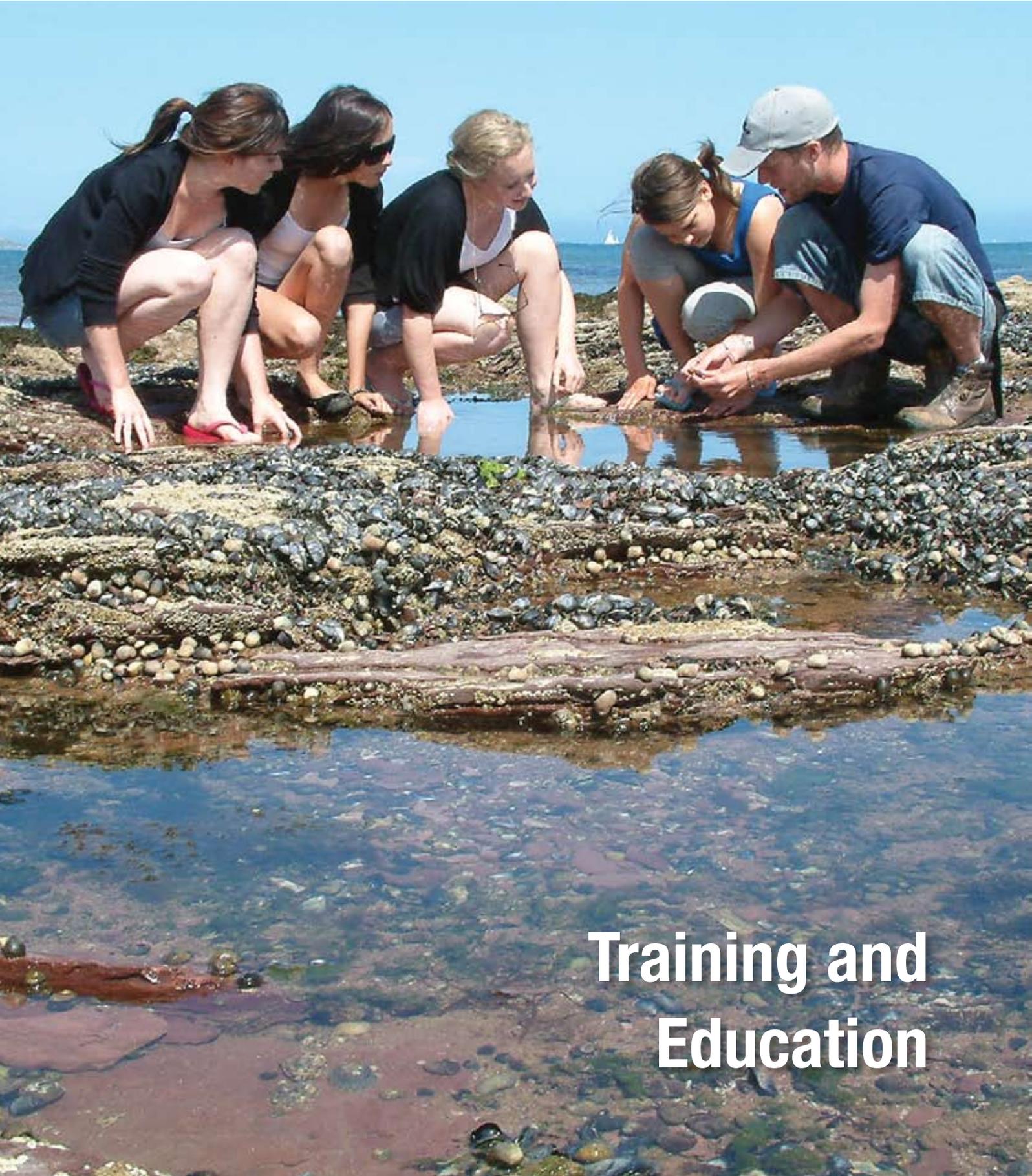




In Practice

Bulletin of the Institute of Ecology and Environmental Management



**Training and
Education**

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Editor: Jason Reeves (jasonreeves@ieem.net)

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IEEM Office

43 Southgate Street, Winchester, Hampshire, SO23 9EH, UK

Tel: 01962 868626 | Fax: 01962 868625

E-mail: enquiries@ieem.net | Website: www.ieem.net

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McParland Finn
British Ecological Society

Editorial

Training and Education

I am delighted to see an edition of our magazine devoted to Training and Education and covering a wide range of themes for our Continuing Professional Development (CPD). As members of IEEM we all have the potential to play pivotal roles, through our range of professional skills and expertise, in making sure that relevant training and education are being provided, or planned, for the future. Where we feel they are not, we all have the ability to make our voices heard and to take action as necessary to improve the situation at a national or local level.

In May 2009, IEEM and the British Ecological Society (BES) submitted a joint written response to the Environmental Audit Committee inquiry into 'Green Jobs and Skills' (http://www.parliament.uk/parliamentary_committees/environmental_audit_committee/ingreenjobs.cfm) where we highlighted the need for 'new green jobs to move away from traditional economic areas and move into landscape, wildlife and biodiversity management...which form part of sustainable services requiring a range of ecological professionals' and suggested a 'Green workforce' initiative. We also pointed to the evidence for an Ecological Skills Gap, a theme being explored in more detail in the IEEM Ecological Skills Gap Project led by Jill Sutcliffe. More recently the House of Commons Select Committee for Innovation, Universities, Science and Skills published its report on Students and Universities at http://www.parliament.uk/parliamentary_committees/ius.cfm. The summary makes for some interesting reading. Did you know that the Government has set a target of 40% of all adults in England gaining a university qualification by 2020? What could that mean for future IEEM members and the profession?

In earlier responses to the Department of Innovation, Universities and Skills (DIUS) consultation on *Higher Education at Work – High skills: High Value*, IEEM stressed the role and value of professional institutes like ours that are well-placed to support the training and education of professional ecologists and environmental managers. DIUS has now merged with BERR to form the Department for Business, Innovation and Skills (BIS) with responsibility for higher education – an important department for IEEM to set its sights on. In 2009-10, BIS will be responsible for total government departmental spending of £15 billion on higher education and making strong links to the business world. These are timely reminders of the value and importance of training and education, the need to keep ecology and environmental management on the political and business agendas and the potential roles we have to play to seize opportunities for positive change.

In IEEM's Training, Education and Career Development Committee (TECDC) we play our part in evolving and overseeing CPD opportunities so that our members (and potential members) are able to develop and sustain their skills and expertise. When I first joined the Institute, I think there were less than 10 courses and one conference annually. Now our Professional Development Programme runs to over 80 short training courses and we organise several conferences annually – helping to develop the professional careers of IEEM members such as Julian Jones, whose annual CPD submission won him a prize from IEEM (see Nick Jackson's article on page 33). We are always looking to improve the range of services we offer and we are currently working on the development and piloting of an IEEM Mentoring Scheme. The forthcoming joint IEEM/FBA conference on 'The Future of Freshwaters' includes sessions on training and skill needs for the future in the freshwater world – I hope to see some of you there.

*Pam Nolan CEnv MIEEM
Chair of the Training, Education and Career Development
Committee and member of Council*

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Cover image: Rock pool education with a Marine Biological Association LEMUR placement trainee at Goodrington Sands, Devon

Photography: LEMUR Project

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

Correction

On page 16 of *In Practice* 64, June 2009, Table 2 refers to 'Number of sample points / ha'. It should refer to 'Number of sample points / km²'.

Why Should Learned Societies and Professional Bodies Worry About Science Education?

Karen Devine

Education Officer, British Ecological Society

In an overcrowded science curriculum, students are exposed to many areas of biological science and the content of the curriculum is determined by those who make the best arguments for their subject discipline.

The science and biology criteria set down by the Qualifications and Curriculum Development Authority (QCDA) form the basis of the studies that young people (5-19 years) undertake. It sets out both the knowledge and understanding young people should have and the skills they should be able to demonstrate at each stage of their education.

When it comes to the sciences the QCDA has a problem. Unlike other subjects, the scientific knowledge society acquires is constantly changing and growing in breadth and depth. The content of science curricula must reflect these changes and to be fair it does try.

The QCDA relies on input and advice from subject specialists to determine the curricula content and they have a challenge because we, as a biological community, all have a clear idea about what young people should know before they reach higher education and graduate but we're less interested in the details like the fact that young people have a limited amount of time to study each subject.

A balance needs to be struck between breadth and depth and unfortunately depth has given way to breadth. The casualty is cohesion within the curricula. Biological content is reduced to a series of topics, each of which is designed to give students a brief taste of the various biosciences. It is content with limited context and, for a significant majority of young people, learning only happens when its relevance to our everyday lives is understood. This is clearly demonstrated by the *Life Study: A level Biology in the 21st Century* report published by the Wellcome Trust in 2004.

This report highlighted the fact that human biology was considered by A level students to be the most interesting topic whereas they found ecology, plant biology and food production to be the least interesting.

The same research also found that of all the topics covered in the specification, students found ecology (predominantly classification and variation) to be the least important topic studied although environmental biology (human impacts on the environment) was considered more important than human biology, which ran a close second.

Ecology has taken a nose dive in terms of popularity over recent years; anecdotal evidence linked this to a number of facts including a reduction in fieldwork at school. Ecology seemingly is perceived as out of date and irrelevant.

In 2008 the British Ecological Society (BES) held a workshop to discuss issues in ecological education with a view to approaching the QCDA with the findings and recommendations. The workshop was attended by ecologists, science teachers and environmental/ecological educators.

The workshop concluded that there is less concern with the ecological content of the UK curricula, but how we teach and why we teach ecology needs to be addressed. Where topics such as genetics clearly demonstrate contemporary science and promote discussion of emotive topics such as genetic engineering and the treatment/prevention of disease. Classification, on the other hand, becomes a history lesson and taxonomy is reduced to a simple 'making keys' by the school teachers.

Curriculum content should avoid reductionism of ecology into a few abstract concepts where context is impossible to deliver. Young people are exposed to foodchains and foodwebs at every stage of their education but they are never encouraged to wonder why understanding foodchains is important to wider issues such as interdependence. Similarly, most 16 year olds can recite *verbatim* the carbon cycle but they wouldn't be able to explain its relevance to biological processes.

There is a need to link humans to ecosystems in a more positive light rather than as organisms external to and impacting on them. The long-term doomsday approach has branded ecology as a very pessimistic science.

During summer 2009, QCDA is in the process of consulting on the GCSE science criteria and we are offered an opportunity to improve the teaching of ecology to the 14-16 year old age group. Each bioscience will have its supporters aiming to convince the QCDA that the curriculum content needs to be improved and expanded, each group considering how best to promote their subject area.

Ultimately, the science curriculum at GCSE is based on 'how science works' and is intended to create a scientifically literate society alongside preparing young scientists to take the next step in their scientific careers. Within this context, what is it that we really need all young people to understand, what are the skills that they will need, and how do we best ensure that their teachers have the resources to deliver? And for the next generation of ecologists, what would give them the best start in their careers?

Full details of the BES *Ecology in UK Curricula* report can be obtained from the author.

Correspondence: Karen@BritishEcologicalSociety.org

Becoming a Botanist?

Clare O'Reilly MIEEM

Freelance botanist, ecologist and environmental trainer, Ptyxis Ecology

As demand for botany degrees collapses, we need plant people more than ever. Yet ecologists choosing to become botanists face many challenges.

"Botanists are seen as oddities, even by ecologists" muses Louise Denning, Head of Botany at RSK Carter Ecological, "our botanists are just that and don't do animal surveys. We send both a botanist and a protected species ecologist on all but the smallest Phase 1 habitat survey".

Louise's stance is unusual: generally, botany is not seen as critical because habitats are not protected like bats or badgers, and animal ecologists are expected to do vegetation survey work. Consequently, some junior ecologists are bearing unfairly heavy botanical responsibilities. Discussing this issue on my IEEM Continuing Professional Development (CPD) courses, several ecologists have described situations where their surprised managers demanded why they had misnamed a habitat. A frequently cited example was lowland unimproved acid grassland being misidentified as something less valuable. This habitat is typically species-poor and quite widespread in urban-fringe areas. The ecologist in one such case simply didn't recognise the characteristic grass mix of fescues and common bent and misidentified sheep's sorrel. Yet he didn't want to become a botanist - just a competent general ecologist.

Anecdotal evidence continues to suggest that consultancies are faced with severe botanical skills shortages.

"We struggle to find general ecologists with adequate botanical skills for Phase 1" explains Louise. Every year she is "shocked"

at the poor results in their basic plant test for junior posts (see box), particularly as candidates are allowed to use books in the test. Their results from recruitment tests for experienced botanists are often not much better, echoing Stephanie Wray's comments in her 2005 *In Practice* article *First find your botanist*. Although the botanical skills gap has been highlighted repeatedly in this publication and others (particularly in the 2007 report on the implementation of Plant Diversity Challenge, the UK's commitment towards the Global Strategy for Plant Conservation), the situation is apparently not improving.

So the need and demand for plant people in the ecology sector is still acute. Yet botany is doing badly. Applications for plant science degrees have collapsed over the last 10 years (see Figure 2).

Does this matter to the ecology sector? Arguably, yes, very much. Vegetation assessment, mitigation, restoration, creation and monitoring require a suite of skills, not just in plant identification and surveying. Surely the definition of a *professional* botanist in the ecology sector is someone trained in plant autecology, phytosociology, plant reproductive biology and plant physiology, as well as taxonomy? Botanists need to understand how all these factors interact before they can design habitat restoration schemes. They also need training in experimental design and statistical analyses appropriate for vegetation (as opposed to animal) data.

Masters taught courses are helpful, but most are understandably designed to train generalists. Louise again: "I would look for Masters courses that include both Phase 1 and NVC, and identification of at least the top 20 British plant

Testing Times

Plant identification test results for a Graduate Ecologist post are shown below. The 10 plants were: ash, alder, colt's-foot, wild garlic, soft rush, hogweed, common reed, annual meadow-grass, scentless mayweed, and spiked sedge. Candidates were allowed to use plant identification books in the test.

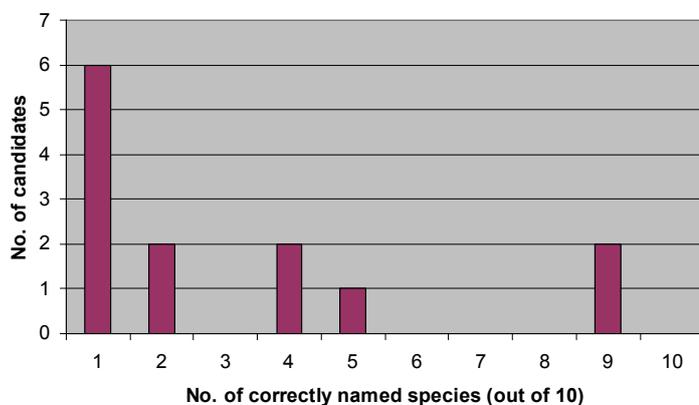


Figure 1. Plant identification test results from 13 candidates applying for a Graduate Ecologist post in 2009



Wild garlic flowers
Photo: ptyxis ecology

All candidates stated on their applications that they were competent field botanists and had completed Phase 1 habitat surveys. Several had done National Vegetation Classification (NVC) surveys and grassland or woodland survey Masters projects. Despite these claims, over half were unable to name an ash tree branch or recognise a rush. The only plants named by those people scoring '1 out of 10' were either wild garlic or common reed.

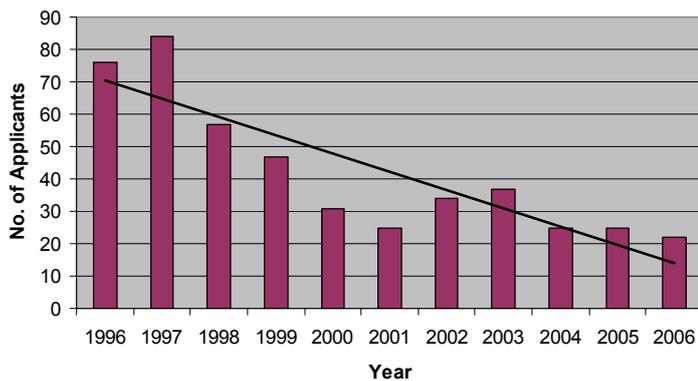


Figure 2. Applicants for C200 botany first degrees (includes plant science, plant biology, crop science, plant pathology, plant biotechnology and applied botany) 1996-2006 (from <http://search1.ucs.co.uk/fandf00/index.html>)

families, as this is fundamental. You will really struggle to use field guides without knowing the families as a starting point."

There are several botany Masters presumably devised to train students for careers in botanic gardens, and government/NGO policy roles, notably the MSc in Botanical Conservation at Plymouth University and the MSc in Plant Conservation at Sussex University. Both cover plant identification, but judging by the information chosen to publicise the courses, seem to focus rather a lot on tropical and other overseas plants.

An overseas field trip is a feature of many Masters courses and is there to attract students - but British vegetation is so fundamental to ecological consultancy careers that learning about foreign fields will do little to enhance your job prospects. Instead, choose a course with as much exposure as possible to a variety of British habitats - you can enjoy a holiday in the sun any time!

Some biodiversity survey or conservation Masters push plants, as the lecturers involved are botanists. Masters courses at Edge Hill, Birmingham, Imperial, and Sussex Universities all have plant pathways available, once general modules are completed.

Many other Masters courses do have a module on field botany, too many to mention here, but as far as I am aware, there are only two 'pure' botany MSc courses: Edinburgh University's Plant Biodiversity and Taxonomy and Reading University's Plant Diversity. The latter course comprises diverse options including plant ecology, molecular systematics, plants and climate change, plant family taxonomy, Phase 1 and NVC survey, multivariate statistics and, unusually, a field trip every week, but sadly, due to recent staff retirement, no longer some of the 'traditional' botany that had been a feature of this course for over 30 years, like plant anatomy and plant reproductive biology.

However, a graduate of the Reading Masters and now fully-fledged habitat surveyor, Alice Fenton, cautions, "It's a steep learning curve from doing surveying on a course to doing it for real. A course equips you with your driving licence; you need more practice before you can enter a *Grand Prix!*" So do not expect to become a botanist by completing a single course. Instead, either look for a job involving surveying every day (like the Centre for Ecology and Hydrology's Countryside Survey project) or an employer who recognises that you need regular, ongoing support to develop botanical skills and with the cost of CPD training courses.

There is an increasing choice of plant identification short courses. The University of Birmingham's Biological Recording and Species Identification programme, run in partnership

with the Field Studies Council (FSC), has been tremendously successful, and the FSC runs about 120 botanical courses a year, catering for an estimated 1,500 students. The Royal Botanic Gardens Edinburgh recently started a Certificate in Practical Field Botany, and the Ashmolean Natural History Society in Oxfordshire runs a popular plant family identification course one Saturday a month over the summer. Leicester University Botanic Garden has just launched an Advanced University Certificate in Plant Identification, usefully combining evening classes with weekend field trips. Dr Richard Gornall, who runs the Leicester course, is encouraged that five undergraduates enrolled. "It's clear that there are people out there who are keen" comments Richard, and adds that many students just do not realise that these skills lead to careers: "I tell them that you can pay your bills with botany!"

Becoming a botanist has a final hurdle: getting a job. I spoke to a student who is completing a PhD in grassland ecology, and goes out weekly with her local natural history society's botany group: "Consultancies I've approached just don't seem to appreciate my botanical skills; they all want me to do protected species surveys and work towards at least one protected species licence. I am doing some bat and great crested newt survey work, but I want to be a botanist!"

There is much that an aspiring botanist can do to improve their career prospects. Botanists ideally should be competent to work in any habitat, so CPD training needs to target habitats not otherwise encountered on degree courses or in a job. Some employers have specific botanical requirements, for example, if seeking to work for the Environment Agency, developing aquatic plant identification skills (especially diatoms), would make you a highly attractive candidate. You can demonstrate how proficient you are at higher plant field botany with a Field Skills Identification Certificate (FSIC), validated by the Botanical Society of the British Isles. FISCs comprise plant identification and survey tests, testing your 'field eye' as well as taxonomic skill, plus you can't fail - you get a certificate giving a measure of where you are on the Taxonomic Skills Pyramid and guidance on how to progress. In addition, you can't be a botanist in the ecology sector without knowing a good range of ecologically important bryophytes, especially to work in mire habitats.

In conclusion, there seems to be an increasing choice of postgraduate and short courses covering plant identification and survey. However, it would be valuable to have these courses covering more areas of plant science. We also need to encourage those who wish to specialise in botany, and accept that all ecologists need ongoing botanical training to meet professional standards. Above all, IEEM's support is needed to ensure that botanists do not soon become *extinct* oddities!

This article is based on preliminary research, so if any member has details of further relevant courses, please send these to Jill Sutcliffe, IEEM's Ecological Skills Gap Project Officer (jillsutcliffe@ieem.net).

Find out more from:
www.findamasters.com
www.bsbi.org.uk/html/training.html

Correspondence: clare@ptyxis.com

Project LEMUR: Training the Next Generation of Wildlife Professionals

Phil Burton
Learning Manager, Herefordshire Nature Trust

In 2000, the Heritage Lottery Fund (HLF) conducted a survey of the issues facing the heritage industry. The survey highlighted a significant decline in heritage skills across the UK, such as species identification and habitat survey skills. The survey also revealed the difficulties faced by those who manage heritage sites in finding people with the requisite practical experience and abilities to help maintain them. As a result of this survey, HLF in 2005 awarded a total of £7 million to help fund the setting up of 10 exemplary heritage training bursary schemes that would improve the quality of skills available to the heritage sector by providing new entrants or existing staff with work-based training opportunities.

The results of the survey are not a startling revelation to those of us working in the industry. However, what is significant about this £7 million award is that it was a national acknowledgement that the heritage sector is in desperate need of financial help to start planning for future skill gaps in the heritage sector. It was HLF's hope that this funding would provide a significant injection of funding to kick start this process so that it will become mainstream funded in the future.

As a result of this funding, the LEMUR project (Learning Environments in Marine, Urban and Rural areas), a joint initiative between Ambios Ltd (not for profit), Sheffield Wildlife Trust, and Herefordshire Nature Trust (who are leading and co-ordinating the project), was successful in securing £704,000 of funding support in 2006. LEMUR is one of 10 partnership projects nationwide to receive the funding (www.hlf.org/bursaries).

The LEMUR project is an accredited heritage training model that has proven to offer a shorter route to developing the necessary field skills and competency required to enter a professional post in nature conservation. The training and work experience on offer by the three partners have either a marine, urban or rural theme, hence the project's title 'LEMUR'. The heritage bursaries in Herefordshire, Warwickshire and Worcestershire have a rural theme linked to woodlands, wildflower meadows, rivers, orchards and agriculture. The Sheffield bursaries have an urban theme linked to urban wildlife corridors, whilst in Devon, bursaries have a marine theme linked to coastal habitats such as estuarine sites.

The project offers 36-week work placements to passionate and enthusiastic individuals who are intent on making a career of nature conservation. To date 36 trainees have passed through the programme. Each trainee receives a tax and National Insurance free training bursary allowance of c.£200 per week. Eighty percent of the placement is spent working at the host placement organisation alongside experienced wildlife professionals who act as their mentors during this period. These mentors guide and support the trainees in a safe and nurtured way. This 'on the job' experience is backed up by a tailored training package provided by the LEMUR partners that is geared up to providing the fundamental building



Open day led by LEMUR trainees to showcase their skills
Photo: James Fair

blocks in species identification, ecological habitat survey, habitat management and heritage interpretation. These skills are also backed up by important work skills such as project management, computer and communications skills.

It is during this 36-week period that the trainee can put these skills into practice, and reinforce them whilst working on real conservation initiatives that their placement host is delivering. This way, the LEMUR project is helping to increase capacity within host organisations enabling them to raise delivery of their respective conservation objectives.

Herefordshire Nature Trust, Sheffield Wildlife Trust and Ambios Ltd act as a 'learning hub' from which they out-post trainees to placement hosts within their 'themed' area. The placement host has direct responsibility for and supervision of the trainee throughout the placement period. The LEMUR hub provides additional support and training throughout.

The LEMUR Heritage bursary placements on offer are extremely diverse and geographically spread from South Yorkshire to Devon, taking in Warwickshire, Worcestershire and Herefordshire along the way. The types of placements on offer have focused on provision of skills and experience in species identification, survey work, habitat management practices and heritage education. Organisations hosting placements have included Herefordshire Nature Trust, Wye Valley Area of Outstanding Natural Beauty, the Malvern Hills Conservators, Warwickshire County Council and Worcestershire Wildlife Trust in the rural hub; Marine Biological Association, Torbay Coast and Countryside Trust, Sharpham Outdoors Trust and Living Coasts in the marine hub and Green Estates, Sheffield City Council, Sheffield Wildlife Trust and Working Woodlands Trust within the urban hub.

The LEMUR experience begins with the recruitment process, which is co-ordinated by the Herefordshire Nature Trust and supported by each of the hubs. Each of the host placement organisations works closely with their local LEMUR hub

manager in selecting their trainee. The LEMUR team remove the administrative burden from the recruitment process on behalf of the placement host, leaving the host to simply short-list and attend an interview day with their local hub manager.

The trainee's journey begins with an induction day with their respective LEMUR hub team. The day maps out expectations, milestones, their training, administrative requirements and the all important LEMUR mentor support network. The rest of the week is spent being inducted by their placement host before attending a three-day team-build alongside the rest of the trainees and the LEMUR team.

At the team-build there are a series of activities designed to bond the new team of trainees together and to provide metaphors for working effectively such as prioritising work and quality of communication. The trainees also receive training course tasters operated by the different hubs, such as barn owl pellet analysis, bat surveying and vegetative grass identification, etc.

Immediately after the team-building event the trainees return to their respective learning hubs for two weeks of intensive practical 'hub core' training, that gears them up to start their role with their host. The training reflects the types of role on offer. The marine hub provides a solid foundation in heritage interpretation skills and practical experience in planning and running a real education event for large groups of school children within the shore zone. The rural and urban hubs offer a solid foundation in botany, species identification and habitat survey skills. Here the trainees learn basic principles of botany, the use of a range of floras in identifying species, habitat condition, assessment principles, they gain knowledge of differing species' ecological importance and their specific wildlife protection, landowner liaison skills, risk assessments and knowledge of differing habitat surveys such as National Vegetation Classification (NVC) and Phase 1. By the end of the two weeks, the trainees are able to plan, implement and report on a full Phase 2 survey of an ancient woodland as per industry standards.

It is from this point onwards that the trainee begins work with their host on a full-time basis. Thereafter, the LEMUR team continue to provide skills and accreditation support to the trainee that add value to their time at the host.

The earlier hub core training is later backed up by a further five-day block of training once the trainee has settled into their role at the host – usually a couple of months later. This training incorporates a variety of protected species surveys and mitigation measures for dormice, great crested newt, badger and bats, etc. In other hubs there is a focus on grassland survey



Rob Bacon, Wye Valley AONB trainee, showcasing his bumblebee training
Photo: LEMUR Project



LEMUR trainees undertake a botanical identification test
Photo: LEMUR Project

skills, which is run along the lines of the hub core training for woodlands.

Where the specifics of each trainee's role demand specialist in-depth training such as MapInfo (GIS) or is simply out of the scope of the host's ability to offer it as an 'on the job' learning experience, the project makes available an allowance of £500 to the trainee to attend a course. Examples of courses attended by trainees have included additional specific species identification and survey courses for beetles, moths, fungi, bumblebees, bats, butterflies, NVC, pond survey and ecology, barn owls and reptiles. Other courses have included RYA Powerboat handling, GIS (MapInfo) and GPS, Marine Mammal Medic (run by British Divers Marine Life Rescue), hedgelaying, dry stone walling, and traditional chair making. Some of the trainees have used their additional training allowance to join IEEEM in order to tap into other courses.

Another feature of the LEMUR scheme is networking with other professionals and amateurs. Each group of trainees in each hub is responsible for planning, promoting and running a 'hub open day' event to showcase the skills that they have learned so far. These events allow fellow trainees from other hubs to learn a little more about another dimension of work in the heritage sector. The event provides a safe platform upon which to practise and develop skills required of a trainer and event organiser as well as for the trainees to network with potential employers. LEMUR is also plugged into the network of amateur biological recording groups and societies within their hub area. The trainees join in with additional volunteer based activities in their spare time. This way they maximise their learning and make the beginnings of important contacts to help them through their careers.

The project has a team of dedicated skills assessors whose role it is to support and verify the competence and skills level of the trainee whilst working 'on the job' at their host. They do this by arranging to observe the trainee carrying out a specific activity in the work place, and then follow-up with specific days at the hub to review each trainee's portfolio of evidence. By the end of the 36-week placement, they will have achieved three units from either the Level 3 National Vocational Qualification (NVQ) in Environmental Conservation or a Level 3 National Open College Network (NOCN) qualification in Biological Assessment Skills (designed and trialled by the LEMUR project).

Finally, the project closes with a celebratory graduation event whereby the trainees and hosts come together to reflect on the LEMUR experience over the past 36 weeks.



LEMUR trainees moth trapping with Malvern Hills Conservators, Ian Butler and Bernadette Noakes
Photo: LEMUR Project

It was the LEMUR partners' 30 years of combined experience of running several different heritage training schemes beforehand, coupled with the commitment by the host organisations to provide high quality placements, that helped make a successful multi-partner bid to the lottery fund to run the LEMUR project. The bringing together of all this experience has allowed the best practice learned from each of the former training schemes to be incorporated into a nationwide learning framework called LEMUR. Now, after three years of running LEMUR, the project has proved to be extremely well honed and effective in continuing to feed the environmental sector with appropriately trained new entrants with a range of background skills and experiences.

A few of the partners' previous training schemes have included Herefordshire Nature Trust's Environmental Experience for Life-long Learning Project (EEL), Sheffield Wildlife Trust's various adult learning courses and Project Kingfisher run by Ambios Ltd.

The Herefordshire Nature Trust's EEL project primarily provided 'on the job' training in field identification and survey skills to teams of graduate trainees since 1999. In addition to this, the award-winning EEL project ran separate skills courses that provided training for 157 wildlife professionals from 53 different environmental organisations. Courses ranged from Wildlife Law, Phase 1 and NVC survey techniques through to a variety of species ecology and identification courses, such as bumblebees and sedges and rushes. During this time, the EEL project managed to train and enthuse 64 trainees.

Ambios Ltd's Project Kingfisher was a European Social Funded project that set up an 'on the job' learning framework for 70 trainees to work alongside experienced wildlife professionals in the work place. In addition, a further 140 wildlife professionals received training support in a range of short courses such as RYA Powerboat Level 2 and National Proficiency Tests Council (NPTC) chainsaw operation. An added focus of the project was the use of computer skills in the work place.

Education and training has been at the heart of Sheffield Wildlife Trust for years. The Trust has offered a wide range of training opportunities from one-day courses to accredited NOCN training and NVQs in environmental conservation. These training opportunities have supported and backed up the plethora of volunteer opportunities that exist at the Trust. Whether as a full-time or *ad hoc* volunteer, these training courses have provided the basis to gain the skills and experience needed to further a career in the heritage industry.

Like its predecessors, Project LEMUR has been hugely successful in getting over 94% of its trainees into diverse conservation roles. These roles range from marine education officers with the Wildlife Trust for Cornwall, ORCA, Hebridean Whale and Dolphin Trust in Scotland, field ecologists working for ecological consultants located nationwide, conservation officers for Butterfly Conservation and Countryside Commission for Wales, assistant county ecologists with Warwickshire County Council, to National Nature Reserve estate workers for Natural England, countryside rangers, environmental centre tutors, environmental planning officers and assistant marine biological data officers.

Over the years, the combination of LEMUR, EEL, Kingfisher and Sheffield Wildlife Trust's range of adult learning programmes have helped supply the nature conservation industry with a significant number of new entrants with the types of practical hands on skills that employers are looking for. As of December 2008, these projects have trained in excess of 250 trainees and in excess of 300 other employed wildlife professionals.

All previous projects run by the partners have been extremely over-subscribed for places. LEMUR has received in excess of 1,200 applications for its 36 bursary placements. This clearly shows that there is still a high demand for this type of training initiative.

Current funding from the HLF is expected to cease in September, although, as of 16 July 2009, HLF have launched a new funding initiative called 'Skills for the future'. LEMUR has been invited as one of the ten existing bursary schemes to bid into this fund which will extend the current project to 2012. We will not know if we have been successful until 24 September 2009.

In the meantime, the LEMUR team is working hard to try and identify new partners and funding initiatives not only to support a LEMUR-type initiative, but also to make it sustainable and mainstream for the future. In doing so, the team have been producing a short film to capture both the essence of the LEMUR experience as well as a flavour of the skills issues that nature conservation is currently facing. In addition to this, the LEMUR team are running a conference at Kew Gardens on 18 September 2009 to showcase the project and disseminate its best practice. The LEMUR website is currently undergoing an update to capture interest from potential hosts and trainees, which will help inform and influence current drives to make LEMUR sustainable. If you would like to know more about how you can get to see the film or attend the conference, or find out how you can learn more about the training opportunities offered by LEMUR then please visit the website.

If you are looking for this kind of training opportunity in order to secure a post in nature conservation, or know of someone in this position, help us to secure future funding by going to the LEMUR website and completing the online questionnaire. This will help us to help you by making a case for continued funding.

LEMUR website: www.projectlemur.org

Correspondence: p.burton@herefordshirewt.co.uk

Ecological Skills Training: A Provider Perspective

Petra Billings MIEEM
Head of Learning, Plumpton College

Introduction

When I did my first degree in the late 1970s, ecology was generally viewed as a rather obscure branch of biology, unrecognised as a career option in schools, and poorly represented in university degree provision. In recent years, however, there have been great developments in ecological education through both academic and vocational routes.

In this small Sussex college, I have been involved in the development and delivery of ecological courses for some years. The IEEM Ecological Skills Gap Project (see article in *In Practice*, December 2008) is undertaking invaluable work in exploring the extent and appropriateness of ecological training provision, and I am very pleased to offer a contribution to the discussion.

Demand for Vocational Skills Training in Ecology

Plumpton College is a land-based college in West Sussex which works in partnership with the University of Brighton to deliver a range of foundation and honours degrees in subjects varying from animal science through wine production to horticulture, arboriculture and countryside management. One of our greatest strengths in the latter context is that we have an 800 hectare estate with a wonderful range of habitats from unimproved chalk downland and chalk streams to semi-natural ancient woodland and agricultural habitat such as field margins and mediaeval hedges. In the mid 1990s we found that there was a clear demand from graduates in conservation and related courses for ecological skills training, particularly wildlife identification and survey skills and practical estate skills. These students were strong academically but lacked the practical skills needed for employment. We filled this skills gap through courses such as the National Certificate in Countryside Management, a Level 3 course, and National Vocational Qualification (NVQ) Level 2 Environmental Conservation, the latter still popular today. We soon realised, however, that there was a need for higher-level courses which combined both the academic rigour and subject knowledge and the vocational skills, and we developed a part-time Higher National Certificate (HNC). In turn, this grew into a full-time Higher National Diploma (HND) in countryside management and then, in line with government policy, evolved into a foundation degree in countryside management in 2005. Thus we have seen a demand for training in ecology and environmental management grow steadily over the past 15 years.

What are Foundation Degrees?

Foundation Degrees are two-year vocational degrees which combine both academic and vocational skills training. They have largely replaced HNDs and, like HNDs, they are the equivalent of the first two years of an Honours degree. The

Foundation Degree (FdSc) in Countryside Management has been a popular course from the outset. In line with the ethos of widening participation, the government agenda which underpins the development of these courses, it is sufficiently flexible to offer both full-time and part-time study routes. Also, any of the modules can be taken on a 'stand-alone' or Continuing Professional Development (CPD) basis.

In addition to its flexibility, the entry criteria are set so as to encourage application from the widest possible community, to the extent that we have successfully taken applicants with no formal qualifications, possessing only the commitment and work experience to demonstrate the potential for passing the course. This has been important because, in this 'new' industry which still struggles to find a voice with careers advisors, we find that a significant part of the demand for training comes from mature students, many of whom are changing careers and thus lack the traditional educational qualifications such as A levels they would often need to get into an honours degree course. In recent years I have interviewed applicants from a great array of working backgrounds, from policemen and nurses to those coming from insurance and financial industries to those involved in retail and hospitality and even a croupier from a Mayfair casino.

The third pillar of foundation degree development, beyond being vocational and accessible, is the opportunity for progression on to an honours degree. This we achieve through our partnership with the University of Brighton. We have worked closely with colleagues there, mapping our courses against each other to provide opportunities for Plumpton College students to progress directly to year three of honours degree courses such as BSc Ecology and Biogeography, BSc Biological Science and BSc Environmental Science. These students graduate with both a foundation degree and an honours degree within three years, and with both high-level academic skills and strong vocational skills. Our 'top-up' students have consistently achieved high grades at university.

Employer Involvement

At Plumpton College we have involved employers at all stages of course development to ensure that we are meeting their needs in terms of both academic and vocational skills. Local employers sit on curriculum advisory panels (CAPs) for each of our subject areas and our Countryside and Environment CAP includes representatives from local authorities, the South Downs Joint Committee and non-governmental organisations (NGOs) such as the National Trust, the Farming and Wildlife Advisory Group, the Royal Society for the Protection of Birds and the Sussex Wildlife Trust, as well as local estate managers. All have contributed to the course structure and content.

Course Content

The FdSc in Countryside Management has been designed to provide students with a broad training in environmental management that leads to employment opportunities in a range

of jobs including estate managers and rangers, education officers, consultancy work or, usually with the additional top-up year, to work as biological surveyors or ecologists.

In the first year, students are provided with a basis of knowledge and skills through a balance of academic modules in soil science, botany, ecology, and landscape assessment and vocational skills-based modules on field biology skills, practical estate skills and interpretive skills. Landscape Assessment is a particularly popular module in which students develop a recognition of key landscape development processes, with an introduction to local geology, archaeology and woodland history, and learn practical fieldwork skills such that, essentially, they learn to interpret the 'lumps and bumps' of the landscape as being natural or anthropogenic, to support field evidence with documentary evidence assembled through research from sources such as the local records office, and to recognise the associated management needs. All students undertake a work placement and through our strong contacts with Sussex employers, they can choose from a range such as ranger or reserve management groups, ecological consultancy, or environmental education.

In the second year, students are given the opportunity to apply the first year learning through modules such as habitat management, in which they visit local sites which provide well-managed examples of a range of habitat types, where site managers discuss the principles of their management.

In another module, students are required to write a habitat management plan for a chosen site. Then students can choose from a range of options which allow them to tailor their course to suit their career aspirations. There are modules which provide opportunities for working with volunteers by participating in our own college conservation volunteer group, New Leaf, set up and run by students, or for gaining additional work experience in the sector. Other modules provide training in Geographical Information Systems (GIS), and in the National Vegetation Classification (NVC). Yet other modules focus on more in-depth ecological study, for example, through behavioural and evolutionary ecology. All the students must undertake an academic project on a subject of their choice and some excellent past projects have included a survey of the location and condition of WWII pillboxes along the river Ouse; an evaluation of the success of translocation of herpetofauna species; an investigation into juniper distribution in Sussex and potential for its re-establishment, and a study into the effect of water quality on the distribution of water shrews on the Pevensey Levels in East Sussex.

In the FdSc Countryside Management we provide well-focused relevant training for employment in the sector. Many students have come to us from varied backgrounds and have found relevant employment as a direct result of the course. Isabel Sturdy and Prim Duplessis are prime examples— see Boxes 1 and 2.

Box 1

Profile: Isabel Sturdy

Plumpton College 2005-2007

Having gone to university immediately after leaving high school to do a French and German degree, and having fallen straight into a career in French property, I found myself several years on feeling dissatisfied with my job and future career prospects. My job entailed plenty of travel to and from France, dealing with money and looking after hundreds of clients at a time, and yet it left me wondering: shouldn't there be more to a job than this? I thought back to some careers advice given to me many years previously at school, which was to follow your passions when choosing your career. When I thought about it, I knew that if I had taken that advice in the first place I would have gone straight into conservation and environmental work.

And so, at the age of 27, I went back to college. Through plenty of reading I decided that a foundation degree (new that year) would be the most likely qualification to get me a job at the end of it, and that Countryside Management was exactly what I wanted to study. I applied to several colleges in both England and Wales that offered the course but when I attended Plumpton College's open day that summer I knew that I had found where I wanted to study.

The foundation degree is designed to make its students employable. I went from having absolutely no experience in countryside work to being offered my first countryside job before I had even graduated. I learned a wide range of both practical and more theoretical skills on the course and was employed as Assistant Ranger for the City of London Open Spaces department on the strength of my estate skills, knowledge of livestock and experience with volunteers (which had been gained weeks beforehand on Conservation Grazing and Managing Volunteers modules at Plumpton). This led to my next job as Estate Worker at the Boxmoor Trust looking after 250 acres and a large flock of sheep, to Estate Officer at Aldenham Country Park and its rare breeds farm, to my current job at the North West Kent Countryside Partnership, where I give advice on land management, lead practical volunteer days, source funding and enjoy a fantastically varied job.

My present job combines experience from my 'old life' with my new qualification and skills: it is perfect for me. I think it's obvious that I enjoyed the Plumpton College experience; I can honestly say that since I completed my foundation degree I haven't looked back.



Box 2

Profile: Prim Duplessis

Plumpton College/Brighton University 2002-2005

My background was originally in hotels and catering, however with the arrival of children I took up a post as a teaching assistant at the local primary school. As the family grew older, I was looking for a change of direction and had no wish to return to catering. Brought up in rural Ireland, I particularly wanted to do something that would get me outdoors, put me back in touch with the countryside, and earn a living from it.

The qualifications needed to gain access to this industry meant returning to full time study – and becoming, in my case, an ‘extra’ mature student! This also had considerable financial implications. Nonetheless, I applied for a place on the HND (as it was then) in Countryside Management at Plumpton College and was accepted.

The course is very practical and quite wide ranging, with a good choice of optional modules in addition to the core elements to allow the student to follow their own direction. Work experience is also a key element throughout, and I volunteered with both East Sussex County Council Rangers and the Farming and Wildlife Advisory Group (FWAG). Having gained the HND after two years, I then went on to top it up to a BSc (Hons) in Biological Science at the University of Brighton.

After graduation I was offered a job by FWAG, as an Assistant Farm Conservation Advisor. The work is very varied, and modules such as Biological Surveys, Agricultural Practices, GIS, Ecology, Biogeography, and of course Work Experience have been invaluable. I am currently involved with the Sussex Landcare Project, run in conjunction with the Environment Agency which aims to reduce diffuse pollution from agriculture in Sussex watercourses. I also advise farmers on appropriate habitat management for farm wildlife and regularly undertake site surveys and management plans.

This job gets me out of doors at least part of the time, and has certainly put me back in touch with the countryside. I also feel I am contributing something worthwhile, however small, to its health. Going back to full time education was a hard, but good decision, and I have achieved what I set out to do.



Part-Time Training Routes

Despite these successes, particularly in environmental management, we became aware that the course was not as accessible as we would like. This sector attracts significant numbers of people who wish to change career and opportunities are often limited by the need to continue to earn an income while retraining, in other words, by the need to study part-time. While the FdSc Countryside Management is available on a part-time basis, this route normally takes four years. This can be a daunting commitment for applicants, particularly as those changing career tend to be concerned about the time it will take them to retrain, and potential age discrimination once seeking work. Recognising this problem, again with the support of the University of Brighton, we have developed a new qualification, a foundation diploma. These qualifications are aimed specifically at part-time students. They effectively re-package core modules from the related foundation degrees into two-year part-time courses. They are at the same level as a foundation or honours degree, with some year one and some year two modules. We have developed foundation diplomas to run in parallel with all those foundation degrees which historically have attracted significant numbers of part-time applicants. Diploma students attend the timetabled classes for their appropriate modules with the degree students.

For the FDip Field Biology though, we have gone further and offer this course both within the normal timetable and alternatively, numbers permitting, as an evening class supported by some Saturday field trips. In practice, this is a ‘blended learning’ approach, balancing lectures and fieldwork with a significant expectation of private study supported by web-based learning materials. The first year of the FDip Field Biology includes Landscape Assessment, Field Biology Skills and Soil Science as compulsory modules. In addition, students choose either Estate Skills, as a more practical career route, or Ecology. In the second year, all students must take Habitat

Management, Countryside Law and National Vegetation Classification, and then they can choose two options from a varied range of choices, including Managing Volunteers, Interpreting the Environment, Habitat Management Plans, Geographical Information Systems and a contemporary study or project. This course was validated only last year and is already attracting interest. Further details of both the foundation degree and the foundation diploma can be found on our website at www.plumpton.ac.uk.

Future Developments

In terms of the potential for future developments, we are constrained by funding and the shifting nature of government policy on higher education. However, the foundation degree/diploma model, encompassing both academic and vocational skills training, as well as allowing great flexibility at module level in course development, is an excellent vehicle for delivering ecological skills at this level and thus responding to the changing needs of the industry. Future developments are likely to include increased availability of some of the more academic modules online, by distance learning, giving greater accessibility to those in work but not excluding the hands on fieldwork element which is essential for the practical skills.

Correspondence: petra.billings@plumpton.ac.uk

Natural Talent

Joanne Mould
Development Manager (Volunteering), BTCV Scotland

In the summer of 2006, BTCV Scotland launched the innovative Natural Talent training bursary scheme. The scheme, which is supported by the Heritage Lottery Fund, is an apprenticeship programme that aims to train a new generation of environmental specialists in taxonomic and habitat management skills with a focus on lower plants, fungi and invertebrates. The scheme is funded until December 2010 and in this time will train 20 apprentices throughout Scotland and Northern Ireland.

Natural Talent was developed in response to the growing concern of an ecological skills gap. Many green employers cannot fill vacancies because candidates do not possess the relevant skills, existing experts are retiring or leaving the sector without passing on their expertise to a new generation, specialist taxonomic skills are no longer routinely taught in higher education and, while volunteering is recognised as an established route into the environmental sector, this excludes those with financial or other commitments.



Maren Flagmeier, apprentice bryologist (2006-2008)
Photo: Peter Baxter

Natural Talent apprenticeships focus on specialist taxonomic and habitat management skills. To date these have included Hymenoptera, Coleoptera, freshwater conservation, grassland conservation management, fungi and lichen. Each Natural Talent apprenticeship lasts between 12 and 18 months and is salaried at £12,500 per annum with further money available for equipment, training and travel. The scheme is unique in that there are no age restrictions and we do not require particular qualifications; instead candidates must demonstrate their commitment to their chosen subject and their desire to specialise in the field of the apprenticeship. We have offered, on average, five apprenticeships per year since 2006 and individuals apply to become an apprentice via a competitive application process. To date we have received over 500 applications for less than 20 places.

Although BTCV Scotland employs each apprentice, we are reliant on the support of our partner organisations to provide the specialist training each apprenticeship requires. Each partner organisation hosts the apprentice and provides training as part of their ongoing work programme. Each apprenticeship is truly an 'on the job' learning experience with tangible benefits for the host organisation. Some of our partner organisations are the Royal Botanic Garden Edinburgh (RBGE), Scottish Natural Heritage (SNH), National Museums Scotland, Glasgow Museums, the Royal Society for the Protection of Birds (RSPB) and the Scottish Environment Protection Agency (SEPA). Each apprentice has one or more placements throughout their apprenticeship and their learning is overseen by one or more mentors who are specialists in the field of study. The role of the mentor is to oversee the general learning outcomes for each apprentice and to ensure that the placements in each partner organisation fulfil these and to provide specialist advice when necessary.

To date, nine apprentices have completed a Natural Talent apprenticeship and we are currently hosting 10 apprentices who are due to complete their apprenticeships over 2008-2009. Our apprentices have included individuals who have spent a number of years volunteering in the environmental sector, recent graduates and those with established careers who have decided to change, and have ranged in age from 22 to 45. All



Geoff Wilkinson (far right), hoverfly apprentice, with mentor Graham Rothery (left) looking for hoverfly larvae in rotten tree stump
Photo: BTCV



Cathy Fiedler, apprentice hymenopterist, surveying for *Colletes floralis* on Islay
Photo: BTCV

graduates of the scheme have moved into employment in the environmental sector or to further study in their specialist field. Jobs have included advisory work with SEPA, the Northern Ireland Advisory Agency and the Farming and Wildlife Advisory Group (FWAG) as well as ecological consultancy and self-employment.

Natural Talent has evolved significantly over the last three years. Host organisations now recognise the benefits an apprentice can bring to their organisation and, in some cases, contribute financially to their training and development. Several of our previous apprentices have been employed by their hosts and this is likely to continue. The work that the apprentices contribute to the environmental heritage sector has clear benefits for conservation in Scotland and Northern Ireland and, although we are nearing the end of our current phase of funding, we aim to expand the scheme throughout the UK and continue to offer Natural Talent apprenticeships targeting gaps in the environmental skills sector and creating the effective partnerships that have made the scheme so successful for apprentices and their host organisations.

All new apprenticeships are advertised on our website at www.btcv.org/naturaltalent. Our apprentices write about their daily activities on our blog at <http://btcvnaturaltalent.blogspot.com/>.

Correspondence: j.mould@btcv.org.uk

Case Study

Name: Catherine Fiedler

Age: 26

Apprenticeship: Hymenoptera (sawflies, wasps, bees and ants)

Apprenticeship duration: November 2007 - May 2009

Apprenticeship placements: Liverpool Museums, Glasgow Museums, RSPB Islay

"I've been interested in insects from a young age and studied biology at university. As part of my Masters degree, I did a couple of insect-related research projects, in particular on the order Hymenoptera (sawflies, wasps, bees and ants). I found my project on parasitic wasps fascinating.

After graduating, I wanted to learn more about this order of insects on a practical level, but struggled to find a route into a career in entomology. So, when I saw this apprenticeship advertised, it sounded like my dream job."

Much of Cathy's apprenticeship has been devoted to learning Hymenoptera identification skills, utilising the collections of specimens at Glasgow and Liverpool Museums to develop her knowledge. Her apprenticeship has also involved learning the skills required for the curation of specimens, as well as the field skills required for surveying and capturing Hymenoptera.

Part of the Natural Talent apprenticeship scheme entails apprentices developing a personal project. Cathy developed a project with Queens University Belfast and the RSPB and spent five weeks at the RSPB reserve at Loch Gruinart on Islay studying the ecology of the northern mining bee.

"This species is very dependent on a particular habitat, namely machair. Not much is known about the bee's ecology, so it really appealed to me as a project. I was looking to find out more about the bee's ecology – where it chose to nest and what it foraged on. I intercepted the females as they returned to their burrows and took pollen samples from their hind legs, the pollen was then analysed in the lab to find out what flowers the bees were feeding on."

Cathy's project was written up and will be used by the RSPB in developing a habitat management strategy for the bee and she has presented her work at a conference on machair conservation.

In addition to the specialist identification, laboratory and field skills that Cathy has developed throughout her apprenticeship, BTCV Scotland also strives for each apprentice to develop the soft skills required to be effective in any employment. Networking with other experts, time management, report writing and communicating technical expertise to different audiences have all been an essential part of the apprenticeship. Cathy has attended conferences and workshops, has delivered Hymenoptera training to BTCV staff and volunteers, has joined several societies including the Bees, Wasps and Ants Recording Society (BWARS) and the British Ecological Society (BES) and has spent time visiting other museum collections.

"Browsing the job websites made me realise just how many skills I've gained from the apprenticeship, and I'm in a much better position now to get into the environmental sector than I would have been without the experience I've had with Natural Talent. There are lots of options for a graduate of the scheme! And I'm really grateful for having had the opportunity. I so enjoyed my research project in the summer that I decided to go for a PhD. I'm starting a project later in the year researching how pollinators interact between native plants and the invasive Himalayan balsam."

The European Distributed Institute of Taxonomy - Training the Next Generation of Taxonomists

Isabella Van de Velde and Thierry Backeljau
 EDIT – Work Package 8 'Training and Public Awareness', Royal Belgian Institute of Natural Sciences, Brussels

Introduction

The European Distributed Institute of Taxonomy (EDIT) is the collective answer of 28 leading European, North American and Russian taxonomic institutions to a call from the European Commission to create a network of excellence in 'Taxonomy for Biodiversity and Ecosystem Research'. The EDIT consortium was officially established on 1 March 2006 with financial support from the European Union (EU) for the first five years, but aiming to be a permanent supranational network that will facilitate interaction, integration, collaboration and coordination of taxonomic research institutions in Europe and beyond.

The objectives of EDIT are:

1. to reduce the fragmentation of European taxonomic research;
2. to rebuild and strengthen European taxonomic expertise; and
3. to coordinate the European contributions to global taxonomic efforts, such as the Global Taxonomy Initiative.

Hence, the overarching goal of EDIT is to integrate Europe's taxonomic workforce in order to improve society's capacity to understand and protect biodiversity, so that mankind can benefit from it in a long-term, sustainable fashion.

An essential component in this ambitious endeavour is the development of a high quality, pan-European integrated taxonomic training programme.

Why Focus on Taxonomic Training?

European science is facing a continuing loss of taxonomic expertise because the positions of retiring professional taxonomists are often redirected to new researchers lacking sound taxonomic expertise, or, even worse, are simply cut for budgetary reasons. Consequently, taxonomic expertise in Europe is eroding at a fast pace, so that the transfer of taxonomic knowledge and skills to new generations is also steadily decreasing. Hence, in order to reverse these negative trends, it is imperative to establish high quality training that prepares students for future taxonomic careers.

Unfortunately, current European taxonomic training programmes are highly fragmented across countries, and across educational structures within countries. Moreover, taxonomic training opportunities are extremely heterogeneous in scope, purpose, intensity, financial support, and educational level; the training may be formal involving undergraduate or

postgraduate university courses, or take the form of modules in a wider package of courses, short courses, in-house seminars, field courses, 'on the job' training, etc.

Despite the disparate and very local character of European taxonomic training opportunities, there is common ground between institutions, suggesting that a more coherent shared framework for high quality expert taxonomic training can be established. This integrated framework should involve a wide range of partners, starting with EDIT members, but also mobilising taxonomic institutions, universities, research centres and international organisations outside the EDIT Consortium.

The integration of EDIT's education and training opportunities into the wider international context provides a crucial contribution to the Global Taxonomy Initiative's capacity building activities, since many countries worldwide are also in desperate need of taxonomists.

Set Up of the Distributed European School of Taxonomy

EDIT and other partner institutions are establishing a European state-of-the art school of taxonomy: the Distributed European School of Taxonomy (DEST). The aim of DEST is to develop a joint taxonomic training programme provided by leading expert taxonomists in the participating institutions. The programme is intended to be offered to European and non-European trainees.

During the first phase of the set up of DEST, the existing taxonomic training resources in Europe were surveyed. This revealed the strengths and weaknesses of those resources and highlighted the challenges that they have to face to meet the taxonomic standards and needs in the 21st century. This



Picture 1. Summer School 2008 - Collecting animal sound recordings is increasingly recognised as a valuable and non-invasive tool for taxonomy, biodiversity research and nature conservation
 Photo: M de Biaggi

exercise provided a baseline to define the objectives and ambitions of DEST.

More information is available at:
<http://www.e-taxonomy.eu/files/C8.1.2.pdf>
<http://www.e-taxonomy.eu/trainingresources/>

DEST comprises the following components:

- Expert-in-Training programme (operational)
- Summer School (operational)
- Modern Taxonomy course programme (under development)

Expert-in-Training Programme

The main objective of the Expert-in-Training programme is to provide young graduate students and early career researchers with an opportunity to acquire, and to strengthen, taxonomic research skills through 'on the job' training. To this end, the trainee joins a project team where they are coached by an expert (mentor), and shown 'how to do the job' in a particular, specialised taxonomic discipline. Other objectives of the programme are to encourage mobility, to promote integration by establishing new contacts with other researchers, and to contribute to capacity building in the trainee's institution. Currently, EDIT provides about 10 individual Expert-in-Training grants per year. These grants cover travel, subsistence and bench fees.

The Expert-in-Training programme was launched in June 2008. In the first call, 21 taxonomic placements were offered by EDIT institutions for trainees from other EDIT institutions. To improve the impact and visibility of European taxonomic training resources, institutions outside EDIT were involved in the second call (2009). Thus the number of placement offers increased to 31, while grants were offered to trainees from EDIT partner institutions or from other European universities/research institutes.

For more information see: <http://www.e-taxonomy.eu/node/60>

Summer Schools

The purpose of the Summer School is to train students in 'best field practices' for basic taxonomic research, biodiversity



Picture 2. Summer School 2009 – Sample collection in the field
 Photo: A Kroupa

studies, and conservation biology. Summer Schools focus on practical taxonomic experience, combined with theoretical lectures, to provide an in depth understanding of the current state of taxonomic research, biodiversity sampling methods and their broad applicability to other scientific disciplines and areas of social relevance.

The Summer School is open to students who have recently finished their Masters or who are in an early stage of their PhD research in a biological discipline. Student and teacher participation is financially supported by EDIT.

The first Summer School, Modern Taxonomy and Field Work, was held in 2008 (31 August - 14 September), jointly with EDIT's ongoing All Taxa Biodiversity Inventory and Monitoring (ATBI+M) initiative in the French/Italian Alpine nature reserves of Mercantour and Alpi Marittime. ATBI+M activities are part of a global research effort to document spatio-temporal dynamics of biodiversity in conservation priority areas. The Summer School brought together students and training providers from all over Europe - 21 professional taxonomists from seven European countries gave lectures to and supervised field work for 20 students of 16 nationalities from 13 European countries.

The setting for the second Summer School in 2009, From field to Web - studying biodiversity with the taxonomist's toolbox, was the biodiversity-rich region of the Muránska Planina National Park, Slovakia (19 July - 1 August).

The Summer School provides a unique chance for students to meet professional taxonomists and experience firsthand the challenges and rewards of field work in an inspiring setting.

For more information see: <http://www.atbi.eu/summerschool>

Modern Taxonomy Course Programme

Teaching and training in taxonomy in universities and institutions is provided by a diverse set of approaches, for example, by offering courses in pure and applied taxonomy at various levels, for various durations and with or without formal qualification. There are, however, few dedicated training courses that provide future professionals with fundamental expert knowledge on basic taxonomy.

The training curriculum will target topics such as: nomenclature; identification tools and methods; describing species; phylogeny and evolutionary biology; data analysis and management; collection conservation; and relevance of taxonomy to other disciplines and to society in general.

The Modern Taxonomy course programme is being developed in a modular manner so that courses can be offered at several institutions. In this way the courses will give the best quality that partners can offer from their available staff, experiences and equipment. Each partner institution will contribute a different number of subjects depending on the match between the curriculum topics and the existing expertise of the institution. The trainee will attend the course subjects in two ways: 'face to face' at the institutions and, where appropriate, by means of e-learning.

One of the challenges will be to integrate the course programme into current university curricula. The courses will be offered as a new study programme that preferably should be included in existing teaching programmes at universities, thus emphasising the fundamental importance of taxonomy in the professional formation of future biologists. Moreover, it paves the way for motivating or preparing students for an eventual future taxonomic dissertation or career in taxonomy.

For more information on EDIT please visit: www.e-taxonomy.eu

Correspondence: Isa.Vandeveld@naturalsciences.be

Is the Time Right to Move to a Membership Exam?

Steve Pullan CEnv FIEEM
Land and Conservation Adviser, Natural England

The basic premise for awarding membership of this Institute is that of degree qualification and work experience, assessed by peer review by the Membership Admissions Committee (MAC). Our present arrangements for accepting people into membership are based upon the same basic process, with some refinements, that has not changed since the Institute was founded. However, I have on a number of occasions advocated moving membership from the peer review document assessment to a more complex series of steps under the umbrella of a membership exam, and/or accreditation of courses (Pullan 1995, 1997).

To date this strategy has been considered to be put forward at the wrong time by MAC, the Training, Education and Career Development Committee (TECDC) and Council because of a desire to encourage membership in this initial phase of the Institute's life. For me the problem is, having set off without an 'exam' and/or accreditation of educational courses and having the current strategy, it will never be the right time to introduce one! I believe that if the Institute is to be seen to be setting standards for its members then an 'exam' is a very good way of demonstrating this to all concerned. It shows that we believe in standards and we stand by those standards. In the end they are our standards. Others can say they are not good enough, but they cannot accuse us of being a 'cosy club' where we only admit our friends on a nod and a wink. Do not be fooled, this type of comment is often heard, in the Civil Service in particular. The attitude of many government employees is, 'if

government calls me an ecologist, or environmental manager then I am an ecologist or an environmental manager, I don't need to be a member of a 'cosy club' like IEEM.' This attitude effectively says, irrespective of any industry standards or academic qualifications, I will ignore these standards. However, in contrast, within the industry at large there can be heard counter criticism of this attitude. Many IEEM members outside government have often been heard to say "just because you work for government does not make you a competent ecologist or environmental manager." Often this is levelled at government agencies, but that is clearly very unfair as many parts of government employ many competent ecologists and environmental managers who are IEEM members.

Surely, the basic principle of membership of a professional body and one which IEEM is seeking from those who are awarded Full membership, is that if they call themselves ecologists and/or environmental managers, they have the necessary core skills, technical skills, knowledge and understanding to an acceptable IEEM standard. The report *The profession of ecology and ecological management: what you need to know* and Annex A (IEEM 1995) defines the core/key skills, technical skills and knowledge thought to be relevant to the profession, and Annex A provides a map across the full range of topic areas and in addition, it also highlights links to other disciplines and professions. Edmonds and Stuart (1991), in a review of assessing competence at higher levels (professional), stated that competent professionals 'tend to acquire a set of guiding principles of which they are often only partially conscious and derived largely from their experience. These may build upon academic theories and knowledge, or be loosely related to this knowledge and understanding gained in the early part of their



IEEM membership certificates: green for Students and Affiliates, purple for Graduates (not shown), red for Associates, and blue for Full

careers'. This fits with the learning model of Cavero (1992), 'A major difference between experts and non-experts in any field is, experts have far more procedural knowledge. That is, they *know how* (my italics) to perform their craft'. This I would summarise in relation to IEEM as: 'ecologists and environmental managers as members of IEEM, are professionally competent to perform the task asked of them, demonstrating as they do so, core/key skills, technical skills and the knowledge and understanding required by the task. This they have gained by the process of both initial and continuing education. In addition, they are able to perform a defined task in a range of situations, some of which may be new to them; but always they are capable of a competent piece of work to the standard as defined by the Institute's *Code of Professional Conduct* (CPC) and any other industry standards.'

If work of the Institute's members falls below the standard set in the membership criteria and CPC it will ultimately devalue the Institute. This is the purpose of the CPC and the setting of standards for membership.

As already outlined, it is difficult for the Institute to ultimately impose standards if those who join, from the education system in particular, are incapable of achieving this basic standard. The point is, as the Institute nears the point at which the only new members coming into the Institute will be student/graduate members, it will become even more important that we are seen to be setting standards. The Institute needs to recognise that failures are most likely to come from those who are newly qualified, as those already practising will be working upon their known ability by those who employ them. This means that on achieving FULL MEMBERSHIP, having qualified with the appropriate professional experience, four years, they are competent professionals.

So what is the cost, to the individual and to the Institute, of a membership exam? This can be summarised as: what are the benefits and disadvantages to both the individual and the Institute of being a member generally? This has been researched by Mitchell (1993) who suggests that the purpose of a professional membership is:

On behalf of the Institute:

- 'to promote the highest standards of competence, practice and conduct;
- to promote research and development in the profession and to advance its practice;
- to protect and preserve members' professional independence and to exercise professional independence over them; and
- to do anything necessary to advance and protect the charter of the profession.'

This he sums up in terms of what the individual applying for membership gets in terms of benefits:

- 'kudos from membership;
- insurance cover (there is a body to back up if they get sued);
- access to information, advice and support; and
- a network of other interested professionals.'

And the cost of this membership to the individual:

- 'ongoing monitoring of her/his practice;
- the profession's code of conduct covering such aspects as core responsibilities, qualifications, competence, services, competition, publicity, etc.;
- self regulation; and

- increasingly, continuing education and development (CPE/CPD) of being a member.'

If these are the pros and cons of membership of IEEM then surely a membership exam will also be seen as setting standards by other professional bodies and employers. Most of the long established professional bodies, including those outside medicine, have membership exams and/or accreditation of courses for membership (e.g. Royal Institute of Chartered Surveyors, Institute of Leisure and Amenity Management, Royal Town Planning Institute, Chartered Institute of Water and Environmental Management, Institute of Chartered Foresters). One of the key comments that opponents make against an exam is, 'we do not want the three hour exam papers akin to those from college or university.' The answer is very simple, what our exam is, it is. We define what is necessary to become a Full member by examination. This is absolutely key. We do not have to have a written exam if we do not want one. In fact, I would oppose such an approach. I believe that we can be more effective by using other examination strategies (see Box 1 for my suggestion). Further, an exam also has other advantages; it builds loyalty to IEEM and gives *kudos* to the individuals who pass. I do not think we should undervalue these concepts in those who choose to join the Institute and gain their membership this way. Clearly there are possible pitfalls with an exam. There is the time of members to run it and administer it. The time and cost to applicants and this depends on what it is they have achieved to pass. To start with it could simply be to turn up and take part in a series of one- or two-day events called the IEEM Professional Competence Exam (see Box 1 for my suggestion).

Advantages to this process:

- This would demonstrate that we are setting standards with other professional bodies and employers.
- It would also stop backsliders each year when it is time for renewal. It would mean those who left now would have to start again using the new membership process, with additional cost to that individual. There should be no exemptions to this rule.
- It would also give some sanctions to those who have had disciplinary findings against them. It would also ensure that if there were problems with somebody's membership there would be some sanction short of throwing them out by asking them to sit the exam again and passing for a second time.
- The cost to the Institute should be cost neutral, but it should ensure that we cover the costs of the administration. This may mean an additional fee for central administration to cover the above costs of the CPD event, on the same lines as the Society for the Environment as present.

Are we a 'cosy club' just admitting our friends into membership? We are not a 'cosy club', but a professional body setting standards in the industry. Is it not time to be seen to be setting those standards in those who now join the Institute? The expected norm is by examination within the professions generally. If one looks at the experience of the Society for the Environment and the way that membership dramatically increased in 2005 with the idea of Chartered Status (Tasker 2005), then surely the impact of setting an 'exam' would have the same effect. Is it not time to raise the hurdle for membership of the Institute? I hope this article, in which the ideas expressed are mine alone and not necessarily those of Council, MAC or TECDC, will at least kick off the debate, because in my view it is about time we seriously looked again at this issue and finally implement an exam to gain Full membership.

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Correspondence: steve.pullan@naturalengland.org.uk

Box 1**Idea for initial exam called the IEEM Professional Competence Exam**

To be run over two full-day sessions as part of our CPD programme

Day 1:

- Ice breaker session.
- Talk on the *Code of Professional Conduct* (from a senior member of the institute).
- Introduce case study (this should be local and also a site that allows access, but also has information available for candidates to use as this would allow different events to have different themes).
- A talk from one, or several, of the Full members present on a topic of their choice.
- Local case launch.
- Site visit to gather data.

Day 2:

- Team work on case study prior to presentation.
- Presentations of case study in groups.
- Group discussion on case study.
- Presentations of individual's work. To be marked by the whole group.
- Possible talks on topical issue from members present.
- End.

The concept is that attendance at such an event would become mandatory if the member is to progress to Full membership status. The cost to the applicant could be the same as the normal CPD training offered by the Institute (£60 per day) and venues and dates could be staggered across the country and year. This would mean that there would have to be a change in the rules for membership and my suggestions are listed in Box 2.

Box 2**Possible changes to the Membership Regulations**

- No longer any direct access to being a Full member from the date that Council approved the change.
- Applicants and upgrades would only be able to get the Associate grade directly. This would mean that applicants would have to wait between one and three years before becoming a Full member with their experience, having completed the exam during that period as an Associate. (This also gives the Associate grade more *kudos* and stops people waiting until they can achieve Full membership before applying.)
- An interim measure could be that those who would have gone directly into membership as a Full member, as at present, could still get it after one year without an exam, but only, for example, for two more years. This would be agreed by MAC on an individual basis and would be communicated at the time of acceptance into membership that an exam was considered to be irrelevant in this case.
- Those who rejoined after having left or lapsed would have to go through the new process. There would be no exceptions to this rule.
- To then progress to Chartered Status, a peer review professional interview would still be required while gaining Full membership as the final stage of this process.
- Associate grade would be awarded as present, with the same peer review process.

A Practical Introduction to GIS in Ecology

Ben Fisher AIEEM
Project Manager, RSK Carter Ecological

Introduction

Geographical (or Geographic) Information Systems (GIS) are used almost everywhere, and their uses and capabilities are increasing rapidly. Such rapid advancement and modification can be daunting if you are new to GIS.

Today, most ecology courses have a GIS module, but beyond university or college it is most likely that GIS skills are picked up along the way during your career.

There is a multitude of GIS training courses available. However, only a few are focussed on ecology and therefore the most useful if you want to apply your new GIS skills directly to your ecological work.

This article introduces a few important GIS concepts and procedures to help ecologists navigate the exciting world of GIS.

What is GIS?

There are many definitions of GIS but, put simply, they are tools that process spatial data into information that is usually utilised to inform decision-making. GIS are computer-based systems designed specifically to facilitate digital storage, retrieval and analysis of spatially referenced environmental data. Using GIS you can conduct spatial analysis with the intent to extract or create new data that fills some required conditions or condition e.g. identification of water bodies with great crested newts (GCN) within 500 m of a development boundary.

Ecological applications of GIS include creating an inventory of records of protected species or designated sites in a particular area, finding a distance of a badger sett from a proposed development, or mapping invasive plants from GPS data.

Which GIS Software Package?

One of the first questions is, which GIS desktop package is best suited to your requirements? Selecting the package most suited to your needs at the outset will save money in the long run. Therefore, it is worth undertaking some thorough research, using a combination of trial software and independent resources, to ensure you have the right tools for the job, while exploring the range of capabilities of the available software.

If you studied GIS at university, it is likely that you used the ESRI ArcView package, which is well suited to academic research, as there is access to many powerful analysis extensions. However, there are other commercial GIS desktop packages to consider, such as MapInfo, Cadcorp and Manifold. In addition, there are free GIS desktop packages, such as GRASS (Geographic Resources Analysis Support System). Before deciding on a GIS software package, consider your budget and of course what you will be using it for.

Once purchased, GIS software packages can often be left under-used when solely used in a graphical context. The package can be regarded as a tool for 'posh colouring-in', when the geographic information functions within the software are neglected. Often, GIS is used at the end of a project for simple map creation, but can be applied throughout the project.

GIS should be utilised at a project's inception. Particular functions that are important to the ecologist include spatial database creation and subsequent spatial analysis. Often ecologists are self-taught in GIS and unfortunately, if you are not working closely with a GIS professional, the GIS learning process can be slow and frustrating.

Data Representation in GIS

There are two fundamental methods of representing the real world using GIS. These are known as raster and vector data models (see Image 1 below). A raster data image in GIS provides a way of storing information in a regular grid or matrix of points. An example of a raster model is an Ordnance Survey (OS) tile (e.g. a 1: 10,000 OS tile). A vector data image is a coordinate-based data structure used to represent map features. Each object is represented as a list of sequential x and y coordinates. Attributes may be associated with the objects, for example, topography information. An example of a vector data image is a converted AutoCAD (computer-aided design) file in GIS.

GIS Layers

Within GIS, each spatial dataset or layer within your project can be opened individually, or together. For example, a base layer could be OS base mapping on top of which you can overlay layers of your choice. You may overlay designated site datasets at a given point and identify the designations at that point as shown in Image 2. It is possible to save your GIS work as a project as you conduct your GIS work. This saves the configuration of your project including which GIS layers you are using as part of your work, their status (visible or switched off), and project views.

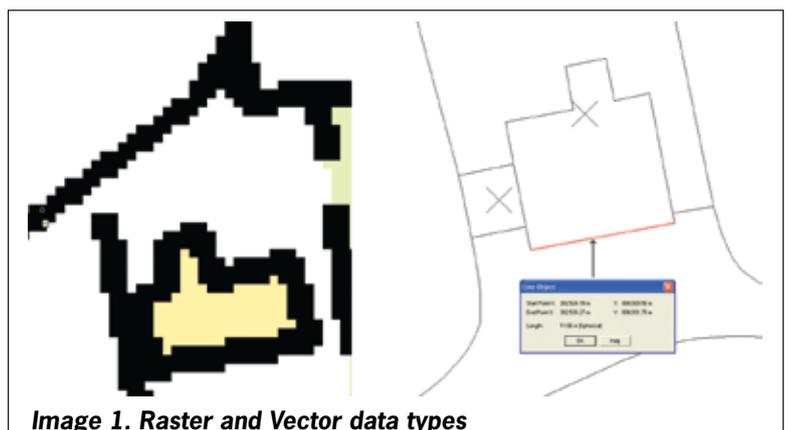


Image 1. Raster and Vector data types



Image 2. Designated Sites identification at a selected point

Ecology Data Sources

As part of your GIS project work you could be required to use GIS to obtain secondary data including information on designated sites and protected species. National designated site datasets are available through government agency websites (for example, www.naturalengland.org.uk). Multi-agency geographic information for the countryside (MAGIC) (www.magic.gov.uk) is a comprehensive map and dataset site primarily for England and Wales. It is a portal for downloading datasets in GIS formats including MapInfo tab and ESRI shapefiles. In addition, it is possible to create a map of your choice through the website's viewer. Available datasets include invaluable information about how each dataset was created, known as 'metadata'. Metadata ensures the user has enough information about the dataset to use it confidently for the purpose intended; metadata should always be created in conjunction with your own GIS datasets.

Biological Records Centres, and local wildlife groups (such as bat groups), hold protected species records and local wildlife site data that can be used within GIS. These data will be delivered to you in one of a range of formats depending on the preference of each record centre. You could receive protected species information in an excel spreadsheet that has x and y coordinate information in columns. This can be imported to create point data in GIS.

Base Mapping

To conduct spatial analysis, you require a real world location for your GIS work; therefore, you need to acquire base mapping. Ordnance Survey base mapping can be purchased from resellers including Centremaps and Emapsite. Both Centremaps and Emapsite have user-friendly viewers to ensure you purchase the correct location and

the correct type of mapping for your project requirements. Both raster and vector base mapping is available from the OS resellers. Raster base mapping includes OS street level 1: 10,000 scale, while vector base mapping includes OS Mastermap 1: 1250 scale base mapping. The OS map data supplied is usually linked to a georeferencing Tiff World File (TFW), which ensures that when the file is opened in the GIS package it is in the correct projection and coordinate system.

Georeferencing

Within your GIS work, it is likely you will need to use a format that does not have location information attached. This might be a raster image, for example, a jpeg of a proposed development site. To use this image in your GIS work effectively you must georeference the image.

To complete georeferencing you need to use control point coordinates that can be taken from your OS base map, or from a website such as MAGIC. These control points must match a point on your image that you intend to georeference. Useful control points include the corners of buildings and field-boundary intersections. Vector images can also be georeferenced. A common type of vector image that often requires georeferencing is an image from an AutoCAD file (for example, DWG or DXF). Images from AutoCAD files are often drafted to scale but are not always referenced to a real world location. When you are georeferencing, ensure that you select the correct coordinate system. In Britain, select British National Grid (BNG) – the most appropriate projected coordinate system for Britain.

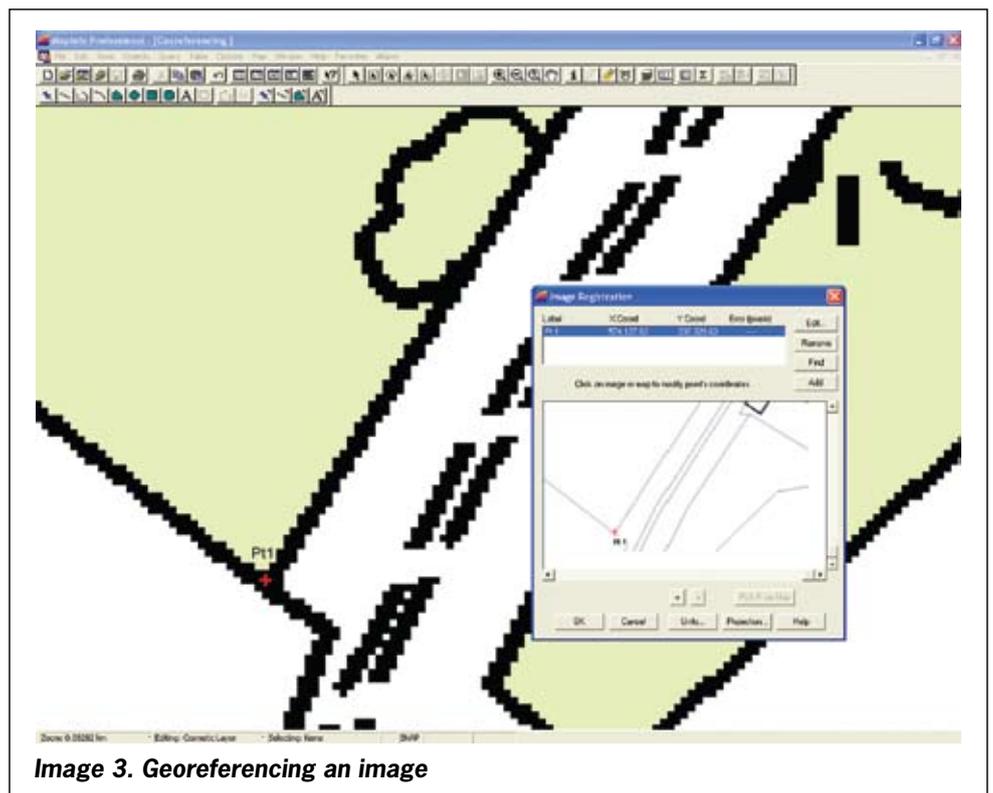


Image 3. Georeferencing an image

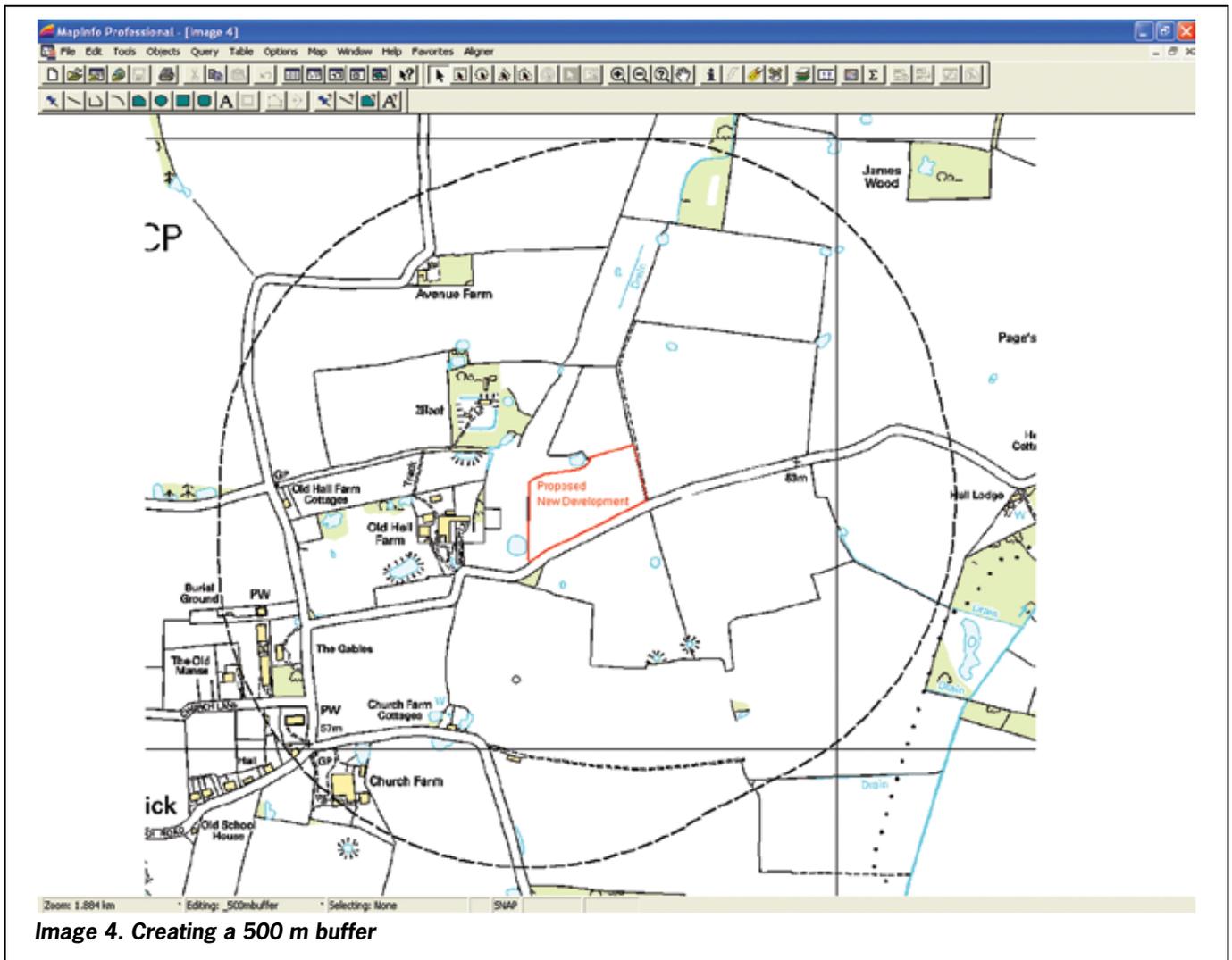


Image 4. Creating a 500 m buffer

Buffer

To conduct spatial analysis, a common GIS procedure is to create a 'buffer'. A buffer is a zone around a feature of interest (for example a new development) on a map; the zone is created for analysis. This zone could be used for GCN surveying, for example. As newts are capable of moving substantial distances over land – typically 200-500 m from their breeding pond, but up to 1.3 km – it is usually considered necessary to assess the suitability of habitat within 500 m of a proposed development, and to survey all suitable ponds for newts during the breeding season. Therefore, you should identify which water bodies are within 500 m of the new development, for example.

Dataset Creation and Digitisation

Great Crested Newt Surveying

Within your GIS work you will need to create your own GIS datasets. Database columns can be added at the start of your dataset creation and throughout your GIS work. If you are conducting GCN surveys, for example, you will need to create a water body dataset. You should create a point dataset for ponds and a line dataset for drains/ditches using digitising tools in the GIS. Within GIS software packages you have access to digitising tools that are similar to drawing packages. These allow you to create graphic objects such as point, line and polygon features, as well as text. However, once you create a new feature within the GIS, such as a point, you are also creating a row within a table behind the new feature. Adding data behind the graphic object enables you to analyse/compare data more thoroughly

and extract more information. Each pond or drain/ditch should be given its own record within the dataset. Note that digitising the point of the pond nearest to the area of interest (for example, a new development) ensures data consistency and is useful if you intend to conduct further analysis of the data. For example, you may wish to calculate the distance of a pond from a proposed new development. Ponds and drains/ditches for survey can be identified easily on OS colour raster 1: 10,000 base mapping. Google Earth is compatible with GIS, and can be used to identify additional or potential ponds, for example, that are not already mapped on the OS raster base mapping. GIS users can import data from GIS systems including MapInfo into Google Earth and vice versa. If available, both Google Earth and Aerial Photography can be invaluable to your GIS work.

In GCN surveying, an up-to-date database with the survey status information is vital for the planning of survey visits, especially if you have a large number of water bodies to survey that extend over a large area. Data can be updated manually and directly within the GIS. If data is stored in a different format, for example, in Excel spreadsheets, the spreadsheets can be imported into GIS, and data can be copied ('joined') from the spreadsheets to a GIS table using a column with a matching unique identifier in both the Excel spreadsheet and the GIS data table, such as a water body ID.

Phase 1 Survey

A survey type for which a number of the digitising tools within GIS can be utilised is a Phase 1 Habitat Survey. Until recently, there has not been a standardised palette available for GIS. GIS users have had to make do with creating their own standards, which fitted as closely as possible to the Phase 1 Handbook's

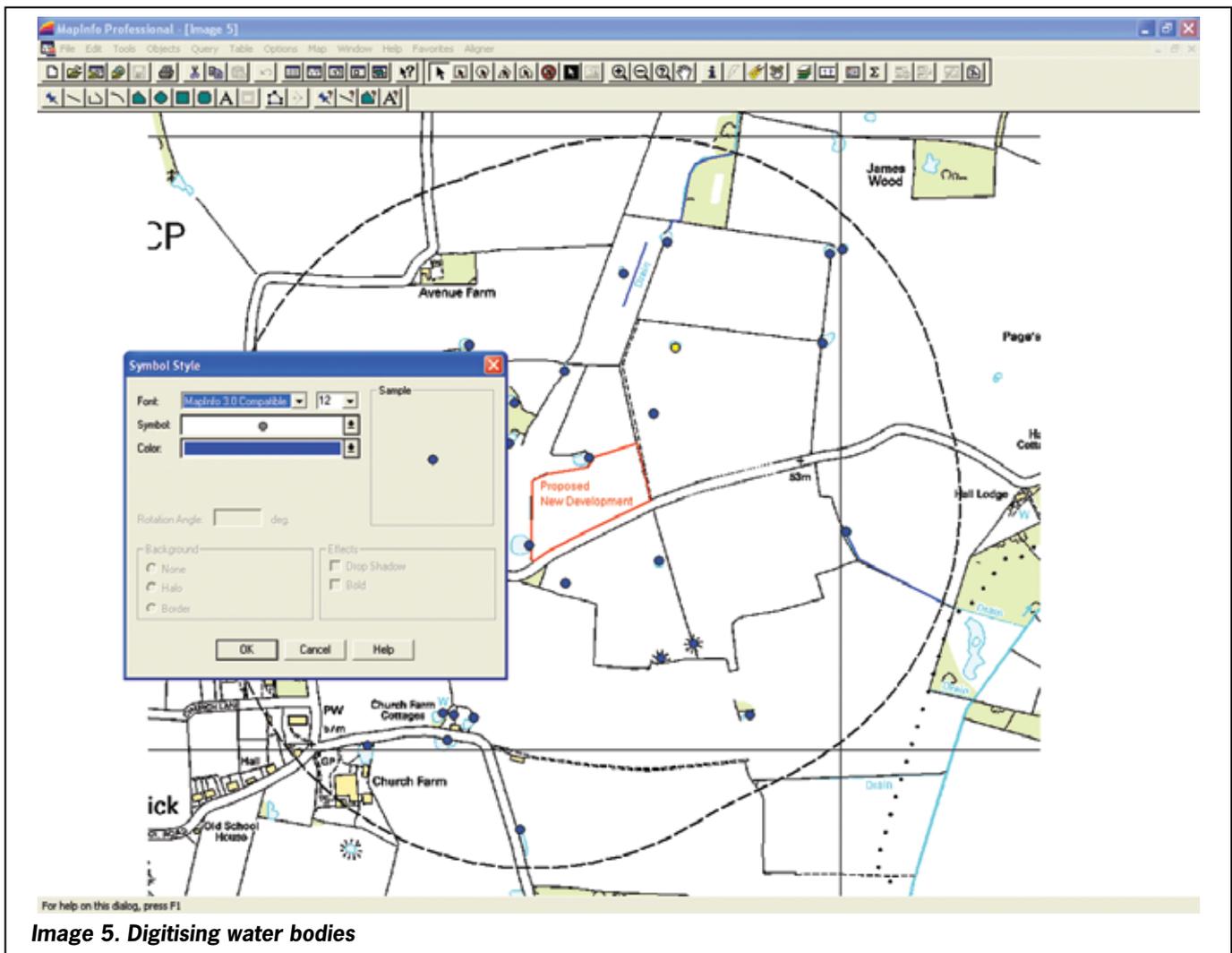


Image 5. Digitising water bodies

key. The Joint Nature Conservation Committee (JNCC) has created its own standardised ArcGIS 'style file' that contains the Phase 1 colour mapping palette and, for MapInfo GIS users, RSK Carter Ecological Ltd has created a Phase 1 Habitat Survey Keysheet Package. Information on both these GIS standards is available on the JNCC website, <http://www.jncc.gov.uk/page-4258>.

Phase 1 maps are often mapped at 1: 10,000 scale. Point, line or polygon feature types should be stored as a separate layer. This is GIS good practice that extends beyond the ecological use of GIS. This separation also ensures that point features such as green crosses indicating scattered scrub are not hidden under polygon features such as solid yellow areas of amenity grassland.

Government bodies including Natural England and Scottish Natural Heritage have strict guidelines for data delivery, and these should be adhered to as best practice even if you are working on non-government projects. The data standards include stipulations to ensure the data is 'clean' (for example there must be no overlaps or gaps) and information on metadata requirements. The standards ensure that data is of the highest quality and can be 'kept alive' beyond the life of an individual project.

Selecting a Subset of Your Data

Within your GIS work you can select a subset of your data based on a particular entry in a column of your data. If you wanted to create a separate dataset of water bodies that have great crested newts present you can use the select function in the GIS. This dataset can be used independently of the original

dataset, and can be used to create a map that only shows water bodies that have GCN present. You can also select a subset of your data based on their geographic relationship to another layer, for example, you could select which designated sites fall within a buffer zone and create a subset of designated sites only within the buffer zone.

Mapping

Ultimately, most GIS work includes map creation. One of the best ways to present your findings is to create a thematic map. When you have completed your GCN surveys, the use of a thematic map is a good way to display your results effectively. Simple thematic mapping is based on a column within your

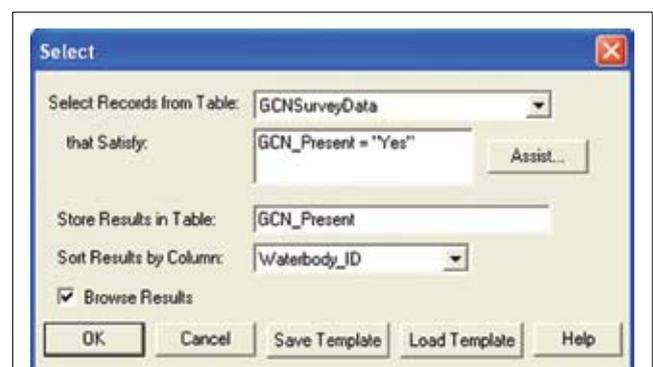


Image 6. Selecting a subset of your data – Water bodies with GCN present

dataset. If you create a 'survey results' column within your GCN dataset that includes categories, 'Unsuitable', 'Negative after 4 visits' and 'GCN present', a thematic map can be created. GIS software packages include tools for the production of final layouts. As a rule, your final layout should include a title, legend, scale, orientation and location identifier, for example, easting and northing, or a small location map.

What Next?

This article has touched on only a few key GIS concepts. Once you start to use GIS on a regular basis, you will discover its vast capabilities within an ecological setting. Attending training courses can lead to a worthwhile enhancement of your GIS knowledge.

Adrian Yallop's important article, entitled *Mapping Plant Distribution for Conservation Monitoring*, published in *In Practice*, June 2007, shows clearly some advanced potential uses of GIS in ecology.

Perhaps the most important advice is to be unafraid of trying out new things in GIS. Within GIS there are many different ways to complete the same task so you are learning all the time and this can give the GIS user a lot of satisfaction.

Five Top Tips for GIS Beginners

1. Understand OS licences: although licences appear daunting initially, an understanding of them is important. Fortunately, OS reseller – the Centremaps store – has a comprehensive OS licensing guide. See <http://www.centremapslive.co.uk/files/licensing/index.htm>.
2. Create a simple data-management system, which all GIS users should understand and can compile. 'Effective data management' equals 'data efficiency', which saves time and money. A good test is to ask yourself whether you would be confident of finding all data associated with a particular project a year after you compiled it.
3. There is a large GIS community. If you have a question about GIS or are performing a repetitive task that you think can be automated, for example, contact other GIS users for advice, as it is likely that some of them have had a similar experience. Major GIS software packages have advice pages, the MapInfo User Group for the UK and Ireland includes access to a talk list on which you can post a question to which a response is usually obtained within 20 minutes.
4. Search the internet for GIS tools. Useful, free GIS tools can be found at www.directionsmag.co.uk. Ecology-focussed tools for ArcGIS can be found at www.spatialecology.com.
5. GIS and cartography should work hand in hand. Although data analysis may be done using GIS, often the final product will be a map on which cartographic principles always apply. Ask yourself whether the map clearly displays to the user the required information.

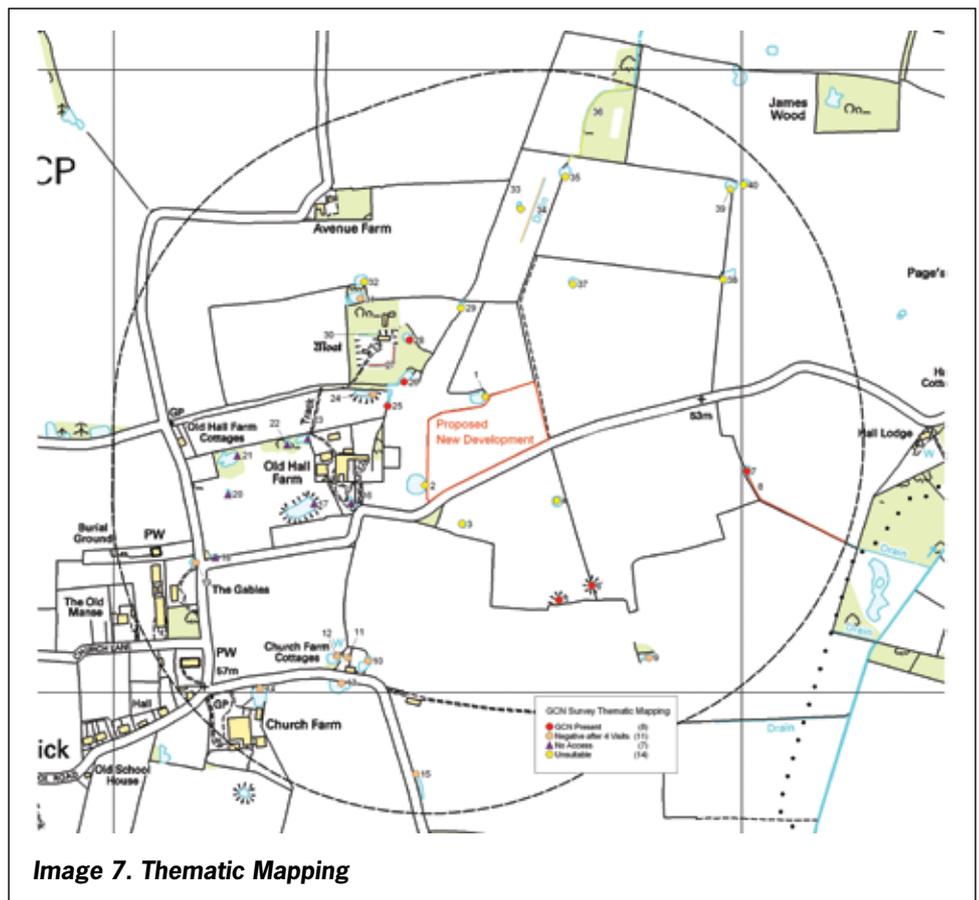


Image 7. Thematic Mapping

Please note: The GCN data and proposed development site location in the images above are fictitious and have been used only to demonstrate GIS concepts and procedures.

Thanks to the RSK Carter Ecological GIS team (past and present).

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Correspondence: BFisher@rsk.co.uk

Biodiversity Data, Informatics and Ecologists - The e-Biosphere 09 Conference

Debbie Bartlett MIEEM* and Tony Witts**

*Senior Lecturer in Environmental Conservation, Greenwich University, and consultant specialising in rural development

**Kent and Medway Biological Records Centre

The recent publication of the IEEM Guidelines on Metadata Standards: Reporting, Sharing and Archiving Ecological Data and the International Conference on Biodiversity Informatics, e-Biosphere 09, held in London at the beginning of June 2009, attended by the authors, have prompted this brief review of some of the emerging tools available for sharing biodiversity data and information.

Taxonomic identification skills are not necessarily the same as field skills and, while not wishing to denigrate the teaching of systematics in any way, they cannot be taught solely within the university setting. Individuals need to be self motivated and of a particular mind set; the highest standards are often reached by those concentrating on one particular group. But exactly what skills are needed to be a competent ecologist or environmental manager?

To begin with botany; while a survey, for example a Phase 1 habitat survey, would require the identification of brambles *Rubus* spp., a botanical taxonomist would recognise many distinct sub-divisions of *Rubus fruticosus* agg. But taxonomists are not always ecologists... so should ecologists claim, or aim, to be taxonomists? And what level of detail is required to meet the purpose of any particular survey? There is a real danger that ecologists may feel under pressure to identify specifically themselves rather than referring to the appropriate specialist, now so



Figure 1. Greenwich University MSc students visiting the 'wet room' at the Natural History Museum and being introduced to the giant squid

easy with digital imaging. With some invertebrate groups determination to species level is only possible by the use of technical morphological keys or even dissection. Interesting though this may be, and important in some cases, many environmental management decisions can be made without recourse to 'rare but dead' (RBD) techniques. It is the old chestnut of how much, and exactly what data, will provide enough information for appropriate decisions to be made. With current resource constraints it seems likely that survey effort will be pared down to the minimum.

The science of species identification is based on the detailed published description of specimens, originally based on reference samples held in natural history museums either as herbarium specimens, preserved skins or 'wet' collections with organisms preserved in alcohol or formaldehyde. With changing environmental conditions and the process of adaption and evolution responding to these increasing variation and divergence from 'type' is to be expected. While this may be subtle and geographically-based, information needs to be shared globally in order for changes to be recognised and the implications understood.

The Convention on Biological Diversity (CBD) came into force on 29 December 1993. The objectives of the Convention are:

- the conservation of biological diversity;
- the sustainable use of its components; and
- the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

Article 17 deals with the sharing of information, a prerequisite for effective implementation of the CBD, and states:

1. The Contracting Parties shall facilitate the exchange of information, from all publicly available sources, relevant to the conservation and sustainable use of biological diversity, taking into account the special needs of developing countries.
2. Such exchange of information shall include exchange of results of technical, scientific and socioeconomic research, as well as information on training and surveying programmes, specialised knowledge, indigenous and traditional knowledge as such and in combination with the technologies referred to in Article 16, paragraph 1. It shall also, where feasible, include repatriation of information.

This laid the foundation for setting up international protocols and mechanisms for the sharing of information; the rationale for the development of biodiversity informatics. The recent e-Biosphere 09 conference,

held in London from 1-3 June 2009, focused our minds on the relatively new field of biodiversity informatics. This international meeting of over 500 taxonomists, systematists (and at least two interested ecologists) discussed the current and potential capabilities of information technology when applied to biodiversity information at the organism level. This fledgling field is currently attempting to mobilise the data locked away in the specimen jars and drawers of many of the world's major natural history museums and academic institutions to make this vast resource freely available to all. It is envisioned that web-based applications will unlock the power of this dataset to greatly improve levels of knowledge of the natural world, for both the general public and those with a professional interest.

The three central goals for the three-day conference were:

- reaching a higher level of shared understanding of Biodiversity Informatics, what it is, what it can contribute, and the limits of its current capabilities. The 'Street Fair', consisting of computer demonstrations, exhibits, and poster displays, was planned with this goal in mind;
- exploring the unmet needs of the users of biodiversity information, and the untapped potential for new sources of content and new levels of data integration; and
- assembling priorities and advice for research and development in Biodiversity Informatics over the coming five to 10 years.

Globally, taxonomists and systematists are developing vast databases of taxon occurrence data and a suite of data standards and web-based applications to make biological data available freely to all. A brief review of the major initiatives is given below:

The Barcode of Life Consortium (BoLC):

A globally co-ordinated initiative to catalogue each species on earth by mitochondrial DNA analysis. This project aspires to simplify species identification by digitising a small and easily separable DNA sequence. A carefully collected tissue sample of a living organism can be compared against the DNA sequence of known named specimens held within the database, eliminating the need to collect whole organisms and damage ecosystems. The catalogue currently holds the DNA sequence for over 59,000 formally described species.

The Catalogue of Life:

A compendium of 66 global taxonomic databases covering over 1.1 million species with an aim to catalogue every species on earth. Checklists are produced annually, organising and unifying taxonomic information from all of their source databases.

Global Biodiversity Information Facility (GBIF):

An explorable database of over 177 million taxon occurrences. Users can query the vast database by species, geographical location, or by dataset. Occurrence data are displayed graphically on-the-fly and the supporting metadata for the observation or specimen is listed.

The Encyclopedia of Life (EoL):

This has had wider publicity than the other initiatives, and has been publicised by Edward O Wilson: "Imagine an electronic page for each species of organism on Earth..." For each species, its taxonomy, distribution, images, IUCN category, genetics, evolutionary history, morphology, behavior, ecology and importance for human well-being are displayed where available. Links to specialist references for the species are also given via the Biodiversity Heritage Library. This makes fascinating reading and how many

people are aware that, for example a search for Bechstein's bat *Myotis bechsteini* will give access to the relevant scanned pages of *The Bats of Iran: Systematics, Distribution and Ecology* by Anthony F DeBlase? It's a whole lot quicker than going to the British Library! (Although hours can drift away...)

So there is a lot happening on the internet and vast amounts of information are becoming available but how is it useful to practising ecologists and environmental managers? Perhaps the greatest value to us in attending the conference was the realisation that we, in the UK, are in a unique position regarding biodiversity information – and have achieved a level of information sharing envied by those from other countries.

We have the **National Biodiversity Network**, generally known as the NBN or NBN Gateway, the UK's repository of species and habitat occurrence, currently holding over 40 million records. Users can search and download (where applicable) observations by species or by geographical location.

Across much of the country there is a network of county based Biological Records Centres which collect biodiversity data from within their catchment areas, pass it on to NBN, and disseminate it in response to requests for information, often from consultants, developers and the planning sector. These records centres often form the bridge between the local recording community, professional ecologists, statutory agencies and local governments.

The most commonly used software package for keeping biological records is Recorder®. Upon start up, the programme gives the user handy tips, one of which reads: 'If you want to earn a decent living from biological recording – forget it! There is no money in it.'

This software package is recommended by the National Biodiversity Network and supported by the Joint Nature Conservation Committee (JNCC). In the UK there is a heavy dependence on amateur enthusiasts to catalogue the wildlife they see. Many of the planning decisions made by local authorities are based, in part, upon the findings of these 'foot soldiers'. OK, so the screen 'tip' may be tongue-in-cheek, but it is nonetheless true; professional ecologists do well to remember that much of the information they acquire during 'desk studies' originates from volunteers.

The UK is committed to providing data via the NBN Gateway to the Global Biodiversity Information Facility (GBIF). Outside the UK, the collation of biodiversity data and taxon occurrence is largely the remit of academic institutions and museums. There seems to be no replication of the local record centre framework that exists here. At the e-Biosphere 09 conference in London there was a call for the standardisation of the metadata that accompanies a specimen or taxon record. This metadata should include the basic information that, in a British record centre, would make the record valid, *i.e.* who recorded it, where it was recorded, when it was recorded, and what it is (the four Ws). In essence the first three items on this list are simple to ascertain, the fourth - what it is - is the tricky bit. But surprisingly, the first three are often missing from the consultant reports seen at the Kent and Medway Biological Records Centre, where the great majority of data are supplied by amateur recorders and county taxon group specialists.

With the 2010 deadline for halting the loss of biodiversity looming there is a concern regarding the deficit in skilled people to identify the micro-organisms, fungi, plants and animals that are left; without these there is little hope of knowing what the true state of our environment is.

Universities have recently been criticised by the ecological industry for producing graduates and post-graduates with less than perfect surveying and identification skills. As part of the training for other professionals, for example, industrial chemists, pharmacists, nurses, beauticians and motor mechanics all require work placements as absolutely vital components of training. The ecological industry expects the academic institutions to produce fully developed taxonomists and field surveyors. Is this right, or even good for the industry? In practice, a significant proportion of the skills base is found, not within the professional, but the voluntary sector with keen naturalists, many of whom would not be eligible for membership of IEEM. This is evidenced by a survey of the county recorders of Kent, who are relied upon to verify records where identification is unclear. Only five of the 11 experts for groups including aculeate Hymenoptera, Lepidoptera, higher plants, bryophytes, marine algae, bats and herpetofauna are either practising ecologists or trained in some form of taxonomy.

For the UK ecological industry to make an increasing contribution to global biodiversity research, ecologists and environmental managers should be:

- producing accurate, usable data;
- nurturing taxonomic specialists and acknowledging their contribution; and
- working together with academic institutions to ensure the best possible courses and industrial experience are available to students.

Sandra Knapp, from the Natural History Museum (London), speaking on the first day of e-Biosphere 09 suggested that we need to move away from the view that taxonomy was practised by individuals working in relative isolation to a team-based approach. She used the analogy of the Cern Large Hadron Reactor where a large multidisciplinary, and interdependent, team are involved in scientific research. The whole team are acknowledged rather than credit given to the top scientists. Perhaps ecologists and environmental managers should follow this example. We cannot expect everyone to do everything and we need to work together, professionals and enthusiasts, experienced practitioners and new entrants to the profession, if we are to achieve our real goal of minimising biodiversity loss.

And please follow the IEEM guidelines and submit those records to your local records centre... and add to the work of the volunteers – it's their work you get on those print outs.

Websites of interest:

- e-Biosphere 09
www.e-biosphere09.org
- Convention on Biological Diversity
www.cbd.int
- Barcode of Life Consortium
www.barcoding.si.edu
- Catalogue of Life
www.catalogueoflife.org



Figure 2. The splash screen of Recorder 6® showing a handy tip for biological recorders

- Global Biodiversity Information Facility
www.gbif.org
- Encyclopaedia of Life
www.eol.org
- National Biodiversity Network
data.nbn.org.uk
- Recorder
www.recordersoftware.org
- Kent and Medway Biological Records Centre
www.kmbrc.org.uk

The views expressed in this article are the authors' own; they do not necessarily reflect the opinions of their respective institutions.

Correspondence:
d.bartlett@gre.ac.uk / tony.witts@kmbrc.org.uk

A Method for Assessing Water Vole Habitat Suitability

Jane E Harris CEnv MIEEM*, Helen J Markwell CEnv MIEEM** and Ben A Raybould***

*Principal Ecologist, Kewick Ecological Services

**Senior Environmental Scientist, Halcrow Group Ltd

***Graduate Environmental Scientist, Halcrow Group Ltd

A method has been developed to assess habitat suitability for water voles *Arvicola terrestris* in coastal and riparian grazing marsh dyke systems. Using a number of features favourable to the water vole, sites are scored between one (unsuitable) and eight (optimal). A positive correlation between site scores and animal use has been demonstrated in marsh dyke systems in Norfolk. The Water Vole Habitat Suitability (WVHS) method has successfully been used to inform impact assessments, scope options for mitigation, and to monitor habitat re-instatement in relation to a number of flood defence schemes. The method has the benefit of being suitable for use over both large and small scales, enabling rapid and precautionary assessments, and identifying potential enhancement opportunities. Initial investigations on main river systems elsewhere in East Anglia suggest that the method has benefits when applied to scenarios other than marshland habitats.

Background

Coastal and flood plain grazing marshes are typically protected from flooding by embankments, and are drained by an extensive network of dykes (ditches). The dykes may provide an important habitat for the water vole, and in Norfolk such marshes are considered to be a stronghold for the species with some of the highest densities in Britain (Henson 2001). The water vole was afforded full legal protection under the Wildlife and Countryside Act 1981 (as amended) in April 2008, and flood defence schemes must assess potential impacts on this species.

Grazing marsh dykes vary considerably in their suitability as water vole habitat. Grazing intensity and frequency, bank profiles, water levels and dyke management regimes all influence water vole habitat suitability and are dynamic. Water vole populations are able to adapt to spatial and temporal habitat change within marsh blocks, largely because of the connectivity of the dyke network and absence of barriers to dispersal, and it is usual to find both source and sink habitats within a dyke system.

Method Concept and Development

In 2001, baseline ecological surveys were undertaken for coastal defence works on a 5 km stretch of the North Norfolk coast between Kelling and Cley, where the shingle embankment defended approximately 250 ha of grazing marsh and reedbeds. Options under consideration ranged from holding-the-line to managed retreat. A key concern was to identify the pattern of distribution and habitat use by water voles throughout the area of potential influence. To address this issue, it was decided to

include an assessment of water vole habitat suitability (WVHS) in the standard water vole survey methodology (Harris 2001). Eight habitat features favoured by water voles were scored for presence/absence (Table 1). The choice of features was partly determined from well-documented habitat requirements (e.g. Strachan and Moorhouse 2006), but also from 'surveyor experience' of water vole habitat preferences specifically in coastal grazing marsh dykes. The scoring system for the WVHS assessment grouped dykes into three broad habitat types (Table 2).

Table 1. WVHS features used in field survey sheets

Habitat suitability feature	Score 1 if present
Well-developed (>60%) bankside and emergent vegetation to provide cover	
Year round availability of food sources	
Suitable refuge areas above extremes in water levels	
Steep banks suitable for burrowing	
Permanent open water	
Presence of berm (ledge at water level)	
Lack of disturbance through poaching, grazing and/or recent management	
Nest building opportunities in vegetation above water level	
Habitat suitability assessment score	

Table 2. Habitat categories based on WVHS scores

Dyke habitat type	Number of WVHS features exhibited
Unsuitable (no potential for enhancement)	<3
Sub-optimal (potential for enhancement)	3-5
Optimal	>5

The entire grazing marsh dyke system was surveyed to allow comparison of the actual presence of water voles with the habitat suitability assessment. The type, density and distribution of water vole signs showed an obvious correlation with the WVHS assessment, although not tested statistically. All optimal dykes were occupied, frequently supporting core breeding colonies. Sub-optimal dykes were often used, especially for feeding, but with fewer breeding sites. Water voles were generally absent from unsuitable dykes. Mapping of the WVHS survey data provided an overview of the extent and distribution of optimal, sub-optimal and unsuitable dykes at the flood defence compartment scale, and was extremely useful in assessing potential impacts on the water vole population.

Benefits of Habitat Assessment as a Survey Tool

The advantage of the WVHS approach is that it provides a more robust and precautionary assessment than presence/absence surveys alone, which are only a snapshot of water vole activity and may rapidly become out of date, even within one breeding season. The WVHS assessment takes account of inherent fluctuations in water vole populations, recognising that habitats remain suitable for several seasons. It also has a predictive capability in determining how the population will respond to changes in the dyke network. This has particular relevance in relation to mitigation, for example, determining the availability of sub-optimal habitat that could be enhanced to accommodate water voles displaced by the flood defence scheme.

The WVHS assessment is relevant to both small and large surveys. It is particularly useful for marshes with many kilometres of dykes where the technique can provide a relatively rapid, but none the less precautionary assessment tool compared to more traditional approaches. For example, where water vole activity is observed or suspected in a general area, habitat suitability can be mapped and ground-truthed with checks at regular or interspersed intervals to confirm the animals' distribution in sub-optimal or optimal habitats. This will generally result in mitigation being planned wherever a risk of water vole presence is perceived. Where habitats are assessed as unsuitable, more thorough checks to confirm the absence of field signs are required and may need to be repeated prior to commencement of the works in order to conclude mitigation that is not required.

Broadland Flood Alleviation Project

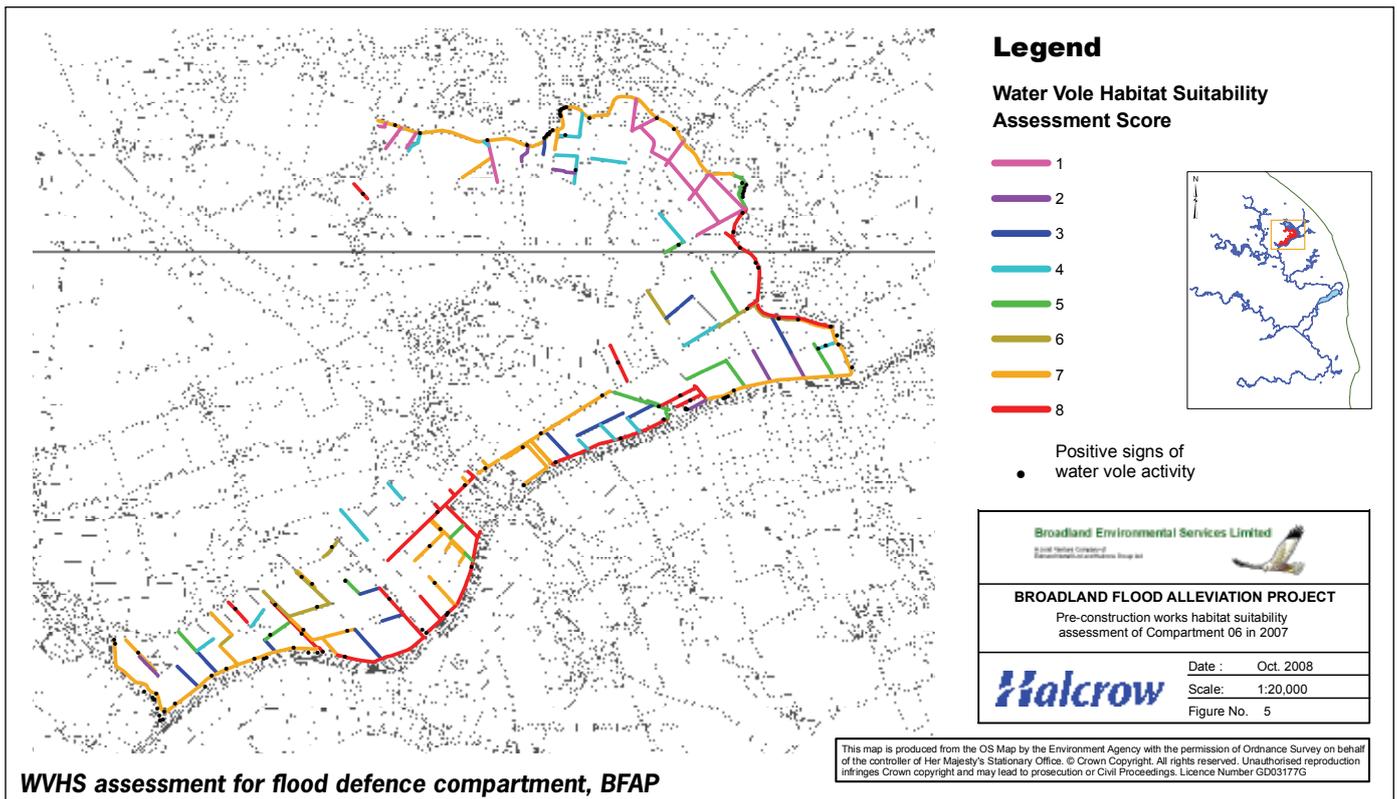
The Broadland Flood Alleviation Project (BFAP) is a long-term project providing flood defence improvements within the tidal areas of the Rivers Yare, Bure, Waveney and their tributaries (www.bfap.org). In excess of 240 km of flood defences protect 40 flood compartments comprising more than 21,000 ha of land, over half of which is managed through traditional grazing. Water voles are widespread, and core populations

are commonly found in the soke dyke that runs parallel to the flood embankment. The soke dykes are routinely in-filled and relocated as part of the flood defence improvement works, and therefore mitigation involving displacement from the soke dyke is regularly implemented. In 2006 and 2007 more than 30 km of soke dyke was subject to water vole mitigation as part of the works.

A major concern of the large scale mitigation undertaken for the BFAP is the fate of displaced water voles, namely the suitability of the adjacent marsh dykes within the compartment to accommodate displaced animals. Furthermore, the extensive baseline water vole surveys are usually carried out at least one year in advance of the flood defence works, with the possibility of a change in animal distribution in the interim. An additional and important consideration for the project relates to the reinstatement of post-works habitat, and the ability to monitor not only whether animals have recolonised the new soke dykes, but fundamentally whether the habitat is suitable to enable colonisation. Consequently, the WVHS assessment developed at Cley-Kelling was incorporated into the BFAP water vole baseline and post-works survey methodologies in 2007, to test its value in addressing these concerns (Halcrow 2008).

During 2007, the WVHS method was used in five BFAP flood compartments as part of baseline surveys, and nine compartments as part of the project's post-works monitoring programme. It was also validated by being used on a full marsh and soke dyke system in one of the compartments within the project area (Cantley Marshes, owned and managed by the RSPB). At the latter site it was applied to 423 sub-sections of dyke, which were also thoroughly surveyed for positive evidence of water voles. The resultant data were assessed using logistic regression analysis.

In order to facilitate BFAP baseline surveys, a standard recording form with supporting detailed guidance notes for assessment of the presence/absence of the eight features listed in Table 1 have been developed. The field survey forms afford the opportunity to provide additional useful information about the survey site (such as local land use, vegetation type and grazing pressure) to aid interpretation of scores, based on features relevant to Broadland.



WVHS assessment for flood defence compartment, BFAP

Experience gained from the extensive BFAP surveys demonstrates that the three categories of habitat (Table 1) correlate well with observations in the field (Table 3). Sites with a score of 6, 7 and 8 in Broadland routinely support water voles. Field signs are rarely found in sites with a score of 1 and 2. Sites within the 'sub-optimal' category are often considered sink habitats, and may be unoccupied during the spring months when population density is low; however field signs are often recorded in the later summer months. Some sites with a score of 5 are considered an overlap between the 'sub-optimal' and 'optimal' categories. Such sites generally provide good quality habitat capable of supporting resident animals, but do not have a berm present. These latter sites routinely support field signs.

Table 3. WVHS field observations in Broadland

Score	Suitability	Comment
1	Unsuitable	This type of water body will contain very few features of benefit to water vole. It is possible that this type will have been recently cleaned out, and will have scored the one point from having open water present.
2	Unsuitable	This type of water body often contains (in various combinations) very little if any vegetation, poor shallow or low banks, no berm and with no rush/grass tussocks in close proximity of the water body.
3	Sub optimal	In this case there will be a small number of positive features; these water bodies may rarely be of enhancement potential (to raise the score to 6).
4	Sub optimal	This type of water body is commonly characterised by suitable open water, steep banks and good vegetation coverage, but is often subject to significant disturbance e.g. bank poaching by cattle. A score 4 water body will often have good enhancement potential to make it an optimal water body.
5	Sub optimal	A score of 5 will often describe a sub optimal water body; however sites without a berm and a score of 5 will generally provide good quality habitat. A score 5 water body will often have a number of field signs on them, and enhancement potential to make it an optimal water body is almost certain.
6, 7 & 8	Optimal	A score of 6, 7 or 8 represents an optimal water body for water voles. It will often have dense and varied vegetation, tall and structurally sound banks, permanent open water, a lack of disturbance (often due to the exclusion of cattle), the presence of one or more marginal berms, suitable refuge sites and/or nest building opportunities. A score 6, 7 or 8 water body will often be lined with thick margins of grass, sedge and/or rush tussocks, and will routinely support water voles.

Regression analysis, undertaken using the data from the detailed survey at Cantley marshes, demonstrates a highly significant positive relationship ($P < 0.0001$) between WVHS



Typical extensive dyke network in Broadland flood plain grazing marsh
Photo: Mike Page

scores and the presence of water voles at a site (Raybould 2008). As a result WVHS survey data are now routinely incorporated into figures within the Environmental Statements produced as part of the BFAP, with dykes being colour coded according to score. Dykes entirely choked with emergent vegetation where no open water is present are reported separately. Such dykes are clearly unsuitable for current occupation and would be classed as 'sub-optimal', but sensitive dyke clearance would in most instances quickly return them to 'optimal' status.

Post-construction work surveys, a routine feature of the BFAP works in relation to a number of environmental features, now include the WVHS method. Results indicate the majority of new soke dykes quickly re-establish good quality water vole habitat, and can highlight any areas that require remediation.

Future Development of the WVHS Method

Looking forward, a natural progression of the WVHS relates to its potential for use on watercourses other than extensive marshland dyke systems. Initial investigations indicate that, when combined with searches for water vole and mink field signs, the method can provide a useful tool as part of surveys of lowland main river systems. The method can identify potential impacts of proposed development schemes, be used to inform options for mitigation, and highlight potential for habitat enhancements. In order to refine and improve the method, the authors would be very happy to receive feedback from any surveyors who use the WVHS. The associated survey forms are free for use or adaptation, but should be acknowledged in any associated reports or publications using the standard *In Practice* format.

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Correspondence:
j.harris@kepwick.biz / markwellh@halcrow.com

BFAP GRAZING MARSH DYKE AND WATER VOLE HABITAT SUITABILITY SURVEY FORM

Compartment:											Date:		
Station ref. no.													
Recorder(s):													
Grid reference:	T												

ADJACENT LAND USE	A	B
Improved grassland		
Semi-improved grassland		
Cattle/horse grazed		
Sheep grazed		
Hay/silage		
Stockproof boundary		
Arable		

WATER WIDTH (m)	0	1	2	3	4
FREEBOARD (cm)	0	20	50	100	200
WATER DEPTH (cm)					
CONDUCTIVITY (uS/cm)					

Recently cleaned?	
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SOIL TYPE	
Clay	
Peat	
Sand	

VEGETATION COVER	0	1	2	3	4	5
Open water surface						
Floating macrophyte						
Floating algae						
Emergent						
Submerged macrophyte						
Submerged algae						
Floating mat						
Accreted / Elevated						
Exposed mud						
Litter / Detritus						
Shaded						

WATER COLOUR	
Orange / brown	
Pink / purple	
Green	
Milky	

A	B	70 - 100%	D	5
north	south	30 - 70%	A	4
east	west	10 - 30%	F	3
north-east	south-west	3 - 10%	O	2
north-west	south-east	< 3%	R	1

GRAZING ON BANK TO WATERS' EDGE	None	Low	Medium	High
Grazing level (A / B)				
Wet poaching (A / B)				
Shelf formation (A / B)				

WATER VOLE			
Sighting		Pathway in vegetation	
Latrine		Feeding remains	
Burrows		Cropped grass around tunnel	
Footprints		Colour (Black / Brown)	

WATER VOLE HABITAT SUITABILITY	
Well developed (>60%) bankside and emergent vegetation to provide cover	
Year round availability of food sources	
Suitable refuge areas above extremes in water levels	
Steep banks suitable for burrowing	
Permanent open water	
Presence of berm	
Lack of disturbance through poaching and grazing	
Nest building opportunities in vegetation above water level	
Habitat Assessment Score	

NOTES INCLUDING OTHER FAUNA (e.g. breeding birds; amphibians; Norfolk Hawker.)

New Badger Guidance from Natural England

Charles J Wilson

Wildlife Management Senior Specialist, Natural England

In June 2009, Natural England published guidance on the interpretation of 'current use' and 'disturbance' in the context of legal protection of badger setts under the Protection of Badgers Act 1992.

Protection for setts, as opposed to the badgers themselves, was first introduced by the Badgers Act 1991, which defined a sett as: 'any structure or place which displays signs indicating current use by a badger' and introduced a number of offences including 'disturbing a badger when it is occupying a sett'. These carried over into the Protection of Badgers Act in 1992 and have been the subject of much debate ever since.

So What Could be a Sett?

Although the definition in the Act could be interpreted very widely, at the Queen's Bench Divisional Court in June 2000 it was judged that it applied only to the tunnels and chambers of the sett, and the areas immediately outside the entrances, or to other structures used by badgers for shelter and refuge. So a grass field or a woodland glade, for example, may show signs of 'current use' by badgers, such as tracks, trails and foraging signs, but this clearly does not make it a badger sett. On the other hand, badgers will often use places that do not fit the typical picture of a badger sett; for example, gaps and crevices amongst rocks and boulders, or spaces under garden sheds, raised buildings or other structures. And what about the spoil heaps outside the sett entrances? On the basis of the above case law, if these are 'immediately outside the entrances' they can form part of the sett, and may therefore be protected. In our view, this means that if they are in the immediate area outside and form a structure, such as an entrance platform (as they often do), or provide access for badgers to the entrance, then they are protected by the Act. By contrast, if spoil has fallen or accumulated beyond the 'immediate area', or spilt down a sloping bank, then it is unlikely to form part of the sett – it is simply waste material from the excavation. As a working guide, we normally consider any spoil more than about 0.5 metres from a sett entrance as beyond the 'immediate area' and therefore not part of 'a sett', unless it still performs some obvious function as part of the sett, as described above.

Current Use

As far as we are aware, there is no case law to help with the interpretation of 'current use' so we rely on the ordinary meaning of the words. Importantly, 'current use' is not synonymous with current occupation. To strictly equate the two would be nonsense, as a sett could alternate between being 'in use' during the day and 'not in use' at night as badgers went out to forage each night and returned each morning. On the other hand, the definition in the Act only requires that the structure or place 'displays signs indicating' current use. Thus a sett is defined as such (and so protected) as long as signs indicative of 'current use' are present. So the sett is protected until the signs (i.e. 'field signs') have deteriorated or decayed to the extent that they no longer indicate 'current use'. Depending on weather, soil conditions, other activity in the area, etc., this could take weeks

or more. In many cases it may be safer to consider when a sett is NOT a sett; i.e. if the field evidence, absence of signs, debris in sett entrances, etc., indicate that it is not in use.

The 'Disturbance' Offence

Again, there is no case law to help define disturbance – though it is important to note that the offence here is 'disturbing a badger', not disturbing a sett – a term that is often used. But what might disturb a badger occupying a sett? We take the view that badgers can be quite tolerant of *apparent* disturbance at or near their setts without, themselves, being disturbed. This is inferred from the fact that badgers commonly have their setts in railway cuttings, road embankments, gardens and working farms, where they live with varying levels of disturbance in the vicinity of the sett – often levels of noise that we would not want to have to put up with ourselves! Evidently badgers, like most animals, can habituate to regular noise and activity, but we cannot assume that badgers in a secluded and quiet location will be as tolerant as those used to trains running past every few minutes. However, they clearly can be quite tolerant and what may constitute 'disturbing a badger' in any one case will be a question of judgement.

Many badger workers may regret the passing of the more clear-cut guidance on disturbance, in which fixed distances and examples of activities that would or would not need a licence were given, but we believe that the new guidance, though less prescriptive, better reflects the intention of the Act.

The full guidance on 'current use' and 'disturbance' is available on our website at: <http://www.naturalengland.org.uk/ourwork/regulation/wildlife/species/badgers.aspx>

Correspondence: Charlie.Wilson@naturalengland.org.uk



Badger

Photo: www.wildstock.co.uk

Continuing Professional Development

Nick Jackson AIEEM

Education and Professional Development Officer, IEEM

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

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

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



Julian Jones

Photo: Les Starling

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

If you want to be in with a chance of winning next year's CPD prize, please make sure that you complete and send in your 2008/09 CPD form along with your membership renewal in October.

Correspondence: nickjackson@ieem.net

Julian Jones Biography

When I joined IEEM as an Associate member in 1996, it was because of the opportunity to attend really good, yet relatively cheap training workshops. My contract with English Nature's Wiltshire team had just ended and I was desperate to find some work; IEEM allowed me to build up something of a portfolio to take to interviews. I attended Phase 1 Habitat Survey and National Vegetation Classification workshops and learned how to identify sedges and grasses – in theory at least!

The following year, I netted my first job, working for the Wildlife Trusts as Powys Wildlife Sites Officer. This was an amazing job. I was charged with developing a partnership of countryside organisations and had to come up with criteria to select 'second tier' sites – now usually called Local Wildlife Sites.

Local Wildlife Sites work gave me a real taste for 'front-line' nature conservation. I remember one particularly difficult evening, giving a presentation to the Brecon and Radnor executive committee of the Farmers Union of Wales (FUW). It seemed to me that none of the farmers in the room was interested in wildlife conservation, yet as I was leaving, tail between my legs, one of the farmers came up and said, rather quietly that he had some fields he'd like me to look at. Over 10 years later that farmer is now a Wildlife Trust trustee and his farm has more biodiversity than most nature reserves!

My work for the Wildlife Trusts is now quite wide ranging, covering wider countryside and nature reserves and I'm more likely to be in a meeting on health and safety policy than surveying wildlife sites, but I still manage a day a week in the field – just!

Julian Jones CEnv MIEEM

Wildlife Trust Manager, Radnorshire Wildlife Trust

Date	S/Uns	Type (C/W/Se)	CPD activity and name of provider for structured CPD	Skill developed	Hours/Period
9/10/07	S	C	SEVERN & WYE CATCHMENT CONFERENCE held at Glos. Wildlife Trust; organised by Montgomeryshire Wildlife Trust	Developing landscape-scale conservation projects.	8
21 x 22/1/08	S	C	Wildlife Crime Conference; CCW & The Police held at Llandrindod, Powys.	Recent case studies in view of strengthened legislation of EC Habitats Directive. General networking with Wildlife Crime Officers from several Police forces in Wales.	16
14/3/08	S	Se	Wales Spatial Plan (Central Wales area) Consultation seminar organised by National Assembly for Wales; held at Aberystwyth University.	Environmental planning in Wales over next 20 years.	8
13/5/08	Uns	W	Re-introduction of Water Vole at Llangoese Lake, nr. Brecon. (Facilities provided by Environment Agency Wales)	Site visit to see mink traps in operation and ditch & pool habitat creation for water voles.	6
17/5/08	Uns	W	Invertebrate recording day at Radnor Forest, Powys. Organised by Powys Biodiversity Information Service	Invertebrates of ephemeral and upland pools.	6
2/6/08	Uns.	Se	A consultation seminar on the Local Development Plan in Powys	Learning the framework behind the LDP process	3

Julian Jones's CPD submission 2008-9

Professor John Rodwell Awarded the IEEM Medal

On 25 June 2009, Professor John Rodwell was presented with the IEEM Medal for his distinguished contribution to the advancement of vegetation science in Britain and Europe.

The evening was opened by IEEM's President, Professor Steve Ormerod, signing a Memorandum of Understanding (MoU) with the Institute of Environmental Professionals - Sri Lanka (IEP-SL). The IEP-SL was represented by Mr Kapila Fonseka from the Sri Lanka High Commission.

Our guest speaker for the evening was Dr Helen Phillips, Chief Executive of Natural England (NE). She outlined some of NE's priorities, working towards closer links with IEEM and increasing membership of IEEM by NE staff.

Fellowship certificates were also presented by Dr Phillips to Mick Green, Peter Jepson, William Latimer and Roland Randall.

The MoU and new Fellows are reported on in more depth in *Institute News* on page 38.

Below is the citation for the IEEM Medal, which was written by John Hopkins with contributions from Tim Bines and Richard Jefferson.

'We are here today to celebrate the career of John Rodwell, who more than any ecologist of recent generations has opened our eyes to the rich diversity of vegetation which occurs in Britain and is our foremost phytosociologist. Of course John's name will, for most of us, be irrevocably linked to the *National Vegetation Classification* (NVC). But we must not also fail to see him as a significant contributor to our understanding of the vegetation of Europe and a respected international figure.'

'Classifying, putting names to things, is a starting point for nearly every scientific discipline and British ecologists made an excellent start in the description and classification of our vegetation leading to the publication in 1939 of Sir Arthur Tansley's *The British Isles and their Vegetation*. However after that, with a few striking exceptions such as Donald McVean and Derek Ratcliffe's *Plant Communities of the Scottish Highlands* in 1962, the description of our vegetation, our most basic ecological intelligence, lapsed into darkness and ignorance as the academic community in the UK and North America waged war upon the very idea of classification itself and the term phytosociology was entirely alien to their vocabulary.'

'This was a period when the classification of vegetation flourished in continental Europe and forays to Britain made by Braun-Blanquet and others, provided some of the first analysis of how our vegetation fitted to the broader European scheme. With the publication in 1952 of *Irische Pflanzengesellschaften* by Braun-Blanquet and Tüxen matters perhaps reached their lowest ebb. This book is where one must go for the first accounts of several types of British and Irish vegetation, not least our much loved 'MG5' meadows. Perhaps no vegetation is so evocative of the countryside of these Isles, but to our shame they were first described in German. A student of British vegetation in the 1970s needed to be a good linguist as some of the most informative papers on vegetation classification were published in German, French, Spanish – even Norwegian and Portuguese; surprisingly little in English.'



Professor Rodwell is presented with the IEEM Medal by Dr Helen Phillips

'The stage was therefore set for John to make his outstanding contribution and to bring light and new order to our knowledge of British vegetation and system to its conservation and management.'

'After leaving South Yorkshire some of John's later adolescent years were spent living in Llandudno in the shadow of the Great Orme, the most important Carboniferous limestone grassland site in Wales. It is perhaps not surprising that after graduating with First Class Honours in Botany from Leeds University he went on to do his PhD research on limestone vegetation under the tutelage of Joyce Lambert at Southampton University.'

'As many of you will know John then spent four years at Oxford University, training for the priesthood and since 1975 he has maintained this vocation as a non-stipendiary priest in the Diocese of Blackburn.'

'But it was also science that took him to the North West of England, and in 1975 he also took on the role at Lancaster University of co-ordinator, and in due course the editor, of the NVC, a task which consumed his working life for more than two decades.'

'The fruits of these labours are well known. In 1991, *British Plant Communities Volume 1: Woodland and scrub* was published, followed over succeeding years by a further four volumes. Together they give a comprehensive and unified coverage of British vegetation which is the envy of many other European countries. Today almost no serious paper on British vegetation is published without stating the NVC type being researched. For the environmental manager and conservationists being able to negotiate the NVC and know its language is now stock in trade and not a few know some sections of *British Plant Communities* off by heart, in part a testament to the clarity and liveliness of its prose.'

'Arguably the most important contribution the NVC has made is in the field of conservation. Precise descriptions of vegetation ranging from coast to mountain top means that it has been possible to set clear guidelines for the selection of Sites of Special Scientific Interest which ensure comprehensive conservation of our vegetation, and also the species which depend upon it. Equally important, with the coming into force in 1992 of the EU Habitats Directive, there was a need to be able to place our vegetation into the European context and again the NVC has been the main tool for this task.'

'As an academic, perhaps the most distinctive contribution John has made over the years has been as a teacher, educating conservation professionals and others in the use of the NVC scheme. He has run numerous training courses, initially with the conservation agencies but since then for many other organisations. A community of specialists with a thorough understanding of our vegetation has grown up around him. In this he differs from most other university teachers (John joined the faculty at Lancaster University in 1991 and was made Professor of Plant Ecology in 1997), for his teaching has gone well beyond the confines of the undergraduate lecture theatre. No academic ecologist has engaged so directly and regularly with ecological practitioners. He has brought his enthusiasm, sense of fun and enjoyment to the subject which has inspired all who have come in contact with him.'

'John's research activities did not, however, end with the publication of the NVC and in 1991 he set up the Unit of Vegetation Science at Lancaster University. From this group appeared numerous publications and tools which can be used by the student and manager of vegetation. At this time John also broadened the geographical range of his activities. As an active partner in the European Vegetations Survey and European Vegetation Map Project he has helped to forge a better understanding of European Vegetation. He has been an advisor to the European Environment Agency and other national bodies in the EU. His reach has even extended to collaborations in Russia and Albania. However, John has always remained strongly rooted on his home patch, and the sustained research interest he and several of his research students have had in our upland hay meadows has played a key role in ensuring the vulnerable status of this iconic habitat was recognised.'

'More recently, John has returned to his roots as it were, to re-examine with typical thoughtfulness the landscape of his ancestral South Yorkshire from the point of view of ecology, community, identity and faith.'

'John retired from his post at Lancaster University in 2004, but this has not been a 'pipe and slippers' retirement, as he likes to point out. He continues to teach, research, publish, inform and inspire us - long may he do so!'

Professor Rodwell will be speaking at our Annual Conference on 10-12 November 2009, this year on the theme of Protected Areas. For more information please see page 37.



Helen Phillips presented Fellowship certificates to (top to bottom) Mick Green, Peter Jepson, William Latimer and Roland Randall



The Future of Freshwaters

A Joint IEEM / FBA Conference

16-17 September 2009

University of Warwick

In one of the most significant water-related events this decade, the IEEM and FBA are joining forces to promote the fusion of good science with best management practice through this joint conference. Key sessions will examine threats to freshwaters, the evolving policy context and the need to maintain future science capacity.

If you have a responsibility for legal compliance; strategic planning; water resources; water research; environmental monitoring and assessment; aquatic surveys; biological analytical services; regulatory authorities; or conservation and enhancement of the natural environment, then this conference is for you!

Full details and online booking at:

www.ieem.net/conferences.asp



Protected Areas: Past, Present and Prospects

2009 Annual Conference and AGM

10-12 November 2009

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

This year is the 60th anniversary of the National Parks and Access to the Countryside Act 1949. This act led to the designation of National Parks in the UK and eventually to the numerous other types of protected areas we are now all aware of. These protected areas are under threat from climate change and many other pressures. This conference will explore the role of protected areas, look at how they are currently managed and how this may have to be changed or adapted when looking to the future.

Contributors already confirmed include: Professor John Rodwell, Professor Adrian Phillips CBE, Jim Latham (CCW), Caro-lyne Ferris (CAAN), Edward Holdaway (Europarc), Phil Belden (South Downs Joint Committee) and Stewart Pritchard (SNH).

Full details and online booking at:

www.ieem.net/conferences.asp

Institute News

IEEM Spring Conference 2010 – Ecosystem Services

The call for papers is now open for our Spring 2010 conference, which will be held on 24 March 2010 in London. If you are interested in presenting a paper please contact Nick Jackson (nickjackson@ieem.net).

Call for Workshops 2010

Share your skills and expertise, why not run an IEEM training workshop in 2010? Please e-mail Nick Jackson (nickjackson@ieem.net) for further details.

IEEM signs its first international MoU

IEEM President, Professor Steve Ormerod, signed the Memorandum of Understanding (MoU) with the Institute of Environmental Professionals – Sri Lanka (IEP-SL) during the recent Awards Evening. We were very pleased that the First Secretary in the Sri Lanka High Commission, Mr Kapila Fonseka, was able to attend, as did Kate Jefferies MIEEM who was most helpful in facilitating communications at the Sri Lanka end. Our contact in Sri Lanka has been Mr Senaka Samarasinghe. The MoU is an important overseas link for IEEM and the first of its kind but we now have to start to put some of the aspirations in the MoU into practice.

New Fellows

Council, at its meeting on 25 June 2009, approved two new Fellows, bringing our total up to 38 – congratulations!

Professor Des Thompson

Des has been a professional ecologist and environmental manager for 29 years with substantial research work going back to his PhD and recent recognition of such from the University of Nottingham in awarding a DSc. He is currently Policy and Advice Manager, Scottish Natural Heritage and Chairman of the Joint Nature Conservation Committee UK Uplands Lead Co-ordination Network (UCLN). He has a particular expertise in upland management. He also holds numerous professional appointments over a very wide range of topics. His publications number over 150, including 12 books.

Mick Green

Mick is a Founder Member of IEEM and is the founder and Director of the consultancy Ecology Matters. Mick has undertaken research and survey in ecological management of the environment since 1982, including work for the former Nature Conservancy Council, Countryside Council for Wales and the Royal Society for the Protection of Birds. He has worked extremely hard on getting ecological principles embedded in legislation and environmental policy. He has run many workshops for IEEM and is on the EclA Guidelines Marine Steering Group. He has a substantial list of related publications.

Membership Renewals 2009-2010

The membership renewals notices have now all been sent out and are due by 1 October 2009. This is our annual plea for a prompt response. The cards sent with the renewal notice gives many good reasons to continue with your membership – do please take a moment to read them.

Individual Charter for IEEM

Looking to the future, the prospect of IEEM gaining its own Charter was aired at the 2008 AGM. Preliminary approaches to the Privy Council have established that there would appear to be no reason, in principle, why IEEM should not proceed with an application and we now propose to start the process. There are quite a few hurdles to overcome and the intention is to consult the membership during the process through a questionnaire and when necessary, seeking formal approval at an AGM. Key

questions are likely to be the name of the Chartered Institute and the designation which it might award. Towards the end of the process IEEM will need to adopt a new Constitution which need not be significantly different from the current one in its purpose, but is required to use certain conventions in phrasing and layout. Obviously there are a number of other Institutes concerned with the environment so there will need to be appropriate consultation not only with them but also significant IEEM stakeholders. Reports on progress should now be a regular feature.

Guidelines for Ecological Impact Assessment in Britain and Ireland: Marine and Coastal

The Marine and Coastal EclA Guidelines are now available as a consultation document (www.ieem.net/ecia.asp). The closing date for comments is 20 November 2009.

Protected Areas Position Statement

IEEM is inviting members to help develop a draft Position Statement on Protected Areas at a workshop in London on 29 October 2009. The draft Position Statement will then be available for comment at the November conference. If you would like to participate in the workshop please contact Jason Reeves (jasonreeves@ieem.net) by 16 October 2009.

Protected Areas Images

At this year's annual conference, on 10-12 November 2009 in Suffolk, we would like to have a display of members' protected area photographs (people, species, habitats, landscapes, etc.). For more information please contact Jason Reeves (jasonreeves@ieem.net).

Staff Changes and News

IEEM is pleased to welcome Carol Best as our new Finance and Office Administrator. Carol has taken over from Gemma Langdon-Saunders who is going into teacher training. Carol has a wealth of financial and administrative experience with a variety of firms in the local area. Carol is a keen walker and cyclist with sailing, canoeing, dancing and cooking as further interests.

After being a talking point in the office for some time, congratulations go to Mimosa Nushi, our Marketing and Public Relations Officer, whose wedding to Marcus Hember took place on 1 August 2009 in Wiltshire. Mimosza comes from Kosovo so the wedding had a distinctively international flavour. We wish them all the very best for their future happiness.

Using Your IEEM Post Nominals

As members the Institute, Fellow, Full and Associate members are entitled and encouraged to use their post nominal FIEEM, MIEEM and AIEEM respectively after their name: this is your endorsement as a professional ecologist or environmental manager. We would like to see this as a standard in the sector wherever possible. Where your name appears on the web in a professional capacity, e.g. company website, it should clearly state your category of membership; there are no other membership categories, and statements such as 'Professional Member of IEEM' are not recognised and should not be used.

Use of the IEEM Logo

This is a polite reminder to all members that usage of the IEEM logo is strictly limited to IEEM business activities only. The logo can be used to specify a link to the IEEM website, but *not* to endorse an individual, organisation, product or service. In all cases you should contact the IEEM office to find out if you can use the logo or not. If you are currently using the IEEM logo other than as specified above please remove it as soon as possible.

East of England Shadow Section News

The first meeting of the East of England Geographic Shadow Section Committee was held on 9 March 2009 and a further meeting on 6 July 2009. At this stage the Committee is largely focused on organising events around the region.

Jeremy Halls led our first field meeting to look at reptile mitigation on the Broadland Flood Alleviation Project at Potter Heigham in Norfolk on the evening of 14 May 2009. The purpose of the visit was to see what methods were being used to protect reptile populations as a consequence of flood defence works. This included consideration of pre-planning and survey techniques, methods used to displace and capture animals, and creation and management of receptor sites. The meeting was well attended, with around 25 people enjoying a useful discussion on the issues and an opportunity to meet other institute members.

Our second event was led by Neil Harvey at Essex Wildlife Trust's Sawbridge Marsh nature reserve on the afternoon of Sunday, 12 July 2009. This was billed as a recording and species identification event, the objectives being to generate species records for the site and to share identification skills. Four members attended, splitting their effort between botanical and entomological recording, with various collecting and recording techniques being demonstrated. The botanical highlights included a large colony of southern marsh orchids, carnation sedge, great water dock, water and marsh horsetail

and yellow rattle. Comparison was possible between the similar blunt-flowered, jointed and sharp-flowered rushes and hints and tips were shared for the separation of many other pairs or groups of similar species. The most unusual species recorded was tea-leaved willow, which is native to north and west Britain, although its origin on this site is unknown. An elm, sampled for later confirmation, is believed to have been Huntingdon elm *Ulmus x vegeta*. A grapnel was used to obtain flowering fennel pondweed, unbranched bur-reed and a water starwort from the River Stort.

Plant galls were discussed, using meadowsweet to demonstrate the range of predators attacking some species, and the possibility of using galls to identify critical species was raised. The now seemingly ubiquitous harlequin ladybird was recorded and compared with 7-spot ladybird, highlighting the most useful features for separation, and the less often seen water ladybird was shaken out of marsh vegetation. Other invertebrates included the locally uncommon horsefly *Chrysops relictus*, unwisely trying to bite the group's entomologist, and oak bush-cricket, beaten from the foliage of a crack willow.

The Committee will be supporting the Annual Conference at Center Parcs in November 2009, and will be putting together a programme of indoor events through the winter. For more information please visit www.ieem.net/eastengland.asp.

David Collins CEnv MIEEM
 Convenor, East of England Geographic Section



Participants at the field meeting at Sawbridgeworth Marsh

Irish Section News

Along with six other professional institutes, the IEEM Irish Geographic Section has been involved with a new landscape training course in Ireland.

The Heritage Council and its Project Partners have developed a 'Pilot' *Introduction to Landscape Character Assessment (LCA) CPD Training Module*, which was delivered in Spanish Point and Tulla, County Clare on 14 and 15 May 2009, in partnership with Clare County Council and the Landscape Observatory of Catalonia in Spain. This multi-disciplinary landscape management course, the first of its kind in Ireland, is being developed in accordance with Article 6B - 'Training and Education', of the European Landscape Convention (ELC).

Professor Carys Swanwick, University of Sheffield and George Lambrick, Consultant Archaeologist from the UK undertook an external evaluation of the 'pilot' and their recommendations are being fed back into the design of the 'full' LCA CPD course, which will take place in Clare on 16 and 17 September 2009.

For details of the September LCA CPD course, please contact the course co-ordinator, Alison Harvey (Planning and Development Officer).

Tel: 056 7770777
 Mobile: 087 419 3458
 E-mail: aharvey@heritagecouncil.ie

North East England Section News

The 2009 programme for the North East England Section closed with two field meetings. July saw Trina Barrett leading a field meeting on mitigation methods for great crested newts, while in June, Tony Martin led a walk around a successful habitat creation/restoration project at Cobalt Business Park, North Tyneside.

The Cobalt Business Park project has provided an attractive country park setting for informal recreation as well as protecting and enhancing habitats and species of ecological interest. Low soil fertility appeared to be the key to establishing species rich vegetation on the site; while hand collecting and sowing of seed has introduced a number of species that might otherwise have struggled to colonise the site. A small area of new wood plantation featured patches of bluebell and ramsons introduced as seed in a small scale trial.

Evening events in 2009 started with a fascinating presentation by Dr Dorian Pritchard on the status of the dark honeybee in Britain. It has been argued that the native strains of the British honeybee were wiped out by Isle of Wight disease in the early 1900s - with bee keepers subsequently restocking from European sources. Dorian, however, presented convincing evidence that the strain of dark honeybees has survived in northern England and suggests that they warrant specific conservation measures as a 'native' species. Dorian's presentation was followed by a debate about the definition of the term 'native species'. It seems highly probable that the strain of dark honeybees could have arrived by natural dispersal after the last ice age, but equally plausible that early human settlers would have supplemented this natural spread by importing productive colonies. The exact status of the dark honeybee may never be resolved, but there is good evidence that this behaviourally and morphologically distinct strain, showing particular adaptation to our northern climes, is alive and buzzing in the North East.

In March 2009, we returned to the Old Mill Hotel to hear a presentation by Professor Brian Huntley of Durham University. Brian spoke on the potential impacts of climate change on European breeding birds and drew heavily on *A Climatic Atlas*

of *European Breeding* co-authored with Rhys Green, Yvonne Collingham and Stephen G Willis (2007). Brian's talk outlined the process of climate envelope modelling for alternative climatic scenarios and the predicted impacts on bird distributions across Europe. Key predictions are that:

1. the average European bird species will shift by nearly 550 km northeast by the end of this century;
2. species ranges will, on average, reduce in size by a fifth and overlap the current range by only 40%;
3. three quarters of all of Europe's nesting bird species are likely to suffer declines in range;
4. Arctic and sub-Arctic birds and some Iberian species are projected to suffer the greatest potential range loss; and
5. climate change may lead to the extinction of some European species with small ranges.

April 2009 saw Naomi Hewitt giving a presentation to North East members about the Exploring Your Environment (EYE) Project. Naomi's presentation was entitled *Two Way Traffic: Improving Access to Environmental Data*. It emphasised the importance of species distribution records collected by amateur and professional ecologists with a particular focus on issues surrounding:

- encouraging the submission of records;
- 'ownership' of data;
- checking reliability of data, data archiving and metadata principles; and
- subsequent sharing of environmental records.

The EYE project operates two databases of environmental information:

- a website which allows people across the region to record their sightings of wildlife; and
- the North East Environmental Data Hub, a database of wildlife and habitat information bringing together environmental information from organisations and experts, in order to build a bank of information about the natural history of the North East.

For more information about the EYE project, to contribute data, or enquire about data holdings please visit the EYE website at www.eyeproject.org.uk.

The AGM of the North East England Section will be held on the evening of 10 September 2009 at St Mary's College, University of Durham. There will be a presentation on the introduction of the European beaver in Britain by David Batty of Scottish Natural Heritage. This promises to be an excellent evening with a talk on a highly topical, and perhaps controversial, issue.

Once again we are seeking contributions to the coming year's events programme. We typically offer around 10 events each year, with a combination of evening presentations and field events. If you have suggestions for events or would like to volunteer please do get in touch. Keep in touch with forthcoming events via our Section webpage at www.ieem.net/nesection.asp.

Andrew Cherrill CEnv MIEEM
Committee Member, North East England
Geographic Section



Trina Barrett (left) and Tony Martin (third from left) discuss great crested newts

Yorkshire and Humber Shadow Section News

After a successful inception in 2008 the Yorkshire and Humber Geographic Section is truly fully fledged and thriving. 2009 has seen a wider range of events hosted by the group but with an emphasis on habitat creation and restoration.

Events have so far included well-attended technical events including *Applied Grassland Management* from Lobo Ecology and Natural England and, earlier in the year, a very interesting evening at Leeds University with Penny Anderson of Penny Anderson Associates Ltd. Penny presented a talk entitled *Habitat Creation – What Can Be Achieved*. A great evening was had by all and we were also very pleased to welcome a number of delegates from outside the area.

Penny's presentation focused on the wider principles of habitat creation and restoration across a number of habitats including species-rich grassland and woodland. Clearly a lot to fit in and indeed take in, but at the end of it we did have time for a few specific questions. Penny even agreed to pick a few up the next day over e-mail!

The Section was also pleased to hear a talk from Professor David Hill entitled *Natural England – Beyond Regulation*. The presentation sparked a great deal of discussion about regulation today and, importantly, in the future. In particular, there was much discussion about land banking. Land banking is a term more typically associated with the wealthy including people like Donald Trump. Land is purchased with the expectation that demand will increase and, as a consequence, the price will rise, at which point you stand to earn a lot of money. How could this work for conservation? It is no doubt a debate which will continue!

On Wednesday, 17 June 2009, the Section held an afternoon/evening meeting at Flamborough Head and Bempton Cliffs hosted by Wold Ecology Ltd and RSPB.

During the afternoon session, time was spent with Richard Baines of Wold Ecology Ltd looking at higher level stewardship scheme at Head Farm, Flamborough. A number of habitat creation projects were demonstrated such as wetland

restoration, Biodiversity Action Plan (BAP) grazing marsh habitat, grassland restoration to species-rich grassland, and arable options such as wild bird crops.

Ruth Porter, RSPB Seabird Research Officer, gave an evening presentation on breeding seabird monitoring programme for the Bempton Cliffs Special Protection Area (SPA). The project work, which is being funded mainly by Natural England but with a contribution from RSPB, is looking at productivity work on gannet, kittiwake, razorbill, guillemot, fulmar and herring gull. Initial results for this year indicate that guillemots have had a productive year and that gannets have had as good a year as usual. In addition, Ruth has been undertaking diet study work looking at which species of fish were brought in by guillemots using visual observations. The birds were mainly bringing in sprats but also some sand eels. This study is also looking at 'provisioning' – how many visits an hour parents were making to carry food to their chicks.

An initial satellite tagging pilot study of seabirds from the SPA is also being undertaken in 2009. This has involved the satellite tagging of kittiwakes, and has investigated the methods for successfully catching and tagging the birds. A total of 5 kittiwakes have been tagged, one of which flew out to sea 150 km from the SPA colony to Dogger Bank (in the middle of the North Sea) on a four hour non-stop flight, where the bird spent one and a half hours foraging, before the tag was unfortunately lost. However, this initial finding is potentially indicative of the importance of the Dogger Bank as a feeding ground for this species.

As ever the Yorkshire and Humber Section is keen to see new members join the Committee, so if you are interested please contact Gordon Haycock (details on Section webpage at www.ieem.net/yorkshire.asp). Alternatively, you may like to suggest a topic for discussion. If you do, please e-mail Gordon or one of the Committee, we will be pleased to hear your suggestions.

*Bernadette Lobo MIEEM, Tony Stones MIEEM,
Richard Baines MIEEM and Ruth Porter*



Guillemots are being studied by the RSPB to find out more about their productivity work

Partnership News

Society for the Environment

The last few months for the Society have indeed been eventful. The AGM on 17 June 2009 marked the end of the term as Chairman for Tim Boldero of the Institution of Water Officers after a challenging period for the Society but from which it has emerged successfully. The Board has elected a new Chairman, John Gregory, formerly Chair of the Registration Authority, Chair of the Management Committee and Vice Chair of SocEnv for the past two years. John has worked in fisheries in the UK and overseas for more than 30 years and is currently working for Environment Agency Wales in Cardiff. John's professional background is in fisheries science and he is a Fellow and Vice-President of the Institute of Fisheries Management where he has been instrumental in developing its conferences, communications and CPD scheme.

At the Society's fourth Annual Reception following the AGM, Lord Chris Smith, Chairman of the Environment Agency, presented Jonathan Porritt with an Honorary Fellowship to the Society for the Environment. The Honorary Fellowship was given in recognition of Jonathan's outstanding service to sustainability and also his service to the Society. Jonathan highlighted the strategic importance of Chartered Environmentalists at a time when urgent action is needed to build on the foundations put in place by government to produce a more sustainable society.

Chairman of the All Party Parliamentary Group for Climate Change, Colin Challen MP, was also presented with an Honorary Fellowship at the event. This was in recognition of his championing of the concept of Contraction and Convergence, as a framework within which to allocate emissions equitably per capita, and the valuable contribution that he has made to raising awareness of climate change concerns.

Also receiving Honorary Fellowships at the reception were founder board members of the Society for the Environment: Steve Martin, Robin Welcomme and Jon Prichard. Current IEEM Honorary Fellows are Alex Tait and Jim Thompson.

There is yet more significant news from the Society - the appointment of a new CEO, John Carstensen, who started on 3 August 2009.

He joins the Society for the Environment from INTRAC - a UK-based international training and research organisation for NGOs - where he was Chief Operating Officer.

He has solid experience in a wide range of environmental issues as well as in capacity development, training and awareness raising. Before joining INTRAC he was based at United Nations Environment Programme (UNEP) Headquarters, Nairobi, for more than three years and at its regional office for Europe in Geneva for five years. He coordinated UNEP's environmental assessments after the Asian Tsunami Disaster from December 2004 to July 2005.

He has developed and directed the implementation of several large scale bilateral and environment assistance programmes covering natural resource management, biodiversity, water,

and waste and pollution control. He was based in Thailand and Vietnam for five years and in Egypt for three years carrying out these programmes.

IEEM will look forward to working with John as he takes over the helm at SocEnv.

The following members have recently been approved as Chartered Environmentalists: Mrs Jane Atkinson, Mrs Andrea Ayres, Mr Simon Barron, Dr Mihai Coroi, Mr Mike Harris, Mr Peter Johnstone, Mr Heiko Kling, Mrs Merle Leeds, Mr Jon Taylor, Mr Ryan Walker, Mrs Sian Williams.

www.socenv.org.uk

Countdown 2010

Countdown 2010 has launched a new website with the aim of providing a 'one-stop shop' for biodiversity and the 2010 Target. Online content has been restructured to provide improved site navigation and ease of access to information. Key content includes: what will happen after 2010, information on developments at EU and international level on work towards the adoption of a new Biodiversity Target post-2010, and the 2010 International Year of Biodiversity campaign.

A new section is dedicated to the initiatives the Countdown 2010 Secretariat, together with its partners, will undertake to raise awareness of biodiversity during the International Year of Biodiversity. Visit the new Countdown 2010 website at www.countdown2010.net.

www.countdown2010.net

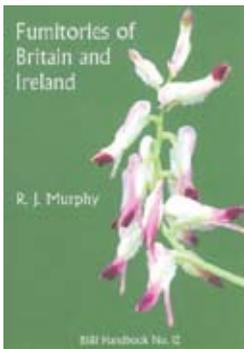
IUCN - The World Conservation Union

The IUCN-UK Committee Secretariat is now based at the Royal Zoological Society of Scotland (RZSS) at Edinburgh Zoo. It had previously been based at the Joint Nature Conservation Committee (JNCC) in Peterborough. Commencing on 1 April 2009, establishment at RZSS has included migration of the IUCN-UK website, transfer of the archive and getting used to new functions and processes. RZSS are taking their role as Secretariat seriously as all is now in place and six members of RZSS staff will contribute directly to servicing the Committee.

Several IUCN-UK members, including IEEM, have successfully established their details on the IUCN Google Earth layer provided by IUCN HQ in Gland, Switzerland as the UK tested the system as a pilot. This is the first step towards greater member profile and better communication opportunities which they are trialling in the UK for the wider IUCN movement globally.

www.iucn.org / www.iucn-uk.org

Recent Publications



Fumitories of Britain and Ireland, BSBI Handbook No. 12

Author: Rosaline J Murphy
Available from: www.nhbs.com
Price: £12.50 (plus P&P)
ISBN-13: 978-0-901158-40-6

Fumitories form a small but fascinating group in the British flora. With a name which is derived from the French, *fume terre*, the French for burned earth, the two tone flowers look as though they have been singed in a fire.

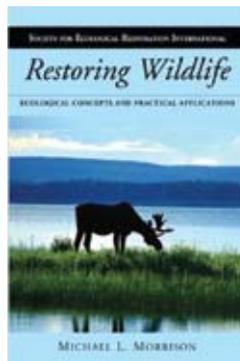
Some 60 species grow in the Mediterranean region whereas further afield a few are found in both India and on some East African mountains. This leaves 10 species in Britain and Ireland, two of which are endemic - only occurring here. The purple ramping-fumitory *Fumaria purpurea* remains on the revised UK Biodiversity Action Plan list whereas the large-flowered Western ramping-fumitory *F. occidentalis* no longer appears on it. The new approach to conservation status now takes threat into account and, while the plant only occurs in Cornwall and on the Isles of Scilly, it is not thought to be in danger of being lost, hence the change in status.

You might think there is not much to say about 10 species but you would be wrong. The authoress, Rose Murphy, lives in Cornwall and has had the opportunity of seeing most of these species on her doorstep – with the exception of few-flowered fumitory *F. vaillantii* - and she has looked at them extremely closely so that she can provide a wealth of features by which to separate them. These plants can be difficult to identify due to subtle differences which can occur across a range of features. Individual plants within a species can show a high degree of variability depending on how shaded the area is in which a plant grows since this can affect the number of flowers produced and the degree of recurvedness in the fruit stalks. Rose makes all this very clear. The text is supplemented by line drawings, clear photographs and distribution maps. A marvellous addition to the series.

The Fumitories provide the first in a series of mini-handbooks following on the very successful Botanical Society of the British Isles Handbooks which tend to have concentrated on entire families such as sedges or Umbellifers. An earlier short two-page outline covering nine of the 10 species appeared in the *Arable Plant Field Guide* by Phil Wilson and Miles King, published by WildGuides in 2003 on pages 238 and 239 and this is available online at www.arableplants.feldguide.co.uk.

For a full list of BSBI Handbooks see www.bsbi.org.uk.

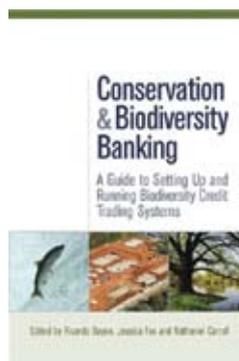
Jill Sutcliffe MIEEM



Restoring Wildlife: Ecological Concepts and Practical Applications

Author: Michael L Morrison
Available from: www.islandpress.com
Price: £29.00
ISBN-13: 9781597264938

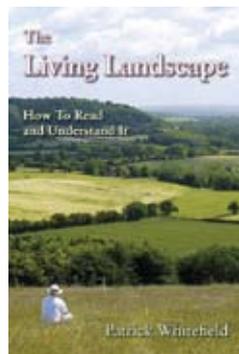
This publication gives ecologists and other professionals involved with restoration projects the tools they need to understand essential ecological concepts, helping them to design restoration projects that can improve conditions for wildlife. It also offers specific guidance and examples on how various projects have been designed and implemented. The book interweaves theoretical and practical aspects of wildlife biology that are directly applicable to the restoration and conservation of animals. It provides an understanding of the fundamentals of wildlife populations and wildlife-habitat relationships. The approach outlined can be applied at all spatial scales, from broad-scale (landscape) projects down to small (site-specific) ones. The publication emphasises a holistic, integrated ecosystem approach. *Restoring Wildlife* builds on material presented in *Wildlife Restoration*, published by Island Press in 2002, offering the basic information from that book along with much updated material in a reorganized and expanded format.



Conservation and Biodiversity Banking: A Guide to Setting Up and Running Biodiversity Credit Trading Systems

Editors: Nathaniel Carroll, Jessica Fox and Ricardo Bayon
Available from: www.earthscan.co.uk
Price: £29.95
ISBN-13: 9781844078141

The idea of putting a monetary value on biodiversity and using the market and businesses to promote conservation is growing rapidly. This handbook is a comprehensive guide to conservation banking, explaining what it is and how it works. The book provides practical guidance, tools, case studies, analysis and insights into conservation banking and other market-based approaches to conservation. Also covered are the origins of conservation banking, the advantages and disadvantages for conservation, how conservation banking works in reality, the legal, practical and financial aspects of setting up and running a conservation bank and how 'biodiversity off-sets' can be internationalised.



The Living Landscape: How To Read and Understand It

Author: Patrick Whitefield
Available from: www.permanent-publications.co.uk
Price: £19.95
ISBN-13: 978-1-85623-043-8

The Living Landscape explains how to go about reading the landscape. It goes on to look in detail at landscape formation, from rocks, through soil to vegetation and the interactions between plants, animals, climate and people that make the landscape around us. Each chapter is interspersed with diagrams, sketches and notes. Understanding how landscapes evolve is a useful skill for landscape designers, farmers, gardeners and smallholders but it is also a life-enhancing skill all of us can enjoy.

In the Journals

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British Ecological Society

Jim Thompson CEnv MIEEM and Jason Reeves AIEEM

A Paillex *et al.*

Large river floodplain restoration: predicting species richness and trait responses to the restoration of hydrological connectivity

Journal of Applied Ecology 2009, **46**: 250-258

The negative effects of progressive and rapid disconnection of secondary channels in flood plains have led to restoration programmes and a growing interest in restoration ecology. Current restoration strategies in large river floodplains focus on the macroinvertebrate response related to the increases in lateral connectivity of the secondary channels. Post-restoration sampling showed deviations of the restored channels from their expected ecological state. This was in part due to rapid colonisation by non-native species of new habitats created by the restoration measures. The authors recommend that floodplain-scale restoration should focus on diversification of the hydrological connectivity of channels, thereby conserving a maximum of functional characteristics in macroinvertebrate communities.

Correspondence: amael.paillex@unige.ch

J R Rouquette *et al.*

Valuing nature-conservation interests on agricultural floodplains

Journal of Applied Ecology 2009, **46**: 289-296

As the ecosystem services approach becomes embedded in decision-making, ecologists are increasingly called upon to value the biodiversity of a site or to compare the value of different sites. In this study, the authors assess seven methods of valuing nature-conservation interest and compare their utility. Five agricultural land drainage schemes across lowland England were selected for study. The current land-use was determined and four different scenarios of future management were developed. The land-use and habitats predicted under each scenario were assessed using seven methods of determining value, namely: Ecological Impact Assessment method, reserve-selection criteria, target-based criteria, stakeholder-choice analysis, reserve-selection criteria guided by stakeholders, agri-environment scheme payments and contingent valuation. The first three methods derive values based on predefined priorities, the next two use stated preferences of stakeholders, and the last two methods derive monetary values based on revealed and expressed preference, respectively. The seven different valuation methods, although all giving significantly correlated findings, resulted in seven different rankings of nature-conservation value for the 25 situations studied. Each method has its strengths; monetary valuations are appropriate in some contexts, stakeholder preferences are paramount in others, but where objectivity is key, then assessment against independently defined criteria or targets should be the preferred method.

Correspondence: J.R.Rouquette@open.ac.uk

A J Houghton *et al.*

A novel, integrated approach to assessing social, economic and environmental implications of changing rural land-use: a case study of perennial biomass crops

Journal of Applied Ecology 2009, **46**: 315-322

The potential conflicts of assuring food security, water availability, energy security and biodiversity conservation are recognised as a key challenge by governments worldwide. Methods with which decision-makers can compare the performance of different land-use scenarios against sustainability objectives will be crucial for achieving optimised and sustainable use of land-based resources to meet all four

challenges. It is predicted that within 20 years in the UK, bioenergy crops could occupy significant areas of rural land. Among these, dedicated biomass crops, such as *Miscanthus* spp. grass and short rotation willow *Salix* spp. coppice, differ significantly from arable crops in their growth characteristics and management. It is important that the potential impacts of these differences are assessed before large-scale, long-term planting occurs. The authors used a Sustainability Appraisal Framework (SAF) approach to landscape planning in the UK to identify stakeholder aspirations (objectives) and associated criteria (indicators) for the planting of dedicated biomass crops. The use of environmental and physical constraints mapping allowed the SAF to focus only on environmentally-acceptable locations, thereby avoiding unsustainable trade-offs. The mapping identified 3.1 million ha of land in England as suitable for planting, suggesting the UK government target of 1.1 million ha by 2010 is feasible. Using biomass crops planting as an example, this work illustrates the potential of a Sustainability Appraisal Framework, subject to identification and agreement of appropriate indicators, in securing a holistic understanding of the wide-ranging implications of large-scale, long-term changes to rural land-use in the wider context of sustainable land-use planning *per se*.

Correspondence: alison.houghton@bbsrc.ac.uk

D Gabriel *et al.*

The spatial aggregation of organic farming in England and its underlying environmental correlates

Journal of Applied Ecology 2009, **46**: 323-333

Conservation in Europe is expected to shift from maximising biodiversity at the expense of yield to conserving biodiversity under food production constraints. Organic farming is potentially of great importance for environmentally sustainable farming. Understanding the distribution of organic farms and the environmental, social and cultural correlates is necessary to predict the way in which this may change over time. The authors collated data from 30 variables describing the topography, climate, soils, farm size/type, human population characteristics and farm business in the English agricultural landscape. The results show that a combination of environmental variables associated with a lower agricultural potential predisposes farmers to convert to organic farming, which further promotes conversion of farmers in the neighbourhood. Organic farming as a 'wildlife friendly' method is more likely to occur in agriculturally less-favoured areas where economic incentives for conversion to organic farming do not need to be high and the loss of production due to conversion will be comparatively small. This suggests that an efficient conservation strategy, which takes the global demand for food into account, would be to promote organic farming as an agri-environment scheme in landscapes that are already rich in organic farms at the expense of those existing high-production landscapes that are not.

Correspondence: d.gabriel@leeds.ac.uk

M Dallimer *et al.*

100 years of change: examining agricultural trends, habitat change and stakeholder perceptions through the 20th century

Journal of Applied Ecology 2009, **46**: 334-343

The authors examined the long-term patterns of agricultural and habitat change at a regional scale in the Peak District. As stakeholders are central to the implementation of successful land-use policy, they also assessed their perceptions of historical changes. In the period 1900 to 2000, there was a

fivefold rise in sheep density, along with higher cattle density. There was a reduction in the number of farms, evidence of a shift in land ownership patterns, and increased agricultural specialisation, including the virtual disappearance of upland arable production. Despite previous studies showing a substantial loss in heather cover, they found that there had been no overall change in the proportion of land covered by dwarf shrub moor. Nonetheless, turnover rates were high, with only 55% of sampled sites maintaining dwarf shrub moor coverage between 1913 and 2000. Stakeholders identified many of the changes revealed by the historical data, such as increased sheep numbers, fewer farms and greater specialisation. However, other land-use changes were not properly described. Policy and management objectives should therefore be based primarily on actual historical evidence. However, understanding stakeholder perceptions and how they differ from, or agree with, the available evidence will contribute to the successful uptake of land management policies and partly determine the costs of policy implementation.

Correspondence: M.Dallimer@sheffield.ac.uk

D J T Douglas, J A Vickery and T G Benton
Improving the value of field margins as foraging habitat for farmland birds

Journal of Applied Ecology 2009, **46**: 353-362

Uncropped field margins are important foraging habitats on farmland for many declining bird species and are a key component of agri-environment schemes across Europe. Maximising the value of foraging habitats requires detailed knowledge of the factors influencing habitat selection and food availability. The authors conducted an observational study of foraging habitat selection by breeding yellowhammers *Emberiza citrinella* on lowland mixed farmland, in relation to underlying invertebrate and vegetation characteristics. There was a clear seasonal shift in the relative use of field margins and cereal crops. Margins were used less than crops in late summer, despite supporting higher invertebrate abundance relative to cereals. Seasonal increases in vegetation height were most marked in margins, suggesting the seasonal decline in margin use may reflect reduced food accessibility. In the second phase of the study, field margins were cut experimentally to create short, open patches within taller margin swards. The use of cut patches for foraging yellowhammers increased significantly between early and late summer, and patches were used more frequently with increasing height of adjacent uncut margin. These findings strongly support the theory that tall vegetation reduces margin accessibility in late summer. Provision of invertebrate-rich field margins is a core component of agri-environment schemes, but they may have limited value in late summer. More effective management, such as more frequent cutting, may be required to maximise the benefits for foraging birds by creating short, open vegetation patches. Measures to increase accessibility to invertebrates on farmland are likely to benefit a range of bird species across a variety of crop types.

Correspondence: david.douglas@bto.org

R J Pakeman and A J Nolan
Setting sustainable grazing levels for heather moorland: a multi-site analysis

Journal of Applied Ecology 2009, **46**: 363-368

Many habitats of high conservation value are managed by grazing but could be damaged by poor grazing management. Approaches and methods to set appropriate grazing regimes must be developed that can be applied with confidence under different situations to ensure that deleterious habitat changes are unlikely to occur. Heather moorland is an important habitat for conservation, but is under threat from high grazing pressures. Too high a pressure converts the dwarf-shrub dominance to grass dominance. Thus, it is imperative to be able to assess a sustainable grazing level for moorland: the

no-effect level. Data from 10 grazing experiments on heather moorland, each carried out and monitored in a similar manner, were analysed together to estimate the impact of heather utilisation on the balance between heather and grasses, sedges and rushes. The analysis indicated a no-effect level of 31.6% utilisation of current year's growth to maintain the balance between heather and monocotyledonous plants but with a considerable degree of uncertainty. The current assumed utilisation level for sustainable grazing of heather (40% of current year's growth) appears too high. A conservative utilisation figure to reduce the risk of heather loss should be set nearer 20%. Developing models based on utilisation is more efficient than basing models on stocking rate information. This approach could be extended to other vegetation types where monitoring of key indicator species could be more efficient than developing experimentally based grazing prescriptions.

Correspondence: r.pakeman@macaulay.ac.uk

S G Potts et al.
Enhancing pollinator biodiversity in intensive grasslands
Journal of Applied Ecology 2009, **46**: 369-379

The authors aimed to quantify the effectiveness of different field margin management strategies for putting bumblebee and butterfly biodiversity back into intensive grasslands. Using four intensive livestock farms in south-west England, they manipulated conventional management practices (addition of inorganic fertilizer, cutting frequency and height, and aftermath grazing) to generate seven grass-based treatments along a gradient of decreasing management intensity. They also tested two more interventionist treatments which introduced sown components into the sward: (i) a cereal, grass and legume mix, and (ii) a diverse conservation mix with kale, mixed cereals, linseed and legumes. They monitored bumblebee and butterfly responses in each farm from 2003 to 2006. Bumblebees were most abundant, species-rich and diverse in the sown treatments and virtually absent from the grass-based treatments. The diverse conservation mix treatment supported larger and more diverse bumblebee assemblages than the cereal, grass and legume mix treatment. The sown treatments, and the most extensively managed grass-based treatments, had the highest abundance, species richness and diversity of adult butterflies, whereas butterfly larvae were only found in the grass-based treatments. Extensification of conventional grass management by stopping fertilisation, reducing cutting frequency and not grazing, benefits butterflies. However, to enhance bumblebees requires a more interventionist approach in the form of sowing flower-rich habitat. Both approaches are potentially suitable for adoption in agri-environment schemes in the UK and Europe.

Correspondence: s.g.potts@reading.ac.uk.

S C Jähnig et al.
Effects of re-braiding measures on hydromorphology, floodplain vegetation, ground beetles and benthic invertebrates in mountain rivers

Journal of Applied Ecology 2009, **46**: 406-416

Medium-sized and large mountain rivers are among the most degraded river types in Europe and numerous river restoration projects are currently carried out to achieve 'good ecological status'. Surprisingly little is known about the effects of river restoration measures on aquatic and terrestrial organisms. The authors investigated the effects of restoration on hydromorphology, floodplain vegetation, ground beetles and benthic invertebrates of Central European mountain rivers by comparing seven restored, multiple-channel sections with seven nearby non-restored, straight sections. River restoration measures which re-create multiple-channel patterns differ in their effect on floodplain vegetation, ground beetles and benthic invertebrates. The strong increase in the number of floodplain vegetation species is due to the creation of additional habitats, while riparian ground beetles react mainly to the

increased availability of gravel bars. The lack of response of benthic invertebrates to restoration measures is due to the comparatively small changes in aquatic microhabitat composition. The results indicate that floodplain habitats react more strongly to re-braiding as a restoration measure compared to in-stream habitats and that floodplain communities might be best suited to judge the immediate effects of restoration.

Correspondence: sonja.jaehrig@uni-due.de

J A M Raeymaekers *et al.*

Guidelines for restoring connectivity around water mills: a population genetic approach to the management of riverine fish

Journal of Applied Ecology 2009, **46**: 562-571

While freshwater systems provide important goods and services for society, they are threatened by human activity. Fragmentation is one of the most serious ecological concerns in the riverine environment. Historical and cultural values may conflict with nature restoration. The authors used the Zwalm sub-basin (Scheldt basin, Belgium) as a case study for reconciling the restoration of the native fish fauna with the preservation of historical water mills (320–1,000 years old). They assessed the genetic structure of a barrier-sensitive species, the three-spined stickleback *Gasterosteus aculeatus*, to estimate the impact of fragmentation on a local to catchment scale. Water mills provoked an average loss of almost 4% of the genetic variation which accumulated to 40% over the entire system (~23 km, 13 barriers). The impact of individual mills strongly increased with upstream distance and water mill height. The authors propose a number of management actions, such as building new fish passages and translocating individuals to above-mill populations. These will counter the negative impact of the water mills on the genetic variation in aquatic fauna, whilst retaining their cultural–economical value and limiting the restoration costs.

Correspondence: joostr.raeymaekers@bio.kuleuven.be

M Dallimer *et al.*

What explains property-level variation in avian diversity? An inter-disciplinary approach

Journal of Applied Ecology 2009, **46**: 647-656

Available evidence suggests that property-scale factors can be influential in shaping patterns of biodiversity; however, they are rarely included in studies. Using 44 upland farms in the Peak District, the authors investigated the roles of ecological, agricultural and socioeconomic factors in determining avian species richness. The authors were able to demonstrate a strong relationship between socioeconomic circumstances and avian species richness. Species richness declined with increased ownership levels and reliance on farming for the household income. This indicates that farms that are more important sources of income for their owners are managed in more intensive ways that are less beneficial to biodiversity. However, net income, rental value and the level of agri-environment scheme (AES) payments did not play a role in predicting species richness. The agricultural landscape is managed by a mosaic of landowners, all of whom can influence biodiversity conservation. Currently, farmland conservation policy largely assumes that socioeconomic barriers and financial costs of implementing conservation measures are constant. Incorporating a consideration of the varying circumstances of individual properties into policy design is likely to result in substantial biodiversity gains.

Correspondence: M.Dallimer@sheffield.ac.uk

C Kerbiriou *et al.*

Tourism in protected areas can threaten wild populations: from individual response to population viability of the chough *Pyrrhocorax pyrrhocorax*

Journal of Applied Ecology 2009, **46**: 657-665

Many protected areas are now faced with increasing pressure from visitors and tourism development. There is thus an urgent need for conservation biologists to evaluate the full impact of human disturbance not only on individual responses, but also on the viability of protected populations, so that relevant management measures can be proposed. The authors studied the impact of tourism on the rare and endangered chough *Pyrrhocorax pyrrhocorax* on a protected French island to assess the relationship between visitor pressure, bird individual behaviour and fitness, and population viability. During eight years, they monitored foraging behaviour and estimated monthly juvenile survival using mark–recapture data. Population viability was examined under different tourism scenarios, using a stochastic individual-based model that incorporated the impact of visitor numbers on juvenile survival. The authors show that a relatively minor human-induced disturbance has dramatic effects on population viability in a protected area, even when breeding individuals are not directly affected. This suggests that the full impact of tourism in protected areas may be overlooked, and has direct consequences for the assessment of sustainable levels of human disturbance and the design of quantitative management options compatible with tourist activities in protected areas.

Correspondence: kerbiriou@mnhn.fr

B Smith *et al.*

Enhancing invertebrate food resources for skylarks in cereal ecosystems: how useful are in-crop agri-environment scheme management options?

Journal of Applied Ecology 2009, **46**: 692-702

UK agri-environment schemes rarely address within-crop biodiversity yet this habitat is used almost exclusively by some taxa. With the removal of set-aside, maximising the ecological services provided by in-crop management options is critical. Field trials of small undrilled patches in the cropped area have been shown to increase skylark *Alauda arvensis* numbers and breeding productivity. This response may reflect a benefit for lower trophic levels, such as the invertebrates and arable plants on which birds feed. Two within-field management techniques (undrilled patches and wide-spaced rows) were compared on 10 conventionally managed farms growing winter wheat in northern and eastern England in 2002 and 2003. The effect of the treatments on invertebrate abundance, particularly invertebrates known to be important food for birds, was compared and the link between cover of arable weeds and invertebrate abundance was assessed. Neither undrilled patches nor wide-spaced rows benefited invertebrate populations at the field scale. The value of undrilled patches for invertebrates would be enhanced by promoting weed cover, particularly broadleaved weeds; this could be achieved by creating the patches in the spring using cultivation and avoiding spraying with broad-spectrum herbicides. Higher numbers of non-pernicious weeds could provide food and refuge for invertebrates which are a food source for skylarks and other farmland birds that forage in the crop.

Correspondence: bsmith@gct.org.uk

B J Anderson *et al.*

Spatial covariance between biodiversity and other ecosystem service priorities

Journal of Applied Ecology 2009, **46**: 888-896

Ecosystems support biodiversity and also provide goods and services that are beneficial to humans. The extent to which the locations that are most valuable for ecosystem services coincide with those that support the most biodiversity is of

critical importance when designing conservation and land management strategies. There are, however, few studies on which to base any kind of conclusion about possible spatial patterns of association between ecosystem services and biodiversity. Here, the authors present national-scale estimates of the spatial covariance in areas important for ecosystem services and biodiversity (richness of species of conservation concern), using Britain as a case study. They then explore how these associations are sensitive to the spatial resolution of the available data, the spatial extent of the study region and to regional variation across the study area. Their analysis reveals a mixture of negative and positive associations. In particular, the regionalisation analysis shows that one can arrive at diametrically opposing conclusions about relationships between ecosystem services and biodiversity by studying the same question within different areas, even within a moderately small island. In a policy context, the location-specific nature of relationships between ecosystem services and biodiversity underscores the importance of multi-scale environmental decision-making, so as to reflect both local conditions and broader-scale priorities.

Correspondence: k.j.gaston@sheffield.ac.uk

A D Manning, P Gibbons and D B Lindenmayer
Scattered trees: a complementary strategy for facilitating adaptive responses to climate change in modified landscapes?

Journal of Applied Ecology 2009, **46**: 915-919

Facilitating adaptive responses of organisms in modified landscape will be essential to overcome the negative effects of climate change and its interaction with land use change. Without such action, many organisms will be prevented from achieving the predicted range shifts they need to survive. Scattered trees are a prominent feature of many modified landscapes, and could play an important role in facilitating climate change adaptation. They are keystone structures because of the disproportionately large ecological values and ecosystem services that they provide relative to the area they occupy in these landscapes. The provision of habitat and connectivity will be particularly relevant. Scattered trees are declining in modified landscapes due to elevated tree mortality and poor recruitment often associated with intensive land use. The sustainable management of scattered trees in modified landscapes could complement other strategies for facilitating climate change adaptation. They create continuous, though sparse, vegetation cover that permits multi-directional movements of biota across landscapes and ecological networks. The management of scattered trees should be an integral part of conservation objectives and agricultural activities in modified landscapes.

Correspondence: adrian.manning@anu.edu.au

B A Woodcock et al.
Responses of invertebrate trophic level, feeding guild and body size to the management of improved grassland field margins

Journal of Applied Ecology 2009, **46**: 920-929

Management of lowland mesotrophic grasslands in north-west Europe often makes use of inorganic fertilizers, high stocking densities and silage-based forage systems to maximise productivity. The impact of these practices has resulted in a simplification of the plant community combined with wide-scale declines in the species richness of grassland invertebrates. The paper aimed to identify how field margin management can be used to promote invertebrate diversity across a suite of functionally diverse taxa (beetles, planthoppers, true bugs, butterflies, bumblebees and spiders). The authors identified the impacts of management (cattle grazing, cutting and inorganic fertilizer) and plant community composition (forb species richness, grass species richness and sward architecture) on invertebrate species richness and body size. By partitioning

field margins from the remainder of the field, economically viable intensive grassland management can be combined with extensive management aimed at promoting native biodiversity. The absence of inorganic fertilizer, combined with a reduction in the intensity of both cutting and grazing regimes, promotes floral species richness and sward architectural complexity. By increasing sward architecture the total biomass of invertebrates also increased, increasing food available for higher trophic levels, such as birds and mammals.

Correspondence: bawood@ceh.ac.uk

R Woodroffe et al.
Social group size affects *Mycobacterium bovis* infection in European badgers (*Meles meles*)

Journal of Animal Ecology 2009, **78**: 818-827

In most social animals, the prevalence of directly transmitted pathogens increases in larger groups and at higher population densities. Such patterns are predicted by models of *Mycobacterium bovis* infection in European badgers *Meles meles*. The authors investigated the relationship between badger abundance and *M. bovis* prevalence, using data on 2,696 adult badgers in 10 populations sampled at the start of the Randomised Badger Culling Trial. *M. bovis* prevalence was consistently higher at low badger densities and in small social groups. The association between high *M. bovis* prevalence and small badger group size appeared not to have been caused by previous small-scale culling in study areas, which had been suspended, on average, five years before the start of the current study. The observed pattern of prevalence might occur through badgers in smaller groups interacting more frequently with members of neighbouring groups. Likewise, longitudinal data are needed to determine whether the size of infected groups might be suppressed by disease-related mortality. Although *M. bovis* prevalence was lower at high population densities, the absolute number of infected badgers was higher. However, this does not necessarily mean that the risk of *M. bovis* transmission to cattle is highest at high badger densities, since transmission risk depends on badger behaviour as well as on badger density.

Correspondence: rosie.woodroffe@ioz.ac.uk

L Kullman and L Öberg
Post-Little Ice Age tree line rise and climate warming in the Swedish Scandes: a landscape ecological perspective

Journal of Ecology 2009, **97**: 415-429

Elevational tree line change in the southern Swedish Scandes was quantified for the period 1915-2007 and for two sub-periods 1915-1975 and 1975-2007. The study focused on *Betula pubescens* ssp. *czerepanovii*, *Picea abies* and *Pinus sylvestris* at a large number of sites distributed over an 8,000 km² area. Over the past century, tree lines of all species rose at 95% of the studied localities, with means of 70-90 m. All three species displayed maximum upshifts by about 200 m. This magnitude of response was realised only in particular topographic situations, foremost wind-sheltered and steep concave slopes. Other sites, with more wind-exposed topoclimatic conditions, experienced lesser magnitudes of upshifts. Thus, spatial elevational tree line responses to climate change are markedly heterogeneous and site-dependent. Even in the case of substantial climate warming, tree lines are unlikely to advance on a broad front and a large proportion of the alpine tundra will remain treeless. Maximum tree line rise by 200 m represents a unique trend break in the long-term Holocene tree line regression, which has been driven by average climate cooling for nearly 10,000 years. Tree line positions are well-restored to their pre-Little Ice Age positions. Recent tree line ascent is a truly anomalous event in Holocene vegetation history and possibly unprecedented for seven millennia.

Correspondence: leif.kullman@emg.umu.se

R Brys and H Jacquemyn

Biological Flora of the British Isles: *Primula veris* L. No 253
Journal of Ecology 2009, **97**: 581-600

Correspondence: rein.brys@inbo.be

H Jacquemyn *et al.*

Biological Flora of the British Isles: *Primula vulgaris* Huds. (*P. acaulis* (L.) Hill) No 254
Journal of Ecology 2009, **97**: 812-833

Correspondence: hans.jacquemyn@bio.kuleuven.be

It is useful to see both of these attractive species - cowslips and primroses included in the lists for the Biological Flora.

As usual, in both papers the main topics presented within the standard framework of the *Biological Flora of the British Isles*: distribution, habitat, communities, responses to biotic factors, responses to environment, structure and physiology, phenology, floral and seed characters, herbivores and diseases, history and conservation. Both are valuable reference documents for those interested in the conservation, management or re-establishment of these species.

J Laborde and K Thompson

Post-dispersal fate of hazel (*Corylus avellana*) nuts and consequences for the management and conservation of scrub-grassland mosaics
Biological Conservation 2009, **142**: 974-981

Many rodents and birds are both predators and dispersers of the nuts of many woody plants. This study examined the role of granivores as predators and dispersers of common hazel *Corylus avellana* and the consequences of this interaction for *Corylus* regeneration and scrub encroachment into grassland. In the Cressbrook Dale nature reserve in Derbyshire, *Corylus* nuts were buried in the grassland at two distances (<15 and >70 m) from scrub vegetation to estimate the rate of seed removal over three years, also assessing the success of dispersal and seedling establishment in the grassland. The rate of nut removal at close sites was consistently higher than at far sites. All sown nuts were removed over two years at close sites, while at the far sites around 20% of the sown nuts were still present the following spring. Grassland close to the scrub had the highest intensity of nut predation but also had the highest density of *Corylus* seedlings. The grey squirrel *Sciurus carolinensis* was the most important disperser of hazelnuts into the grassland. The squirrels scatter-hoarded 10–12 thousand hazelnuts in 1.5 ha of grassland adjacent to scrub. In this reserve, two non-native vertebrates are mainly responsible for maintaining the dynamic balance between the scrub and grassland habitats. The squirrels disperse hazelnuts into the grassland and sheep slow scrub encroachment by continuous browsing.

Correspondence: javier.laborde@inecol.edu.mx

K Vermonden *et al.*

Urban drainage systems: An undervalued habitat for aquatic macroinvertebrates
Biological Conservation 2009, **142**: 1105-1115

The authors assessed the conservation value of urban drainage systems in lowland areas and compared them with similar watercourses in rural areas in the Netherlands. A total of 36 water bodies in urban areas were selected to investigate the macroinvertebrate biodiversity in relation to environmental variables. Four types of macroinvertebrate assemblages were distinguished in the urban water systems, differing in environmental conditions and values of ecological indicators. The variation in macroinvertebrate assemblages was significantly explained by nitrate, pH, grain size (sediment composition), transparency, nymphaeid and submerged vegetation. Urban drainage systems can sustain a macroinvertebrate biodiversity comparable to that of drainage systems in rural areas and semi-natural and natural

watercourses and can even be a habitat for red list species. To optimise biodiversity values, urban water management should aim to lower nutrient levels, stimulate vegetation and increase transparency, which are key factors for macroinvertebrate diversity. The authors show the potential conservation benefits of water systems in urban areas, but further studies are needed to investigate the optimal design of cities to include biodiversity as an integrated part of the urban environment, thereby sustaining a higher biodiversity in an increasingly urbanising world.

Correspondence: K.Vermonden@science.ru.nl

R B Sage *et al.*

The flora and structure of farmland hedges and hedgebanks near to pheasant release pens compared with other hedges

Biological Conservation 2009, **142**: 1362-1369

Hedgerows, on farms where shooting takes place, leading from woodlands with pheasant release pens are often used by the pheasants as corridors for accessing game crops. The authors compared shrub and ground flora structure and species composition, in hedges near to and away from release sites with a wide range of release sizes, at 109 game estates in four regions in England in 2002 and 2003. There was more bare ground, fewer stable perennial plant species, more weeds and fewer tree and shrub seedlings in hedges near to release sites compared to the controls. Alongside hedges, there were more weeds on hedgebanks near to release sites, and depending on hedge size, fewer stable perennial species or fewer tree and shrub seedling species. While the woody structure of the hedge itself was not substantially different, shrub leafiness within hedges at 10–20 cm off the ground was reduced in all except very short hedges near to releases. The authors argue that the differences observed were due to the presence of pheasants in those hedges during the late summer and autumn following release and not to pen siting or game management factors. They hypothesise that where larger accumulations of pheasants occur in hedges, the changes to ground flora species composition observed were due to increased soil fertility and soil disturbance. The effects on mature shrub leafiness and woody seedlings were probably caused by direct pecking.

Correspondence: rsage@gct.org.uk

A Gray, P D Robinson and S Stroud

Use of the Biological Flora framework in the United Kingdom Overseas Territories: *Euphorbia organoides* L.
Biological Conservation 2009, **142**: 1754-1766

The United Kingdom Overseas Territories (UKOTs) are globally important for a high diversity of endemic and threatened plant species but are poorly represented in plant ecological literature. This lack of ecological research is compounded by a lack of funding and skills. Cost effective approaches to compiling relevant conservation information are required. The authors present the first examination of a species from the UKOTs presented within the standard framework of a Biological Flora. This framework allows a convenient way to compile ecological information and assess missing data. The account reviews all available information on Ascension spurge *Euphorbia organoides* from Ascension Island in the South Atlantic Ocean relevant to understanding its ecology and conservation, including soil chemistry, climate and plant community data. *E. organoides* is an endemic perennial, found in dry, lava plains of Ascension Island with soils comprised of weathered volcanic scoria. It has suffered habitat loss through the introduction of invasive species and survival in the wild is currently under threat. The authors relate the information gathered for this Biological Flora to the conservation of the species in the wild and propose the framework should be used as one way of compiling information relevant for conservation managers.

Correspondence: alangray@ceh.ac.uk

News in Brief

Billion butterflies summer record

The Great British Butterfly Hunt reached a climax in the middle of one of Britain's most extraordinary butterfly summers – when a billion butterflies of one species took to the wing. That is how many painted ladies were in the air across the country in late July, after the greatest ever invasion of the migratory species from North Africa. In a phenomenal population movement, up to 20 million individual butterflies are thought to have poured into Britain in the space of a few days, to lay their eggs on thistles from the south coast to Scotland.

Return of the wolf

The idea of reintroducing wolves to Scotland has returned again, that is if an ambitious proposal to reintroduce the grey wolf back into the British countryside gets the backing of local landowners and the Government. Wolves have not roamed the Scottish Highlands for more than 250 years, but a paper in *Biological Conservation* outlines how bringing the wolf back to Britain is the only effective way of controlling the growing population of red deer which are eating their way through the highland vegetation and destroying the local habitat. Red deer have no natural predators and hunting has only a limited impact on their numbers, and almost no effect on their grazing behaviour. Wolves, however, can hunt day and night, 365 days of the year, and the chilling effect they have on the grazing behaviour of large herbivores has been documented.

Alien to combat Japanese knotweed

Under plans from Defra, jumping plant lice from Japan could be released in Britain to control Japanese knotweed. The non-native sap-sucking insect would be released under licence to tackle knotweed, notorious for causing significant damage to native British flora, allotments, gardens, pavements, buildings, railways and water courses. A national eradication plan through conventional means was estimated to cost £1.56 billion in 2003. But now, five years of research by scientists at CABI has shown that a species of psyllid, *Aphalara itadori*, is the best candidate to control the knotweed. The scientists believe the introduction of the psyllid would not adversely affect native wildlife and could significantly reduce the costs of tackling Japanese knotweed. Defra and the Welsh Assembly government are currently consulting on the release of the insect and IEEM is hoping to respond, if you are interested in helping with the response please contact Jason Reeves (jasonreeves@ieem.net). The consultation closes on 19 October 2009.

Calling all bat detectives

The Bat Conservation Trust (BCT) is urging people to help record bat sightings this summer. The Big Bat Map has been launched by the Count Bat Project, part of BCT, to provide an interactive way for people to get help with bat conservation on a local level; looking to the skies on an evening to detect bats. The web-based map of bat activity found on the BCT website (www.bats.org.uk/bigbatmap) allows users to record sightings of bats flying in their area and view where they have been seen all over the country and near where they live.

Rare snake coming back to heaths

The rare smooth snake is to be reintroduced at an RSPB nature reserve in Devon every summer for the next few years to establish a healthy self-sustaining population. The reptile was last recorded in the county in the 1950s but disappeared after the loss of its natural habitat. The snakes are currently only found on lowland heaths in Sussex, Surrey, Hampshire and Dorset. Restoration of suitable heathland habitat in Devon over the past two decades will allow it to return to much of its former range.

HLF to pump millions into heritage skills

The Heritage Lottery Fund (HLF) has announced that it is to invest an additional £7.3 million to support a wide range of specialist skills and training opportunities within the heritage sector. This will deliver up to 1,000 paid training opportunities for people seeking a career in heritage and will include specialist skills ranging from horticulture to conservation and web design. HLF is taking a two-tiered approach to this investment: £2.3 million will be invested quickly with current grantees as an extension of HLF's successful £7 million Training Bursary Programme; and £5 million will create a new programme, entitled 'Skills for the Future', to launch towards the end of the year. This will offer new work-based training in the skills that are needed to look after our buildings, landscapes, habitats, species, and museum collections. This could include training education and outreach officers, volunteer managers and people who need new technology skills to help the public learn about our heritage and play an active part in its future.

Severn tidal power scheme

The Weston barrage, running 10 miles across the Severn estuary between Weston-super-Mare and Cardiff, is the largest of four tidal power schemes being considered by government. Lord Chris Smith, Chair of the Environment Agency, has warned that the giant tidal energy scheme which the government is counting on to meet ambitious new green energy targets should not be built because it would be so ecologically destructive that the immense environmental impacts would outweigh the carbon reduction benefits. The government's roadmap to a low-carbon UK has called for a 34% cut in emissions by 2020, with the power sector contributing the bulk of that saving. The Weston barrage would be the centrepiece of the nation's renewable energy plan. It could generate 8.6 gigawatts of zero-carbon electricity from the Severn, the equivalent of eight large coal-fired power stations, and would be the single largest renewable energy project in Europe. But the £5 billion flagship scheme would permanently flood nearly 35,000 hectares of internationally protected wetlands and also destroy some of Britain's most important fisheries in the Severn, Wye and Usk catchment areas.

Birds most at risk from wind farm collisions

A recent Danish study in the *Journal of Environmental Management* has designed a risk management tool to identify those bird species most vulnerable to collisions with wind turbines. Assessing the impact of offshore wind farms on all species of migrating birds is difficult, and radar technology and visual and aerial surveys can be costly. This study has therefore developed a simple and cost-effective method to assess which species are most at risk from collisions. Two indicators are used in the framework: the relative abundance of breeding populations of birds potentially affected by a wind farm; and the vulnerability of a species to death from collisions with wind turbines. Combining both these indicators into one index allows the risk to different species to be classified as low, medium or high priority.

Building links between ethnic minorities and National Parks

A national project called Mosaic, led by the Campaign for National Parks, aims to build sustainable links between black and minority ethnic communities and the National Parks and Youth Hostels Association. Mosaic was developed in response to evidence that although about 10% of the population is of an ethnic minority background, only about 1% of visitors to National Parks are from ethnic minorities. The National Parks were created for the benefit of the public. Mosaic works to

make sure that all people have an equal opportunity to enjoy the many benefits that National Parks offer. The project started in January 2009 and will end in March 2012.

New impact assessment method monetarises ecosystem damage

A Danish study in *Ecological Economics* outlines a new way of placing a monetary value on damage to ecosystems which uses a 'budgetary constraint' - which equates to the maximum that an average person can pay for an additional life year. The method provides a tool for sustainable development by using measures usually applied to health economics. Life cycle impact assessment (LCIA) is part of a process that analyses the damage caused by different events or processes to humans, ecosystems and resources. In general, impacts on humans are ranked higher than impacts on ecosystems or resources. This new research suggests it would be useful to replace the scores in LCIA analyses with monetary values - an estimate of what we would be willing to pay to avoid a specific type of damage. This would indicate the importance of the impact. The approach has been attempted previously, but inconsistencies arise because different approaches are used to cost different types of damage. The new method uses just one system of costing based on Quality Adjusted Life Years (QALYs). This is the same system used in health economics to determine whether a particular medical intervention, such as a drug, is worthwhile. In other words, all impacts, whether on humans, ecosystems or resources, can be measured in the same terms.

Wikipedia-style website to record every species on Earth

As mentioned in Debbie Barlett and Tony Witts's article in this edition, the recently-launched Encyclopedia of Life (EoL) aims to create an individual webpage for every single one of the world's plant and animal species. This will be a truly Herculean task - 5,000 species of mammals, 8,000 species of reptiles, 10,000 species of birds, 250,000 angiosperm species, over one million insect species (with perhaps another five million new ones to be described), and not to mention a multitude of micro-organisms. EoL is a self-perpetuating encyclopedia, written by and refereed by anyone who wants to contribute with the ultimate goal of making information about all the world's organisms freely available. Accuracy will be ensured by an expert team of curators, who will weed out any inaccuracies and clarify any confusions. There are however several potential problems, such as defining a species, many species having several differing names, and determining how many species there actually are.

Battle for Europe's last ancient forest

A contest between the competing needs of conservation and economic growth is threatening the future of large parts of Europe's last ancient forest. The 380,000 acre Bialowieza Primeval Forest, which straddles the border between Poland and Belarus, is one of the largest unpopulated woodlands remaining in Europe and home to more than 3,000 species of fungi, 178 kinds of breeding birds, and 58 species of mammal including wolves, lynx and the continent's largest herd of European bison. It is also a UNESCO World Heritage Site and resembles the wildwood that covered much of Europe before man intervened. On the Polish side of the border, residents are opposing plans to extend the protected zone of this unique habitat, which is under threat from rising temperatures and declining rainfall, but the Polish Government wants to enlarge the area's national park, which occupies less than a fifth of the Polish part of the forest. It has offered up to 100 million zlotys (£20 million) to be shared among the nine communities that would be affected by broader regulations protecting wildlife. However, the region is among the poorest in Poland, and the 2,400 residents of Bialowieza district are sceptical, fearing it would discourage investment, cause job losses and reduce the community's tax revenues. Political arguments between Belarus

and Poland have stifled joint efforts to safeguard the forest and since Poland joined the European Union in 2004 the EU's eastern border fence has run through the forest. To extend the protected area on the Polish side, the government needs the approval of local authorities and says that the scheme would cost between one and a half million and three million zlotys.

New marine reserves

Natural England (NE), the Countryside Council for Wales (CCW) and the Joint Nature Conservation Committee (JNCC) have been working together as the Government's statutory advisors to identify and propose: examples of marine habitats in territorial waters around the coast of England for designation as marine Special Areas of Conservation (SACs) to meet the requirements of the European Habitats Directive; examples of marine habitats in UK offshore waters for designation as offshore SACs; and sites of particular importance for seabirds for designation around the coast of England and Wales as Special Protection Areas (SPAs) to meet the requirements of the European Birds Directive. Once sites have been identified as draft SACs or SPAs they will be recommended to Government for approval to undertake a public consultation. The Secretary of State for the Environment, Food and Rural Affairs determines which sites in English and offshore waters are ultimately put forward to the European Commission for inclusion in the Natura 2000 network and Welsh Ministers determine which sites in Welsh waters are put forward. NE is currently progressing six draft SACs and two potential SPAs.

In a separate exercise, NE is also working with JNCC to begin identifying those areas that could be recommended as Marine Conservation Zones (MCZs) under the Marine Bill currently being considered by Parliament. The identification of MCZs will follow a separate process and a later timetable than that for Natura 2000 sites, and will be developed through stakeholder involvement in four regional MCZ projects; Finding Sanctuary (South West England), Irish Sea Conservation Zones, Net Gain (North Sea), and Balanced Seas (South-East England). CCW is working with the Welsh Assembly Government on a similar project in Welsh waters.

Judicial Review of decision to grant planning permission

Members should be aware of the result of the Judicial Review proceedings brought against the decision of Macclesfield Borough Council to grant planning permission for the development at Bryancliffe, Wilmslow Park South, Wilmslow. In February 2008, following completion of a section 106 agreement, Macclesfield Borough Council had granted planning permission for the demolition of the existing house and erection of three apartments with undercroft parking on the site. The legality of the decision to grant planning permission had been challenged on seven grounds and a hearing was held on 21 and 22 May 2009. The judge had determined that the Judicial Review application should succeed and had quashed the planning permission, on the basis that he agreed with three of the grounds, these being:

- that the Committee Report did not deal with the European Community Habitats Directive on protected species in regard to the bat roost that had been identified on the site;
- that the Committee Report failed to say whether there was compliance with the policies in the Development Plan or not; and
- that there was a failure of the Council to take account of applicable policies.

Cheshire East Council have now amended their procedures to ensure that such a challenge cannot be made against any future decisions.

Tauro-Scatology and TV Ecologists

Time for our regular appointment with Basil O'Saurus, our very own Professor of Tauro-Scatology who, apparently, has more to say on the subject of sexed-up environmental science on the television. Last time, if I remember, you were telling us how we could hang a crime thriller around a group of young, glamorous ecologists. So what new twist can you add this time?

Times are changing and we have to change with them. TV crime dramas these days don't just involve gritty, pseudo-real world scenarios: they increasingly involve implausible twists such as time travel.

Life on Mars, Ashes to Ashes...

Exactly. You get the picture. So, I have been trying to write this into the plot for my new TV series too.

Let's remind ourselves of the essential elements in these series: the protagonists start as young, glamorous contemporary detectives then, by some bizarre plot twist – a road accident, a shooting – they are transported back to the 1970s or 1980s.

Exactly. And they know that they are back in the 1970s or 1980s because their trendy contemporary outfits are magically replaced by glaringly unfashionable clothes...

Hang on Prof, I sense a problem.

Explain.

If an audience sees an ecologist wearing clothes that were last in fashion 20 years ago, they will just assume it is a program about contemporary ecologists. They'll need something a little more drastic to be convinced that any time travel has taken place. But if we can overcome that little obstacle, I'm sure that there is some mileage here. Have you got a title?

Well, *Life on Mars* and *Ashes to Ashes* are, of course, both songs by David Bowie, who immediately conjures up images of sophisticated, urban chic, so we need to find an equivalent that will resonate with an audience interested in the environment and ecology...

Difficult...

Not at all. I'm sure that most IEEM members would far rather listen to Fairport Convention than David Bowie. I did toy with using Jethro Tull's *Songs from the Wood* but this closed down the number of habitats where we could set stories. So I finally settled on Crosby, Stills, Nash and Young's seminal album *Déjà Vu*...

You are a Commissioning Editor's worst nightmare, Prof. How are you going to keep audiences on the edge of their seats?

Car chases.

Car chases? What relevance have they to ecology?

Not a lot. But they are one of the most realistic aspects of *Ashes to Ashes* and *Life on Mars* so I thought we should squeeze one or two into each episode of *Déjà Vu*.

Realistic?

Absolutely. If the streets of London were as deserted as they invariably are when Gene Hunt guns his Audi to the next scene,

red-blooded males would be making handbrake turns at every intersection. And, it gives the refugee from the 21st century plenty of scope for making sharp asides about fuel consumption and the benefits of hybrid cars.

What about a plot line?

I've thought about this one too. Again, remember what happens in *Life on Mars*: Sam Tyler goes back in time, finds a culture rife with rough justice and corruption where coppers and criminals have tacit understandings and blind eyes are frequently turned?

Yes, but where will you find the equivalent example in environmental management? How does this help us?

Remember how the old Water Authorities worked before privatisation and the establishment of the National Rivers Authority? When they were both poacher and gamekeeper? When sewage works were much less well regulated?

Okay Prof, but what kind of plots can we envisage?

Well, our Sam Tyler figure has to stumble across a river that is far more polluted than he has ever seen, and then angrily confront the tough, straight-talking Gene Hunt equivalent in our series, arguing vehemently that it is an absolute disgrace because he's taken a kick sample but can't find any stoneflies in it.

I can hear viewers around the country wondering if there is anything good on another channel, but carry on...

...and Gene counters that the river is cleaner than it was when he was a boy because in those days all you could find were blood worms whereas now you sometimes find *Gammarus* and *Asellus*...

So what does Sam Tyler do next?

He is absolutely flabbergasted by this and says "I bet you haven't got a clue what the Trophic Diatom Index would tell you". To which Gene says "The Trophic Diatom What?" And Sam explains, leading Gene to retort angrily: "it will never catch on." Or something. It will be hilarious.

Is that hilarious in the widely-accepted sense of 'something that makes most people roll around the floor laughing uncontrollably'?

More 'hilarious' in a deeply ironic sense.

...recalling Gene Hunt's definition of alternative comedy, to wit: "not funny"?

Harsh but, in the final analysis, probably fair. Back to the drawing board then?

I'm afraid so. But thanks for your time anyway.

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New and Prospective Members

APPLICANTS

If any existing Member has any good reason to object to someone being admitted to the Institute, especially if this relates to compliance with the Code of Professional Conduct, they must inform the Executive Director by telephone or letter before **9 October 2009**. Any communications will be handled discreetly. The decision on admission is usually taken by the Membership Admissions Committee under delegated authority from Council but may be taken directly by Council itself. IEEM is pleased to welcome applications for Membership from the following:

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APPLICATIONS FOR ASSOCIATE MEMBERSHIP

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The following have successfully upgraded their Membership:

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Miss Claire Andrews, Mr Jason Appleby, Miss Stephanie Boocock, Miss Abigail E Dando, Dr Benjamin T Garnett, Dr Samantha Hill, Miss Vicky Hollands, Mr Timothy J McHardy, Mr Clive Mellon, Mr Paul Parsons, Miss Madeleine Ryan, Miss Betsabe Sanchez, Mr James Streets, Mr Jonathan J Taylor, Miss Elizabeth Wickens, Mr I William Woodrow

UPGRADES to ASSOCIATE MEMBERSHIP

Mr Paul Andrews, Mr Christopher Barrett, Mrs Marianne D Bergin, Miss Sarah Bignell, Mrs Sarah R Candlin, Miss Julia Coneybeer, Miss Aisling Dower, Miss Irene ES Folliot, Miss Victoria L Forder, Mr Thomas B Gardiner, Mr James Godbeer, Mr David Harries, Dr Helen M Markland, Mrs Jenna A McGuinness, Mr Thomas M O'Donnell, Mr Robert J Randall, Mr Robert Revolta, Miss Nicola Rohmann, Mr Rory A Sandison-Macdonald, Miss Kate Sharma, Mr Luke Sidebottom, Miss Sarah D Taylor, Mr Alexander Vaux

UPGRADES to GRADUATE MEMBERSHIP

Miss Emma Grubb

Forthcoming Events

IEEM Conferences

DATE	EVENT	LOCATION
16 - 17 September 2009	IEEM/FBA Conference - The Future of Freshwaters	Warwick University
10 - 12 November 2009	IEEM Autumn Conference 2009 - Protected Areas: Past, Present and Prospects	Elveden Forest, near Thetford
24 March 2010	IEEM Spring Conference 2010 - Ecosystem Services	London
November 2010	IEEM Autumn Conference 2010 - Biodiversity Beyond 2010: Missed Opportunities, New Targets	Dublin
Spring 2011	IEEM Spring Conference 2011 - Ecological Skills Gap	TBC

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

IEEM Training Workshops 2009

15 September	Hazel Dormouse Ecology and Conservation	South West England
16 September	Phase I Habitat Survey	East of England
22 September	Identifying Fungi	Scotland
28 September	An Introduction to Bat Survey, Impacts and Mitigation	Scotland
7 October	Field Signs and Habitat Management for Water Voles	Scotland
9 October	Introduction to the National Vegetation Classification	South East England
12 October	Water Vole Ecology	South West England
13 - 14 October	Water Vole Conservation and Development	South West England
4 November	Surveying for Bats and Development - The Consultant's Approach	South East England
4 November	The Role of BAPs in Local Development Frameworks and Site Specific Development Proposals	East Midlands
10 November	Survey and Identification of Conifers - An Introduction	North West England
11 November	Survey and Identification of Conifers	North West England
18 November	Badgers: Survey, Exclusions and Mitigation	Scotland
19 - 20 November	Outdoor First Aid and Incident Management	South East England
25 November	Winning Approaches - What do you need to do to Convince a Planning Inspector?	South East England

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

IEEM Section Events

10 September 2009	North East England Section AGM and Evening Speaker	Durham
2 October 2009	Irish Section AGM and Dinner	Co. Wicklow
8 October 2009	Scottish Section AGM and Conference - Species Reintroductions: Philosophy, Issues and Implications	Argyll
14 October 2009	Welsh Section Event - Biological Data and Ecological Consultants: The Role of the Recording Network in Wales	Wrexham
9 December 2009	North West England Section AGM	Liverpool (TBC)

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