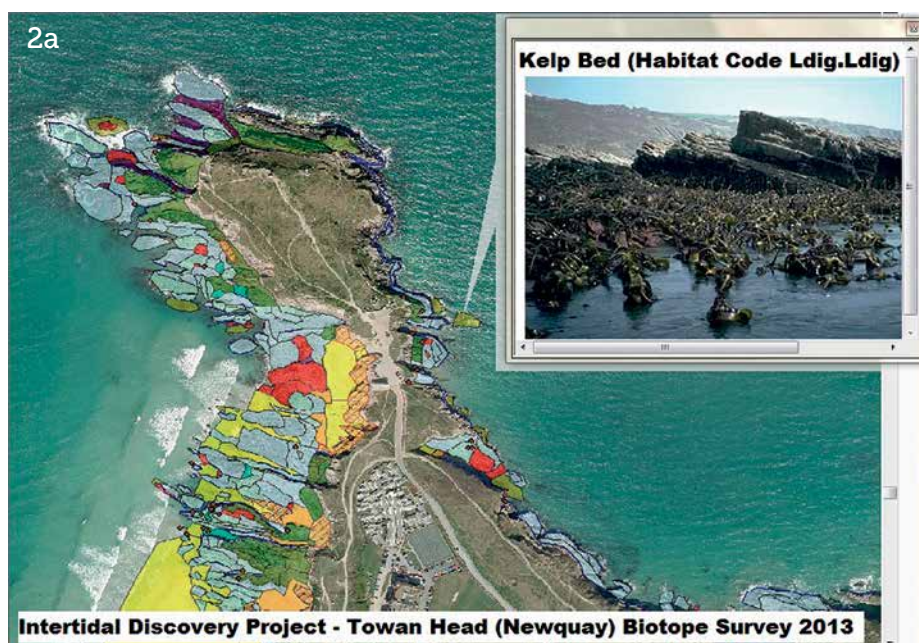
Honeycomb worm reef *Sabellaria alveolata*. Photo by Alan Rowland

describing intertidal zones throughout the UK, examples of 92 have so far been recorded along Cornwall's north coast.

We have found superb examples of intertidal underboulder communities (a 2007 priority BAP habitat) located around Cape Cornwall and St Ives, where iconic species such as stalked jellyfish (*Lucernariopsis campunulata* and *Halicystus auricula*), light bulb sea squirts *Clavelina lepadiformis*, and candy striped flatworm *Prostheceraeus vittatus* have all been found intertidally. A new record has been confirmed for creephorn *Chondracanthus acicularis*, a red seaweed species that had previously been recorded only from the county's more sheltered south coast; and the honeycomb worm *Sabellaria alveolata* has been extensively mapped around the Bude area, where only ad hoc records existed previously.

The surveys have revealed surprisingly large numbers of the strawberry anemone *Actinia fragacea*, together with notable records for the bushy rainbow wrack *Cystoseira tamariscifolia* dominating rockpools, and the brown fork weed *Bifurcaria bifurcata* on open rock of the lower shore. This would appear to support suggestions from the previous Marine Biological Association's MarClim study that these species could be among the 'winners' of climate change with warming sea and air temperatures affecting their distribution, habitat and abundance in the South-West. (Hiscock *et al.* 2005).

Below and top right
Figure 2: Towan Head habitat maps
2a: Habitat information pop-ups
2b: Habitat breakdown charts
2c: 3D effect



Offsetting: moving towards an evidence-based metric for biodiversity assessment

L.J. Cousins GradCIEEM, S. McMellor MCIEEM, G.J.C. Underwood and L.J Appleby Hepburn
Essex University

Research at Essex University has calculated the Defra pilot metric for biodiversity offsetting at a series of sites. The aim was to test its sensitivity to species composition with diversity indices that measure species richness and distribution. The work aims to formulate a metric to calculate offset requirements that incorporates measured diversities with indices for structural connectivity and conservation value. Offset recommendation and design will be the responsibility of many CIEEM members and it is essential that the tools used for the process can deliver the desired outcome. In the case

of offsetting, this is no net loss to biodiversity. Researchers are encouraging practitioners to participate in the study because:

- Input from CIEEM members can significantly aid metric design.
- Peer review is essential to the process of metric validation.
- CIEEM members should play an active role in the formulation of the tools they use.
- Practitioners need the ability to choose from methods based on the best evidence available.

Expert feedback is essential at each stage of metric development. As part of the process of developing and validating a metric for biodiversity offsetting, the Essex project would benefit greatly from your experience, opinion and comments. To make the process accessible to all, an online questionnaire has been prepared with the aim of gathering professional opinion. Respondents will be asked to comment on the choice and weighting of assessment criteria. Input from CIEEM members will be an invaluable aid in shaping the model and essential to the validation process. The survey is open to all and can be found at the following address;

www.surveymonkey.com/s/offsetting_metric

During 2014, practitioners will be invited to test a new metric in the field, following an appropriate briefing. Following analysis for consistency, accuracy and ease of use, the results of the project will be published. Once in the public domain, the findings will offer a positive contribution to the biodiversity offsetting debate; reduce the gap between policy and environmental science; and provide a platform for the opinion of environmental professionals.

Introduction

Biodiversity offsets are conservation activities designed to provide compensation for losses caused through development that cannot be mitigated through the normal mitigation hierarchy. A change in policy to routinely apply offsetting as part of the planning process has recently been the subject of a Defra Green Paper consultation.

To calculate the biodiversity value of a site, how much and of what type of habitat could replace it, is by no means an easy task. This problem of ecological

equivalence is further confounded when we seek to include societal, cultural and economic values into the equation. It was interesting to look at similarities between the responses submitted by organisations with the expertise and experience to comment on such matters. Anticipating some of the criticism levelled at Defra's pilot metric, research at the University of Essex aims to address some of the issues raised.

In the United Kingdom, the idea of implementing a biodiversity offsetting policy has been gathering momentum for at least the five years since Defra commissioned and published a scoping study which examined the design and use of offsetting for England (Treweek *et al.* 2009). The UK government is not alone in its ambition to counter biodiversity losses by routinely offsetting the impacts caused by development projects. Many countries already have or are currently working towards developing offsetting policies that will contribute towards commitments originally made at the 1992 Rio Convention on Biological Diversity and subsequently revised by parties in Aichi 2010 (CBD 2010). That the UK is experiencing something of a biodiversity crisis is well known and will not come as news to *In Practice* readers. The State of Nature Report (Burns *et al.* 2013), for example, makes dismal reading and is only one in a series of publications that increasingly struggle to maintain an optimistic future view. Positioned at the front line of this crisis, the work of professional ecologists and environmental managers is obviously pivotal in maintaining and improving the status of species and habitats. Regardless of how smart we can be, or innovative with the resources we have, it cannot be denied that changes are needed to improve the efficacy of the frameworks within which we currently work.

Offsetting in the UK

Ecological compensation through offset provision seems to be the paradigm change most favoured by Government. This has been clearly indicated through a number of publications, the creation of six regional pilot schemes and not least by the public consultation of a Green Paper on the topic, which closed in November 2013. It is easy to see why offsetting has gained government support. The policy, theoretically at least, ticks two very important and desirable boxes. Firstly, if successfully implemented, the aim of attaining “no net loss” and possibly a “net gain” in biodiversity is an outcome to which no-one could hold aversion. Secondly, the possibility of stimulating a marketplace for a trade in habitat creation would be welcome at a time of economic

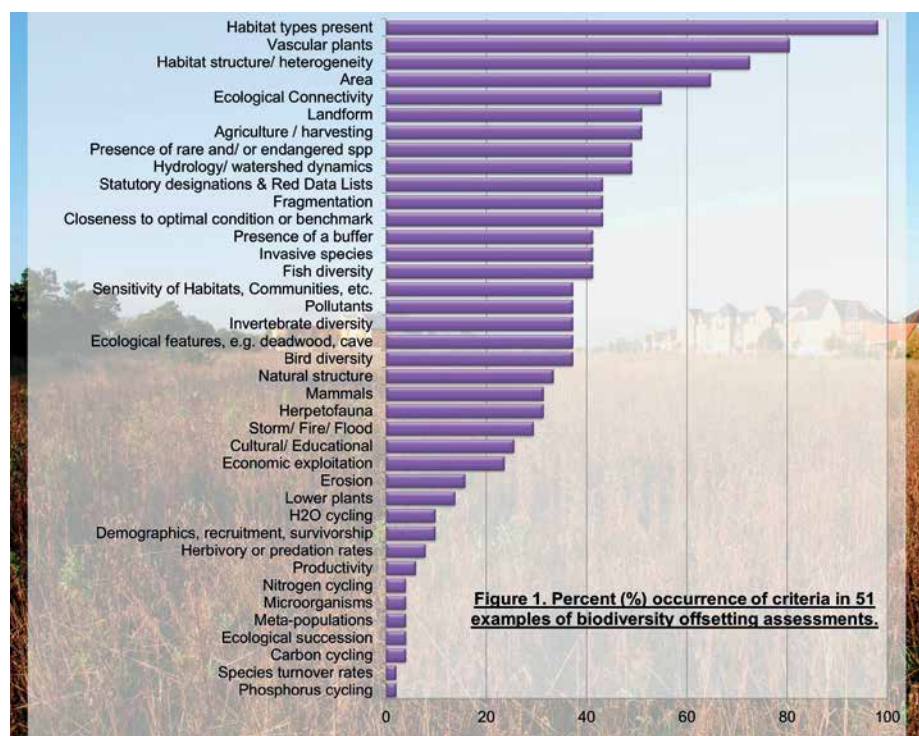


Figure 1. Percent (%) occurrence of criteria in 51 examples of biodiversity offsetting assessments.

austerity. In 2011 the collective global market for “compensatory mitigation” was estimated to have had a minimum annual value in excess of \$4.0 billion (Madsen *et al.* 2011).

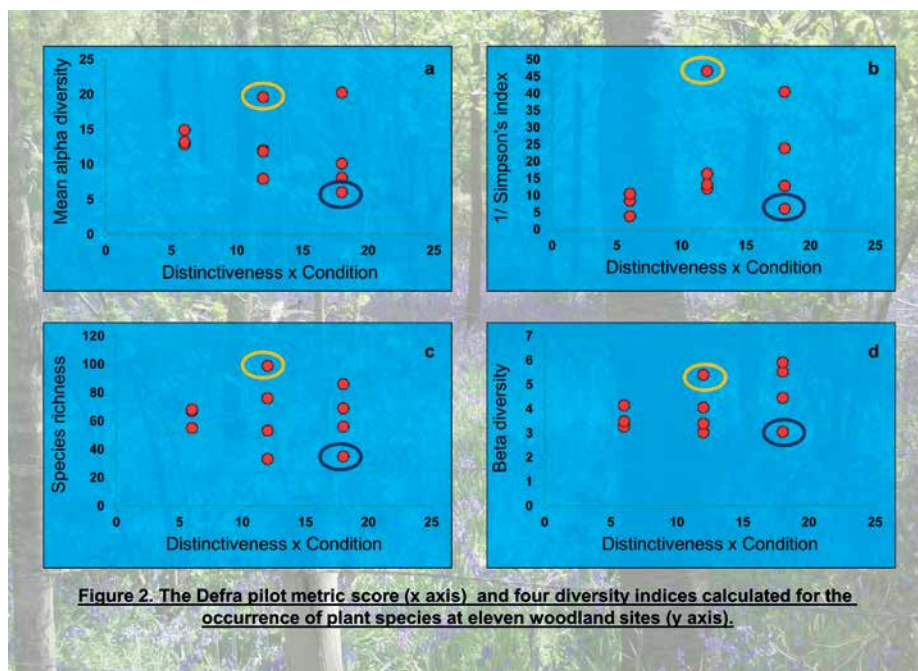
Though advocates of this approach may have hoped that the policy of biodiversity offsetting would gain near universal consent, it has actually received some scepticism and from some quarters, wholesale disapproval. The reasons for this are numerous, but a major criticism is the fact that biodiversity offsetting is by no means a simple process; it involves the assessment of complex systems affecting multiple stake holders, some of whom may have genuinely conflicting interests. There are also public concerns that offsetting would supersede current legislation by enabling development projects to skirt planning procedures instead of being a new tier of compensation offering safeguards additional to those presently in place.

The responses to the Green Paper returned by organisations with experience and professional insight raise interesting points and some commonly held opinion (responses from CIEEM, BES, Wildlife and Countryside Link, Natural England and the Commons Environmental Audit Committee are all available to view online). One common theme within these

responses was a recognition that nationally, biodiversity is under threat and that, in principle, they support efforts to develop new methods to protect biodiversity into the future.

Offsetting metrics

From the perspective of an ecologist and scientist, the metric for calculating conservation credits is of particular interest. Proposed by Defra for use in the six regional pilot areas, it is a tool designed to quantify biodiversity losses and the scale of compensation (Defra 2012). This metric, however, received criticism for being simplistic. Respondents to the Green Paper agreed that, for the pilots, it was a very useful starting point but highlighted, among other things, that whichever metric be recommended for national use it should fully account for the natural complexity of ecological systems; include social, cultural and landscape values; and be a rigorous ecological assessment based on sound scientific evidence. These criticisms draw into close focus the fundamental problems that must have initially faced those working for Defra to develop the pilot metric. On the one hand, environmental assessment must be scientifically rigorous, inclusive of as many natural, environmental, societal, and economic factors as are practicable.



Conversely, the outcome of such a rigorous assessment must be justified, easily conveyed and transparent to a non-specialist audience. Finally, after all this, the process of habitat evaluation and offset design shouldn't present additional cost to the planning process.

Research at the University of Essex aims to address some of the issues surrounding biodiversity offsetting by formulating a metric for offsetting that connects evidence-based science with the needs of developers, practitioners and planners. Now in its third year, the project started by examining more than 50 examples of biodiversity assessment methods. These examples were the product of a literature search that included only methods used or recommended for offsetting or assessing conservation value. Originating from 23 countries, it became clear that a broad spectrum of methods have been used. These ranged from very basic metrics, relying on the simple identification of habitat type and a measurement of area, to much more complex models that involved the measurement and weighting of multiple criteria including physical attributes, ecological functions and geo-biological data, as well as information on species at the site of interest. It was also found that different methodologies used various definitions and synonyms

to describe similar criteria. These were unified under suitable headings to avoid confusing or double counting the criteria used. As an example, the heading of ecological connectivity was used to encompass such criteria as the presence of corridors; ecological coherence; position as an ecological unit, juxtaposition or contiguity. This solution helped contain the number of criteria and aid analysis. The most commonly occurring criteria, appearing in 98% of assessment methods, was the classification of habitat types present (Figure 1). This was enabled in a high proportion of these methods (80%) by gathering field data on vascular plants. As can be seen from the Figure, a large number of criteria were used. Complex models appeared less frequently, which must reflect the limits of survey resources and a preference towards "rapid assessment" methods.

Criteria selection

Conscious of the need for an offsetting metric not to demand additional ecological scoping or survey work, the research at Essex uses data that normally form the basis of the ecology chapter of an environmental statement (ES). Clearly, not all the criteria shown in Figure 1 are commonly required as part of an Environmental Impact Assessment (EIA). However, NVC-style botanical censuses

classify habitat type and if repeated samples are taken, a level of certainty can be applied to measure the completeness of the survey, as can indices of diversity. Similarly, data for birds and invertebrates can be handled in the same way. Data searches and desk studies are another part of the EIA process that yield geographic information about the presence and proximity of neighbouring habitats and locally important sites. Again, if these data are handled quantitatively they can produce informative landscape indices (e.g. connectivity or buffer), which powerful GIS tools such as those used by many Local Biological Records Centres could compute. Given the volume of information required to compile an ES, the Essex metric draws from this and (by intelligently using the data gathered) aims to express the results as a viable offsetting metric.

The science behind the description and explanation of biological diversity dates back to the divergence of ecology as a distinct biological discipline and it is still a fertile area of research (Fisher *et al.* 1943, Magurran and McGill 2010). To find which indices for diversity best suited offset metric requirements, it was necessary to apply many of the recognised variants (e.g. Fisher's Alpha, Shannon-Wiener, Simpson's equitability, Species Accumulation, Rank Abundance Distribution, Species Area Relationship and Whittaker's Beta). These indices were applied to field data comprising the occurrence and distributions of plants, birds and invertebrates from a range of habitat types: woodlands, urban fringe grasslands and locally important saltmarshes in this research project. By seeking redundancy among these indices it was possible to omit many that conveyed little or no additional information. The metric being developed at Essex currently takes the form of an adaptable rule-based model; included within the model are numeric descriptors of community composition, biogeographical information in the form of structural connectivity, buffering and habitat conservation value. The model is versatile and allows for the addition of new criteria and the manipulation of criteria weighting. As a means of comparing performance, the Defra pilot metric was also calculated for each of the sites included in the study.

An important element of the Essex study is to test the performance of the metric proposed by Defra; preliminary investigation suggests that it may lack sensitivity to biological variation between sites of a similar habitat type. Comparing the pilot metric scores against diversity indices for a sample of sites was intuitively a reasonable place to start (Figure 2). Within the woodland subset of habitats studied, the site highlighted in blue contained relatively fewer species (Figure 2c) and consistently fell among the lower end when alternative index values were applied (Figure 2a, b & d). The site with apparently the lowest floristic diversity achieved a maximum score under the Defra scheme. A site that achieved the median Defra score is indicated in yellow yet it was the richest and had among the highest index scores.

This result is unsurprising simply because the pilot metric uses condition as proxy for diversity. However, one concern coming from the University of Essex study is that the omission of species data could undermine offset success. In a scenario where a diverse site (of any given habitat type) is lost to development and where compensation is provided in the form of a less diverse example, the resultant net-loss would go unnoticed due to a lack of information on species present.

Species richness is the simplest and easiest of diversity indices to interpret; however, richness alone does not necessarily equate to high conservation value. Nevertheless, richness or an alternative index which includes information relating to richness (e.g. Whittaker's mean alpha) should be included in the calculation of biodiversity value. This may require weighting to adjust for habitat type or the presence of non-native, invasive species. With the aid of a comprehensive data set, these are challenges the Essex project is working to resolve.

Biologically diverse communities and habitats form ecosystems that not only have greater intrinsic value but are resilient to disturbance and, therefore, more capable of maintaining the services they provide (Folke *et al.* 2004). Though tempting and easy as it may be to criticise biodiversity offsetting and the methods by which it can be achieved, nationally we are

facing continuing losses to the numbers and distribution of species and habitats, a trend that must be reversed. Biodiversity offsetting has the potential to compensate for residual losses that would otherwise remain unaccounted for. As a community we may be unable to report having found the perfect solution to the problem of selecting and weighting assessment criteria but by building on what has already been achieved, a workable solution is attainable.



About the Author

Leslie Cousins is an early career ecologist and graduate CIEEM member with a variety of conservation interests. Having graduated in 2011 with a degree in ecology and gained experience in ecological consultancy, he is now based in the School of Biological Sciences at the University of Essex. He is in the final year of his PhD, working under the supervision of Dr Leanne Appleby Hepburn and Prof. Graham Underwood. His research takes an ecological perspective to examine metrics and their use in biodiversity offsetting. The research is a NERC studentship with Natural England as a CASE partner and has additional support from the Essex Wildlife Trust.

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References

- Burns, F., Eaton, M., Gregory, R., Al Fulaij, N., August, T., Biggs, J., Bladwell, S., Brereton, T., Brooks, D., Clubbe, C., Dawson, J., Dunn, E., Edwards, B., Falk, S., Gent, T., Gibbons, D., Gurney, M., Haysom, K., Henshaw, S., Hodgetts, N., Isaac, N., McLaughlin, M., Musgrove, A., Noble, D., O'Mahony, E., Pacheco, M., Roy, D., Sears, J., Shardlow, M., Stringer, C., Taylor, A., Thompson, P., Walker, K., Walton, P., Willing, M., Wilson, J. and Wynde, R. (2013). *State of Nature report*. The State of Nature Partnership. www.rspb.org.uk/Images/stateofnature_tcm9-345839.pdf
- CBD (2010). *Aichi Biodiversity Targets* [online]. Available at www.cbd.int/sp/targets/
- Defra (2012). *Biodiversity Offsetting Pilots. Technical Paper: the metric for the biodiversity offsetting pilot in England*. PB 13745. www.gov.uk/biodiversity-offsetting
- Fisher, R.A., Corbet, A.S. and Williams, C.B. (1943). The relation between the number of species and the number of individuals in a random sample of an animal population. *Journal of Animal Ecology*, **12**: 42-58.
- Folke, C., Carpenter, S., Walker, B., Scheffer, M., Elmqvist, T., Gunderson, L. and Holling, C. (2004). Regime shifts, resilience, and biodiversity in ecosystem management. *Annual Review of Ecology, Evolution, and Systematics*, **35**: 557-581. <http://www2.bren.ucsb.edu/~fd/misc/595/folke-regimeshifts-annrevecolsys04.pdf>
- Madsen, B., Nathaniel, C., Daniel, K. and Bennett, G. (2011). *2011 Update: State of Biodiversity Markets*. Forest Trends, Washington DC. www.forest-trends.org/publication_details.php?publicationID=2848
- Magurran, A.E. and McGill, B.J. (2010). *Biological diversity: frontiers in measurement and assessment*. Oxford University Press, Oxford.
- Treweek, J., ten Kate, K., Butcher, B., Venn, O., Garland, L., Wells, M., Moran, D. and Thompson, S. (2009). *Scoping study for the design and use of biodiversity offsets in an English Context*. Department for the Environment, Food and Rural Affairs. www.gov.uk/government/uploads/system/uploads/attachment_data/file/218689/BiodiversityOffsets_12May2009.pdf

Digital photography and biological recording: opportunities and pitfalls based on a study of hoverflies (Diptera, Syrphidae)

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Bright Angel Coastal Consultants Ltd

This article explores the potential use of digital photography as a biological recording tool. It is based on an analysis of a dataset of nearly 17,000 records of hoverflies from a variety of Internet sources. This family of flies represents one of the better-recorded invertebrate taxa but includes a substantial number of species that require detailed investigation under high magnification. As such, an analysis of photographs of this fly family offers an insight into the issues that may emerge if photography is used in a broader context for biological recording. The results show that photographers largely report species that are relatively common and are encountered without employing specialist search techniques. The results also emphasise the need to employ a variety of search techniques to assemble robust taxonomic lists that are



The hoverfly *Volucella pellucens*, or Great Pied Hoverfly, is a common species whose males hold territories in sunlit glades

representative of the fauna of a study site. At the moment, there is no co-ordinated programme of data extraction from the Internet. Thought needs to be given to its potential as a source of records, but should bear in mind the time required to extract records.

The need for robust data on the ecology, distribution and abundance of our plants and animals is essential for ongoing conservation science, management and policy development. Yet, despite this need, the supply of trained and competent taxonomists is seemingly declining and the science is under severe stress in many institutions. Godfray *et al.* (2011) highlight structural weaknesses in the academic world with University departments shifting emphasis away from taxonomically-based skills and studies; and since 2009 many regional museums have shed key natural historians. Many professional taxonomists carry their interests into retirement and often form the basis of skills in national and local societies. Consequently if there are fewer jobs in taxonomic disciplines, there must ultimately be a commensurate decline in the population of retired professionals who continue to make an essential contribution to our knowledge of plants and animals.

There is also a huge body of people from all walks of life who take an interest in natural history. They are the unsung heroes of biological recording because much of the data held by the National Biodiversity Network (NBN) comes from their efforts. These are 'citizen scientists' or perhaps more appropriately they are non-vocational taxonomists (Morris 2010). Their interests and skills vary, but the data they collect is the basis for many of the essential parts of conservation management: defining SSSIs, monitoring trends and distribution, and adding new species to the 'British list'. Some even provide taxonomic advice to the Universities and run training courses attended by museum staff!

There is clearly a need for a mature conversation about the future of professional taxonomy, but perhaps there is

greater hope for the non-vocational sector? A survey of natural history societies might suggest that here too, activity is waning. Membership of many societies is at best static. A general shift in demographics is evident, with fewer young people joining and participating in society activities.

Looking at modern social media however, there is arguably no sign of a decline in interest in wildlife. Interactive web-based forums are extremely popular. The online biological recording facility *iSpot*¹, that allows people to upload photographs for identification, is extremely popular and generates good numbers of records across a wide range of taxa (Woods & Scanlon 2012). Other forums include *Wild About Britain*² and the huge community of photographers based around *Flickr*³, *Picasa*⁴ and *Ipernity*⁵. There are also numerous active and popular forums on *Facebook*⁶. Clearly, there is demand for interaction and assistance with identifying plants and animals. In addition, there is a continuing demand for places on Manchester Metropolitan University's MSc in biological recording. What is the key separator between modern and historic biological recording?

A change in philosophy

In a recent post on a Yahoo forum⁷, there was an exchange in which an individual took great exception to the competent specialist saying that a particular animal could not be identified to species level from photographs. The gist of the tirade was that the specialist should wake up to the modern world and recognise that photography was the way forward. This view was supported by others, who also believed that it was unreasonable for a specialist to decline to make a firm identification and that they should have been able to do so from the photograph supplied. This exchange illustrates how views have shifted away from acceptance of the collection and examination of biological specimens using strict taxonomic rigour. The question that follows must therefore be: can photographic recording actually replace traditional recording? And, can photographic recording form a part of a strategy to maintain and grow the very necessary army of technically competent citizen scientists whose data are essential to conservation management?



A male hoverfly of the species *Eristalis intricarius*; the species is sexually dimorphic

My interpretation of these questions is based on more than five years monitoring the Internet for identifiable photographs of true flies (Diptera) for various schemes, but in particular the Hoverfly Recording Scheme (www.hoverfly.org.uk) where I am co-organiser (with Dr Stuart Ball). During this period I have amassed a dataset of over 17,000 hoverfly records and a further 4000 other Diptera taxa derived solely from photographs posted on web forums or sent in photographs via e-mail. These data form the foundation for more detailed interpretation that will be developed in coming months (Morris, *in prep.*). Meanwhile, there are some fairly immediate messages that can be drawn from the data that could have a bearing on efforts to promote biological recording.

The British hoverfly fauna

At the time of writing, the British hoverfly fauna is known to comprise 283 species. Its taxonomy is relatively well known and is covered by a detailed monograph (Stubbs & Falk 2002). In addition there is a photographic guide (Ball & Morris 2013) that illustrates all of the genera and 165 species (it was developed as a companion to the main monograph and is richly illustrated for this reason). Neither volume is completely up to date; a supplement is needed to cover species added to the British list since 2002 (e.g. there have been two further additions even since the text of Ball & Morris was finalised in late summer 2012).

A substantial proportion of British hoverflies can be identified from

photographs, providing the photographer captures relevant and essential features. Using 30 years' field experience I expect to be able to place a name on photographs of about 140 species (i.e. about half the British list). Mistakes do however happen. I generally avoid jizz (the intuitive use of un-definable characters and experience). Instead, I normally rely on whether I can actually see the key characters, but photographs rarely convey scale properly and are one-dimensional.

There are several genera where identification is best undertaken in males whose critical features exist within the genital capsule or on the undersides of the tarsi (the foot segments). These species present the majority of the difficulties that require microscopic examination and are entirely dependent on morphological rather than colour characters. Other complications arise because many hoverflies are rather variable in colouration (both hairs and the actual integument), with some genera exhibiting strong temperature-related variation. In addition, there is an element of sexual dimorphism in many species and also brood dimorphism in some species with multiple broods.

These factors mean that unlike charismatic groups such as butterflies and dragonflies, the potential for accurate identification based on distinct patterns is more limited. In addition, our fauna is a sub-set of a much larger European fauna (currently comprising over 800 species) where many species complexes exist in genera that are relatively straightforward in the UK because there are fewer known species.

Data compilation

The dataset has evolved and search techniques have been refined through experience. Initial searches were undertaken using a standard search engine (Google) and key words based on either specific or generic names. Rich sources of records are regularly re-visited and I now check over 20 websites daily and around a further 30 on a more intermittent basis. In addition, I occasionally repeat the original Googling exercise and check sources that drop off the horizon due to inactivity. Viable photographs must have a believable date and must either be geotagged or some form of notation must be available to indicate where the

photograph was taken. Where a photograph has more limited data, the author is contacted to seek more detail. Thus, the resulting Excel spreadsheet comprises details of the species, the date of the photograph, a location name, an OS grid reference determined to either 2, 4 or 6-figure resolution (i.e. 10 km, 1 km or 0.1 km resolution), the name of the photographer, the determiner's name, the stage or sex of the animal, and the source, together with additional notes on flower visit, etc.

In the period August to October 2013, an additional set of records was compiled for photographs of hoverflies that could not be taken with confidence to species level. This has already yielded in excess of 500 examples and provides an indication of the wider spread of coverage by photographers. In the majority of cases identification to generic level is possible, but a minority of photographs cannot be taken beyond the level of tribe because of the angle and the coverage of key taxonomic features.

New spreadsheets are developed each year, allowing the previous one to be uploaded into the Hoverfly Recording Scheme (HRS), which is held on Recorder 2002. HRS data are uploaded onto the NBN intermittently (the last time was 2005).

Lessons learned

Full analysis of the photographic data is expected in 2014, but several strong themes emerge that are relevant to the biological recording community.

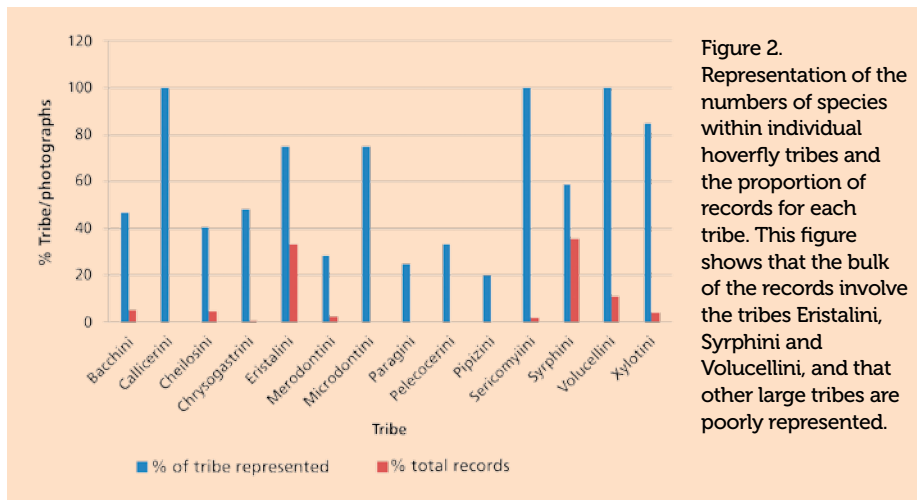
1. There has been a continuous growth in the numbers of data-worthy

photographs placed on the Internet covering the period 2004 to date (Figure 1). The real surge in activity commenced around 2009 when iSpot was launched, but it has been accompanied by a growing level of activity on Flickr, which is now the major source of data. This growth in records appears not to have reached a natural plateau.

2. There is a strong bias in the data because photographers generally respond to an opportunity rather than seeking out a particular species to photograph. Consequently, those subjects that are most commonly seen and stay still for sufficient time to be photographed appear most frequently on iSpot and on other media.
3. Some genera (*Platycheirus*, *Pipiza*, *Cheilosia*) hardly ever figure in photographs even though they form a major part of the list developed during a field recording session by a competent specialist (Figure 2).
4. It is rare for significant lists to be developed for a particular place on a particular day. A long list rarely comprises more than five species whereas a corresponding list by active netting can reach 30 or more species at a good site on a good day.
5. Activity by photographers is a relatively good means of determining the daily, weekly, monthly or yearly level of insect activity. Although there is an inevitable tendency for more photographs to be posted as a consequence of a nice day at the weekend, there remains



Figure 1. Growth of Internet recording between 2004 and 2013. The data for 2013 are marginally bigger than those for 2012 but can be expected to increase over subsequent years. This projection is based on past experience where data for previous years have subsequently grown as photographers join interactive websites and post their backlog of records.



to a major influx of new interest and generated a recording community that had previously not existed to any significant degree.

Implications

This study focused on a taxonomically challenging group of organisms. Prior to 1983 it was considered a very difficult family, but it has benefitted from better keys and illustrations. These books, together with better access to web-based identification aids, has encouraged much greater interest in the family, which was once the preserve of a limited group of taxonomically competent Dipterists. Residual difficulties are exposed by the limitations of what can realistically be identified using photographs.

The range of species that feature on photographs demonstrates how biological recording is dependent upon a combination of sound taxonomy and field craft. Cryptic species and those with habits that do not lend themselves to photography are inevitably overlooked and under-recorded. Digital photography obviously extends the potential for recording amongst those who are unwilling to kill specimens but it must be recognised as an adjunct to more rigorous recording rather than as a potential replacement.

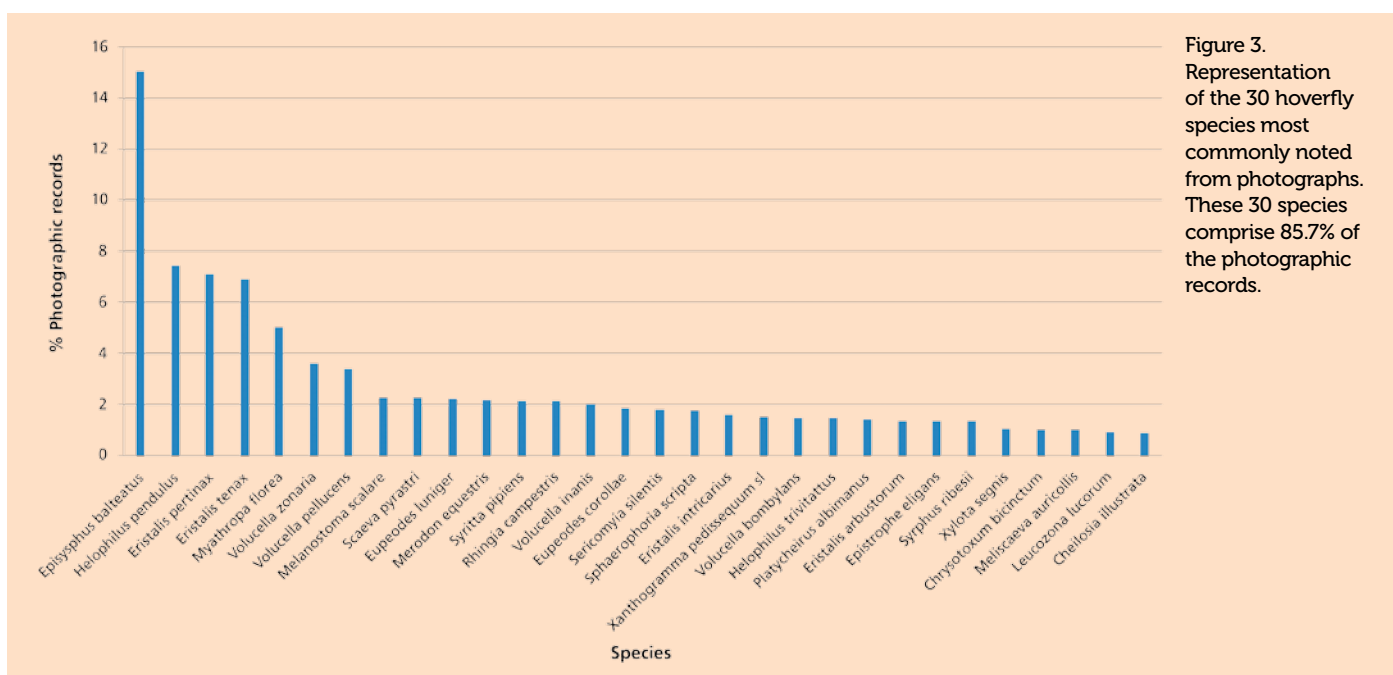
The Internet is, however, an important and growing means of communicating with

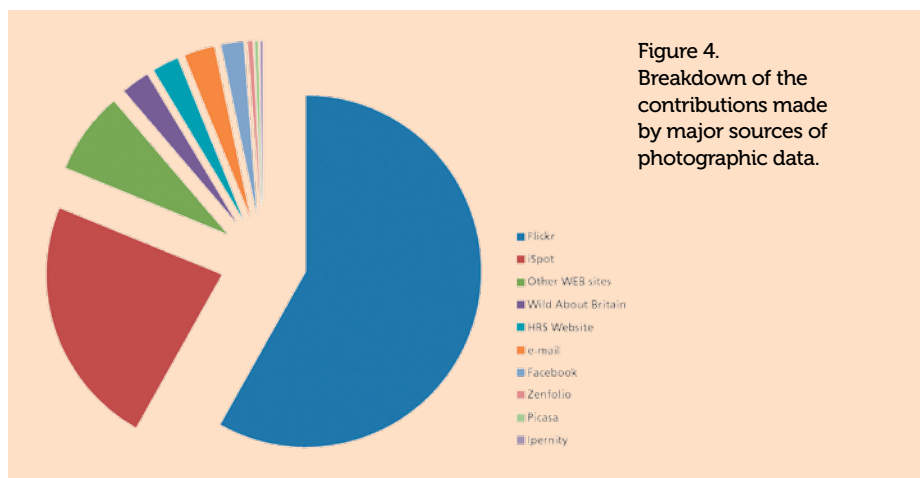
considerable activity during weekdays. Conversely, poor weather quickly shows a slump in numbers. The effects of prolonged heat are also readily apparent, and were demonstrated by a slump in hoverfly records in July 2013.

- Thirty species contribute roughly 86% of the records (Figure 3), despite the list of species recorded exceeding 150. Certain large, charismatic species are particularly well-represented in the dataset. So, too, are the ubiquitous and abundant species that are most frequently seen in parks and gardens.
- A very small number of species appear to be recorded more frequently by photographers than field entomologists. This is particularly

noteworthy for the recently arrived *Cheilosia caerulescens* and for the picture-winged fly *Palloptera muleibris* (Pallopterae).

- Very few photographers concentrate on hoverflies and consequently data collected by this mechanism are highly ad hoc. Those who diligently record these animals and other organisms can be exceptionally useful sources of records but they are very unusual.
- Interaction with individual recorders as photographers is possible, and this in turn has encouraged a small number to make greater effort to record hoverflies.
- The establishment of the UK Hoverflies 'Facebook' page⁸ in August 2013 led





field naturalists and people who take a passing interest in the plants and animals they see. The success of iSpot, which has generated over 100,000 records and has been responsible for two additions to the British list (Woods & Scanlon 2012), is testimony to this. Making these links is, however, not a passive process of establishing a mechanism to capture data and waiting for them to be uploaded. There is a clear need to direct interaction between taxonomic specialists and those members of the public with a latent potential for biological recording. This is illustrated by the relative contributions of data from various sources (Figure 4).

The data that emerge from photographic recorders have potential to augment other sources, but there are obvious limitations; the most important being the relatively limited range of species recorded. There are, however, a number of areas where there is potential to make use of digital photography as a significant addition to the armoury of monitoring tools. The following initial suggestions require refinement, but are worthy of consideration:

1. Providing a relative measure of the abundance of readily identifiable species over a long time-period.
2. Establishing a network of people whose interest is likely to be at a local level such as their garden or nature area. It must, however, be recognised that maintaining interest at an individual level over a long time frame (decades) may not be possible.
3. Monitoring the relative abundance and distribution of charismatic species that might be used in association

with projects such as the National Phenology Network, or other aspects of monitoring responses to climate change and understanding the response of invertebrates to environmental change.

4. Developing a simple suite of recognisable species that are responsive to factors such as temperature or rainfall.
5. Developing 'virtual' communities of natural historians to augment existing arrangements through national and local societies.

Perhaps the most important lesson to be drawn from these initial observations is that the Internet has considerable potential as a source of records of taxa that can be identified from photographs. In the course of this work, it has been noted that moths and butterflies, dragonflies and a few other charismatic animals are regularly photographed. In these areas there is greater potential for using photographers as an adjunct to detailed monitoring.

At the moment these sources are monitored on a highly ad hoc basis (I am aware of several recording scheme organisers who operate as I do) and consequently a great deal of valuable data is missed. The scale of the job of data monitoring should not be underestimated however. Extracting data for the Hoverfly Recording Scheme alone involves several hundreds of hours effort each year after a more intense period of work to ensure that the backlog was properly investigated.

A critical lesson to be drawn from forums such as Wild About Britain, iSpot and Facebook is that people are increasingly reliant upon electronic communication and

Notes

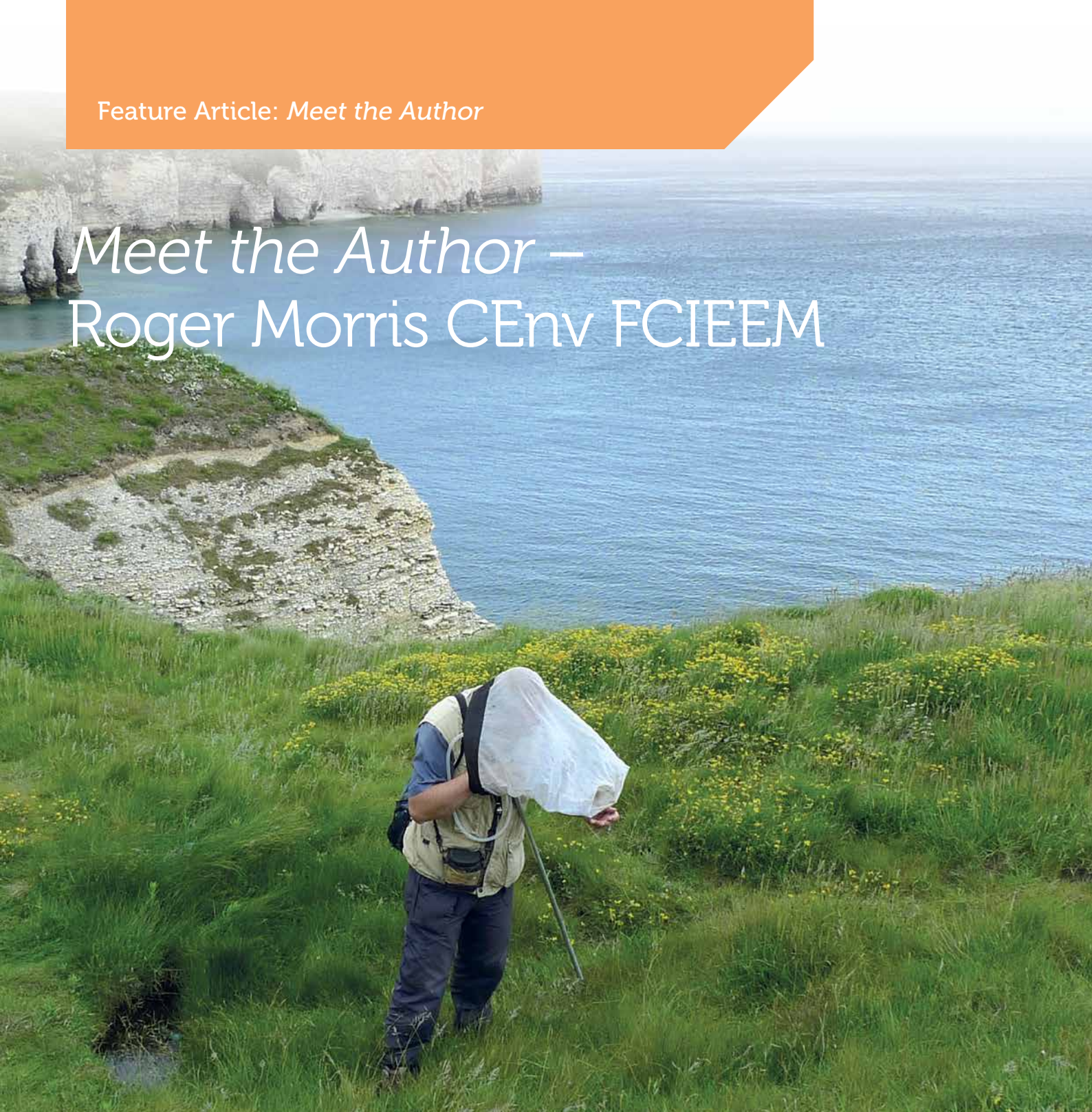
- 1 <http://www.ispotnature.org/>
- 2 <http://wildaboutbritain.co.uk/>
- 3 <http://www.flickr.com/>
- 4 <http://picasa.google.com/>
- 5 <http://www.ipernity.com/>
- 6 <https://www.facebook.com>
- 7 <http://groups.yahoo.com/neo/groups/UK-Hoverflies/info>
- 8 <https://www.facebook.com/groups/609272232450940/>

are less willing to join societies that would previously have met their need for social interaction. This does not bode well for the traditional society and means that they must start to think carefully about how they might adapt to the new paradigm. Experience from the recently established UK Hoverflies Facebook page shows that a new 'virtual society' can be created, but even these formats are dependent upon regular efforts to encourage membership and to motivate people to participate.

References

- Ball, S. & Morris, R. (2013). *Britain's Hoverflies: an introduction to the hoverflies of Great Britain*. Princeton University Press.
- Godfray, C., Boxshall, G., Akam, M., Bailey, M., Blaxter, M., Chase, M., Fortey, R., Knapp, S. and McLean, I. (2011). *Developing a National Strategy in Taxonomy & Systematics*. <http://www.nerc.ac.uk/research/programmes/taxonomy/documents/national-strategy.pdf> (Accessed 06 October, 2013).
- Morris, R.K.A. (*in prep.*). Photography as a source of biological recording: a case study using hoverflies (Diptera, Syrphidae).
- Morris, R. (2012). A change in funding directions: implications for biological recording. *British Journal of Entomology & Natural History*, **25**: 143-151. (available from <http://www.bacoastal.co.uk/Entomology/2012-Funding.pdf>)
- Stubbs, A.E. & Falk, S.J. (2002). *British Hoverflies: an illustrated identification guide*. British Entomological & Natural History Society. (Revised & Updated by Ball, S.G., Stubbs, A.E., McLean, I.F.G., Morris, R.K.A. and Falk, S.J.)
- Woods, W. & Scanlon, E. (2012). iSpot Mobile – A Natural History Participatory Science Application. Paper presented at the 11th World Conference on Mobile and Contextual Learning. <http://kn.open.ac.uk/public/getfile.cfm?documentfileid=18323> (Accessed 06 October, 2013).

Meet the Author – Roger Morris CEnv FCIEEM



What do you do?

I have two 'day jobs'. I am an independent consultant, specialising in coastal management. My clients primarily involve Government departments and agencies. Commissions have ranged from the UK though to The Netherlands and Germany. I am also a non-executive Director at Harwich Haven Authority, which is responsible for providing safe navigation to the ports of Felixstowe, Harwich, Ipswich and Misterley. I am probably as well known, however, for my voluntary role as joint organiser of the UK Hoverfly Recording Scheme.

What or who first inspired you to get into ecology?

It was genetic! Both my parents were biologists. My father was a micro-palaeontologist whose interests ranged from birds to coral reefs; my mother was a botanist. I was captivated by the natural world, collecting fossils to rearing caterpillars from a very early age. Jacques Cousteau's wonderful television programmes definitely pushed me towards Marine Biology - and there is the twist of fate because I ended up with a degree in Applied Zoology!

How did you get to where you are today?

There were no jobs there when I graduated in 1980. So, after several labouring jobs and an abortive attempt to be a teacher (the best thing I ever did was to fail TT), I ended up running a Manpower Services project in 1983 (i.e. at the height of the 1980s recession). Five years later I joined the Nature Conservancy Council as an entomologist. Three years later NCC was split up and the entomological jobs were disbanded. I was with JNCC for a short while acting as editor and print-buyer getting various reports published.

After a 15-month spell dealing with the Channel Tunnel Rail Link I got my first permanent job – after 14 years on 6-month to 15-month contracts and several blocks of unemployment! I became Conservation Officer for South Humberside in 1994 where I gained experience of integrated coastal zone management, shoreline management planning and the rudiments of estuarine geomorphology. Four years later I became Head of Estuaries Conservation in English Nature's Maritime Team, and specialised in big port developments, dredging and estuarine geomorphology. In 2006 English Nature was merged with the Countryside Agency and parts of Defra to become 'Natural England'. I left NE in 2009 greatly disillusioned! My consultancy and appointment to Harwich Haven Authority followed shortly afterwards.

What have been the most important steps along the way?

Mine is not what might be regarded as a conventional career. Between 1980 and 1994 I forwent holidays and used all my spare time developing entomological skills (mainly as a Dipterist and Hymenopterist). The turning point was an interview for the Invertebrate Site Register in 1984 after which it was suggested to me that if I wanted a job in entomology I should give up moths and take up a more useful group – such as flies. It was wise advice but should be noted for a critical point - change direction if you are heading for a dead-end. Flies still provide me with plenty of entertainment even though I no longer work in entomology.

The second key step was the realisation in around 1992 that I stood no chance getting a job in conservation as a biologist. Nobody needed technically competent invertebrate ecologists – they wanted people who understood development planning and wildlife law. That remains the case today I think.

Finally, when I joined Maritime Team, it was clear that nobody was very keen on estuarine geomorphology – it is the trickiest bit of coastal management. So, I made a point of becoming moderately proficient. I had a fantastic mentor – Prof. John Pethick who was absolutely inspirational.

Are there any 'must-have' qualifications and/or experience?

I would argue that a good ecologist working in the broad field of conservation requires the following:

- A sound grounding in wildlife law and its application.
- A basic understanding of drift and hard geology.
- Good geographic literacy in terms of the differences in habitats and species across the British Isles.
- A skill or interest that makes you stand out from the rest of the candidates.
- A constant desire to learn.

Do you have any advice for someone setting out on a career in ecology and environmental management?

It depends on what you want out of life. If you aspire to reach the dizzy heights of management, then don't stay in the same post for more than three years otherwise you will get overtaken by others with more drive. Alternatively, if you actually want to be an ecologist, then bear in mind that a great deal of what one does is not ecology – it is administration in one form or another. So, make sure you have a hobby in wildlife that keeps you engaged with the natural world when one's day-job involves meetings and report-writing.

What's the best thing about your job?

I'm my own boss!

What's the downside?

Very little work and commensurate pay!

What's next for you?

Difficult to say – I hope that there will be enough work to see me through to retirement but I have not discounted another career change.

What is your top tip for success?

I have always advised that one makes one's own luck (good or bad). A sound political nose is probably the most important asset, followed by an aptitude for hard graft (I lacked the former and had bags of the latter). I would also advise that if one hits a dead end, reinvent yourself and change direction.

My other piece of advice would be to have a clear picture of what you want to do, and where you want to be by particular points in your life. It is frightfully easy to drift – Pink Floyd's lyrics about realising that 10 years have passed are so true!

*"... And then one day you find
ten years have got behind you
No one told you when to run,
you've missed the starting gun"*

Extract from 'Time' from 'Dark Side of the Moon' by Pink Floyd.



For further information

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Ecology Legal Update

Mitigation Measures and Habitat Regulations Assessments: when can mitigation secured by planning condition be relied upon by a competent authority to conclude an absence of likely significant effects on a European site from proposed development?

Penny Simpson and Dean Amory
Freeth Cartwright LLP

Introduction

When complying with the "Habitat Regulations Assessment" regime in the context of development proposals (found under Part 6 of the Conservation of Habitats and Species Regulations 2010 ("2010 Regulations") which implement Article 6.3-6.4 of the Habitats Directive), the competent authority (normally the planning authority or the Secretary of State) must make a screening assessment as to the likelihood of significant environmental effects arising from the development in combination with other plans or projects. A key issue is the extent to which mitigation secured by planning conditions may be relied upon to reach a conclusion of no likely significant effect.

On the one hand, most would agree that a planning condition which, for example, restricts the hours of operation of a proposed facility so as to avoid ecologically sensitive times of day or seasons, would be a relevant factor in assessing likely significant effects of a proposed development. On the other hand, most would also agree that it is unacceptable to rely on planning conditions which have the effect of deferring the assessment of likely significant effects until after planning permission has been granted since that would frustrate the purpose of the legislation (in other words conditions cannot be relied on as a surrogate for the assessment process).

However, there are cases where the position falls somewhere in between these two extremes. Two cases went to court

during 2013 on this issue and are the focus of this article. The article seeks to explore where the boundaries lie in terms of lawful reliance on planning conditions when determining likely significant effect.

Case 1: *Feeney v Secretary of State for Transport* [2013] EWHC 1238 (Admin)

The case

This High Court (first instance) case concerned a challenge by Mr Feeney to the Chiltern Railway (Bicester to Oxford Improvements) Order 2013 made under the Transport and Works Act 1992 Act. The Order authorises the construction of a new length of railway, a section of which would pass about 1 km to the east of parts of the Oxford Meadows Special Area of Conservation (SAC).

At the inquiry, Chiltern had argued that, based on modelling data, there was no likely significant effect on the lowland hay meadow feature of the SAC from nitrous oxides (NOx) levels arising from its project. As such no appropriate assessment under the 2010 Regulations was required, nor further assessment or mitigation.

The inspector, however, found that the modelling data left room for uncertainty: *"Although Chiltern has provided some modelling data the potential for significant adverse effects cannot be ruled out until the impact of the scheme has been assessed against on-site data. The current data which are completely based on modelling leave room for uncertainty."*¹



Following the advice of Natural England (NE), the inspector, therefore, imposed a condition under which further air quality / NOx monitoring work would be undertaken followed by the implementation of mitigation measures if shown to be necessary. The condition required information to be obtained about the present state of NOx pollution on the lowland hay habitat, and about the effect of the scheme on the levels of NOx on it, leading to an analysis of possible remedial measures and their implementation. On this basis no appropriate assessment was required.

The Secretary of State accepted the inspector's recommendation and imposed this condition when granting the Order, also confirming that no appropriate assessment was required.

Mr Feeney challenged the planning permission. He argued (correctly) that the Habitats Directive and 2010 Regulations required an appropriate assessment to be carried out unless the Secretary of State was convinced that there was no possibility or risk of a likely significant effect. This follows the well known case of *Waddenzee*², under which the Court of Justice of the European Union ruled that such a risk existed *"if it cannot be excluded on the basis of objective information that the plan or project will have significant effects on the site concerned"*³.

Mr Feeney argued that the imposition of the condition, and particularly the condition's requirement for collection of baseline data on NO_x, proved that the inspector and Secretary of State did not have enough information about those matters, nor could they know whether the remedial measures which were then required to remedy the effects of the scheme could be implemented. Therefore, the screening test should have failed and an appropriate assessment was required.

Mr Feeney lost his argument (and, at the time of writing, it is understood that he has decided not to appeal to the Court of Appeal).

The court ruled that this was not a case where the inspector or the Secretary of State suffered from an absence of knowledge about the condition of the SAC or the predicted deposition of NO_x. Information was before them on both these points and there was no suggestion that the model or data presented by Chiltern were significantly flawed. On this basis, a conclusion was reached by the inspector / Secretary of State that harm to the SAC was "unlikely". The uncertainty that remained, taking into account the data presented, related to what would happen once the railway was in operation. This was the gap which the proposed planning condition was designed to fill: "*That was where the uncertainty lay and no better predictions were available*". Even if Chiltern had provided a baseline assessment in addition to its modelling data prior to determination, this would have revealed nothing to assist, since the unknown element was the data from the railway once it was in operation. Furthermore, NE had given evidence that there was no reason to believe that if remedial measures under the condition were to become necessary, they would not be effective. The suggested measures were "*tried and tested*". As such, the imposition of the condition enabled the Secretary of State to address "*the limited possible effect of the limited uncertainty*"⁶ so as to conclude, lawfully, no likely significant effect.

Comment

This is a controversial decision for three reasons:

The judge found that even though the modelling data provided by Chiltern had

shortcomings, "*no better predictions were available*"⁷. It is not entirely clear what evidence the judge had for this conclusion. If a more thorough assessment could have been carried out by Chiltern to address these shortcomings and to clarify the likely impacts then it is strongly arguable this should have been done, otherwise the condition is indeed having the effect of frustrating the purpose of the 2010 Regulations.

Some lawyers are of the opinion that the judge in *Feeney* misapplied an earlier decision of Sullivan J in *R (Hart District Council) v Secretary of State for Communities and Local Government*⁸. The *Hart* case is authority for the proposition that, when applying the screening test under the 2010 Regulations, the competent authority is required to consider the project as a whole, including mitigation measures if they are part of the project. In *Hart*, the mitigation measure put forward by the developer was clearly part of the project – it was the provision of recreational play areas outside the Special Protection Area (SPA) to dissuade people from using the SPA for recreation. Similarly, the principle in *Hart* would apply to a project put forward with limited hours of operation to avoid ecologically sensitive periods. But can the proposed mitigation scheme in *Feeney* fairly be regarded as "part of the project"? First, Chiltern railways did not itself put forward the condition as part of its project (the Secretary of State applied the condition following NE's advice). Secondly, any future mitigation is contingent on the further assessment work under the condition – i.e. it is not a *certain* aspect to the project. These factors do give rise to a concern but it is doubtful that they render the decision defective. This is because (although not discussed in the judgement) the "likely significant" test must be applied to the project "*in combination with other plans and projects*"⁹. Therefore the mitigation in the *Feeney* case should, in any event, have been taken into account through the "in combination" mechanism.

Finally, the mitigation measures that NE regarded as "tried and tested" (i.e. making management changes to land within the SAC) would, in fact, be dependent on the co-operation of land owners / NE's use of Site of Special Scientific Interest

(SSSI) powers under the Wildlife and Countryside Act 1981. Did the Secretary of State, when imposing the condition, really have sufficient certainty that the measures envisaged by the condition could be implemented, if they were needed, so as to rule out the possibility of significant effects? This is the most problematic and unsatisfactory part of the judgment.

Case 2: *R (on the application of Champion) v North Norfolk District Council* [2013] EWCA Civ 1657

The case

In this case North Norfolk District Council granted Crisp Malting Group Limited planning permission for a proposed development (construction of 2 silos and a lorry park with wash bay facilities) on a site in close proximity to the River Wensum, which is a SAC.

The Council's development control committee decided that the development was not such as to require either an environmental impact assessment (EIA) or an appropriate assessment. However, the Council imposed planning conditions relating to the monitoring and, if necessary, restoration of water quality in the drainage network between the development site and the river so as to avoid harm to the SAC. The first condition prevented any development until a scheme for monitoring water quality in the drainage network was approved by the Council and required the monitoring scheme then to be implemented. The second condition required steps to be taken if the monitoring scheme demonstrated diminution of water quality attributable to the development. The Council had concluded that, with the proposed mitigating measures, there was no relevant risk.

Matthew Champion, a member of a local village action group, brought a claim for judicial review of the Council's decision.

Deputy High Court Judge James Dingemans QC quashed the planning permission on the basis that the committee's two conclusions together were not rational: the decision not to require EIA or appropriate assessment suggested that the committee thought that there was no relevant risk of pollutants entering the river, but the second decision to impose



the condition suggested that there was such a risk. Therefore the imposition of the condition showed that EIA and appropriate assessment should have been undertaken.

The Council and the developer appealed to the Court of Appeal. They won and the High Court decision of Judge James Dingemans QC was overturned.

The Court of Appeal held that there was nothing in the minutes of the committee's meeting to suggest that the inclusion of the conditions had been suggested or agreed because of a likelihood that the development would give rise to a diminution in the water quality in the drainage network, let alone a likelihood of the water quality diminishing to such an extent that it could have a significant adverse impact on the SSSI or the SAC. The conditions had been imposed to meet the concerns of a particular councillor, following a separate and earlier decision of the committee that no EIA / appropriate assessment was required. The committee, in any event, could properly consider

that the conditions were necessary as a precautionary measure for the purposes of reassurance, without considering that in their absence there was a likelihood that pollutants would enter the river.

Relying on *Feeney* (paras 50 and 52 of the judgment),¹⁰ the Court of Appeal stated: "A condition can in principle be imposed to address a situation falling short of one that is considered to involve a likelihood of significant adverse effect. That is how conditions 23 and 24 are to be viewed in the present case, though this case is stronger than *Feeney* because there is here no perceived "residual range of uncertainty" that the conditions are intended to address".¹¹

Comment

The judgment in this case focussed more on the process of decision making than the legality of reliance on the condition. However this case is certainly less controversial than *Feeney*.

Here, the developer had put forward as part of its project a drainage scheme

involving an interceptor and storage infiltration system and, thereafter, a storage infiltration basin to be planted with indigenous plants to act as a secondary treatment system. NE had confirmed it was happy with this scheme which does "not represent novel or untested techniques"¹² and withdrew its objection on this basis. In addition, unlike in *Feeney*, there was no acknowledgement by the competent authority of any risk of a likely significant effect. Finally, it cannot be illogical to conclude no likely significant effect but then to impose conditions to allow for monitoring and remedial measures as a precautionary measure. It would be counter-productive for the caselaw to dissuade such precautionary conditions being imposed.

Conclusions

Conclusions from the cases above are as follows:

- a) Planning conditions may be taken into account by a competent authority when determining likely significant

effects under the Habitat Regulations Assessment regime (see for example regulation 61(6) of the 2010 Regulations, under which the authority “must have regard” to the manner in which the scheme is proposed to be carried out “or to any conditions or restrictions subject to which they propose that the consent...should be given”).

- b) All the elements of a proposed project, including any mitigation measures which are part of the project, should be considered within the assessment of likely significant effects (e.g. Pill L.J. (para 46) in the EIA case of *Gillespie v Secretary of State for Transport, Local Government and Regions*¹³; and Sullivan J. (para 76) in the Habitat Regulations Assessment case of *R (Hart District Council) v Secretary of State for Communities and Local Government*¹⁴).
- c) Planning conditions cannot be relied upon as a surrogate for the required assessment of likely significant effects. They cannot be used to circumvent the need for an assessment. Since, under *Waddenzee*, the likely significant effect test requires risk to be excluded based on objective information, then assessments of environmental impacts must be undertaken rigorously.
- d) Therefore, if mitigation measures are being relied upon to avoid a conclusion of “no likely significant effect” then evidence must be put forward as to the basis for that position. The best predictions possible must be provided.
- e) However, it is a fact of life that predictions of effects are merely that. Predicted effects cannot be guaranteed even based on the best science. As such, there will, in many cases, be value in imposing, through planning conditions, monitoring requirements which are designed to “check” or “confirm” that the impacts turn out to be as predicted once the project is up and running and to allow steps to be taken if, contrary to expectation, the effects are not as predicted. This is acceptable and, indeed, is to be encouraged.
- f) Such conditions are acceptable and may be taken into account when assessing likely significant effects where the effectiveness of the mitigation measures are not in question and where the above requirements are met. Measures whose effect and nature are plainly established and uncontroversial may therefore be taken into account. This is correct either because they are to be regarded as part of the project or, if not, because they are to be assessed as an “in combination project”.
- g) If, where taking into account the mitigation measures, the competent authority is left in doubt as to their efficacy then the screening test must fail. If there were uncertainty on the basis of objective evidence about whether significant harm would be eliminated by the measures available following monitoring then consent could not be granted, as the requirement, as per the Habitats Directive, that the risk of a significant effect be excluded could not be met.

About the Authors

Penny Simpson is a partner within Freeth Cartwright LLP's Planning & Environment Group and a specialist in natural environment legal issues. She advises both private and public sector clients on a wide range of issues including protected sites, protected species, water issues, planning issues, prosecution, wildlife licensing and compliance issues.

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Notes

1 *Feeney v Secretary of State for Transport* [2013] EWHC 1238 (Admin) at paragraph 29 of the judgment

2 (Case C-127/02) *Landelijke Vereniging tot Behoud van de Waddenzee v Staatssecretaris van Landbouw, Natuurbeheer en Visserij* [2005] 2 C.M.L.R. 31

3 (Case C-127/02) *Waddenzee* [2005] 2 C.M.L.R. 31 at paragraph 44 of the judgment

4 *Feeney* [2013] EWHC 1238 (Admin) at paragraph 51 of the judgment

5 *Feeney* [2013] EWHC 1238 (Admin) at paragraph 56 of the judgment

6 *Feeney* [2013] EWHC 1238 (Admin) at paragraph 51 of the judgment

7 *Feeney* [2013] EWHC 1238 (Admin) at paragraph 50 of the judgment

8 *R (Hart District Council) v Secretary of State for Communities and Local Government* [2008] EWHC 1204 (Admin); [2008] 2 P. & C.R. 16

9 Conservation of Habitats and Species Regulations 2010 (SI 2010/490), reg. 21(1)a

10 *Feeney* [2013] EWHC 1238 (Admin) at paragraph 50 and 52 of the judgment

11 *Champion* [2013] EWCA Civ 1657 at paragraph 48 of the judgment

12 *Champion* [2013] EWCA Civ 1657 at paragraph 24 of the judgment

13 *Gillespie v Secretary of State for Transport, Local Government and Regions* [2003] EWCA Civ 400; [2003] Env LR 30 at paragraph 46 of the judgment

14 *R (Hart District Council) v Secretary of State for Communities and Local Government* [2008] EWHC 1204 (Admin); [2008] 2 P. & C.R. 16

Chartered Institute News

CIEEM Awards

Nominations and entries for all of the 2014 Awards categories are now closed. We have had some fantastic entries and are delighted that members are so keen to promote our profession. We talk a lot about poor standards of practice but we have much to celebrate and we should not be shy of shouting about it and making others outside our profession aware of the good work that we do.

Shortlisted entries will be invited to a special Awards Luncheon to be held on the 26th June at the Birmingham Botanical Gardens (see page 61). The event will be compered by journalist and comedienne Helen Lederer with Defra Minister Lord de Mauley as our special guest and Chris Baines our principal speaker. Why not come and join us and help celebrate with our winners? Finalists will be announced in April, and online bookings for tables and seats will open shortly afterwards.

New Eligibility Criteria

We are excited to announce that as of April, our eligibility criteria for membership will be changing. Going forward, CIEEM's Competency Framework will be used as the basis for membership eligibility. There will be a minimum level of expectation of relevant level competences for the different categories of membership. If you are interested in upgrading your membership category and would prefer to do so under our current criteria please note that the last submission date of old applications will be 30th April 2014. We will be removing our existing applications from the website and replacing with the new applications on 31st March 2014. Should you wish to get an existing application in by 30th April 2014 please ensure that you download the application form now. Please visit our website to find out the details of our new eligibility criteria. Should you have any questions please contact the membership team on 01962 868626.

Higher Level Apprenticeships

For several months now CIEEM has been discussing the possibility of developing a postgraduate Higher Level Apprenticeship with LANTRA, the sector skills body for land-based industries. Higher level apprenticeships are something that the UK Government (through the Department for Business, Innovation and Skills (BIS)) have been promoting through their Trailblazers Scheme. The Higher Level Apprenticeship would give graduates the opportunity for 12-18 month's work-based learning with an employer whilst following a planned training programme and receiving a wage. The apprentices would be formally assessed at the end of the apprenticeship period.

The intention is that this would help to bridge the gap between university and permanent employment, allowing graduates who would otherwise seek voluntary roles to get a wage and further training as well as practical experience in the workplace. CIEEM would lead on developing the 'syllabus' and the assessment process for the scheme. We have been liaising with employers and statutory agencies who have all expressed an interest in supporting the scheme and forming an expert panel to develop the syllabus and assessment process.

There are risks, in that we would want to be sure that it was not a means of employing 'cheap labour' and that it did not replace existing Graduate Trainee schemes. The key is securing sufficient Government funding to enable apprentices to be paid a living wage during the apprenticeship period. At the moment Government funding is uncertain so it is not yet clear where we will be able to progress the scheme.

CPD Audit

We recently carried out a random sample audit of CPD records returned by members. The results were disappointing in that just over half of members audited had not returned their CPD record for 2012-13. These records are now being submitted but we must remind all members that undertaking the minimum requirement of CPD is a condition of membership and that you need to evidence this through your CPD record. If you are unable or unwilling to provide evidence of CPD then this may be treated as a breach of the Code of Professional Conduct.

To make it easier for members we will shortly be launching an online CPD recording tool. Anyone who has unusual circumstances that make it difficult for them to undertake CPD on a regular basis should get in touch with the Secretariat to discuss their options.

Degree Accreditation Scheme

We are delighted to announce the accreditation of seven new degree courses or degree pathways. This brings the total number of accredited courses or pathways up to 13. Several of the accredited course programme leaders are now making contact with Geographic Section Committees and identifying ways in which our member networks can support students and how the higher education institutions can help the Geographic Sections.

The newly accredited degrees and degree pathways are:

Degree Courses

Nottingham Trent University
MSc Biodiversity Conservation

Oxford Brookes University
MSc Conservation Ecology

Degree Pathways

Hull University
BSc (Hons) Ecology

Northumbria University
BSc (Hons) Environmental Management

Oxford Brookes University
BSc (Hons) Biology

Oxford Brookes University
BSc (Hons) Animal Biology and Conservation

Oxford Brookes University
BSc (Hons) Environmental Sciences

Degree accreditation is ongoing and more information on the scheme can be found at www.cieem.net.

Spring Conference 2014

CIEEM's Spring 2014 Conference will take place on 18th March at the Burlington Hotel in Birmingham and will be on the theme of 'Biodiversity Offsetting: From Theory to Practice'. We have an excellent programme of speakers and Defra have confirmed they will be sending a speaker along to update delegates on the Government's plans regarding biodiversity offsetting in England. Bookings will be closing very shortly!

<http://www.cieem.net/events/660/biodiversity-offsetting-from-theory-to-practice>

Autumn Conference 2014

We are pleased to announce that this year's two-day Autumn Conference will be at Edinburgh University's Conference Centre on the 11th and 12th November. The theme of the conference is 'Progress in Effective Habitat Restoration and Habitat Creation'.

Accommodation on site at Pollock Halls is limited and can be booked on a first come first served basis online through <http://www.book.accom.ed.ac.uk> at a reduced price of £65.45 quoting the code CONF14. However we will be supplying a list of other hotels and accommodation options nearer the time.

2014 Professional Development Programme

The Summer and Autumn programme of workshops and training courses is now available online. We have tried to respond to ideas and suggestions for new courses as well as delivering those that are popular each year and increasing the geographical spread. We will be adding to the programme throughout the year and are currently seeking trainers for some popular courses that we wish to offer in new locations. Take a look at the website for further details.

<http://www.cieem.net/events>

Calling all CIEEM Chartered Environmentalists

We are continuing to receive a steady stream of Chartered Environmentalist applications and we are looking to recruit members to volunteer as interviewers. There are generally 3-4 interview cycles per year which take place at various locations across the UK. Travel expenses will be paid so it is just your time and environmental expertise we would like you to volunteer. If you think you might be able to spare one or two days a year to assist with interviews please contact Sarah Richards at sarahrichards@cieem.net.

Warranty and Contract Vetting Service from MFL

CIEEM is pleased to announce that our insurance partner, McParland Finn Ltd, has made the decision to take this service back in-house from the current provider. The provision of this advice is an essential tool in your risk management process and the service offered is intended to flag up contractual conditions that may expose you and your business to liabilities which exceed the scope of your professional indemnity insurance. The service is not a full contractual review. If you require a more detailed review, MFL can recommend an experienced legal firm who will provide preferential terms to you as a membership benefit. For more information please contact Darren Hewitt (T: 0161 237 7748, E: darrenh@cieem-insurance.co.uk) or Gabrielle Church (T: 0161 237 7730, E: gabriellec@cieem-insurance.co.uk).

Complaints@cieem.net

False Claim of Membership Grade 2013-14

The individual below has claimed an incorrect grade of membership and has been reprimanded without conditions:

Sophie Meredith (Coventry) GradIEEM claiming MIEEM and AIEEM

New Fellows

Congratulations to **Dr Mike Wells** who has recently been admitted to fellowship of the Institute. Dr Wells has over 20 years' experience as an ecological consultant including 7 years of running his own consultancy, Biodiversity by Design Ltd. For the past 10 years he has also been involved in academic teaching as an external lecturer, external examiner and visiting research fellow. The main focus of his work in recent years has been on matters relating to green infrastructure, sustainable masterplanning and habitat restoration/creation in urban settings. He has published many articles and contributed to several books on this topic as well as lecturing extensively in the UK and overseas. He is a well-known advocate of biodiversity in urban design and, as such, has extensively promoted the principles of biodiversity planning to other professionals through publications, presentations and inter-disciplinary working.

Staff Changes

In January we welcomed **Sarah Richards** who joined us as our Membership Officer. Sarah has previously worked for the RSPB at Sandy.

Gill Kerby has joined CIEEM as the new freelance *In Practice* Editor. Gill is an experienced publishing professional with a career history in ecology and environmental management. She joins CIEEM after 17 years working for the British Ecological Society (BES) as Managing Editor of the *Journal of Applied Ecology*. At the BES, Gill's priority was to make the science published in *J. Appl. Ecol.* accessible to conservation practitioners so that wildlife, habitat and landscape management can be informed by the best science available. Gill has an academic background and an in-depth knowledge of ecology and science publishing. She also has experience of working with environmental consultants and in organisations like the Nature Conservancy Council and the Agriculture Training Board. Gill lives near Stamford in Rutland and is a trustee of her local Wildlife Trust.

Irish Section News

Protected Habitats and Species – A Best Practice Approach

Anne Murray MCIEEM
Irish Section Convenor

The Irish Section of CIEEM hosted its Conference entitled 'Protected Habitats and Species – A Best Practice Approach' on the 18th and 19th of November 2013 in Dublin. The aim of the conference was to provide practical information on surveying and assessing protected habitats and species in Ireland and also to highlight the overlap of ecology with other disciplines such as planning, landscaping, engineering, hydrology and hydrogeology. The conference consisted of a series of focused presentations, case studies and workshops which were delivered over two days by a range of expert speakers from across the island of Ireland.

Jenny Neff CEnv FCIEEM, our CIEEM Vice President, opened the conference. **Ciaran O'Keeffe** (Director, National Parks and Wildlife Service) gave the welcome address and an update on the work of NPWS and, in particular, on the current conservation status of protected habitats and species in Ireland. Trends in protected habitats and species of Ireland show improvements in some and decline in others. The steps towards better management of our protected habitats and species were also identified. In terms of protected EU nature designations, **Rebecca Jeffries** of NPWS provided an update on the conservation

objectives of Natura 2000 sites. Site specific conservation objectives are used as a tool for Appropriate Assessment (Habitat Regulations Assessment). The conservation objectives form part of the management system for Natura 2000 sites. The conservation objectives for Natura 2000 sites designated for raised bogs, for example will be set in 2014/2015. **Raymond Flynn** continued the discussion on raised bogs with his interesting presentation on the importance of understanding the hydrology of bogs, to prevent further degradation and also to restore bogs, in particular raised bogs of Natura 2000 sites.

In relation to survey techniques, the next session aimed to inform ecologists on the different techniques for protected habitats. Mapping and surveying Irish Upland Habitats was outlined by **Philip Perrin CEnv MCIEEM**, who highlighted the challenges of this type of survey work, especially when mapping mosaics and transitional habitats. Classification of habitats is also a challenge given the diversity of communities within most Annex I and Fossil habitat categories and the absence of community-level classification in Ireland, such as the UKs National Vegetation Classification (NVC). 'The Flora and Conservation Status of Petrifying Springs in Ireland' is a PhD research study by **Melinda Lyons** and she shared her experience of surveying and

describing this Priority habitat in Ireland. The results of the project will be used to establish the conservation status of petrifying springs in Ireland.

The session after lunch was the workshop session and the objective was to highlight the interactions of ecology with other disciplines. The aim was to provide a forum for the introduction of the topic and to listen to the work of another profession in the context of ecology followed by questions and discussion, within a less formal environment than the main conference. **Sarah Kimberley** provided a workshop on groundwater-dependent terrestrial ecosystems in Ireland which explained the implications of the EU Water Framework Directive and the assessment of the risk from poor water quality on those ecosystems, habitats and species within Natura 2000 sites (e.g. petrifying springs, fens, raised bogs). A Planning Workshop was running at the same time where Heritage Officer for Kildare County Council, **Bridget Loughlin**, explained where biodiversity and ecology sit in the stages of the Planning System of local authorities.

The final session of the day covered three very interesting case studies including the BurrenLIFE project presented by **Sharon Parr**, 'Assessing Wind Energy Projects on Birds' by **Richard Nairn CEnv FCIEEM** and 'A legal analysis of the N6 Galway Outer Bypass Case' by **Alice Whittaker**.



The second day was opened by **Michael Meharg** (Assistant Director, Biodiversity and Natural Heritage, Northern Ireland Environment Agency – NIEA) with a presentation on the protection of biodiversity in Northern Ireland, in particular on the current conservation status of protected habitats and species in Northern Ireland. The trends in conservation status were outlined and some of the main issues affecting conservation status were identified. Protection of habitats and species on an all-island of Ireland basis has been developed using cross-border Action Plans and research/survey initiatives. The Invasive Species Ireland project is an excellent example of co-operation in the face of an all-island problem.

The MulkearLIFE project is a river catchment scale river restoration on the Lower River Shannon Special Area of Conservation (SAC). **Ruairi O Conchuir** explained that a main project objective is to restore degraded habitats on the Mulkear River and its principal tributaries. While the main target species are Atlantic salmon, sea lamprey and otter, the project benefits a wide range of other fish species, invertebrates, birds and mammals. Numerous restoration methods and results achieved were described and the importance of partnerships with other agencies, local communities and farmers, in the success of this project, was very apparent.

Nuala McQuaid, of the Marine Division of the Department of Environment Northern Ireland, discussed the new Marine Protected Areas (MPAs) in Northern Ireland and the New Marine Act (Northern Ireland) 2013. MPA is defined by the IUCN as: “Any area of intertidal or subtidal terrain together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.”

This was followed by the presentation of a case study of the effects of intertidal oyster culture on the spatial distribution of water birds by **Tom Gittings MCIEEM** and **Paul O'Donoghue CEnv MCIEEM**. This study aimed to identify whether the spatial distribution of waterbirds is affected by the presence of oyster trestles and to inform the ongoing Appropriate Assessment

process. The study included an extensive study across six sites and an intensive study at one site. The results of this study have been used to develop an evidence-based approach to the assessment of the potential impact of intertidal oyster cultivation in the context of Appropriate Assessment of aquaculture activities in coastal Natura 2000 sites.

Staying with marine and coastal themes, the next presentation detailed the methods of surveying and mapping marine habitats and species. **Louise Scally** specialises in marine habitats and species surveys and discussed three case studies which demonstrate the practicalities, challenges and solutions associated with mapping marine habitats and species at a level suitable to measure change: Mapping sensitive subtidal communities, Mapping subtidal marine species and Mapping of the Atlantic Marine Energy Test Site (AMETS).

The Ministerial Address from **Jimmy Deenihan T.D.** (Minister for Arts, Heritage and Gaeltacht) was an important acknowledgement of the role of ecology in Ireland.

Workshop sessions for Day 2 were given by **Christian Nea** of the National Roads Authority (NRA) who gave an insight into the engineering solutions to address compliance with the Habitats Directive. While **Maryann Harris** of Dublin City Council talked about landscaping and biodiversity with participants learning about urban landscapes and how ecologists can influence the management of urban biodiversity.

A number of species survey specialists provided insight and details of survey methods for a number of protected species including **Maria Long MCIEEM** on *Vertigo moulinsiana* in Ireland, **John Conaghan** on survey of rare plant populations in Ireland and **Will Woodrow MCIEEM**, and **Clive Mellon** on marsh fritillary in the Republic of Ireland and Northern Ireland.

Joanne Denyer MCIEEM examined the significance of the bryophyte Red Data Book for ecologists in Ireland when undertaking Ecological Impact Assessments. The focus was on: which habitats are likely to support rare and protected bryophytes; when a detailed bryophyte survey might be required; requirements of surveyors; and developments likely to impacts on bryophytes. Case studies and guidelines, including some from Scotland and Wales (which have a similar bryophyte flora and land-use to Ireland) were discussed.

Henry Andrews MCIEEM's presentation on the *Bat Tree Habitat Key: A guide to potential bat roost features* was given by **Paul Scott CEnv MCIEEM** on behalf of Henry who could not make it on the day. However, we hope to get Henry over to Ireland for an Irish Section event in 2014.

A big thank you to the wonderful presenters for their great presentations on diverse and informative topics.

For further information and to view the conference presentations for the event, please visit www.cieem.net/2013-irish-section-conference-and-agm.



Jimmy Deenihan T.D. meeting Anne Murray, Joanne Denyer and George Smith.

Irish Section News

New Support Officer

Mairead Stack

Irish Section Support Officer
MaireadStack@cieem.net

The post of Irish Section Support Officer is a new one and I am delighted to have the opportunity to support the Irish Section Committee. This is a part-time role and the main remits can be broken down into four broad areas which are: promotion of the Irish section; identification of priority areas for policy engagement; identification of new CPD training in Ireland; and supporting Irish CIEEM events. I started in September 2013 and as the All-Ireland Conference was in November, the first few months were spent organising the conference. Now having some support in place, the Irish Committee will be able to provide further assistance to Irish CIEEM members. We are presently conducting a Training Analysis and hope to have identified courses that we can run here in Ireland in 2014 and going forward.

As a background to myself; I studied Natural Science at Trinity College Dublin, specialising in Zoology and then completed an MSc in Applied Animal Behaviour and Welfare at the University of Edinburgh. I started my career in zoos, working as an assistant keeper in Dublin Zoo to then working as Conservation Co-ordinator for the Federation of Zoos in London. I moved back to Dublin and worked as a sole trader Ecologist for five years, working on a number of National Parks and Wildlife Service (NPWS) projects. I was Editor at the Management Planning Support Unit at NPWS for a year and I wrote eight NPWS Management Plans over the years. Following on from being a sole trader I was a NPWS Conservation Ranger for the North Dublin area on a temporary one-year contract and when this finished I was the Dublin City Council Biodiversity



Mairead Stack

Officer for three and a half years. I have been Secretary of Bat Conservation Ireland also. I moved to Boston for three and a half years where I dedicated my time to my two small children and worked on a voluntary basis for the Massachusetts Audubon Society. I moved back to Dublin in July 2013.

I look forward to working not only on behalf of CIEEM in Ireland but also with the other Geographic Sections.

South West England Section News

High Profile Local Issues and Looking Forward to 2014

The second half of 2013 saw two fascinating events held by the SW Section of particular relevance to our region: a visit to Steart Marshes to see landscape-scale ecological mitigation in practice and a discussion event on the high profile matter of badger management and the control of Bovine TB.

Steart Marshes

In the shadow of the Hinkley Power Station, CIEEM South West members were privileged to witness first-hand ongoing ecological mitigation and enhancement works at a scale that few are likely to be directly involved in. The Steart Marshes project is the second largest uncontrolled tidal exchange scheme in the country, involving breaching existing tidal defences

to allow tidal water from the mouth of the River Parrett to inundate 500 hectares of low-lying pastoral farmland on the Steart Peninsula in North Somerset.

The area has been expertly re-modelled to create freshwater and brackish wetland habitat, with sluices to control levels to benefit waders and wildfowl (and the public watching them) to compensate for losses of 240 ha of mudflats as a result of the yet-to-be-constructed Bristol Ports development, and to contribute to anticipated loss of tidal habitat due to sea level rise over the next 15 years.

Members were informed of the complexity of the issues influencing design and construction, including huge tidal ranges, massive scale engineering, habitat creation, and licensing and translocation of protected species. Although still under construction, the site is already attracting large numbers of waders, wildfowl and also otter. On completion, the site will be grazed under the management of the Wildfowl and Wetlands Trust, who will ultimately manage the site as a wildlife and public resource.

With an estimated 33,000 visitors expected per annum, this will be a flagship project for the region, raising awareness of the environmental and conservation issues here and more widely, whilst inspiring current and future generations.

CIEEM have been invited back once the system is fully functional – after such an inspiring visit there is sure to be plenty of interest!

Many thanks to Matt Phillips (May Gurney), Tim McGrath (Wildfowl and Wetland Trust) and James Scott (Environment Agency) for an inspirational visit and for their valuable evening time after a full day at the wetland face!

Badger Management and the Control of Bovine TB

On Tuesday 10th December 2013, the SW Section held its second AGM, although the main event of the night was a Discussion Event on Badger Management and the Control of Bovine TB. As a high profile and contentious local issue, this attracted healthy attention from our members.

Having established the security of the venue, gone to greater extents than normal to ensure only members attended and consulted with the local constabulary, the event was well attended and thankfully passed peacefully with no protesters!

Three highly knowledgeable speakers gave different perspectives on the biological, ecological, social and political challenges of the management of badgers in the quest to control Bovine TB.

First, Professor Robbie McDonald provided an introduction to badger management and the control of Bovine TB. As Chair in Natural Environment at the University of Exeter, and research including the science, policy and practical implications of Bovine tuberculosis (TB) in badgers, he provided a detailed description of previous research and trials and the ecological and biological difficulties associated with disease control. He provided insight into the phenomenon of perturbation and other patterns of disease spread. He concluded with a comparison of the efficacy of the various badger management methods, specifically TB vaccination, culling or a mixture of both, against no control. A mix of both culling and the application of vaccination to a ring around the cull area provided the greatest reduction in the number of cattle herd incidents (approximately 28%).

Following this in-depth introduction, Roger Blowey explored the role of culling in the control of Bovine TB. As a Royal College of Veterinary Surgeons (RCVS) Specialist in cattle health and production with 40 years of experience with farm animal medicine in Gloucestershire, he has a wealth of scientific knowledge and experience of the impact this disease has on the farming



Before



After

Atlantic Marsh Creation. Photos by WWT)



Photo by Robbie McDonald

community. He provided a detailed description of the various eradication programmes that have been used across a range of diseases prior to showing the pattern of distribution of Bovine TB since the mid-1980s. This was explored in the context of the results of the various trials conducted and how various political decisions and legislation may have played a part in the rise in Bovine TB prevalence over recent decades. He concluded by noting the wide ranging impacts of Bovine TB on man, the farming-based economy and badger communities themselves.

Dr Gordon McGlone completed the suite of presentations by providing a detailed review of the potential use of Bovine TB vaccination with badgers. At the helm of Gloucestershire Wildlife Trust for over 30 years, he led their deployment of the new bTB badger vaccine in 2010 and has contributed to Ministerial advisory groups and Parliamentary Select Committees on the matter. Gordon provided detailed descriptions of the Animal Health and Veterinary Laboratories Agency (AHVLA) Badger Vaccine Deployment Project in Gloucestershire, including the required planning, and achieving efficient and effective delivery. He outlined how this has informed vaccination deployment by other Wildlife Trusts, including imminent programmes in Dorset, Somerset and Devon. He emphasised how 'lay'



Photo by Gordon McGlone

vaccinators and volunteers have been trained to support professional contractors to enable delivery of these programmes at minimal cost.

The full presentations are available to members via the CIEEM website.

Many thanks to our speakers and Duncan McLaughlin and his colleagues at Atkins for providing the fabulous venue.

Looking Towards Events in 2014

The South West Section recently undertook a survey to find out what types of events and activities our members would like to take part in, which informed the above events and will help us shape the programme for 2014. With more than 160 responses from across the region and membership categories (including non-members who are interested in joining), the results indicated a fairly even interest in seminars, field visits, conferences, and training courses, with preference for weekday events, and an emphasis on

evenings for seminars, and on weekends for field visits. Perhaps as may be expected, the Bristol/ Bath area received the most votes for where people would be willing to travel to attend events.

We received a variety of suggestions for event topics and themes, which we have grouped and listed below in order of popularity:

- Species-specific survey techniques and standards, including data interpretation and advances in equipment/technology, (especially south-west specific species, e.g. dormice and ciril bunting);
- Practical examples of mitigation and enhancement (including for European Protected Species licensing), and habitat management practices;
- Biodiversity offsetting, Ecosystem Services and Green Infrastructure;
- Legislation;
- Ecological Impact Assessment (including how to work effectively with other disciplines such as Landscape), and Habitats Regulations Assessment;
- Ecological consultancy challenges, commercial knowhow and networking opportunities;
- Requirements of the planning system/ interactions with planning;
- Habitat-specific ecology and mitigation/ restoration/ management;
- Addressing climate change and impact of social issues (e.g. population growth);
- Ecological Clerk of Works; and
- Surveys and mitigation relating to wind farms and other renewable energy.

Thanks to all who took part and we look forward to issuing details of our developing programme for 2014. Coming soon, we are hoping to secure field visits for our members to see practical examples of habitat creation and restoration at sites in Gloucestershire, Devon and Somerset – watch this space!

Keep in Touch!

In addition to the CIEEM website, a great way to keep up to date with relevant discussions and events in our region is to join our CIEEM South West Section LinkedIn group: <http://www.linkedin.com/groups/CIEEM-South-West-Section-4306464/about>

Scottish Section News

CIEEM Scottish Section Committee 2014

Claire Lacey CEnv MCIEEM

Scottish Geographic Section Convenor
scotland@cieem.net

Following the Section AGM, held on 16th January 2014, the Scottish Section Committee would like to take this opportunity to introduce themselves to the members.



Convenor: Claire Lacey has served on the Committee since 2011. She qualified in Marine and Environmental

Biology in 2002 and has worked ever since in the field of marine mammal ecology. She has worked for both the charity sector and now currently splits her work time between the Scottish Windfarm Bird Steering Group and the University of St Andrews. Within CIEEM, Claire has a particular interest in data-sharing initiatives, survey methodology and is looking forward to becoming more involved in developing CIEEM consultation responses. She would also love to see more 'marine' people become involved!



Vice Convenor: Elaine Anderson has served on the Committee since 2010. Until recently, Elaine worked for an NGO, Highland Birchwoods, as an ecologist and latterly as ecology services manager. She has a passion for mammals, particularly bats and badgers and is being drawn further into the fascinating world of plants. She has a particular interest in raising professional standards and in engaging with students and graduates having worked with several universities to encourage students to think about environmental career opportunities and to encourage student and graduate involvement and membership of CIEEM.

Secretary: Situation vacant at the time of writing. Please get in touch if you would like to join us in this role or as an ordinary Committee member.



Treasurer: Erin Grieve joined the Committee in 2011. As a recent Ecological Science Graduate of the University of

Edinburgh, she understands the importance of guiding and improving standards in ecology and environmental management and recognises the importance of employability of graduates. Like Elaine, Erin

has been very involved in delivering student focussed events and careers talks.



Nicola Tyrrell has served on the Committee since 2009 and has recently stepped down from the role of Convenor. As

an ecologist and environmental advisor since 2005 she has worked with several consultancies to promote a positive approach to wildlife conservation within development and land management. In her role as Director of Ecology with RST Environment she is particularly passionate about helping businesses to understand and fulfil their environmental obligations as well as identify opportunities to do things better. Within the Scottish Committee, Nicola particularly enjoys facilitating collaboration between CIEEM and other environmental organisations.



Marcus Cross has served on the Committee since 2009. He works for Scottish Power Renewables as an

Environmental Manager providing ecological advice to their UK and International Offshore business. In 2002 Marcus was awarded his doctorate in Environmental Parasitology and has worked in various positions in large and small ecological consultancies before starting his current position in 2010.



Phil Baarda was co-opted on to the Committee in 2011.

He is a Woodland and Land Use Adviser based at Inverness and has been with Scottish Natural Heritage for the last five years. Prior to this, Phil has done a variety of things in a variety of places – an EU project manager with the NGO Highland Birchwoods in the Highlands, a nature reserve manager in East Dorset, a field officer with BTCV in Dorset, and a Biodiversity and Livelihoods adviser with VSO in the Philippines. Phil has been a Full member of CIEEM since 1997 and sits on the Professional Standards Committee.



Brian Minshull joined the Committee in 2012. He has operated BCM Environmental Services Ltd since 1990.

His career includes Upland Bird Survey work for NCC, three years as an Assistant Wildlife Warden in Wigan, 16 months as a consultant for ERL (pre-ERM), and 13 years as an environmental specialist on numerous pipeline projects in the UK and abroad. More recently he has provided ecological expertise on development projects closer to home, including ornithological input on wind energy projects. He wants to contribute as he benefitted greatly from his mentors and wants to give something back.



Jessica Tainsh was co-opted as a Graduate member of the Committee in 2012. She

graduated from the University of Glasgow with an MSc in Coastal System Management and a BSc (Hons) in Zoology. She currently volunteers with the RSPB in Lochwinnoch as a family events helper and is sub-contracted with a couple of energy companies, carrying out ecology surveys. Jessica has also been a volunteer with the Cats Protection League, Buglife and at Kelvingrove Museum. Her interests are in ecology and conservation.

There are 16 positions available on the Committee, so there is the opportunity for eight more members to join the current team. Please contact headquarters or any of our Committee members should you be interested or wish to know more. The role of the Section Committee is available to view on the CIEEM website in the new Sections Toolkit.

Please keep in touch and look out for full details of events in forthcoming emails, *In Practice* and on the Scottish Section LinkedIn page. Please get in touch with your ideas of how we can extend the presence of CIEEM in Scottish society and add value to being a member of the Institute.

CIEEM Scottish Section Committee Best Practice Event

Golf and the Environment, 18th April 2014

The CIEEM Scottish Section Committee invites you to an event aimed at providing insight regarding an example of a golf course development that was creatively designed and constructed to succeed in delivering a world-class links golf course that also enhances local biodiversity.

In recent years the image of golf in relation to the environment has suffered, often due to developments occurring in sensitive habitats and receiving widespread

criticism. However, it needn't always be this way; the Machrihanish Dunes course in Kintyre was developed entirely within a Site of Special Scientific Interest (SSSI) by a wealthy American businessman. It was the first 18 hole course in the UK to achieve Golf Environment Organisation (GEO) certification. Similarly, in the last few years, a links golf course was created at Castle Stuart, near Inverness. Again, the developers were American, and the location

is an ecologically sensitive one. The Castle Stuart Golf Links (www.castlestuartgolf.com) are immediately adjacent to the Inner Moray Firth SSSI/Special Protection Area (SPA) and Moray Firth Special Area of Conservation (SAC). As can be seen from the photographs, by working with (rather than against) the statutory bodies, a links course was successfully created on farmland (the sand-dunes did not exist on the site prior to construction).

You are invited to attend a collaborative event between CIEEM and the Castle Stuart Golf Links to find out more about the environmental management of this development project. It is hoped that SNH will provide some input on the day from their perspective, and although not attending in person on the day, the CIEEM Vice President for Scotland, Kathy Dale, will provide pre-prepared context in relation to the development of a links course on the Menie Estate.

The event is planned for the 18th April 2014, which your diary will tell you is Good Friday. This date has been chosen on the basis of both the available dates at Castle Stuart and also the theory that (hopefully) spring will have sprung! The date will (again hopefully) also help with travelling arrangements, as winter should be over. In addition, we intend to organise a CIEEM social event in nearby Inverness that evening. It is hoped that some delegates may even choose make an Easter weekend break of it in the Highlands (with partners, friends or families); perhaps seeing the bottle-nosed dolphins at Chanonry Point, the red kites on the Black Isle or exploring Speyside and the Cairngorms.

Please refer to the CIEEM Scottish Section web page (<http://www.cieem.net/geographic-sections/7/01.-scotland>) for further details and details of how to register. Ecologists, environmental



managers, and developers from all sectors, whether CIEEM members or not, are welcome. Spaces are limited so please book early to avoid disappointment! We look forward to seeing you there!

Overseas Territories Special Interest Group Technical Seminar Review

Anguilla, the Chagos Archipelago and Plant Conservation in the Overseas Territories

26 September 2013, Kew Herbarium, London

Tom Smith CEnv MIEEM

Principal Consultant, RSK

Committee Member, CIEEM Overseas Territories Special Interest Group (OT-SIG)

Building on the success of the first Overseas Territories Specialist Interest Group (OT-SIG) conference held on 31st January 2013, the OT-SIG held a technical seminar at Kew Herbarium on 26th September 2013. For those not aware of the OT-SIG please see *In Practice* (June 2013, pages 49-51) for further information on the group and a summary of the United Kingdom Overseas Territories (UKOTs). The seminar was well attended with 30 delegates from a range of organisations and interest groups.

Marcella Corcoran from Kew opened the seminar with her talk on saving *Pinus caribaea* var. *bahamensis*, the national tree of the Turks and Caicos Islands (TCI). Large numbers of this tree have been killed off on TCI due to an infestation by an accidentally introduced scale insect (*Toumeyella parvicornis*). In addition to the scale insect, the species is also threatened by hurricanes, development and uncontrolled fires started by people. In response to this threat, Marcella highlighted the efforts of the TCI Pine Recovery Project which has set up an international pine-scale working group, is providing *ex situ* collection of seed (Millennium Seed Bank) and has established a detailed monitoring programme.

Samual Pike from Environmental Systems Ltd gave an introduction to mapping conservation issues for the Anguilla

archipelago. Anguilla, a small island situated east of Puerto Rico, supports diverse but fragile marine environments threatened by fisheries and tourism. The aims of the project were to classify the marine environment surrounding the island and provide a detailed bathymetric dataset that was cost effective. This data set could then be for future monitoring of environmental change and to help guide environmental management strategies. The project utilised Earth Observation studies gathered via remote sensing techniques together with ecological knowledge to develop the GIS datasets. The datasets are now being used by the local government using open source GIS.

Rebecca Upson from Kew provided a summary of recent work on the Important Plant Areas (IPA) of the Falkland Islands. The Falkland Islands are important biogeographically owing to their position between the Antarctic and South American continents; however, given the Falkland Islands' isolation and small size, they are naturally vulnerable to ecological change. This is particularly evident following surveys which highlighted soil erosion, invasive species, off-road driving and over-grazing as particular threats to species and habitats. The IPA programme which is co-ordinated by Plantlife International and IUCN, provides a framework for the identification of those areas most important for plant conservation. Using all known botanical records and targeted field work, the application of the IPA criteria identified 17 IPAs across the Falkland Islands. The identification of these sites will allow for conservation strategies to be developed.

The seminar was concluded by **Clare Stringer** of the Chagos Conservation Trust with her presentation on 'The Chagos Islands: protecting the world's biggest no-take marine reserve'. The Chagos Islands are located in the central Indian Ocean and contain the largest coral atoll in the world and over 60,000km² of shallow limestone reef and associated habitats. On 1st April 2010, the British Government announced the creation of the Chagos Marine Reserve. This designation of a fully no-take Marine Protected Area (MPA) that extends to 200 nautical miles, created the largest marine reserve in the world. It was also granted the highest level of marine protection as there are no people living within the proposed MPA. The MPA now acts as a living laboratory to allow scientific study of the diverse marine ecosystem, and in particular fish recovery, whilst also acting as a reservoir for biodiversity that may allow future re-colonisation of over-exploited oceans.

The seminar highlighted the wealth of the biodiversity within the UKOTs, but also the threats posed to the many vulnerable habitats and species. The OT-SIG is committed to promoting the work going on in the OTs and providing a forum for the discussion of that work. The Group has already begun planning further events for this year. Please keep updated through the CIEEM website for further details.

South East England Section News

Section Committee 2014



Convener – Ben Benatt CEnv MCIEEM

I have worked as a consultant ecologist since 1991, and have been employed by Halcrow/

CH2M Hill since 2006 where I am based on Hammersmith, London and work on a wide range of environmental projects mainly in the southeast of England. I have been on the South East England Section Committee since 2009, and have been Convener since 2011.

I have found my time spent on the Committee to be rewarding, in particular helping to organise local events for CIEEM members. Being on the Section Committee enables me to have direct links with CIEEM and involvement with the running of the Institute, as well as giving me the opportunity to develop connections with fellow ecologists and discuss ecology-related issues with them.



Vice-Convener – Debbie Bartlett FCIEEM

I combine working as a consultant ecologist and landscape manager with my role as programme

leader for the MSc in Environmental Conservation at the University of Greenwich, the first MSc to gain CIEEM accreditation. My research interests are agriculture and forestry and the challenge of combining delivering benefits for wildlife while maintaining economic viability and sustainable livelihoods.

My role with CIEEM is as a member of Training, Education and Career Development Committee (TECDC) and of the Governing Body. My involvement with the South East Section has focused on organising events on different topics around the region. I look forward to meeting more members in the future and am particularly interested in student involvement and facilitating new entrants to the profession.



Secretary – Lynn Whitfield MCIEEM

I have worked as a consultant ecologist since 2005 and am currently a Principal Ecologist in the

London office of AMEC E&I UK Ltd. I work on a wide range of environmental projects, specialising in bat ecology.

As a member of the Committee for the last couple of years I have enjoyed helping out at Section meetings while taking the opportunity to meet up and network with a range of other members from all walks of the professions represented by CIEEM. I began a term as Committee Secretary this year by organising the Section AGM at Wisley RHS Garden, and look forward to helping further the aims of CIEEM members in the region during 2014 and beyond.



Committee Member – Peter Lawrence MCIEEM

I have worked as a Consultant Ecologist since 2002 and am currently an Associate Ecologist based

in the London office of LUC. I work on a wide range of ecological projects including protected species work, with particular experience in open space enhancement and strategic biodiversity planning.

As a relatively new member of the Section Committee, I have enjoyed the opportunity to get to know the members of the Committee and other CIEEM members from across the region, with a range of backgrounds and skills. I look forward to helping deliver Section events and meetings in the year ahead, including to support student involvement and career development, and also the opportunity to contribute to the wider work of CIEEM.



Committee Member – Liz Fagg GradCIEEM

I have worked as a Further Education lecturer at K College since 2002, and have taught Practical

Conservation to students at a range of countryside sites in southeast Kent. To further my qualifications in Ecology, I studied an MSc in Environmental Conservation part-time and graduated in 2012 from University of Greenwich. I regularly support CIEEM at conferences by helping on the information stands and promoting the benefits of CIEEM membership and training events. This gives me the opportunity to meet a wide range of professionals and is very rewarding. The South East England Section has just asked me to join their Committee, which I am looking forward to, with the expectation that I will be more involved in supporting the Section.

Yorkshire and Humber Section News

Section Event Report

The Yorkshire and Humberside Section became a bone fide Section at its AGM in March 2013, and we've been pretty busy since then.

The first was a talk on the killer shrimp, hosted by Ecus Ltd in Sheffield. It gave an introduction to the shrimp, its ecology, identification and behaviours; areas in the UK where it has been found, with theories as to how it may have been introduced and spread; biosecurity; and finally an opportunity to inspect killer shrimps under the microscope. It was an informative evening and very well attended.

The Section is keen to follow an ecological/environmental project or two from start to finish, to observe how it progresses on the ground, and achieves its outcomes. Two site visits were arranged with this in mind, the first being a trip to the newly

acquired Yorkshire Wildlife Trust Reserve near Driffield. Skerne Wetlands is to be developed into a wetland in the River Hull headwaters, and will provide an excellent opportunity to observe both the opportunities and the difficulties relating to such projects. Contact Sara Robin sara.robin@ywt.org for more details.

The second visit was to the Dark Peak Nature Improvement Area on the outskirts of Sheffield. This NIA is part of the Local Nature Partnership, a South Yorkshire Forest Partnership initiative. It is focussing on a 1970s conifer plantation, removing the majority and restoring it to broadleaf woodland and moorland. The site has a natural inclination towards woodland cover; a river clough running through the site is already beginning to redevelop its natural cover of oak and rowan. Felling is expected

to take place towards Christmas 2014, with replanting taking place the following spring. For more information, contact Ross Frazer ross.frazer@rspb.org.uk.

A surveying workshop was organised by Barry Wright of Energyline, who has developed a new survey method designed to record data detailed enough to reconstruct a hedgerow scheduled for removal as part of a mitigation strategy. All attendees had the opportunity to try out the new HEDGES method on a site close to Wetherby. A user friendly survey, it can be completed on one A4 sheet of paper instead of the 17 pages required of the Defra Hedgerow Survey Handbook (2nd ed). The afternoon was very well attended, nicely rounded off by a social in a Wetherby pub. For more information on the HEDGES method, contact Barry Wright barry.wright@energyline.ltd.uk.



Burbage, Dark Peak NIA. Photo by Sara Parratt-Halbert.

A joint field meeting with the Yorkshire Naturalists Union (YNU) took place at Flamborough to record marine and coastal wildlife, contributing to a Shore Thing survey for the Marine Biological Association (MBA). The resulting data has been entered directly into the MBA's database, with more general records entered into the YNU's online recording site and eventually the NBN Gateway. For more information contact Paula Lightfoot p.lightfoot@btinternet.com. Our Section is working on further joint events for 2014; look out for these in the Training and Events section of the CIEEM website.

The last event of the year took place in Thirsk in November; 'An Evening of Bats', attended by 66 people. John Drewett gave a fascinating talk on Natterer's Bats, which was still the talk of the town at the Committee meeting a couple of weeks later. The second part of the evening was an introduction to the North Yorkshire Bat Group Minimum Standards for Bat Surveys given by Andrew Westgarth. Our Section has several members whose special interest is bats, so expect to see more bat related stuff in the future.



Sara Parratt-Halbert MSc.
Photo by Stinking Weasel

About the Author

Sara Parratt-Halbert MSc GradCIEEM is Project Manager for EU ERDF Interreg.IVb funded project Stimulating Enterprising Environments for Development and Sustainability (SEEDS). She works for South Yorkshire Forest Partnership in Sheffield. Previous posts include Woodland Manager; and Environmental Education Centre Manager, both for an urban woodland in South Yorkshire.

Contact Sara at:

sara.parratt-halbert@syforest.co.uk
www.seeds-project.com



Gordon Haycock and Elizabeth Richell, Sheffield Science Fair.

Career Events Report

Two Careers events have been attended by the Yorkshire and Humber Section Committee in autumn term of 2013. The first event was at Leeds University School of Earth and Environment and was attended by Gordon Haycock and David Martin. Using the newly supplied banner and CIEEM literature, we engaged with a good number of students, with many expressing an interest in Section events and 35 signed up for email notice of forthcoming events.

The second event took place at Sheffield University with Elizabeth Richell and Holly Smith joining Gordon on the stand. Once again the literature was invaluable for engaging students, and a further 52 signed up for email notification of Regional events.

In both cases the events were well attended, and students seemed eager to engage. It is hoped that they will attend Section events and meet our membership, encouraging them to pursue a career as an ecologist or environmental manager, and join CIEEM!

Partnership News



Society for the Environment

We are pleased to announce that the following CIEEM members have been admitted as Chartered Environmentalists:

Mr Jonathan Jackson, Mr Thomas Oliver, Mr Sion Brackenbury, Mr David Denman, Mr Duncan McLaughlin, Mrs Rebecca Purslow, Miss Laura Gore, Ms Primrose Duplessis, Miss Phillippa Baron, Mr Leonard Griffiths, Mrs Katie Rogerson, Mr Edward Godsiffe, Dr Eleanor Lucy Ballard, Ms Clare May

www.socenv.org.uk



IUCN-UK

IUCN President, Zhang Xinsheng, visited IUCN-UK during his visit to the UK in February 2014 for the London Conference on Illegal Wildlife Trade. To mark President Zhang's visit, a reception was held at London Zoo as an opportunity for him to meet with the UK's IUCN Members and to listen to what they had to say about conservation and about IUCN.

www.iucn-uk.org



European Network of Environmental Professionals

Following on from the General Assembly held last October ENEP's Executive Committee has embarked on a process to conclude its activity plan for 2014. Part of this process has involved the President and Project Officer visiting almost all of the 23 member associations to discuss their priorities for 2014.

ENEP has also secured a meeting with Commissioner Potoš, who is head of DG Environment, on Friday 28 March at 10h30. A delegation of three representatives will attend the meeting to highlight the value of the ENEP network to the Commission.

To help with the ongoing workload of the network, ENEP has a new Project Assistant. Monika Baunach joined ENEP in February for a two-month period. Monika is from Nuremberg in Germany, but lived in London for two and a half years before moving to Brussels. She holds a BA in European Studies from the University of Passau, Germany and an MA in Political Communications from Goldsmiths, University of London. Prior to joining ENEP, Monika worked as an intern in WWF-UK's Public Affairs Team.

www.efaep.org



All-Party Parliamentary Group for Biodiversity

In late January the APPGB held an event in the House of Commons on Biodiversity and Climate Change. Presenting at the event were Professor Alex Rogers from Oxford University on the effects of climate change on the marine environment; Professor Chris Thomas from the University of York on observations, projections and conservation strategies; Dr Nathalie Pettorelli from the Institute of Zoology at the Zoological Society of London on the international effects of climate change on biodiversity; and Dr Mike Morecroft, Head of Profession, Climate Change, at Natural England on Climate change impacts and adaptation from a statutory agencies point of view. Zac Goldsmith MP, Lord Oxburgh, Joan Walley MP and Caroline Spelman MP also attended. The APPGB is currently finalising its own website, where the presentations from the event will be uploaded. We will share these documents with members as they become available.

www.publications.parliament.uk/pa/cm/cmallparty/register/biodiversity.htm

Applicants and Admissions

If any existing Member has any good reason to object to someone being admitted to the Institute, especially if this relates to compliance with the Code of Professional Conduct, they must inform the Chief Executive Officer by telephone or letter before 20th April 2014. Any communications will be handled discreetly. The decision on admission is usually taken by the Membership Admissions Committee under delegated authority from the Governing Board but may be taken directly by the Board itself. CIEEM is pleased to welcome applications for membership from the following:

APPLICANTS

Applications For Full Membership

Mr James Askham, Miss Laura Blaker,
Mr Chris Cummins, Mr William Jackson,
Ms Alison Johnston, Dr Annabel King,
Mr Steven Peters, Mr Duncan Revell,
Mrs Elizabeth Sanders, Mr Chrispian Snell,
Dr Philip Sterling.

Applications For Associate Membership

Mr Joseph Bradshaw, Miss Leanne Butt,
Ms Lisa Dolan, Mrs Catherine Poate,
Mr George Siskos, Ms Nikki Taylor.

Applications to Upgrade to Full Membership

Miss Katherine Harrington, Dr Steven Heathcote.

Applications to Upgrade to Associate Membership

Miss Sarah Atkinson, Miss Paula Bateson,
Mr Stephen Beal, Miss Joanna Greetham,
Miss Amelia Hodnett, Mr David Hunt,
Ms Ruth McGuire, Mr Patrick O'Shea,
Miss Elaine Rickman, Mr Barnaby Scott,
Mr Dominic Sheldon, Miss Julie Watson,
Miss Elizabeth White.

ADMISSIONS

Chartered Ecologists

Registrants announced 23 October 2013:

Mrs Penny Anderson, Ms Sue Bell, Mr John Box,
Ms Katharine Dale, Dr Phillip Edwards,
Mr Paul Goriup, Mr Richard Graves,
Ms Jacqui Green, Dr Richard Jefferson,
Mr Peter Jepson, Dr Martyn Kelly,
Mr William Manley, Prof Robert Marrs,
Mrs Jenny Neff, Ms Pamela Nolan,
Mr Michael Oxford, Dr David Parker,
Mr Steven Pullan, Ms Caroline Ann Skinner,
Dr Fred Slater, Mrs Claire Wansbury.

Registrants announced 15 January 2014:

Mr Philip Baarda, Mr Simon Barnard,
Dr Michael Dobson, Miss Nicola Faulks,
Dr Alan Feest, Mr David Feige, Dr John Feltwell,
Dr Martina Girvan, Miss Emma Goddard,
Mr Luke Gorman, Mr Stuart Graham,
Mr Paul Gregory, Mrs Sally Hayns, Dr Rachel Hirst,
Dr Sarah Jackson, Ms Lisa Kerslake, Mr Paul Lee,
Mr James McCrory, Mrs Susan Morgan,
Prof Stephen Ormerod, Ms Stephanie Peay,
Mrs Katherine Prior, Mrs Abigail Sanders,
Mrs Kerry Shakespeare, Dr George Smith,
Mrs Claire Smith, Dr Jim Thompson,
Dr Joanna Treweek, Mr Paul Watts,
Mr Paul Whitby, Mr Michael Willis,
Miss Amy Wright.

Full Members

Dr Niamh Burke, Dr Patricia Byrne,
Dr Nicola Chapman, Dr Stewart Clarke,
Mr Thomas Cook, Mrs Sarah Dillon,
Ms Caroline Essery, Mr Richard Harrison,
Mr Philip Irving, Mr Christopher Jones,
Dr Kevin Jones, Mr Anthony Juniper,
Mr Rhyen Law-Cooper, Dr Stephanie May,
Miss Rachel Midgley, Miss Laura Murray,
Mr Matt Pannell, Dr Alexandra Pollard,
Mr Paul Renshaw, Miss Leanne Sargeant,
Miss Francesca Tarry, Mr Simon Thomas,
Ms Mary Thornton, Dr Rachael Thwaites,
Dr Paul Tinsley-Marshall, Ms Heather Webb,
Mr Robert West.

Associate Members

Mr Andrew Cole, Miss Aisling Connolly,
Mr Andre Douglas, Mrs Roberta Epps,
Miss Jane Herbert, Miss Rebecca Nason,
Mr Rupert Simms, Miss Ellen Somerwill,
Miss Stacey Waring, Mr Robbie Watt,
Mr Martin Woolley, Mr Ben Wyatt.

Upgrades to Full Membership

Miss Eleanor Body, Miss Sally-Ann Hurry,
Miss Rhia McBain, Miss Emma North,
Mrs Hilary Phillips, Miss Lucy Plumb,
Mr Stewart Wesley.

Upgrades to Associate Membership

Mr Richard Anderton, Miss Jess Batchelor,
Miss Helen Davies, Miss Johanna Fewtrell,
Mrs Abigail Gray, Miss Kristy Kelly,
Miss Michelle Nesbitt, Mr Keith Thomas,
Miss Leanne Wall.

Recent Graduate Members

Miss Robyn Ablitt, Mr Adam Banting,
Miss Emma Barnes, Mr Andrew Davies,
Miss Charlene Davies, Miss Jenny Downie,
Miss Carol Flaxman, Miss Rhona Fulton,
Ms Alison Gilry, Miss Franky Green,
Mr Gary Hillier, Miss Rebecca Hubball,
Miss Maisie Jepson, Mr Christopher King,
Mr Geoff Maud, Mr Craig Osgerby,
Miss Laura Shakespeare,
Miss Lucy Robison-Smith,
Miss Kathleen Smart, Miss Katie Stenson,
Mr David White, Mr Andrew Zealand.

Recent Upgrades to Graduate Members

Miss Jessica Breeze, Miss Lorna Griffiths,
Miss Katherine Knox, Mr Sean Woods.

Recent Student Members

Miss Emma Alexander, Miss Rebecca East,
Mr Henry Smith, Mr Mate Vakarc.

Recent Affiliate Members

Mr William McCauley.

Chartered Ecologist – Going From Strength to Strength!

Karen Sanderson

Registration Officer, CIEEM

As you may be aware, CIEEM established the Register of Chartered Ecologists under powers conferred by the granting of a Royal Charter on 1st April 2013.

The award of Chartered Ecologist has given us the opportunity to create a new professional standard which will be widely recognised and valued. To that end, the process has been designed to be thorough, robust and rigorous. The award provides a professional benchmark which demonstrates that those holding the title have been thoroughly assessed and are working to the highest standard, and have the competence to take the profession forward to meet the challenges of the future.

In order to test the process and build an initial pool of assessors (there was no grandparenting), the Register was initially launched to applications from the President, past-Presidents and Fellows in July 2013. Feedback from the Fellows was that the application form is challenging and takes longer than they expected. One Fellow remarked that the form was "... similar to completing an application form for a job...a very important job!"

From this first batch, 21 applicants were ratified by the Governing Board. On being awarded Chartered Ecologist status, Paul Goriup commented: "... delighted to have been accorded this new professional recognition. I expect that Chartered Ecologists will now rank with other chartered professions for our scientific knowledge, managerial competencies and practical experience. As the impacts of climate change and biodiversity loss intensify in coming decades, Chartered Ecologists will be vital for helping society cope with them."

The Register was opened to applications from Full members on Monday 30th

September 2013. We are delighted to announce that from this second tranche, a further 32 applicants who were successful at stage two of the process, were ratified by the Governing Board and are now entitled to use the post nominals 'CEcol'. Amongst these new Registrants are Luke Gorman and Paul Watts, both are Senior Ecologists at Atkins, and Kerry Shakespeare and James McCrory, who are both Lead Ecologists for RPS. They were pleased to share their reasons for applying for Chartered status.

Luke Gorman: "I have worked as an ecological consultant for over ten years, leading the ecological input into a number of complex and nationally important schemes. I work to high standards, using innovation and new industry technologies to advance the ecology discipline further. I am extremely pleased to have been granted chartered status and believe that the Register of Chartered Ecologists will raise the standards of practice in the ecology sector."

Paul Watts: "CIEEM allows registration as a Chartered Ecologist via two possible routes: generalist and specialist. As one of Atkins' lead ornithologists, I chose the specialist route, requiring me to demonstrate competences to an authoritative standard. I found the application process both challenging and interesting, allowing me the opportunity to reflect on the ecological skills that I have gained whilst working on a variety of projects for Atkins, as well as in my volunteer role as a bird ringer. I am very proud to have received chartered status and feel it is testimony to the high standards that all Atkins' ecologists adhere to."

James McCrory: "Becoming a Chartered Ecologist is a significant milestone in my career to date. The process to become chartered challenged me to analyse how my experience has contributed to my profession. Being chartered reinforces the

need to be an ambassador for the highest professional and ethical standards in ecological consultancy."

Kerry Shakespeare: "Like James, becoming a Chartered Ecologist is a significant achievement in my career. I find ecology an ever challenging and exciting sector to be part of. I hope through this chartered status that an ecologists role in influencing future developments will go from strength to strength, keeping us at the forefront of decision making to not only allow development to proceed but to also protect and enhance the natural environment for future generations."

Recruitment of assessors is an integral part of the process and a top priority. All assessors must be Chartered Ecologists and have taken part in training. We are happy to report that a healthy pool is building from our first Registrants who are keen to promote the profession and help drive up standards. We are extremely grateful to our assessors who are volunteers and selflessly give their time and support to us. Thank you.

The Register is open and is proving popular. Applications are welcome from Fellows and Full members of CIEEM and are processed on a first come, first served, regional basis. Additionally, we will soon be accepting applications from equivalent grade members of certain other licensed professional bodies. For further information and details of how to apply, please go to our Chartered Ecologist webpages (www.cieem.net/chartered-ecologist) or do not hesitate to contact me should you have any questions or require further information.

For further information

Contact Karen at:
KarenSanderson@cieem.net

Featured CIEEM Training Workshops

Introduction to Phase 1 Habitat Mapping and Plant Identification

(8-9 May, Newark)

Trainer: Jane Southey CEnv MCIEEM

Level: Beginner

Phase 1 methodology is a system used extensively to provide rapid recording of wildlife habitats. The first day of this two-day course will introduce plant taxonomy, focusing on some of the common British plant families. Participants will have the opportunity to use keys to identify plants both in the classroom and in the field. The second day will introduce Phase 1 methodology. Participants will integrate both days' learning by applying survey methodology and conducting plant identification in classroom group exercises and in the field.

Introduction to the National Vegetation Classification (NVC)

(30 June, Broxton, near Chester)

Trainer: Julia Drage MCIEEM (rtd)

Level: Beginner

The National Vegetation Classification (NVC) classifies community types by recording and analysing the plants present. The technique provides a widely used methodology for providing detailed (Phase 2) ecological site survey. This one day course aims to encourage thinking in terms of the occurrence of plant communities. The classroom session will cover data collection and analysis, identification of plant communities and site evaluation. Participants will record and sample communities on a neutral grassland and the collected data will be tabulated and analysed, using keys and NVC floristic tables.

Design and Management of Soils for Habitat Creation and Biodiversity

(8 and 9 April 2014, Neston, Cheshire)

Trainers: Dr Jenny Jones, Dr Philip Putwain MCIEEM and Dr David Hackett CEnv MCIEEM

Level: Beginner to Intermediate

Soil is a vital part of terrestrial ecosystems whose importance is often overlooked. This part classroom-based and part field-based two-day course will deliver knowledge of soils to practicing ecologists with little or no prior experience and enable them to speak with confidence when dealing with planners, landscape professionals and project engineers. Workshop topics covered include description of soil types and soil profiles, physical and chemical properties, structure, ecosystem function and soil biodiversity as well as soil amelioration and soil creation with emphasis on brownfield sites. During the second day participants will experience soil profiles of different soil types.

Introduction to Bat Survey

(30 April, Dunblane)

Trainer: Beccy Osborn MCIEEM

Level: Beginner

This course will provide an introduction to Scottish bat legislation, bat ecology, best practice survey techniques, roost types and identification. Case studies will cover different survey situations, including construction sites, wind farms, roads and trees. The day will be classroom based with a field visit in the evening to look at bat roosts and (weather permitting) record at least three species of bat with a number of different bat detectors. Participants will have the opportunity to discuss survey queries and experiences and receive advice on further reading.

Bat Impacts and Mitigation

(1 May, Dunblane)

Trainer: Beccy Osborn MCIEEM

Level: Beginner to Intermediate

This course follows on from Introduction to Bat Survey on 30 April; the event also forms a stand-alone event for participants with some experience of bat surveys. The day will provide a brief overview of Scottish legislation in relation to bats and licence requirements. Bat impacts and mitigation options relating to various development types will be considered including roads, housing, industrial sites and wind farms. Many case studies will be covered and participants are encouraged to bring their own examples of bat mitigation (successful or not!) for discussion. A short field visit in the afternoon is planned to look at some examples of bat mitigation. Participants will have the opportunity to discuss examples of bat mitigation and receive advice on further reading.

Professionalism and Environmental Ethics

(20 May, Birmingham)

Trainer: Jim Baxter

Level: Intermediate to Advanced

Professionals in the fields of ecology and environmental management strive to gain the confidence and respect of working partners and stakeholders by building a reputation based on high quality work, trust, consistency, credibility and integrity. Yet the complexities of the legal and regulatory system, plus other pressures, create ethical challenges that test high professional standards. How can these challenges be practically approached in everyday work?

Raising Standards of Professional Practice: Update and Next Stages

Linda Yost CEnv MCIEEM

Deputy Chief Executive, CIEEM

CIEEM's Professional Standards Committee (PSC) has sought the views of the membership through online surveys and a series of one-day workshops with respect to defining poor practice, and seeking views as to solutions.

The workshops were run on a country basis in England, Ireland, Scotland and Wales to take account of the relevant policy (legislation, regulations, guidance, etc.) and to enable local member participation. The workshops were chaired by the Vice-Presidents from each country and were facilitated not only by PSC but also several members of the Governing Board. We sought the participation of Full members and Fellows from across the sectors in these workshops and sought the engagement of particular non-members from the SNCOs, local Authorities, wildlife/species trusts and societies.

The online survey was used to gather information from those members who expressed an interest in providing their views, and those members who had agreed to participate in the workshops.

The workshops sought to clarify and verify the anecdotal evidence of poor practice that is alleged to be occurring within the profession, and to propose measures that could be taken to address and rectify poor standards. The attendees of the workshops were asked to:

- i. consider what they saw as poor practice;
- ii. consider what was the cause of poor practice;
- iii. consider what the effects of the poor practice was; and
- iv. propose solutions or ways of addressing poor practice.

The outputs of the workshops summarised the key areas of concern that individuals had encountered, which they perceived

Mick Hall CEnv MCIEEM

Associate Director, Arup and Chair of CIEEM's Professional Standards Committee

to be poor ecological or environmental management practice. It also summarised their understanding of the cause(s) and effects, and their thoughts on workable solutions. From the information gathered it was evident that poor standards of work were often confused with issues of compliance with CIEEM's Code of Professional Conduct.

Examples of poor practice that were raised and discussed during the workshops included:

- Operating outside of professional knowledge, skills, sphere of competence
- Exercising of professional judgement in relation to information, advice, applying objectivity, relevance, accuracy, fairness, impartiality
- Compliance with legislation and regulations
- Application, interpretation of guidance
- Over specifying mitigation/survey work
- Conduct of business relationships
- Scientific data and information usage
- Employment of appropriately qualified, competent staff and their management, supervision and support

Considering the findings of the workshops and survey, the PSC drew up recommendations for actions to address areas of poor practice raised and to implement suggestions for solutions. The PSC reported the outcome of the survey and workshops to the Governing Board, which was considered at its meeting on 15th January 2014.

From the suggestions put forward by members a number of topic areas were identified for further investigation. These included that:

- the membership application process should reflect a good standard of practice as well as of behaviour;
- members should remain current in relation to the latest practice in their sphere;

- there should be consistency in the understanding and application of guidance across all sectors;
- there should be minimum standards of practice in the sector through certification and quality assurance;
- appropriate behaviours should be encouraged and reinforced; and
- there should be stronger baseline support in place to promote good standards of work (law, Directives, regulations and policy).

In total there are approximately 40 areas for improvement and it is with some satisfaction that many of these suggestions reinforced the areas of work that are already in progress at CIEEM. The next stage is to determine how best to take forward the remaining issues, and these will need careful consideration by the Governing Board and the individual Standing Committees. Once all of these suggestions have been considered, the recommendations will be prioritised and incorporated into the Business Plan 2014-15 or into the Strategic Plan 2015-2020 as appropriate.

The PSC would like to thank all of the respondents for their valuable time and contributions that have helped identify the issues of poor practice. Their advice will help to shape the measures that will raise standards. PSC expects to provide more detailed updates in the coming months on the work that will be undertaken to deliver these measures.

For further information

Contact Linda at:
LindaYost@cieem.net

Contact Mick at:
mick.hall@arup.com

HABITAT CREATION AND RESTORATION

11-12 November 2014, Edinburgh University



Example of a large scale restoration project - The Great Fen Project, Cambridgeshire

A call for papers will be announced in May 2014.

Accommodation is available on site at the University's Pollock Halls. This is however limited but can be booked online at <http://www.book.accom.ed.ac.uk> at a reduced price of £65.45 quoting code CONF14.

More information: www.cieem.net

The Only Way Is Ethics

Lisa Kerslake MCIEEM

Swift Ecology Ltd

Mike Oxford FCIEEM

Consultant and ALGE Project Officer

This is the first article in a series that will appear in coming issues of *In Practice*. Over the course of these next few articles we will start to explore: what it is to be a good or wise judge over ethical questions, why having a sound ethical basis for everything you do as a professional is important, as well as exploring how to think about different kinds of professional ethical dilemmas.

Judging Wisely

In preparing to write this first article, and taking into account (in our very humble way) the centuries of enlightened debate and argument over ethics, one thing has become apparent to us; that there is no one magic formula to guide our judgement over an ethical dilemma. Nor is there any acid test to determine the 'rightness' or wrongness' of a decision you make. You cannot judge the correctness of an ethical decision by the money it puts into your bank account, or the size of the car you drive, or indeed your status in an organisation. However, what you may learn, after the event, is what other people think of your decisions, people whose judgement you respect.

There is something profound and at the same time immediately practical about the questions we want to consider in these articles: what does it take to be a wise judge in matters of professional ethics? On this particular point, found in a series of excellent articles on business ethics, Klempner (2008) says:

"'Wisdom' is a rather old fashioned word. Modesty seems to forbid us from referring to ourselves as 'wise', yet the opposite 'unwise' is clearly a term of criticism. What we strive to be is not 'unwise', while recognising that genuine wisdom is reserved for the few."



In our coming series of articles, we hope to demonstrate why we should all desire to be wise. However, if – as Klempner suggests – you are uncomfortable with the term *wisdom* then perhaps we can rephrase the original question: what is it to ‘judge well’ on matters of professional ethics?

Whichever way we couch it, what does not seem to be a matter of debate is that being a good judge of professional ethics is an essential accomplishment for a professional person – even if it is something that we mainly do subconsciously. In fact, in our day-to-day lives, we rarely appreciate, or stop to think about how ethics intrudes into so many of the practical decisions that we make. We simply don’t think consciously about this *underlying personal code* that guides how we act and what we do. Nevertheless, some form of ethical or moral code underpins nearly every action we take. And we generally tend to muddle on until something comes up that is beyond our normal experience; a choice or challenge, where we genuinely don’t know what we should do.

Before we get too far into this, we should make a clear distinction. A *difficult ethical decision* is not necessarily the same as a *decision that is difficult to make*. For instance, you may be faced with a situation where it is very clear what would be the right or wrong thing to do. Say you are aware that a client has, contrary to your advice, committed a serious offence under wildlife legislation. The right thing to do would be to at least bring this to their attention – if not to actually report it to the relevant authorities. But this would probably be a very difficult decision to make.

A difficult ethical decision, on the other hand, is where we find that there are at least two possible courses of action. From different perspectives either might seem equally justifiable and appear to be the right thing to do – but each appears to be completely incompatible with the other.

Without going into lots of ethical theories at this stage (we will return to those in later articles), for the practical purpose of

coming to an ethical decision, our response to an ethical challenge is not based on just some mere subjective preference. Our judgement represents our understanding of, and is dictated by, our sense of *what is right*. However subconscious or intangible this may seem, it guides our judgement and gives it its sense of urgency and necessity.

We make our ethical evaluations against a background of common knowledge and understanding of what is acceptable or unacceptable behaviour. For CIEEM members, a list of behaviours that we should abide by or aspire to is given in our Code of Professional Conduct. But, ultimately, what a knowledge of any code of conduct cannot do is substitute for your own good sense and judgement.

What lies behind the very idea of ethics is the notion that it is possible to see the world from a point of view which is, to some degree, detached from the one which we ourselves occupy. And of course we all inhabit different worlds as we perform different roles. Our decision over an ethical issue may be different depending on the assumed role we have in our world as we face a particular challenge: that of professional ecologist, business owner, responsible citizen, loyal spouse, caring parent or child, a decent human being. These particular roles all carry particular personal ‘baggage’ and values that have the potential to clash. The dogmatic response that professional good practice dictates ‘X’, or that the client requires ‘Y’, and that these override all other obligations in all circumstances, is simply unworkable.

Therefore, to take another person into account when you make a decision implies that you put some value on the way they see things, on what is important in their eyes, on what benefits or harms them.

A Difficult Scenario

So how does ethical decision-making work in practice? Let’s consider the following scenario (in the box to the right) where you are acting as an ecological consultant.

It is November, and an elderly farmer has approached you to undertake bat surveys of her barn complex. She is desperately keen to get planning permission before April the following year.

You know that the local planning authority does not have an in-house ecologist, and is unlikely to scrutinise this sort of application too closely, so it is likely to get consent even without any form of ecological survey.

What issues around good practice does this raise, and does it raise any issues that might be in conflict with CIEEM’s Code of Professional Conduct?

Would it change your position if you knew she was recently widowed and needs to move out of the farm as soon as possible?

Should it influence you, if you discover that she has been a very active member of the local Wildlife Trust for the last 30 years – or that she is offering to donate 11 hectares of wildflower meadow on the farm to the Trust if she is able to obtain planning permission?

Does it alter how you might react, if you understand that if you do not accept the commission, she is likely to use an ecological consultant (a friend of the family) that has a very poor reputation locally in terms of the quality and competence of their work?

What further ethical dilemmas might you have to wrestle with if you are told that she is terminally ill and unlikely to survive beyond May the following year? All she now wants to do is get planning permission so that she can leave the barns, as a legacy, to her daughter and three grandchildren.

After your initial inspection, you have found evidence that bats are present but have not established the number present nor the status of the roost.

Finally, you also know that you have an opportunity to work with a very sympathetic architect to achieve an overall biodiversity enhancement. But you won’t have time to do all the necessary surveys recommended by good practice guidance.

So, from your own ethical standpoint, what should you do? And be honest with yourself. You don't have to tell us, but try to really work out what you would do.

Does Ethical Theory Help?

One branch of ethics (Consequentialism) would suggest that one's actions should be judged according to the outcome – in other words, the end may justify the means. Following this approach, if there is a good biodiversity outcome with the barn conversions, in terms of overall gains for bats and a new wildflower meadow, we may take the view that this is the most important thing. But is it that simple?

However, an opposing school of thought (Deontology) suggests that the judgement of rightness or wrongness of any action is independent of the outcome. Instead, we should be guided by the intrinsic goodness of the action, in and of itself. Following this approach, we may feel that an exception should not be made for the farmer and that both the planning and licence applications should be submitted in due course, and should be informed by all necessary surveys in accordance with good professional practice guidance, especially as this could be more easily justified under CIEEM's Code of Professional Conduct.

Finally, would your perspective be different, and therefore how would your reaction change, if you were an ecologist actually working for the local authority who receives the planning application; or alternatively, if you were the licensing officer with the relevant SNCO that has to deal with the EPS Licence application?

Klempner says: *"Sometimes we face ethical decisions which are difficult, not because of something we lack – the required knowledge or expertise, but rather because the nature of the situation which we are dealing with is such that no amount of expertise would be sufficient to determine the one and only 'correct' answer. This is the characteristic of a true ethical dilemma."*

Consequently, as Kant observed, wisdom and skill in judgement can never be reduced to a book of rules. You still need to use judgement in applying the rules.

Is There an Answer to This Dilemma?

In our next article we will reflect on the issues that this scenario raises; what questions it raises under CIEEM's Code of Professional Conduct; and also how we might be able to arrive at a wise judgement that is both pragmatic and apparently acceptable to fellow professionals.

New 'Professional Ethics' LinkedIn Discussion Thread

We do not claim to have all the answers (not yet anyway!), but we hope to stimulate your thoughts and initiate a discussion amongst a wide range of members. So if you would like to share your response to this scenario, or read about how other people would tackle it, we have started a new CIEEM LinkedIn Thread – dedicated to exploring ethical issues as faced by CIEEM members. Go to: <http://www.linkedin.com/groups?gid=4306428>

References

- Klempner, G. (2008). *Ethical dilemma unit 1. Business Ethics – Creating a Thinking Board*.
- Fewings, P. (2009). *Ethics for the Built Environment*. Taylor and Francis Group.

Acknowledgements

The views expressed in this article are the authors' own personal views, although we would like to thank Jenny Neff and Liza Booth for the invaluable comments made on its scope, shape and content.

About the Authors

Lisa Kerslake is Managing Director of Swift Ecology and has previously held senior roles in a local authority, a wildlife trust, and a biological records centre. She is a member of CIEEM's Governing Board, Vice-Convenor of the West Midlands Geographic Section and a former member of the Professional Standards Committee.

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AWARDS LUNCHEON

26 June 2014, Birmingham Botanical Gardens

CIEEM would like to announce the awards luncheon which will be taking place at the magnificent Birmingham Botanical Gardens where the 2014 CIEEM Awards will be presented.



Master of ceremonies: **Helen Lederer**
(British comedienne, writer and actress).



Guest speaker: **Chris Baines**
(One of the UKs leading independent environmentalists).



Guest speaker: **Lord De Mauley**
(Parliamentary Under Secretary at the Department for Environment, Food and Rural Affairs).

Finalists for all the categories will be announced towards the end of April and tickets for the luncheon will go on sale then too. If you would like to attend to support one of the finalists or would like to celebrate the recent achievements of the profession, please visit our website later in the year for further details.

All CIEEM members will be emailed directly with details about tickets after the finalists have been announced.

www.cieem.net/2014awards

What Use is CIEEM to an Academic or, Indeed, an Academic to CIEEM?

A Dialogue Between Two University Lecturers

Eirene Williams CEnv FCIEEM Rtd
previously of Plymouth University

Roland Randall CEnv FCIEEM
Cambridge University

Dr Roland Randall introduces the topic: Ecology and environmental management are applied aspects of the biological sciences, albeit underpinned by an increasingly rigorous body of theory. It is therefore very likely that students specialising in these areas and those academics teaching them will not only need to acquire a good grounding in ecological theory but will also spend some part of their careers in practising or advising on environmental management. In order to get onto the career pathway, most students will be required to gain work experience during vacations and are likely to carry out a dissertation which includes a practical aspect. For all of these reasons, it is advantageous both to enrol as a Student member of CIEEM and also to continue with membership in later life even if one stays in academia.

Dr Eirene Williams interjects: Like many university lecturers in our subject area I was a member of the British Ecological Society (BES) for many years. This was in the days before online subscriptions so my office was necessarily lined with copies of the relevant BES journals. Somehow amongst all this paper I noticed that there was to be a meeting at the Royal Geographical Society to discuss the formation of a professional institute for ecological practitioners. My head of department agreed to pay for me to go to this!

The rationale I had put forward for this was that it was not so much for my own

benefit but for that of our students. I was teaching ecology and habitat management on BSc courses. The first destinations of the graduates were often ranger and warden jobs, but we could truthfully say they could be anything from accountants to zookeepers. One common factor was that they were very likely to be or be dealing with the natural world and the environment, and with other professionals such as planners and engineers. Thus the existence of a professional institute in the ecology and environmental management area, and all that that implied for career development, was greatly to our students' advantage. This has turned out to be true and is the first reason why an academic should consider belonging to CIEEM.

Roland adds: In my case, my head of department did not see a value in an involvement with non-academics (Eirene surmises this might be difference between a Russell Group University and an ex-Polytechnic?!) and I have been the only member of my department to join CIEEM. However, a large number of my students have benefitted from the links I have made and have been grateful for the introductions which led to dissertation opportunities or, in some cases, career pathways.

Eirene continues: Once IEEM (now CIEEM) was established my head of department agreed to pay my annual membership and facilitate relevant CPD activities. Even now, one professional subscription is often payable by a lecturer's department and this is a second reason for choosing CIEEM. In the early days of IEEM there was no specific student membership and no websites so I would pass round my copy of *In Practice* and any news about conferences and events of interest for which there was a student discount available. Many

ex-students are now MCIEEM, CEnv and advancing in seniority in their careers yet remain grateful for the introduction to professionalism through CIEEM.

I was however surprised that so few university lecturers had joined IEEM. As I conducted the first IEEM membership survey in the early 1990s I was in a position to confirm the suspicion that IEEM was initially a consultants' club. Now that CIEEM has come of age there have been long-awaited developments such as accreditation of degrees and the awarding of student dissertation prizes. In order to be considered for degree accreditation, a university course or pathway must have at least one lecturer who is MCIEEM and preferably others who are eligible and who might be persuaded to apply for membership. So the third reason for a lecturer to join is again for the sake of students, who benefit later when seeking employment in the ecology and environmental management sector from having taken an accredited course. The fourth reason is for the lecturer's department, which benefits from being able to market an accredited course.

Roland adds: It is interesting that, in the last few months since the Institute has achieved Chartered status, several of my colleagues have now expressed more interest in what we are about!

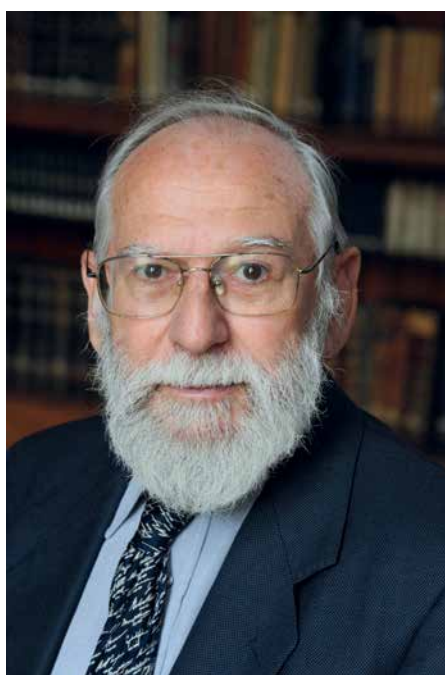
Both agree: Many lecturers do also act as consultants so may have non-altruistic reasons for joining CIEEM. Reading *In Practice* is a good way of keeping up to date on legal and professional issues such as BS42020 that may not appear in the academic or research literature. There are also guidelines and articles published by CIEEM about tendering and pricing work which may not often come through normal

university channels. CIEEM conferences with a more applied focus may also be relevant. Membership of CIEEM (and maybe CEcol status in due course) will add credibility when evidence has to be presented at a public enquiry. As there is always pressure on academics to publish their work the occasional article in *In Practice* may also count for something.

Roland concludes: There is little doubt in our minds that CIEEM membership is of great value both to academics and their students. CIEEM also benefits from academic input in maintaining a thorough grounding in theory and in providing a wider base of membership from the student body – a win-win situation. The next step therefore, is for CIEEM to initiate a recruitment drive in universities and colleges, promoting the advantages both of student membership and membership of more senior staff. Advertisements in the ecological journals may be a start but leaflets posted out to all relevant academic departments extolling the values of CIEEM membership may also be necessary to reach the critical mass required to make membership *de rigueur*.



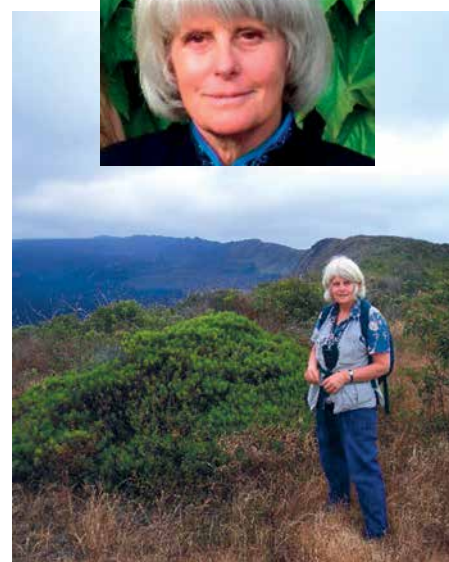
Supervision at Girton College, Cambridge



About the Authors

Roland has retired from lecturing in Biogeography and Conservation and Management at Cambridge University but continues in research on coastal vegetation as a Life Fellow at Girton College, Cambridge. He is also involved with voluntary work for CIEEM. His career began as a lecturer at the University of Ulster after completing an MSc on the coastal vegetation of Barbados at McGill University, Montreal and a PhD at Cambridge on the vegetation of the Monach Isles, Outer Hebrides. He then returned to Cambridge University where he has combined lecturing and research with running a livestock farm and exporting livestock throughout the world. He became a Fellow of the Institute in 2009.

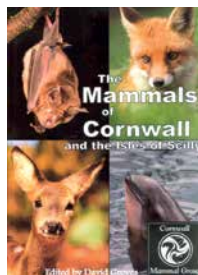
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Eirene has retired from lecturing in Countryside Management at Seale-Hayne College (Plymouth University) and spends much of her time doing voluntary work for CIEEM! Her career started in Malawi as a VSO at the Tea Research Foundation, then lecturing at the Malawi Polytechnic. Back in UK a PhD in Ecological Genetics at Exeter University followed, and she bought a beef farm in Devon combining her academic and practical interests in agriculture and the environment. She has also been active on behalf of CIEEM within the Society for the Environment and contributed to CIEEM being granted Chartered status in 2012.

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New Publications



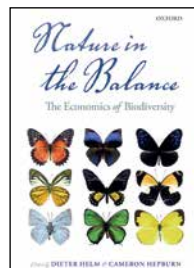
The Mammals of Cornwall and the Isles of Scilly

Editor: David Groves
ISBN: 9781902864105

Price: £9.99

Available from: www.nhbs.com

This comprehensive distribution atlas has been published four years after the launch of the Atlas Project. The Cornwall Mammal Group (CMG) began by working towards filling in some of the gaps through targeted surveys, appeals for records and encouraging the collation of existing records. The Group also wanted to produce a book which went further than just a series of maps and wanted to use the opportunity to educate and entertain anyone with an interest in natural history and encourage them to find out about some of our more intriguing wildlife. The atlas is a starting point, providing a baseline against which to measure change; perhaps as a consequence of climate change or development. It also gives us some ideas about how to target survey work – where to look, and what to look for. Not only with the more established methods of traps and binoculars; but also exploring novel approaches such as tracking tunnels and trail cameras, encouraging community recording, and searching for old records amongst the files and libraries of other organisations.



Nature in the Balance: The Economics of Biodiversity

Editors: Dieter Helm and Cameron Hepburn

ISBN: 978-0199676880

Price: £24.00

Available from: <http://natureinthebalance.org/>

This book sets out the building blocks of an economic approach to biodiversity, and in particular brings together conceptual and empirical work on valuation, international agreements, the policy instruments, and the institutions. The objective is to provide a comprehensive overview of the issues and evidence, and to suggest how this very urgent problem should be addressed. Whilst there has been an enormous growth and research focus on climate change, less attention has been paid to biodiversity. This collection of high-quality chapters addresses the economic issues involved in biodiversity protection. This book focuses on the economics, but incorporates the science and philosophy, combining the application of a number of theoretical ideas with a series of policy cases.



Ecosystem Services: Global Issues, Local Practices

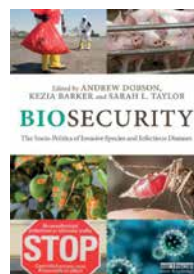
Editors: Sander Jacobs, Nicolas Dendoncker and Hans Keune

ISBN: 9780124199644

Price: £36.74

Available from: <http://store.elsevier.com>

This book covers scientific input, socioeconomic considerations, and governance issues on ecosystem services. It provides hands-on transdisciplinary reflections by administrators and sector representatives involved in the ecosystem service community. The book develops shared approaches and scientific methods to achieve knowledge-based sustainable planning and management of ecosystem services. Professionals engaged in ecosystem service implementation have two options: de-emphasise the ecological and socioeconomic complexity and advance in the theoretical, abstract field, or try to develop research that is policy relevant and inclusive in an uncertain environment. This book provides a wide overview of issues at stake, of interest for any professional wishing to develop a broader view on ecosystem service science and practice.



Biosecurity: The Socio-Politics of Invasive Species and Infectious Diseases

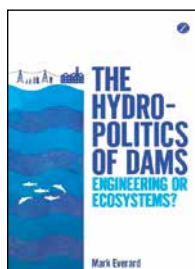
Editors: Andrew Dobson, Kezia Barker and Sarah L. Taylor

ISBN: 978-0-415-53477-2

Price: £32.99

Available from: www.routledge.com

In this introductory volume, biosecurity is presented as a governance approach to a set of concerns that span the protection of indigenous biological organisms, agricultural systems and human health, from invasive pests and diseases. It describes the ways in which biosecurity is understood and theorised in different subject disciplines, including anthropology, political theory, ecology, geography and environmental management. It examines the different scientific and knowledge practices connected to biosecurity governance, including legal regimes, ecology, risk management and alternative knowledges. The geopolitics of biosecurity is considered in terms of health, biopolitics and trade governance at the global scale. Finally, biosecurity as an approach to actively secure the future is assessed in the context of future risk and uncertainties, such as globalisation and climate change.



The Hydro-Politics of Dams: Engineering or Ecosystems?

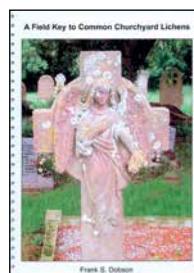
Author: Mark Everard

ISBN: 9781780325408

Price: £21.99

Available from: www.zedbooks.co.uk

This publication charts the troubled waters of 'heavy engineering' approaches to ecosystem management, exploring the history, benefits and problems of large dams. It then explores diverse ecosystem-based approaches to management of human interactions with the water cycle, concluding that a synthesis of approaches is needed in future. The book also addresses political, economic and legal dimensions of water management. Featuring case studies from China, India and South Africa, this insightful new book argues that there are more appropriate physical and social technologies that can help to sustainably provide access to clean water for all.



A Field Key to Common Churchyard Lichens

Author: Frank S. Dobson

ISBN: 9780954232474

Price: £14.99

Available from: www.nhbs.com

This publication is the result of three years of extensive testing by various lichen groups with all degrees of experience. It is fully illustrated throughout and enables nearly 255 species of lichen to be identified in the field. It covers lichens on stone, soil and wooden structures such as gates, fences and benches. In the second edition the species names have been updated and a some minor corrections made. It includes a few new species in the main key but the most important change is in the supplementary key to species on wood. This is based on the much extended key in *Lichens on Trees*. The book is now 50 pages in length and includes 255 species against the 190 in the previous edition.



Hen harriers on a Scottish grouse moor: multiple factors predict breeding density and productivity.

Baines, D. and Richardson, M.

Journal of Applied Ecology 2013, 50: 1397–1405.

The authors compared numbers and productivity of hen harriers *Circus cyaneus*, a protected specialist predator of conservation importance, in relation to a change in generalist predator management at Langholm, a moor managed for red grouse *Lagopus lagopus scoticus* shooting in southern Scotland between 1992 and 2007. During 1992–1999, the moor was managed for grouse and keepers legally controlled predators, thereafter keeping ceased. Following full protection being given to nesting harriers, their numbers increased from two breeding females in 1992 to 20 in 1997, when predation by harriers limited numbers of grouse available for shooting. After grouse management stopped in 1999, carrion crows *Corvus corone* and red foxes *Vulpes vulpes* increased and numbers of female harriers dropped to below five from 2002 onwards. Numbers of breeding harriers were negatively correlated with meadow pipit *Anthus pratensis*, crow, and July grouse abundance during the kept period and positively with spring grouse abundance. Harrier clutch size was positively correlated with vole abundance. Harrier clutch survival and productivity were higher when the moor was kept. Predation by foxes was the main cause of harrier breeding failure. The authors consider this study to be the first that quantifies how control of generalist predators as part of grouse moor management can benefit harrier productivity.

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Reappraising the effects of habitat structure on river macroinvertebrates.

Barnes, J.B., Vaughan, I.P. and Ormerod, S.J.

Freshwater Biology 2013, 58: 2154–2167.

Although rivers are highly structured physically, generalisations about the consequences for macroinvertebrates remain elusive. In part, this reflects the difficulty of quantifying structure *per se* as well as differentiating the effects on organisms of complexity (i.e. the total abundance of structural features), heterogeneity (i.e. the composition and spatial arrangement of different structural features) and surface area. Three hypotheses about habitat structure were tested at the patch scale (<0.1 m²) in tributaries of the Rivers Wye and Usk, mid-Wales: (i) greater habitat heterogeneity and surface complexity alter macroinvertebrate assemblage composition and increase diversity, richness and abundance, (ii) the effects of complexity on macroinvertebrates are distinct from those of increased surface area, and (iii) habitat structure (heterogeneity and complexity) is a major determinant of variations in macroinvertebrates among habitat types (bedrock, silt, sand, gravel, pebbles and cobbles). Bedrock was the least complex habitat, whilst pebbles were the most complex. Habitat mosaics surrounding cobbles had the most variable patch sizes, whilst those around gravel or bedrock were the most even. Complexity (but not heterogeneity) increased macroinvertebrate diversity and abundance independently of surface area, but independently accounted for <5% of the variation in macroinvertebrates. Complexity and surface area also independently increased taxonomic richness, but rarefaction showed that this was an artefact of increased abundances. Habitat type explained more of the variation (up to 21%) and rendered complexity and surface area redundant in our models. Bedrock, silt and sand typically had reduced diversity, richness and abundance of (mostly) Ephemeroptera, Plecoptera and Trichoptera, whilst silt had abundant Chironomidae. The results support the first two hypotheses, but only in part. Habitat heterogeneity did not affect macroinvertebrates, whilst the effects of complexity were weak. The major implication is that habitat type affects macroinvertebrates through factors other than structure alone. The authors advocate a wider reappraisal of the processes involved.

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Opportunistic citizen science data of animal species produce reliable estimates of distribution trends if analysed with occupancy models.

van Strien, A.J., van Swaay, C.A.M. and Termaat, T.
Journal of Applied Ecology 2013, 50: 1450–1458.

The authors investigated whether occupancy models can correct for the observation, reporting and detection biases in opportunistic data. Occupancy models use detection/non-detection data and yield estimates of the percentage of occupied sites (occupancy) per year. These models take the imperfect detection of species into account. By correcting for detection bias, they may simultaneously correct for observation and reporting bias as well. The authors compared trends in occupancy (or distribution) of butterfly and dragonfly species derived from opportunistic data with those derived from standardised monitoring data. All data came from the same grid squares and years, in order to avoid any geographical bias in this comparison. Distribution trends in opportunistic and monitoring data were well-matched. Strong trends observed in monitoring data were rarely missed in opportunistic data. Opportunistic data can be used for monitoring purposes if occupancy models are used for analysis. Occupancy models are able to control for the common biases encountered with opportunistic data, enabling species trends to be monitored for species groups and regions where it is not feasible to collect standardised data on a large scale. Opportunistic data may thus become an important source of information to track distribution trends in many groups of species.

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Intraspecific functional differentiation suggests local adaptation to long-term climate change in a calcareous grassland.

Ravenscroft, C.H., Fridley, J.D. and Grime, J.P.
Journal of Ecology 2014, 102: 65–73.

Populations of the common perennial herb *Plantago lanceolata* have been exposed to nearly two decades of summer drought at the Buxton Climate Change Experiment (BCCIL), a controlled manipulation of climate factors in a species-rich limestone grassland in northern England. The authors used a common garden approach to test for evidence of selection for different suites of functional traits in *P. lanceolata* populations exposed to chronic summer drought and across a soil depth gradient. The main axis of functional variation reflected a trade-off between reproductive and vegetative allocation, consistent with drought avoidance and competitive strategies, respectively. Avoidance strategies were more prominent in droughted populations, whereas competitive strategies were more prominent in populations from control treatments. Treatment differences were more pronounced in shallower soils. Deeper soils in both control and drought treatments promoted functional differentiation associated with competitive strategies, suggesting that selective pressures imposed by different climate treatments are modified by fine-scale edaphic heterogeneity. Results suggest that population-level shifts can be a mechanism of resistance to local climate-induced extinction. Trait differentiation with respect to fine-scale variation in soil depth suggests that edaphic heterogeneity fosters high local genetic diversity, which provides a range of local phenotypes upon which drought-based selection may act.

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Seasonality, weather and climate affect home range size in roe deer across a wide latitudinal gradient within Europe.

Morellet, N. et al.
Journal of Animal Ecology 2013, 82: 1326–1339.

The authors evaluated how home range (HR) size of a large herbivore, the roe deer *Capreolus capreolus*, varies in relation to seasonality, latitude (climate), weather, plant productivity and landscape features across its geographical range in Western Europe. As roe deer are income breeders, expected to adjust HR size continuously to temporal variation in food resources and energetic requirements, the baseline prediction was for HR size to decrease with proxies of resource availability. Among populations, HR size decreased with increasing values for proxies of forage abundance, but increased with increases in seasonality, stochastic variation of temperature, latitude and snow cover. Within populations, roe deer HR size varied over time in relation to seasonality and proxies of forage abundance in a consistent way across the seven populations. The findings were broadly consistent across the distributional range of this species, demonstrating a strong and ubiquitous link between the amplitude and timing of environmental seasonality and HR size at the continental scale. Overall, the variability in average HR size of roe deer across Europe reflects the interaction between local weather, climate and seasonality, providing valuable insight into the limiting factors affecting this large herbivore under contrasting conditions. The complexity of the relationships suggests that predicting ranging behaviour of large herbivores in relation to current and future climate change will require detailed knowledge not only about predicted increases in temperature, but also how this interacts with factors such as day length and climate predictability.

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Impact of plant invasions on local arthropod communities: a meta-analysis.

van Hengstum, T. et al.
Journal of Ecology 2014, 102: 4–11.

The authors present a meta-analysis of 56 studies on the impact of plant invasions on abundance and richness of local arthropod communities. They also study the role of five invader and habitat attributes to assess their influence on the direction and magnitude of effect on arthropod communities: the time since introduction; woody vs. herbaceous invaders; presence of native congeners; canopy cover of the invader; and single vs. multiple invaders. The authors found that overall invaded habitats had a 29% lower arthropod abundance and a 17% lower taxonomic richness compared with non-invaded habitats. Woody invaders had a stronger negative impact on arthropod communities than herbaceous invaders, reducing abundance and richness by as much as 55% and 21%, respectively. The study demonstrates that arthropod communities are negatively affected by plant invasions, which may have substantial effects on other ecosystem features, such as pollination, food web dynamics, decomposition as well as habitat heterogeneity. Loss of arthropod diversity is generally directly associated with loss of plant species richness.

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The importance of landscape and spatial structure for hymenopteran-based food webs in an agro-ecosystem.

Fabian, Y. *et al.*

Journal of Animal Ecology 2013, 82: 1203–1214.

Understanding the environmental factors that structure biodiversity and food webs among communities is central to assess and mitigate the impact of landscape changes. Wildflower strips are ecological compensation areas established in farmland to increase pollination services and biological control of crop pests and to conserve insect diversity. The authors describe results from experimental wildflower strips in a fragmented agricultural landscape, comparing the importance of landscape, of spatial arrangement and of vegetation on the diversity and abundance of trap-nesting bees, wasps and their enemies, and the structure of their food webs. The proportion of forest cover close to the wildflower strips and the landscape heterogeneity stood out as the most influential landscape elements, resulting in a more complex trap-nest community with higher abundance and richness of hosts, and with more links between species in the food webs and a higher diversity of interactions. The authors conclude that in order to increase the diversity and abundance of pollinators and biological control agents and to favour a potentially stable community of cavity-nesting hymenoptera in wildflower strips, more investment is needed in the conservation and establishment of forest habitats within agro-ecosystems.

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Insights into population ecology from long-term studies of red grouse *Lagopus lagopus scoticus*.

Martínez-Padilla, J. *et al.*

Journal of Animal Ecology 2014, 83: 85–98.

Red grouse research has combined long-term studies of marked individuals with demographic studies over wide geographical areas and replicated individual- and population-level manipulations. A main focus has been on understanding the causes of population cycles in red grouse, and in particular the relative importance of intrinsic (behaviour) and extrinsic (climate, food limitation and parasite) mechanisms. Separate studies conducted in different regions initially proposed either the nematode parasite *Trichostrongylus tenuis* or changes in male aggressiveness in autumn as drivers of population cycles. More recent experiments suggest that parasites are not a necessary cause for cycles and have highlighted that behavioural and parasite-mediated mechanisms are interrelated. Long-term experiments show that parasites and aggressiveness interact. Two outstanding questions remain to be tested experimentally. First, what intrinsic mechanism causes temporal variation in patterns of male aggressiveness? The current favoured mechanism is related to patterns of kin structuring although there are alternative hypotheses. Second, how do the dual, interacting mechanisms, affect population dynamics?

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When and where does mortality occur in migratory birds? Direct evidence from long-term satellite tracking of raptors.

Klaassen, R.H.G. *et al.*

Journal of Animal Ecology 2014, 83: 176–184.

In migratory animals, mortality might occur not only during the stationary periods (e.g. breeding and wintering) but also during the migration seasons. However, the relative importance of population limiting factors during different periods of the year remains poorly understood, and previous studies mainly relied on indirect evidence. Here, the authors provide direct evidence about when and where migrants die by identifying cases of confirmed and probable deaths in three species of long-distance migratory raptors tracked by satellite telemetry. The authors show that mortality rate was about six times higher during migration seasons than during stationary periods. However, total mortality was surprisingly similar between periods, which can be explained by the fact that risky migration periods are shorter than safer stationary periods. Nevertheless, more than half of the annual mortality occurred during migration. The authors also found spatio-temporal patterns in mortality: spring mortality occurred mainly in Africa in association with the crossing of the Sahara desert, while most mortality during autumn took place in Europe. The results strongly suggest that events during the migration seasons have an important impact on the population dynamics of long-distance migrants. The authors speculate that mortality during spring migration may account for short-term annual variation in survival and population sizes, while mortality during autumn migration may be more important for long-term population regulation (through density-dependent effects).

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Why is timing of bird migration advancing when individuals are not?

Gill, J.A. *et al.*

Proceedings of the Royal Society B 2013, 281: 20132161.

Recent advances in spring arrival dates have been reported in many migratory species but the mechanism driving these advances is unknown. As population declines are most widely reported in species that are not advancing migration, there is an urgent need to identify the mechanisms facilitating and constraining these advances. Individual plasticity in timing of migration in response to changing climatic conditions is commonly proposed to drive these advances but plasticity in individual migratory timings is rarely observed. For a shorebird population that has significantly advanced migration in recent decades, the authors show that individual arrival dates are highly consistent between years, but that the arrival dates of new recruits to the population are significantly earlier now than in previous years. Several mechanisms could drive advances in recruit arrival, none of which require individual plasticity or rapid evolution of migration timings. In particular, advances in nest-laying dates could result in advanced recruit arrival, if benefits of early hatching facilitate early subsequent spring migration. This mechanism could also explain why arrival dates of short-distance migrants, which generally return to breeding sites earlier and have greater scope for advance laying, are advancing more rapidly than long-distance migrants.

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Looking forward through the past: identification of 50 priority research questions in palaeoecology.

Seddon, A.W.R. *et al.*

Journal of Ecology 2014, 102: 256–267.

Priority question exercises are becoming an increasingly common tool to frame future agendas in conservation and ecological science. There has been no coherent synthesis of key questions

and priority research areas for palaeoecology, which reconstructs past ecological and environmental systems on time-scales from decades to millions of years. The authors adapted a well-established methodology to identify 50 priority research questions in palaeoecology. Using a set of criteria designed to identify realistic and achievable research goals, they selected questions from a pool submitted by the international palaeoecology research community and relevant policy practitioners.

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Forthcoming Events

For information on these events please see www.cieem.net.

Conferences

Date	Title	Location
18 March 2014	Biodiversity Offsetting: From Theory to Practice	Birmingham
11-12 Nov 2014	Habitat Creation and Restoration	Edinburgh

Training Courses

19 March	Making the Most of BREEAM and the Code for Sustainable Homes	London
19-20 March	Developing Practical Skills in Ecological Impact Assessment (EcIA)	Bristol
24 March	Advanced Course in Ecological Impact Assessment (EcIA)	Bristol
25 March	Water Vole Ecology	Lifton, Devon
3 April	Water Environment – The Legal Framework	Oxford
7-8 April	Reptile Ecology, Survey and Handling	Basildon
8-9 April	Design and Management of Soils for Habitat Creation and Biodiversity	Neston, Cheshire
10-11 April	Introduction to Ecological Mapping with Open Source GIS	Athlone, Co. Westmeath
28-29 April	Reptile Mitigation	Basildon
30 April	Introduction to Bat Survey	Dunblane
1 May	Bat Impacts and Mitigation	Dunblane
8-9 May	Introduction to Phase 1 Habitat Mapping and Plant Identification	Newark
15 May	Early Season Grass and Sedge Identification	Salisbury
28 May	Grass Identification for Beginners	Settle
4 June	Reptile Identification, Surveying and Handling	Clyst St Mary, Devon
4 June	Grass and Sedge Identification – Neutral and Calcareous Grassland	Salisbury
5 June	Grass, Sedge and Rush Identification – Heaths, Acid Grassland and Bogs	New Forest
7 June	Bat Handling and Identification	Herne Bay
11-12 June	Introduction to Grass Identification	Settle
13 June	Wildflower Identification for Beginners	Middleton-by-Wirksworth, Derbyshire
19 June	Barn Owl – Surveying and Reporting	Tamworth
30 June	Introduction to the National Vegetation Classification (NVC)	Broxton, nr Chester

Geographic Section Events

18 March 2014	East of England Section Event – Habitat Creation within the Environment Agency's Anglian region	Norwich
22 March 2014	Visit to RHS Wisley and South East England Section AGM	RHS Garden Wisley
26 March 2014	North West England Section AGM	Manchester
27 March 2014	Aquatic Invasive Species Workshop and Yorkshire and the Humber Section AGM	Leeds
9 April 2014	West Midlands Section Conference – Mitigation and Enhancement: Case Studies and Best Practice	Pershore, Worcestershire
18 April 2014	Scottish Section Event – Golf and the Environment Best Practice Event	Castle Stuart, Inverness

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