

inpractice

Issue 80 | June 2013



Green Infrastructure

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in South West France

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Habitat Loss

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Welcome

Celebrating our Royal Charter

The granting of a Royal Charter on 1st April 2013 was a momentous day for ecology. This was the day that the practice of ecology came of age. It has all happened remarkably quickly. I remember a time when the word Ecology was rarely used outside academic circles. But within my lifetime it has become a household word as concern for the environment has grown. Professional ecologists are now engaged in practically every aspect of environmental management. From now on we take our place alongside the older professions of civil engineering, architecture and surveying that gained their Royal Charters in the 19th century. It is almost 200 years since the first of those bodies was established. We may be the 'new kid on the block', but our aspirations have much in common.

What prompted the formation of those early Institutes? It was a time of great proliferation of bodies promoting the arts and sciences, and it is no surprise to find that the principal object of the new professional institutes was "to foster the art and science" of the relevant disciplines. But other factors also influenced their formation. The worst effects of industrialisation had produced abject squalor in many towns and cities, with serious implications for public health. Widespread cholera epidemics and chronic pollution of both air and water led Parliament to take action. Town councils were required to provide clean water, make provision for sewage disposal and provide parks and open spaces for the populace. Urgent action was needed to improve the life of city dwellers. The professions most directly involved in urban development, from housing and factories to viaducts and sewers, needed to improve their standards. Against this background some of the more enlightened engineers and architects took the initiative to set up professional institutes. Others followed, with establishment of the Town Planning Institute in 1914 and the Landscape Institute in 1929. For them the process of gaining a Royal Charter was to take another 50 years or more.

Meanwhile, where were the ecologists? The British Ecological Society, the first ecological society in the world, was founded in 1913. Since then Britain has been a world leader in promoting the science of ecology. But it was not until the 1980s that serious consideration was given to the need for a professional institute. By then environmental issues had become a major cause for public concern. Several international studies, including the World Conservation Strategy and the Brundtland Report, emphasised the global nature of the environmental challenge. They had a profound effect, putting the case for sustainable development firmly on the international agenda. Ecology was becoming recognised as a crucial discipline, important not only for the future of the planet's ecosystems and wildlife, but also for human survival.

In Britain there was a burgeoning of ecological consultants dealing with a vast array of topics from protected species to Environmental Impact Assessment. Concern about the unregulated nature of ecological consultancy work suggested the need for a professional status for ecologists. Founding of the European Federation of Environmental Professionals in 1988 provided another stimulus for ecologists to improve their professionalism.

As a result a small group came together under the aegis of the British Ecological Society to consider what was needed. We were unanimous in our recommendations. We needed an institute dedicated to ecology and environmental management with a rigorous Code of Practice for Ecologists. The inaugural meeting of the Institute was held on 26th September 1991. That does not seem very long ago and it is extraordinary what has been achieved over the past 22 years. We now have nearly 5,000 members and the Institute has developed a huge range of programmes to encourage and promote professionalism. At the heart of this is the Code of Professional Conduct which promotes the highest standards of practice for the benefit of both nature and society.

The scale of the global environmental challenge facing humanity is daunting. Ecologists are in the forefront in tackling the issues and finding solutions. The granting of a Royal Charter not only gives recognition within society to the value of the work that we do, but it strengthens our resolve to do it well.

David Goode CEnv FCIEEM
CIEEM Patron

Information

In Practice No. 80,
June 2013
ISSN 1754-4882

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In Practice is printed on paper using 100% post consumer de-inked waste. This is manufactured by an ISO14001, EMAS accredited company.

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Cover Photograph
Credit: Transport for London (TfL)

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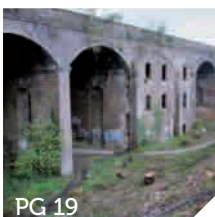
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New Habitats Regulations Assessment Handbook and Journal

DTA Publications have recently announced the *Habitats Regulations Assessment Handbook* and *Journal*. Aimed at practitioners, and available on a subscription basis, the Handbook has been informed by discussions with Defra and the statutory agencies. Regular updates will provide an ongoing service through a purpose built web site. Together with the only Journal of its kind in the field, this will offer a much needed, single, authoritative source of detailed guidance on the assessment of plans and projects, fully consistent with the Defra review 'core' guidance. Written by leading consultants David Tyldesley FRPTI FCIEEM FRSA and Dr Caroline Chapman MCIEEM, the content has been checked by Graham Machin, a specialist barrister. The England and Wales version will be available this summer after publication of the Defra core guidance, with Offshore, Scottish and Northern Ireland versions planned. CIEEM members will receive a £50 discount on the individual subscription rate. Visit www.dtapublications.co.uk for further information.



Guidance on GCN

Natural England is aware that current survey guidance on great crested newts has been questioned (see for example article by Jules Wynn, *In Practice* 79 - March 2013). Natural England has a number of projects underway or in the preparation stage, which aim to evaluate and improve all aspects of Great Crested Newt survey effort. The results of the Great Crested Newt Evidence Enhancement Project will be publicly available on completion in 2014.

Quick guide to Habitats Regulations

The Environment Agency has published a quick guide to the Habitats and Species Protected under the Habitats Regulations. The guide groups habitats and species based on their sensitivity to similar hazards.

http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/LIT_7385_867c0b.pdf



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Environmental Audit Committee publishes report on Pollinators and Pesticides

The report says that recent research suggests that one group of insecticides – neonicotinoids – is having an especially deleterious impact on insect pollinators. The report concludes that Defra should prepare to introduce a moratorium in the UK on the use of imidacloprid, clothianidin and thiamethoxam by 1st January 2014, and support such a proposal in the EU.

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

Government rejects key recommendations for tackling wildlife crime

The Environmental Audit Committee has published the Government Response to its Third Report of Session 2012-13: Wildlife Crime. The Government has rejected calls from MPs to give funding certainty for the critically important National Wildlife Crime Unit, and will not be banning possession of the main poison used to kill birds of prey.

<http://www.parliament.uk/business/committees/committees-a-z/commons-select/environmental-audit-committee/news/eac-publishes-government-response-to-wildlife-report/>



RSPB report on environmental protection legislation and policy in the UK Overseas Territories

The RSPB, in conjunction with FIELD, have published a new report assessing the environmental protection legislation and policy in the UK Overseas Territories, as well as an accompanying summary leaflet. This is the first-ever comprehensive assessment of environmental protection frameworks across all 14 UK Territories. It reveals that whilst there are important areas of good practice, there are many major gaps in environmental governance which urgently need to be filled.

<http://www.rspb.org.uk/ourwork/projects/details/200664-the-uk-overseas-territories-the-uks-hidden-natural-treasures>

Natural Resources Wales becomes operational

The environment and natural resource management can play a crucial part in tackling the economic, social and environmental challenges that face Wales. This is according to Peter Matthews, Chairman of the new organisation Natural Resources Wales, which became operational on 1st April 2013. It is one of the first public bodies in the world that will consider social, environmental and economic benefits in the way it manages natural resources and improves the environment. The new body aims to make sure that the natural resources of Wales are sustainably maintained, enhanced and used.

<http://cyfoethnaturiolcymru.gov.uk/splash?orig=/>



New online resource of ecosystem service mapping projects

The NERC Biodiversity and Ecosystem Services (BESS) Directorate has launched an online survey to find out more about what is being done to map the ecosystem services on which we all depend. With funding from Natural England, the project will develop a searchable online resource to provide, for the first time, a single gateway to the plethora of ecosystem service mapping activities being carried out across England. Ecosystem service mapping is a rapidly-expanding area, but it poses significant technical and practical challenges. The online resource will bring together information on mapping initiatives throughout England, including which services are being mapped, the spatial scales at which mapping is taking place and how the various mapping projects are being used. The compilation of this information in a single, searchable site will help decision-makers understand how different ecosystem services are delivered across a landscape and contribute to strategic national and local environmental planning, including the development of Nature Improvement Areas and Local Nature Partnerships. If you are involved in an ecosystem service mapping project in England, you can get involved in the survey through the following link: http://www.envsurvey.com/map/mapping_survey/login.html

The resource will only be as good as the information supplied, so if you know of anyone else involved in mapping ecosystem services, please pass on this link or ask them to contact Dr Zoë Austin at the University of York (zoe.austin@york.ac.uk).

Standard for biodiversity offsets

The Business and Biodiversity Offsets Programme has published *Standard on Biodiversity Offsets*. It provides a tool to help auditors, developers, conservation groups, communities, governments and financial institutions assess biodiversity offsets against the Business and Biodiversity Offsets Programme's principles, criteria and indicators.

http://www.forest-trends.org/documents/files/doc_3078.pdf



CPRE report says one year on the NPPF isn't delivering

A major analysis by the Campaign to Protect Rural England (CPRE) of how the Government's National Planning Policy Framework (NPPF) is being implemented during its first year has been published. The emerging evidence raises significant concerns about whether the reformed planning system is capable of securing development the country needs and preventing damaging schemes in the wrong locations. The new report *Countryside Promises: Planning Realities* highlights that the views of local communities are being overruled time and again, with major new housing development being allowed to sprawl across precious countryside.

The report makes three general recommendations:

- give more support to getting local plans in place, including immediately announcing an extension to the NPPF transition period of at least 12 months;
- develop more detailed planning guidance over the next 6 months to address areas of confusion and clarify the many vague terms, such as 'viability', used in the NPPF; and
- in the longer term, improve national planning policy by revising the NPPF to ensure that positive statements about sustainable development, prioritising urban regeneration and protecting and enhancing the countryside are properly integrated with policies to promote economic development.

<http://www.cpre.org.uk/resources/housing-and-planning/planning/item/download/2966>

5,000 badgers to be culled this summer

Pilot culls in west Gloucestershire and west Somerset, which will see the killing of 70% of badgers in each area, were authorised by the Government after final licence conditions were met. A third scheme in Dorset is being prepared as a reserve to prevent any further delays. Around 5,000 badgers are expected to be killed across the two areas over a 4-year period as part of the cull in a bid to control the spread of bovine TB.

<http://www.telegraph.co.uk/earth/environment/9897723/5000-badgers-to-be-killed-as-minister-announces-pilot-culls-this-summer.html>



Natural England roll out two new chargeable services

Natural England has rolled out two chargeable advisory services for planning and licensing since the beginning of April 2013.

- The Pre-submission Screening Service (PSS) for European Protected Species mitigation licence applications.
- The Discretionary Advice Service (DAS) to provide discretionary pre-application and post-consent advice on planning/licensing proposals to developers and consultants.

<http://www.cieem.net/news/95/natural-england-rolling-out-two-chargeable-services-from-1-april-2013>

European Commission proposes legislation on Maritime Spatial Planning and Integrated Coastal Management

Maritime spatial planning should be carried out by all EU countries. Member States should decide themselves what and where to plan. However, planning in shared seas should be compatible, to avoid conflicts and support cross-border cooperation and investment. A common framework based on minimum requirements agreed at EU level will ensure that national, regional and local maritime spatial plans are coherent and will facilitate cross-border cooperation.

http://ec.europa.eu/maritimeaffairs/policy/maritime_spatial_planning/index_en.htm



Scottish sharks to be tracked for second year

Scientists are to extend a popular basking shark tracking project for another year. For the last seven months the public have been able to follow the progress of eight sharks online, after they were tagged off the west coast of Scotland in July last year. Two of the sharks have travelled much further than expected, with one reaching the west coast of Portugal and the other the Canary Islands.

http://www.exeter.ac.uk/research/newsandevents/news/title_274442_en.html

<http://www.bbc.co.uk/news/uk-scotland-highlands-islands-21768556>

Cabinet reshuffle sees Alun Davies become Welsh environment minister

Following March's Cabinet re-shuffle Alun Davies (AM for Blaenau Gwent) has replaced John Griffiths (now Culture and Sport) as the minister responsible for Natural Resources Wales/Cyfoeth Naturiol Cymru. His title is Minister for Natural Resources and Food.

<http://wales.gov.uk/about/cabinet/cabinetstatements/2013/cabinetreshuffle/?lang=en>

Natura 2000 network worth €300bn a year

A recent study titled *The Economic benefits of the Natura 2000 Network* has concluded that the Natura 2000 network is worth €300bn a year, the equivalent of 2-3% of EU GDP. This is far over the €6bn per year member states have to spend on maintaining and restoring it, helping strengthen the case for continued or increased funding of nature protection. Based on studies of market and welfare values of habitats and individual sites - though scaled up to EU level - it stated that the benefits that flow from Natura 2000 are of the order of €200 to 300 billion/year. It is estimated that there are between 1.2 to 2.2 billion visitor days to Natura 2000 sites each year, generating recreational benefits worth between €5 and €9 billion per annum. Therefore, investing in Natura 2000 makes sense and is directly relevant to Europe 2020 objectives of growth and employment as it can be a motor for the local and regional economy.

http://ec.europa.eu/environment/nature/natura2000/financing/docs/ENV-12-018_LR_Final1.pdf

New bat species found in Ireland

On 24th February 2013, a single male greater horseshoe bat *Rhinolophus ferrumequinum* was found roosting in Co. Wexford, Ireland. This is the first record of this species occurring naturally in Ireland. Paul Scott CEnv MCIEEM, a professional bat worker and member of Bat Conservation Ireland recorded the bat hanging from the ceiling in a disused cellar. Its identity has been confirmed by the Centre for Irish Bat Research, University College Dublin by analysing a sample of DNA from the bat. Greater horseshoe bats are found in a small number of locations in Wales and southwest England as well as across southern Europe. It is therefore possible that this bat has flown across from roosts in southwest Wales, over 100km away. Further survey work will be undertaken by Bat Conservation Ireland volunteers in 2013 to see if this is a vagrant bat that has entered the country by accident, or if this is a pioneer bat looking to extend its natural range.

For further information contact Paul Scott (pscott60@gmail.com).

Do Natura 2000 sites protect the most vulnerable species?

New research suggests that Natura 2000 sites are highly effective in minimising the number of endangered species of concern to European conservation. The findings may reduce concerns that poor coordination between Member States in setting up the European network of protected areas has led to inadequate protection of vulnerable species.

<http://ec.europa.eu/environment/integration/research/newsalert/pdf/320na1.pdf>

The economic cost of invasive and non-native species in Ireland and Northern Ireland

A new report is available on the economic impact of invasive species in Ireland and Northern Ireland. The summary findings are:

- The current estimate of the annual cost of invasive species to the Irish economy is £161,027,307 (€202,894,406).
- The current estimate of the annual cost of invasive species to the Northern Ireland economy is £46,526,218 (€58,623,034).
- The current estimate of the combined cost of invasive species to Ireland and Northern Ireland is £207,553,528 (€261,517,445).
- The current estimate of the annual cost of invasive species to the UK economy is £1.8 billion (€2.3 billion).

The current estimate of the annual combined UK and Ireland cost is £2 billion (€2.5 billion). The impact of invasive species is not just an issue for biodiversity. Invasive species are known to affect key economic sectors such as agriculture, tourism and the construction sectors. However, these economic impacts are often overlooked or under-reported. There are also inherent difficulties in making cost estimates of economic impacts on which to base decisions on management and control.

<http://www.envirocentre.ie/News.aspx?ID=79D21E24-862B-4685-A66A-2D7059FB72E2&PID=a257bece-c1e7-464a-9cd0-fde10d3a18c3&NID=d546972e-07f5-43c1-9568-30ee1597d260&M=2>

Defra fund new 5-year study into ecology and management of blanket bogs

The five-year project is expected to shed new light on complex ecological issues. The work will help develop future practices and perceptions for the stewardship of moorland and farming. It will consider biodiversity, drinking water quality and future carbon storage. Stockholm Environment Institute's researcher Dr Andreas Heinemeyer is heading the catchment-scale project through the University of York, in collaboration with the Yorkshire Peat Partnership.

<https://sites.google.com/alyork.ac.uk/peatlandesuk/home>

Green Infrastructure: An Introduction

Paul Roebuck MCIEM
Senior Ecologist, The Ecology
Consultancy

Introduction

Just as the Victorians were building adventurous projects across the country over 100 years ago, the government today has big ambitions for large-scale infrastructure projects in urban and rural environments. In the late 20th century projects such as the Channel Tunnel rail link led the way to building more transport and utilities infrastructure to support economic growth. In the 21st century we may be entering another golden age for infrastructure development in the UK.

Whereas in the 19th century construction was largely to the detriment of the environment, nowadays society is much more aware of the value of its natural resources. Alongside what is understood as progress of built infrastructure, there is an increasing need to ensure equal emphasis is placed on developing Green Infrastructure (GI).

The manifestation of society's awareness of natural resources, and the value placed on the environment, led to the establishment of legislation such as the Wildlife and Countryside Act (1981) and Habitats Regulations (1994). Largely, these legal powers and associated planning tools have been used to protect species and habitats within the overall target of sustainable development. Increasingly, and particularly in the last 20 years, we are beginning to focus on the protection of ecological resources and creation of 'green' spaces in addition to more traditional conservation practises. The development of GI is key in the evolution of this idea.

Natural England defines GI as *"a strategically planned and delivered network of high quality green spaces and other environmental features. It should be designed and managed as a multi-functional resource capable of delivering a wide range of environmental and quality of life benefits for local communities. GI includes parks, open spaces, playing fields, woodlands, allotments and private gardens."*

GI can be developed in urban and rural areas; it has importance for biodiversity in



Poppies © Castle Cement

the country, but also for other environmental factors, such as water and flooding, air quality, climate change, and the health and well-being of society. An important element in Natural England's definition is the description of GI as a *"multi-functional resource"*. Essentially, successful GI is central to the concept of an 'Ecosystems Approach' that is defined as a strategy for the integrated management of land, water and living resources, that promotes conservation and sustainable use in an equitable way. Again, multi-functionality is the key idea.

Green Infrastructure Policy and Guidance

So what are the tools to help us achieve successful creation of GI? The Localism Act and the National Planning Policy Framework (NPPF) have changed the focus of the planning system in England. Power is now shifting towards the local and neighbourhood levels and away from

detailed policy-making at a national level. Overarching policy promotes GI through the NPPF and Natural England White Paper. The White Paper also introduced a number of policies and initiatives, including Local Nature Partnerships, Nature Improvement Areas, Biodiversity Offsets (now being piloted until 2014), and the Green Infrastructure Partnership. All relevant parties are being encouraged to make GI an essential part of local plans in cross boundary strategies and co-operation.

For practitioners there is a multitude of best practice guidance available to assist in designing and planning GI. A good place to start is the Wildlife Trusts and Town & Country Planning Association's *Planning for a Healthy Environment – Good Practice Guidance for Green Infrastructure and Biodiversity*. It highlights the policy framework, and the principles of GI along with implementation and management.

Feature Article: Green Infrastructure: An Introduction (contd)

More focused guidance is also available.

The Bat Conservation Trust's (BCT) *Landscape and Urban Design for Bats and Biodiversity* demonstrates how the industry is providing a holistic approach with landscape design being considered essential alongside species protection. It presents simple but effective measures to enhance biodiversity on sites of all sizes with a focus on bats. The content covers landscape design features such as urban woodlands and wetlands, trees, green roofs and walls, linear features, eco-passages and lighting from a bat ecology perspective. It also includes a useful plant species list categorised by features such as rain gardens, green roofs, and living walls, and bed and borders based on plants that provide benefit to bats.

Use of green roofs and similar built environment enhancement methods such as living walls are now commonplace. The industry is supported by reliable design guidance and case studies. In February 2011, the Green Roof Organisation (GRO), the independent UK body representing the industry, produced the *Green Roof Code*. The code, which was the result of technical cooperation across the UK green roof industry, is intended as a code of best practice relating to green roof design, specification, installation and maintenance. In a fast-changing sector of the industry it aims to provide solid guidance to help enable the successful implementation of living roofs.

This enhancement through design approach is now well established, and is widely enforced through sustainability assessment methods such as BREEAM and the Code for Sustainable Homes. Often these tools are used in an urban setting where it is vital to maximize the biodiversity value of our surroundings. This is essential, not only for



London Riverside Park

the benefit of ecology, but also to assist in flood protection, enhance health and well-being and save energy. It also helps to enable the multi-functionality that GI can provide. Good practice guidance, such as that produced by BCT and GRO, is vital to help us achieve development that is truly sustainable and delivers an Ecosystems Approach.

Conclusion

The future for GI seems bright. Moving forwards we expect to see the continuing growth of sustainability assessment methods for development, with holistic, multi-purpose design guidance to support this. Initiatives such as the Wildlife Trust's Living Landscapes project and RSPB Futurescapes are helping to deliver landscape-scale conservation. These and similar schemes are pushing forward the GI agenda.

There are still many challenges to overcome. With so many different organisations involved the ecology sector needs to work collaboratively not only with those within it but with other industries. Projects such as biodiversity offsetting are still being piloted, with some controversy. Will offsetting provide landscape integration and multi-functionality, a vital aspect of GI and the ecosystems approach? Some of these questions are still unanswered and further studies need to be carried out to understand potential success. Work done over the next few years and decades will be vital in years to come, I believe we need to be as bold in our vision for GI creation as the Victorians were in their vision over 100 years ago.



Islington roof top



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For more information see page 48

Notes

1 <http://www.naturalengland.org.uk/ourwork/planningdevelopment/greeninfrastructure/default.aspx>

About the Author

Paul Roebuck is a Senior Ecologist at The Ecology Consultancy based in the London Office. His main work focuses on EIA and major infrastructure projects, BREEAM and CSH, habitat creation and enhancement. Prior to joining The Ecology Consultancy Paul worked at Greengage Environmental LLP (formerly Environmental Perspectives).

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The Blackwater Valley Road: using green infrastructure for ecological mitigation

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Summary

The Blackwater Valley Road comprises 17km of dual carriageway on the Hampshire/Surrey borders. The road was planned and built long before the term 'Green Infrastructure' became widely used, but it provides an excellent practical example of the approach. The success of ecological mitigation was first assessed in 2004 and reviewed again in 2011. The cost of ecological mitigation is usually just a small part of the budget for a road scheme. Nevertheless, a cost is involved. Despite this, it is very rare for schemes to be reviewed to see whether the mitigation provided actually gave the desired results and to allow others to learn from the experience. One exception was the Blackwater Valley Road (A331) on the Hampshire/Surrey borders. In 2004 the success of ecological mitigation on this road scheme was assessed (Atkins *et al.* 2004). In 2011, 15 years after the road was completed, the authors review the results of monitoring studies. This paper is presented to allow others to share the experience, and also to ask whether the recommendations originally made in 2004 are now being put into practice more widely.

The Blackwater Valley Road comprises 17km of high speed dual carriageway linking the A30 with the A31 and M3 (Figure 1). It was conceived in the 1960s and then built in four stages between 1985 and 1996 by Hampshire and Surrey County Councils.

Each of the four stages was the subject of a separate Environmental Impact Assessment (EIA); at the time these schemes were some of the earliest road schemes to be subject to EIA in the UK. The scheme was planned and built long before the term 'Green Infrastructure' became widely used (CIRIA 2011), yet the Blackwater Valley Road provides an excellent example of the approach.

The Blackwater Valley Countryside Project (BVCP) was formed in the 1960s to tackle the neglect and pollution in the Blackwater Valley and now works to increase the valley's importance for biodiversity and as a recreational resource for local people. The BVCP was involved in the scheme throughout its construction and remains responsible for management of the green infrastructure that was retained and created as part of the scheme.

The Blackwater Valley is a wedge of open space separating major urban areas on the Surrey/Hampshire/Berkshire borders. The landscape is dominated by a chain of lakes formed by sand and gravel extraction. Rapid urban expansion led to the degradation of the local landscape and resulted in traffic congestion in the urban areas along the valley. The scheme to build the Blackwater Valley Road was constrained by significant engineering challenges including the narrowness of the valley, the presence of lakes and rivers and by the need to construct an aqueduct for the Basingstoke Canal Site of Special Scientific Interest (SSSI).

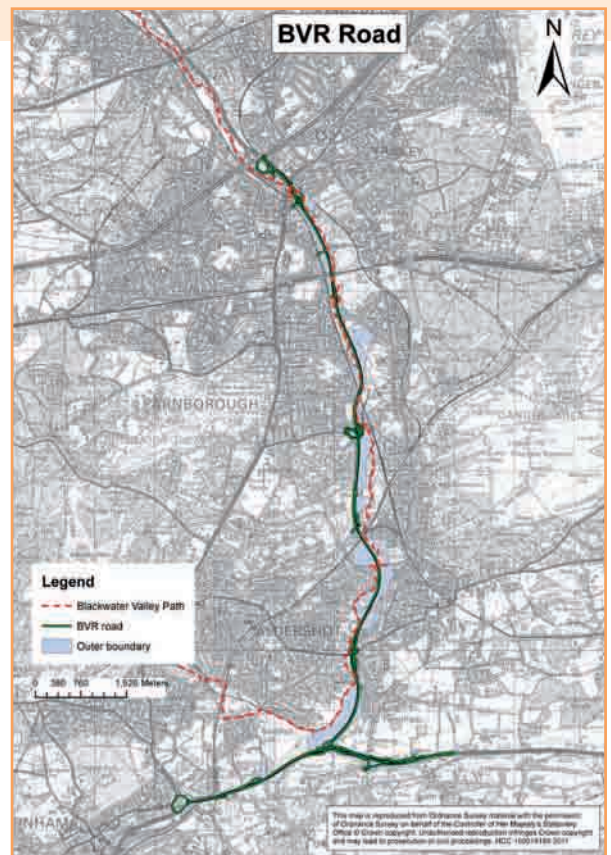


Figure 1. The Blackwater Valley Road (map provided by Hampshire County Council).

The EIAs for the four schemes recognised that the road would have significant effects on ecology as a result of:

- habitat loss – a net loss of 38ha;
- habitat fragmentation reducing the effectiveness of the valley as a wildlife corridor;
- noise disturbance;
- potential pollution of the River Blackwater from surface water run-off;
- effects on legally protected species due to habitat loss and severance; and
- loss of recreational facilities.

In order to mitigate significant effects, the two County Councils purchased substantial

Feature Article: The Blackwater Valley Road: using green infrastructure for ecological mitigation (contd)

areas of land alongside the scheme. This enabled a comprehensive package of green infrastructure measures to be designed and constructed. The overall package of ecological measures included:

- avoidance of existing sensitive areas wherever possible;
- temporary fencing to prevent damage to adjacent areas during construction;
- design of river diversions to improve riparian habitat;
- habitat creation resulting in an increase in water bodies and woodland of 90ha;
- habitat management, such as tree removal from grassland and swamp areas;
- translocation of heathland, aquatic and marginal vegetation and individual rare plants;
- natural regeneration of chalk grassland communities (Figure 2);
- capture and translocation of reptiles, amphibians and fish;
- design of drainage ponds to provide wildlife habitat;
- construction of a tunnel for roosting bats and erection of bat and bird boxes;
- measures to protect the water quality of the river; and
- provision of a public footpath, doubling the area of open access land and improving the quality of an angling lake.

The results of monitoring exercises undertaken in 2004 and 2011 indicated that the habitat creation schemes were largely successful, although some of the new habitats, such as woodland, will still take many years to be of equal quality to those lost. Wildfowl populations have largely benefited from the borrow pits, which provided new water bodies, and woodland bird populations use the extensive new tree belts. Translocation of aquatic plant species was successful, whereas few of the translocated grassland plants survived. Populations of legally protected species have been retained. The habitat changes brought about by the road scheme also benefited many species not targeted by the mitigation work, such as the wildfowl that have benefitted from the new water bodies created from the borrow pits. However, some species have been adversely affected by the changes both directly and as a result of the changes to the overall balance of habitats



Figure 2. A verge that was not sown with a seed mix and was allowed to regenerate naturally supports chalk grassland plant species. Photo by Tony Anderson, BVCP

within the valley; for example, attempts to translocate common spotted orchid were unsuccessful.

Lessons for Other Schemes

The BVR was one of the earliest schemes subject to EIA in the UK. The methodology of EIA has advanced rapidly, and it was hoped that some of the lessons learnt in this study would help with the continuing evolution of

EIA and ecological mitigation. Major issues and ideas identified in 2004 as a result of post-construction monitoring are set out below, with comments on whether they appear to have been taken on board more widely based on the hindsight available in 2011:

No.	2004 recommendation	2011 update
1	Provide sufficient area for the essential environmental works. In this study as much as four times the area of land required for the road was required for the mitigation measures.	There is now a recognition that plans for mitigation should be prepared early, so that land genuinely required for mitigation can be included in any Compulsory Purchase Order. Nevertheless, the area affected by habitat creation and management for the BVR remains unusually large, although this reflects the sensitivity of the location.
2	Prior to preparing a landscape plan assess what important habitats and species will be affected and in what quantity. The plan can then establish a correct balance of habitats to meet the needs of the target species.	EIA procedure ensures that baseline conditions are identified. Policy measures such as national and local Biodiversity Action Plans help ecologists identify the important habitats and species with clear justification.
3	Avoid sensitive areas rather than relying on translocation. Translocation often fails and should be regarded as a valid method of salvage when loss is unavoidable, but essentially a means of enriching a newly created area and not a way of saving existing habitat.	The value of translocation as a salvage operation is increasingly recognised, and some improvements have been made in methods. The message that it is a method of last resort if in situ protection is not viable remains important.
4	Ensure works are correctly timed. Habitat creation work in advance of the habitat destruction during road construction allows time for establishment of habitat, and increases chances of success of translocated material.	Careful programme planning can ensure that time is allowed for mitigation measures. Commitments can be made to such programming can be set out in planning conditions or equivalents. Nevertheless, early consultation with ecologists is essential for project managers to take this into account.
5	Habitat creation and protection should concentrate on large scale and permanent features. Ephemeral features and small areas require intensive management to maintain in the long term.	Large scale permanent features are generally a better use of resources. However, there can be benefits in providing some ephemeral features, such as 'brownfield' bare ground, without entailing excessive costs if they are recognised as ephemeral and secondary vegetation is allowed to colonise naturally. As brownfield sites have been lost to development, even temporary provision of features that can be colonised by mobile species such as some specialist bare ground invertebrates contributes to their habitat (Box & Stanhope, 2004).
6	Address habitat fragmentation. If underpasses are not possible consideration can be given to installing 'green' bridges, specifically for wildlife; a reduction in road kills will also benefit road safety.	Understanding of successful design for wildlife underpasses, either purely for wildlife or combined with human access routes, has improved. There have also been a few examples in the UK of green bridges. However, the expense of green bridges means that they are rarely built, particularly if they cannot be incorporated into bridges required for people. For example, a green bridge was built over the Lamberhurst by-pass on the A21 in Kent, but this structure also provides the main access to the National Trust's Scotney Castle estate.
7	Do not over landscape. Current landscaping practice appears to be measured by the number of trees planted. This approach leads to tree planting on inappropriate areas, blocked footpaths and planting too dense to allow natural woodland flora to develop.	Landscaping understanding has improved, although tree planting schemes can still appear overly influenced by the desire to suppress other plants at all costs and if dense planting is not followed by intense thinning, as would happen in planting for timber production, problems can arise. Establishment of scrub and woodland habitats through natural regeneration alone can be successful but is dependent on the distance and suitability of a suitable seed source and intensity of deer grazing. The authors feel that landscape schemes can also seem to sometimes focus on tree planting at the expense of good quality grassland creation.

Feature Article: The Blackwater Valley Road: using green infrastructure for ecological mitigation (contd)

No.	2004 recommendation	2011 update
8	Use native provenance vegetation. The long period of advance planning required for roads allows plenty of time to source and propagate all plant and seed requirements from local sources.	Use of native and, where justified, local provenance plants has increased. The problems that can arise if non-native stock is used are better understood. However, it can still be difficult to get funding for advance seed collection and propagation due to uncertainty of project approval and timescales. In addition, new questions will appear in the near future about the appropriateness of using plant stock more adapted to a drier and warmer climate than native plants. Such stock is already in use for some forestry schemes, and careful consideration needs to be given to the issues in ecological mitigation schemes. The authors' personal feelings are that such an approach underestimates the adaptability present in plants from the UK itself and this complex area needs more research. (In 2013 the potential implications of 'native' stock being collected in the UK but grown overseas for cost savings are also being highlighted as the scale of such operations is viewed in the light of risk of spreading plant diseases.)
9	Establish good working relationships between highway engineers and ecologists at an early stage. Communication between the different professions can be difficult but is essential to meet common goals. A dedicated Landscape Clerk of Works, involvement of local expertise, and a working group, are all ways of tackling the problem.	Use of an Ecological Clerk of Works is increasingly common on large schemes affecting sensitive habitats and species. Communication between disciplines at the design stage remains critical, and project managers should take control of this process and ensure that the specialists are talking to each other.
10	Monitoring should be put in place from the very beginning. Be prepared to alter designs and management to reflect monitoring results.	Some degree of monitoring is a common requirement prescribed in Environmental Statements. However, the feedback loop that allows this to influence designs and management and share results with others needs improvement. A particular challenge is provided where works are subject to licence due to effects on European Protected Species, as changes to the design would often require the submission and approval of a new Method Statement under the licence. This requirement could increase resistance to change.
11	Permitted development ancillary to construction needs to be strictly controlled with restoration conditions imposed. Site compounds, access roads, storage and processing areas etc can be highly damaging to the environment yet can be outside normal planning restrictions.	This recommendation is a reminder to ecologists, project managers and planning authorities to investigate requirements for ancillary development at an early stage.
12	Ensure continuing management so that beneficial impacts of mitigation measures are not lost. Mitigation measures should remain effective for the life time of the road. Funding to support mitigation measures should be an integral part of the long term highway maintenance budgets.	Funding in perpetuity cannot really be guaranteed. However, a commitment to a long term management plan helps ensure that this is taken into account in the highways maintenance programme.

Three key factors were identified as being instrumental in the success of the mitigation for this scheme:

- Ecologists worked closely with the highway engineers during design and construction of mitigation;
- The Blackwater Valley Countryside Partnership works closely with local authorities, private landowners and local community groups such as the Tongham Woodland Improvement Group (Figure 3) to manage the green infrastructure;
- Maintaining a flexible approach to management, based on monitoring of habitats and species, helped to direct and reshape mitigation measures, while continuing to focus on the original overall aims. For example, trees were removed from a number of plantations to allow naturally regenerating grassland flora to flourish.

The review of the Blackwater Valley Road recommendations shows that some aspects that were quite novel at the time have now become common practice, such as the use of an Ecological Clerk of Works. However, some lessons still need more consistent application. These include the need to mitigate impacts of ancillary permitted development and a tendency among some designers to plant more trees than necessary. Ecologists and land use planners are now experimenting with concepts of 'biodiversity offsetting'. Within such schemes, habitat translocation can add value to newly created habitat. However, this must not diminish the message that translocation is a method of last resort if *in situ* protection is not viable.

In summary, long before the phrase 'Green Infrastructure' came into common use, the Blackwater Valley Road scheme retained, created and managed 117 ha of land to provide multi-purpose benefits for people and wildlife. This green infrastructure was placed in local authority ownership and is being sympathetically managed to ensure that it provides green space for local people, habitat for wildlife and mitigation against the impacts of the road. At a time when budget constraints are likely to have an increasing influence on road and other major infrastructure schemes, it is essential that mitigation is as effective as possible.



Figure 3. Members of TWIG – Tongham Woodland Improvement Group – in their 'wood henge' seating area. Photo by Tony Anderson, BVCP

Green infrastructure with its multi-purpose approach to realising benefits is an excellent way of ensuring this. However, the exercise of monitoring and of reporting the results of mitigation is also important, to build a stronger evidence base to help demonstrate the which techniques work and allow others to learn from experience.

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Acknowledgements

The original 2004 study was supported by Hampshire and Surrey County Councils and the Blackwater Valley Countryside Project. Sue Dent of Hampshire County Council and Jules Wynn of Bowland Ecology kindly provided comments on the draft article.

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Dormouse Bridges on the UK Road Network

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Figure 1. Dormouse bridge installed beneath bat guide bridge, A4048 Sirhowy Enterprise Way

This article provides a brief review of the development of, and rationale behind, dormouse *Muscardinus avellanarius* bridges on the UK road network, summarises results of recent research into the likely behaviour of dormice in relation to roads, and provides advice on when and where dormouse bridges might be an appropriate mitigation tool.

Dormouse Bridges

A number of 'dormouse bridges' have been erected on the road network in England and Wales, and in other situations such as temporary haul routes, in an attempt to mitigate fragmentation impacts resulting from permanent or temporary habitat severance. Typically these structures comprise weld mesh tubes, sometimes supported by metal hoops, containing either natural fibre ropes or plant material such as cut traveller's-joy *Clematis vitalba* or honeysuckle *Lonicera periclymenum* (Woods 2006, Anon 2009). These tubes are supported on either side of a road or haul route carriageway and the ropes or vegetation connect to the tree canopy or shrub layer on either side, allowing dormice to cross without going down to ground

level (see Figure 1). Recently the provision of such dormouse bridges as part of road construction schemes has been the subject of adverse publicity in the local and even national press (e.g. *Bridges help dormice to cross Church Village bypass* <http://www.bbc.co.uk/news/uk-11087137>).

Origins

Two of the first such structures to be erected were the dormouse bridges attached to bat guide bridges (designed by the Robert Stebbings Consultancy Ltd) on the A4048 Sirhowy Enterprise Way in Blackwood, South Wales in 2004, where Cresswell Associates (now an operating company of Hyder Consulting) assisted Arup (designers) and Costain (lead contractors) with ecological

elements of the scheme. This scheme was built largely on an existing terrace formed by a disused railway line along the side of the valley. Pre-construction surveys had identified evidence of dormice in woodland on the proposed line of the scheme; as small fragments of retained woodland would be isolated from the wider available habitat by the scheme, there was potential that fragmentation of the population could occur.

Whereas in other situations it may be possible to avoid such fragmentation impacts by altering the alignment of a scheme, in this case the constraints imposed by the steep-sided valley meant that no feasible alternative route was available. In addition, the position of the scheme on a hillside terrace precluded the use of clear span underpass structures which might allow dormice and other wildlife to cross beneath the scheme safely (Chanin 2011), though the effectiveness of underpass structures as a mitigation tool for dormice is unproven (see below). Discussions were held with the Countryside Council for Wales (CCW), during which it was agreed that the fragmentation impact was a significant threat to the population, and would require mitigation. It was therefore necessary to develop a mitigation measure addressing this fragmentation impact in order to give the licensing body (at that time the National Assembly for Wales) sufficient confidence that the conservation status of the species would be maintained, and so obtain a licence for site clearance works during construction.

Prior to this, little had been done on the English and Welsh road network to address fragmentation impacts on dormice. The Design Manual for Roads and Bridges (Highways Agency 2001) proposed the use of green bridges, or thick ship's rope connecting tree canopies above single carriageway roads, though at the time neither approach had been tested for dormice. Morris (2004) had expressed scepticism that simple rope crossings would be used by dormice, but also described a signage gantry in Japan which had been modified successfully to facilitate movement of the related Japanese dormouse *Glirulus japonicus* safely across roads (see also Minato *et al.* 2008). The key features of the structure were that it provided an enclosed tunnel to minimise risk of predation, within which were branches and/or ropes to provide cover for animals using the structure.



Figure 2. Detail of A4048 dormouse bridge showing climbers growing on the supporting column, connecting to natural ropes forming the bridge structure

Such gantry structures were not considered a viable option for the A4048 scheme, partly on cost grounds and partly because providing adequate footings for structures of that size would have extended beyond the agreed CPO boundaries of the scheme. However, given that bat guide bridges (comprising netting strung between two stanchions) were already proposed in two locations which could also serve to mitigate fragmentation impacts on dormice, it was possible to include dormouse mitigation as part of these structures. The design adopted therefore aimed to

incorporate the key features of the Japanese gantry bridge (an enclosed tunnel and rope/branch cover) in a form compact enough to be supported by the bat guide bridge, without affecting its function. Although it had been intended to attach the ends of ropes to trees on either side of the crossing, using tree ties, these trees were outside the CPO for the scheme, and consent from the landowners was not forthcoming. The ropes were therefore attached to the supporting columns, and the planting of climbing shrubs was specified at their bases (Figure 2).



Figure 3. Experimental dormouse bridge used for testing captive animals' responses to the mesh/rope structure in 2007

At around the same time, Michael Woods of Michael Woods Associates (MWA) was looking for a cost-effective means of reconnecting woodland areas supporting dormice on both sides of an existing quarry access road in the Mendips in Somerset (Woods 2006). This became the second project on which the tubular dormouse bridge design was used, its installation being the subject of one episode in the Channel 4 television series *Wild Thing I Love You*. This structure contains cut vegetation instead of ropes, but is otherwise similar to the A4048 design.

We have subsequently been involved in another road improvement scheme in South Wales (junction improvements on the A449 near Newport for the Ryder Cup golf tournament), where again we were required to provide a structure to mitigate fragmentation impacts in order to meet licensing requirements, even though the

road crossed by the dormouse bridge on that scheme is only open to traffic during major tournaments.

Results of Monitoring

Monitoring proposals for establishing use of these structures by dormice included catching and PIT-tagging (Passive Integrated Transponder) animals in nest boxes on either side of the bridge. However, it takes time for monitoring of this kind to catch enough animals, and then to recapture one on the other side of the bridge, so in the meantime we wanted to gather evidence on whether these experimental structures were likely to be effective. Cresswell Associates and Michael Woods Associates therefore jointly arranged trials using a specially constructed dormouse bridge and some captive-bred dormice, in 2007 (Figure 3). We subsequently learned that the People's Trust for Endangered Species (PTES) was also using captive-bred dormice

to compare their use of various lengths and diameters of dormouse bridges (Anon 2009).

These trials confirmed that captive-bred dormice would readily use the tubes. The PTES trials found that males were more likely to use dormouse bridges than females, and that bridges with tubes of 200mm diameter were just as effective as 300mm ones. The Cresswell/MWA trials found that dormice were as likely to walk along the weld mesh fabric of the tube as the ropes strung through the tube, but this may have reflected the captive animals' familiarity with weld mesh cages. Sadly, at all three of the 'real world' schemes described above, either monitoring has been discontinued or has not continued for long enough to confirm movement of dormice from one side of the roads to the other. We would be extremely interested to hear of any positive monitoring data from other dormouse bridge structures that have been installed and, in particular, it is very much hoped that

research currently being led by Dr Debbie Bartlett at the University of Greenwich will greatly inform the debate (<http://www.cieem.net/news/74/dormice-bridges-phd-project>).

A study of dormice using hedgerows and scrub on either side of the A30 in Devon (Chanin and Gubert 2012), along with the vegetation in the central reservation, represents a further complication in confirming the effectiveness of dormouse bridges, as this study has shown that dormice can in fact cross busy roads, apparently as seasonal dispersal movements (although it should be noted that this study recorded movements only across one side of a dual carriageway: 8m of tarmac with 2m verges). Some anecdotal support for these findings was provided by the A449 scheme described above, during which dormice were found in a number of small (0.16–0.73ha) areas separated from other suitable habitat by active road carriageways or well-used lay-bys (Cresswell *et al.* 2008, Wouters *et al.* 2010, see Figure 4).

There are also experimental data for dormice dispersing across woodland rides (5–6m wide), meadows (20m wide), and woodland clearings (50m wide) in Lithuania (Juskaitis 2008), and Bright (1998) considered that gaps of 100m were unlikely to represent a complete barrier to dispersing dormice. Indeed, Büchner (2008) reports dormice dispersing up to 500m over open arable fields. Clearly, if dormice are able to cross wide roads carrying high volumes of traffic, then monitoring using PIT-tagging alone will not be sufficient to determine whether dormouse bridges have been used (as any tagged animals found on the other side of the road to where they were released could just have easily run across), and more direct evidence of the use of the bridges may need to be obtained.



Figure 4. Small area of low bramble scrub, between the A449 dual carriageway and a well-used layby, in which dormouse nests were found

Limitations of Dormouse Bridges

Part of the problem with dormouse bridges (similar to mitigation measures designed for other species on road schemes), is that of only being effective when used in combination with other measures, which may or may not be implemented properly. Bat crossings, for example, have been considered more likely to work if landscape planting and/or guide fencing is designed to steer bats towards the crossings, in much the same way that badger tunnels and otter ledges are generally only effective in combination with fencing to keep them from crossing the road. Unsurprisingly, no specification for dormouse-resistant fencing exists, and the cost of any fencing which dormice were unable to climb would probably be disproportionate compared to the likely mortality risk. So rather than dissuading dormice from crossing at ground level, dormouse bridges are usually combined with planting (often comprising climbers that are also known dormouse food species), and other features (such as ropes), to draw them towards the crossing from the neighbouring habitat. However, in too many cases these linkages to existing scrub and woodland are ineffectively implemented.

To date, we are not aware of data confirming that dormouse bridges have been used by wild dormice, and they therefore remain unproven as a mitigation tool. However, this is largely due to a lack of proper monitoring rather than an intrinsic ineffectiveness in the structures themselves, and there is no reason to assume that dormouse crossings will not work (assuming they are positioned and designed properly). Nevertheless, until comparative mortality rates are available for dormice crossing at ground level compared to those crossing via a bridge (or using an underpass), it will not be possible to judge whether or not bridges provide *effective* mitigation at the population level (a problem similar to that described by Altringham (2008) and Berthinussen and Altringham (2012) for bat mitigation on road schemes). It is thus very much hoped that Dr Bartlett's research will be effective in answering these questions. It therefore follows that dormouse bridges cannot, on current evidence, be considered to represent 'plainly established and uncontroversial' (PEU) mitigation and, we would argue, should not therefore be automatically required by planning authorities

or licensing bodies as part of a mitigation package when impacts on dormice are predicted. Evidence of dormice crossing roads unaided suggests that fragmentation impacts are less significant than had been previously predicted, though it is not known whether other factors, such as road lighting, may affect the likelihood of this occurring. It also suggests that road mortality of dormice could occur, and may be an additional impact on the species where roads sever dormouse habitat (although low population densities combined with a likely low frequency of occurrence means that the risk is probably very small).

If roads do indeed represent more of a deterrent than an absolute barrier to dormice, perhaps comparable to the effect of roads on some bat species (see O'Connor and Green 2011), then it could be argued that the contribution that dormouse crossings could make to the mitigation of *fragmentation* is thus diminished. However, given that bridges may also minimise the risk of road mortality (such that the risk of mortality using a well-designed bridge is likely to be significantly lower than that crossing the carriageway), then they could potentially provide a population benefit. The main issue then, given the low numbers of individuals likely to be involved (especially if the animals are crossing the road at night, when traffic levels are much lower), is whether or not the installation of a large and expensive engineering structure is disproportionate to the decrease in the risk of mortality that can be achieved. This is clearly a judgement that needs to be made on a case-by-case basis, in consultation with the relevant Statutory Nature Conservation Organisation and based on an understanding of the distribution and density of the population in question.

Use of Dormouse Bridges as a Mitigation Tool

Based on current evidence, taking into account their unproven nature and the increasing evidence for the ability of dormice to disperse across open areas including roads, we suggest that there will only rarely be situations where a dormouse bridge can legitimately be justified. This may of course change as the evidence base develops. Certainly we see no need for such structures over temporary gaps in dormouse habitat (e.g. gas or water pipeline installation), or over permanent gaps where there will be

Feature Article: Dormouse Bridges on the UK Road Network (contd)

little or no mortality risk (e.g. construction site access roads used rarely or only during daylight hours).

If evidence is obtained that dormouse bridges are used by dormice this will, obviously, help justify their use, but it should be noted that if dormice also cross at ground level, then a dormouse bridge could easily be *used*, without being *effective* mitigation at a population level (e.g. if the majority of animals in the population are crossing without use of the bridge). We would therefore not necessarily support the suggestion by Morris and Minato (2012) of modifying signage gantry structures on UK roads as a dormouse mitigation tool – at least until monitoring data (using wild dormice) have been obtained. While we are also concerned about possible impacts of roads on dormice, we do not feel there is sufficient evidence to accurately predict the nature and extent of those impacts, and monitoring of any safe crossing structures for dormice should confirm both that the structures are used and are effective (alone or in combination with other mitigation measures) before being more widely adopted on the UK road network.

There is also as yet insufficient evidence for the effectiveness of underpass structures as a mitigation tool for dormice (Chanin 2011), so more monitoring is required before we would advocate providing underpass structures specifically for dormice. However, these structures have the advantage that they are proven to be effective for a range of other wildlife species, and are significantly less visually obtrusive to road users than bridge structures. Consequently, if we have another scheme where we are required to provide a safe crossing structure in an attempt to mitigate a possible fragmentation or road mortality impact, we would recommend use of large diameter multi-species underpasses (ideally containing brash or live vegetation) in preference to a dormouse bridge, assuming that the vertical alignment permits it.

Monitoring, of sufficient scope and intensity to more fully understand the behaviour of dormice both using such structures and crossing roads unaided, will be essential in order to provide an evidence base for mitigation design on future schemes. Such work will need to include investigation into what is most likely to make them work, including choosing the best location and effectively tying them in to existing habitat.

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Biodiversity and Nature Conservation in Relation to Canal Regeneration: The Cotswold Canals, Gloucestershire

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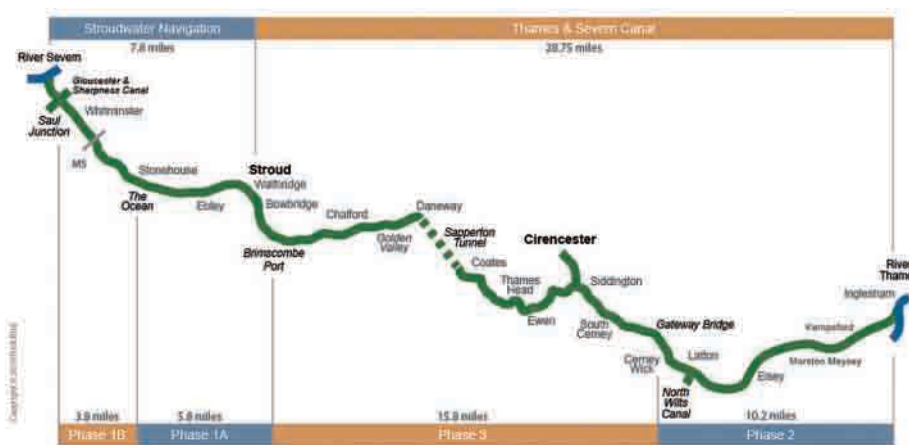


Figure 1. The entire route for the Cotswold Canals restoration project. Image by Nick Bird, 2010

Introduction

Stroud District Council (SDC) and its Partners comprise the project team currently involved in delivering Phase 1a of the Cotswold Canals Regeneration Project. This is the first phase of a wider restoration of the Cotswold Canals by the Cotswold Canals Partnership (CCP) whose vision for the project is to: *“Restore the Cotswold Canals to a full navigation route between the Rivers Severn and Thames in the interests of conservation, biodiversity, and local quality of life; and to use the restoration as a catalyst for wider social economic and environmental regeneration in areas neighbouring the Canals.”*

A significant part of the Canals’ regeneration has involved an ecologist during design and an Ecological Clerk of Works (ECoW)

to provide guidance and advice during construction. However, the ecological mitigation measures and enhancements undertaken for the project are a collaborative effort between the project team, contractors and external stakeholders. This article aims to provide a positive example of how the ecological aspects of the regeneration project are being managed, and how the use of best practice in conjunction with key stakeholder consultation achieved a beneficial outcome not only for the local biodiversity, but for the regeneration project as a whole. The lessons learnt from this first phase of the project will additionally contribute towards the future design and construction phases of the Cotswold Canals Regeneration Project.

Background to the Cotswold Canals Regeneration Project

Extending eastwards from the village of Framilode on the banks of the River Severn to Wallbridge in the Cotswold town of Stroud, the Stroudwater Navigation was opened in 1779 for the transportation of goods from Stroud to outlying commercial centres. The town’s wool trade had firmly established Stroud as one of the region’s important industrial settlements, with the construction of the Stroudwater Navigation contributing to this commercial success. This success led to the continuation of the canal system via the opening in 1789 of the Thames and Severn Canal extending from the Stroudwater Navigation at Wallbridge through to the River Thames at Lechlade; these two canals became known as the ‘Cotswold Canals’. However, the arrival of the Great Western Railway ultimately contributed towards the demise of the Canals, with the eventual closure of the Thames and Severn Canal in 1933 and the Stroudwater Navigation in 1954. The Canals’ abandonment led to their disintegration; subsequently becoming in-filled and incorporated into the built environment or gradually becoming recolonised by aquatic and terrestrial flora.

The restoration of the disused Cotswold Canals was promoted in the early 1970s by what is now the Cotswold Canals Trust (CCT), with the restoration works finally commencing in 2009 and being led by CCP. As the entire route of the Canals extends over 36 miles (Figure 1), the restoration works

Feature Article: Biodiversity and Nature Conservation in Relation to Canal Regeneration: The Cotswold Canals, Gloucestershire (contd)

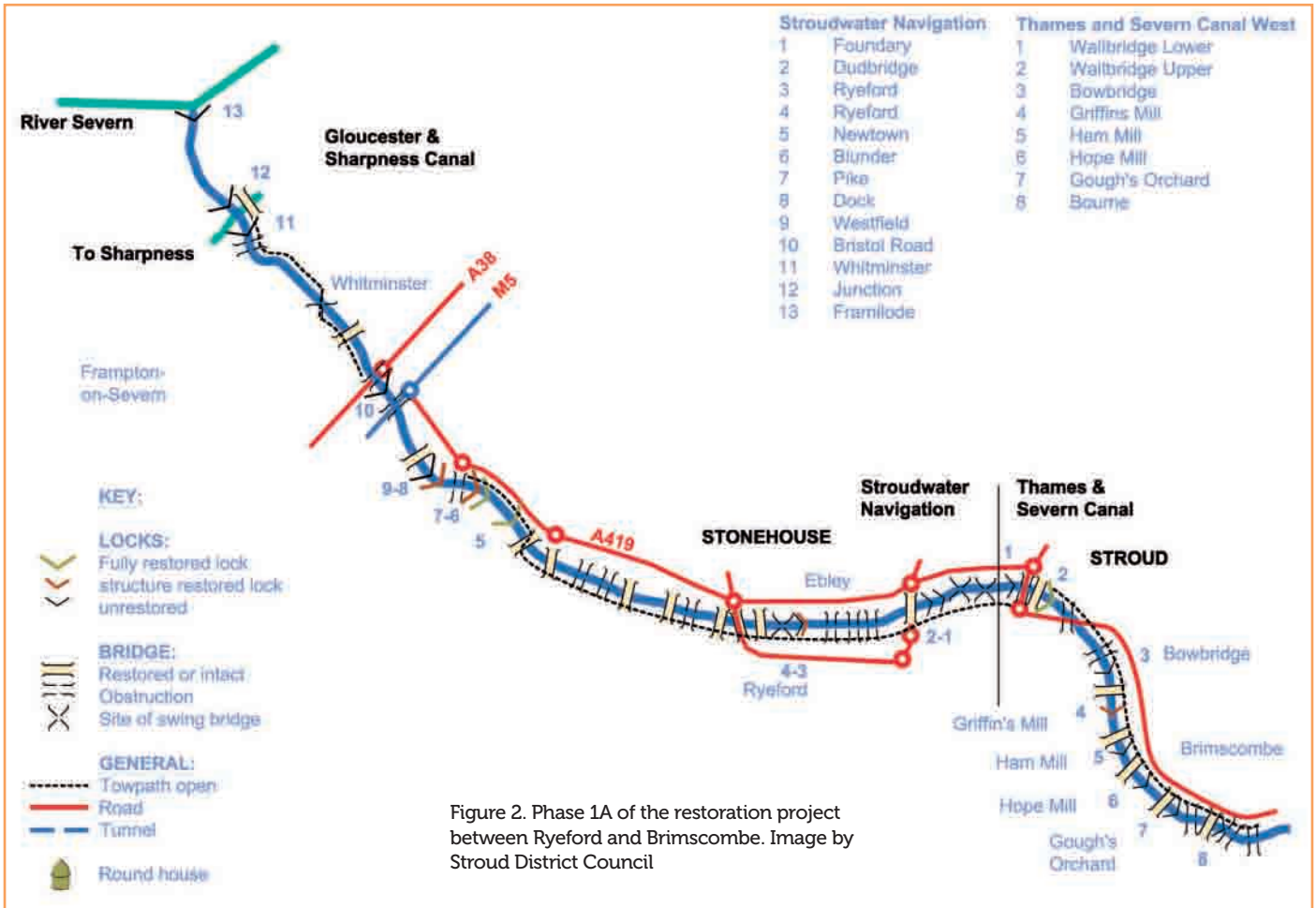


Figure 3. The railway viaduct and former dye-works at the Capels Mill site adjacent to the route of the new canal channel

are being undertaken in a phased approach commencing with Phase 1a (Figure 2), which comprises the restoration of the Stroudwater Navigation between Ocean and Wallbridge, and the Thames and Severn between Wallbridge and Bowbridge. For clarity, Phase 1a's footprint was divided up into separate application sites that corresponded with the individual planning applications submitted to the Local Planning Authority (LPA). Ecological Impact Assessments (EclA) were undertaken for each application site with planning permission being granted in conjunction with specific ecological planning conditions where required. The ecological surveys and assessment have informed the biodiversity enhancements and landscaping proposals, in conjunction with the 'Biodiversity and Nature Conservation' sections of the Construction Environmental Management Plan (CEMP) for each application site.

The Approach Taken to Biodiversity and Nature Conservation

Protected Species

Ecological appraisal identified the potential for protected species to either inhabit the Canals and their riparian habitats or other sensitive receptors in close proximity, such as the River Frome, which is locally designated as a Key Wildlife Site for its mammalian interest, particularly otters. Detailed surveys were undertaken for badgers, bats, great crested newt, otter and water vole. Experienced and where required, Natural England (NE) licensed, ecologists undertook the species surveys according to recognised methodologies and during optimal survey seasons. The survey findings comprise the following:

- Great crested newt and water vole were confirmed to be absent from the collective application sites and adjacent areas.
- Active badger outlier setts were recorded at two separate locations within the Phase

1a footprint, which were permanently closed under licence granted by NE.

- A derelict dye-works, built into the arches of a nineteenth century railway viaduct, located south of Stroud Town Centre was identified as having bat roosting potential (Figure 3). As this structure would be subject to vibration and other temporary construction related impacts, the building was thoroughly assessed for roosting bats and a phased programme of bat surveys was undertaken. Surveys found no evidence for the presence of roosting bats, although common and soprano pipistrelle bats were foraging in the adjacent tree canopy and along the top of the viaduct. Eight bat species were recorded within this corridor, four of which, brown long-eared bat, noctule, soprano pipistrelle and lesser horseshoe, are Species of Principal Importance under Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006.

- As the River Frome corridor within the Stroud district is recognised to support otters, extensive surveys were undertaken for any signs of species commuting, feeding and habitation. These surveys confirmed positive evidence for otter activity at three separate locations: two lying-up places near Dudbridge Upper and Lower Locks, and spraints found on the banks of both the River Frome at the Capels Mill site and the Thames and Severn Canal at Thrupp. The two lying-up places were monitored for species activity and were later confirmed to have fallen into disuse at least twelve months prior to the commencement of the works at the Locks; however, these locations were still monitored during the interim and construction phase. To mitigate for any potential otter presence, the contractor was required not to undertake any night-time working under the CEMP's stipulations.



Figure 4. Landscape masterplan identifying proposed biodiversity enhancements for the Capels Mill site

Feature Article: Biodiversity and Nature Conservation in Relation to Canal Regeneration: The Cotswold Canals, Gloucestershire (contd)

Ecological Monitoring

The restoration and new build construction works for Phase 1a commenced in spring 2011 with a designated and experienced ECoW being assigned to monitor the construction sites on a weekly basis. Due to numerous contractors being used throughout the sites and as 'best practice', it is important that the ECoW undertakes a consistent approach to ecological monitoring, site supervision and the follow-up reporting. Therefore, it was agreed with SDC at the start of the works that a report would be issued after each ECoW site visit and would include the following:

- brief appraisal of the current activity on site;
- photographic record;
- the recording of ecological monitoring and observations;
- recommendations required to provide further ecological mitigation to supplement the CEMP;
- listing of all immediate, ongoing and outstanding actions to be undertaken by the contractor, ECoW or other stakeholder;
- review of the contractor's Method Statements;
- weekly review of all actions and signing off by the ECoW where actions were appropriately undertaken; and
- review of the 'Performance Management' and 'Ecological Receptor' checklists.

The report is circulated to the contractor, the SDC and Halcrow project team and individuals within the Environment Agency (EA). This wide circulation provides all parties with the opportunity to comment on the ecological actions and mitigation measures stipulated by the LPA as a planning condition or stakeholders such as the EA.

Public Relations

The regeneration project has a very high profile locally, especially as the Canals' towpaths are valued by the public as convenient and scenic pedestrian/cyclist recreational and commuting routes. In addition, there are numerous residential and commercial properties that adjoin the Canals' boundaries. It was therefore evident that public concern would be raised over certain restoration activities, such as undertaking tree and vegetation works during the bird

breeding season and the dredging of silt from the canal. Wherever possible, such work was scheduled to take place outside of sensitive periods.

Although the canal regeneration proposal has been warmly received by the public, the ECoW has had to deal with complaints made by individuals. Such complaints were referred to the ECoW by Gloucestershire Constabulary's Rural Environmental Crime Liaison Officer (RECLo) for the district. The ECoW took great care to explain the mitigation methodology to the RECLo in conjunction with a site visit, to ensure that the RECLo was satisfied that appropriate measures to safeguard the local biodiversity had been undertaken and associated wildlife protection legislation was being adhered to. To minimise time spent by the project team and the RECLo dealing with any future complaints, the ECoW kept the RECLo regularly updated of all potentially sensitive works to ecological receptors. Due to the success of these communications, such actions will be adopted as best practice by the ECoW throughout the remainder of the project where works to sensitive ecological receptors are considered likely to engender public concern.

In-Channel Vegetation Management

The removal of in-channel vegetation by the dredging contractor commenced during the 2012 bird breeding season, despite all efforts to avoid this period. To mitigate for this, the ECoW undertook a weekly monitoring programme of the extents of the canal to be dredged a month in advance of the dredging commencing. Any actual or potential for waterfowl, or other bird nesting sites, were plotted on a scale plan, photographed and the level of activity recorded and dated. These records were updated during each visit in order to establish when the young had fledged and whether any new or existing nests had become occupied during the interim. Only when the ECoW confirmed that the young had fledged could that section of the canal be dredged. In order to mitigate for any potential public concern, the RECLo was informed of the monitoring methodology and kept updated throughout both the monitoring and dredging phases.

Habitat Creation and Enhancement

The restoration of the Cotswold Canals will have significant and numerous incidental and

designed-in ecological benefits.

These include:

- the removal of dead sections and bunds will provide a through flow of water, thus increasing oxygen levels and fish passage;
- the inclusion of fish and eel passes within specific restored locks and weir structures to encourage species dispersal and migration - a key requirement of the Water Framework Directive;
- enhanced habitat for otters;
- the creation of a new wildlife pond;
- sixty bird and bats boxes have been made available through grant funding from the Big Lottery Fund's 'Awards for All' scheme, which will be supplied in kit form to local primary schools and sited in the vicinity of the Stroudwater Navigation at Ebley and Cainscross;
- a range of species specific bat boxes will be installed at the Capels Mill site on both retained mature trees and the new canal retaining wall; and
- provision of a landscaped planting that enhances the local environment and existing habitats.

In addition to the above, SDC are committed to seeking out habitat creation and enhancement opportunities wherever possible throughout the regeneration project. This aim has been difficult to action within Phase 1a due to the constraint of the canal and towpath being predominantly bordered by residential and commercial properties or the River Frome. However, one successful example of habitat creation in Phase 1a is a new wildlife pond created within a disused and formerly overgrown corner of a playing field located next to the restored Ebley Confluence Weir. As the playing field comprised part of the functional floodplain the EA was consulted to ensure that the proposed pond would not compromise the existing floodwater capacity of the field. The pond was naturalistic in design, complemented with planting of native species to provide cover for small mammals, herpetofauna and invertebrates, as well as food sources for mammals and birds. In addition, a fringe of scrub was retained at one end to provide cover for herpetofauna commuting between the pond and the adjacent terrestrial and aquatic habitats.

A new canal channel will be constructed through the Capels Mill site; a significant



Figure 5. Boats using the Stroudwater Navigation at Dudbridge during the Stroud on Water Festival. Photo by Stroud District Council



Figure 6. Residents collecting their first barrowful of logs delivered by CCT using the restored Stroudwater Navigation at Ryeford Double Locks. Photo by Stroud News and Journal

and high profile location on the southern periphery of Stroud Town Centre (Figure 3). The pre-construction works required the site to be cleared of the self-seeded woodland. To mitigate for this loss the landscape proposals for the site have aimed to strike a balance between restoring and enhancing the biodiversity of the cleared site and providing an inviting open recreational space for users of both the canal and towpath (Figure 4). The design for the planting at the Capels Mill site is focused upon restoring and enhancing its ecological value. Provision has been made for the planting of an area of native deciduous woodland and shrubs between the channel and River Frome to create a foraging habitat for fauna, particularly badgers, as this species used the pre-construction site for foraging.

Creating a Sustainable Future for the Cotswold Canals

The success of the Cotswold Canals Regeneration Project to date was recognised at national level in 2012 at the Waterways Renaissance Awards where the collective works pertaining to the Wallbridge Project, consisting of a new road bridge, visitors centre, restored Wallbridge Upper Lock and adjacent café won the Awards' Partnership category. At a county level, the Wallbridge Project also won the 2012 Campaign to Protect Rural England (CPRE) Gloucestershire Award for its sustainability and regeneration. The Stroudwater Navigation hosted the 'Stroud on Water Festival' in 2012 in conjunction with the Inland Waterway Association's National Trailboat Festival (Figure 5).

In November 2012, CCT used the restored Stroudwater Navigation to deliver a tonne of logs via barge to the lock cottage at Ryeford Double Locks; the first wood delivery along this stretch of canal for over fifty years (Figure 6). This delivery illustrates the potential for local commercial transportation offered by the Cotswold Canals to sites not accessible by

road. In addition to this local usage, CCT are keen to encourage the use of the Cotswold Canals for wider commercial enterprise and have been discussing with Thames Water the viability of using the entire fully restored Cotswold Canals navigation to transport water between the Severn and Thames catchments to mitigate for increased water consumption during periods of drought, particularly in the south-east of England. CCT maintain that the financial and environmental benefits of using the Canals for water transfer could significantly outweigh other options such as the construction of either a new national pipeline or major reservoir.

In addition to the green transportation possibilities offered by the navigable Cotswold Canals, CCT in conjunction with the Stroud Valleys Canal Company (SVCC) will be installing a small-scale hydro power scheme at the restored Dudbridge Locks. It is anticipated that the revenue raised by selling the green energy to the national grid will contribute towards providing a long-term sustainable income to support and maintain the restored Canals.

Phase 1a of the Cotswold Canals Regeneration Project has been a learning curve for those involved. However, the collaborative and integrated approach to the planning, development, design and implementation of the project has resulted in far-reaching benefits, including those pertaining to biodiversity and nature conservation. Subsequently, the project team have been able to deliver Phase 1a using a considered approach to the retention and enhancement of the local biodiversity. This approach has used the information obtained through ecological surveys and stakeholder consultation to tailor mitigation measures and ecological enhancements that are wholly appropriate to the locality, its habitats and the species present. The ecological lessons and 'best practice' measures learnt from

Phase 1a are a valuable resource for the remaining phases of the regeneration project, as they will be able to inform future design, mitigation measures and monitoring of the construction works.

Acknowledgements

Stroud District Council: Paul Caine, Dave Marshall and Darryl Rasdell

Halcrow Group Ltd: Simon Casey, Mark Seward and David Whitehorne

Further Reading

Cotswold Canals Partnership: <http://www.cotswoldcanalsproject.org/general.asp?pid=2&pgid=1895>

Cotswold Canals Trust: <http://www.cotswoldcanals.com/>

Halcrow Group Ltd: <http://www.halcrow.com/Our-projects/Project-details/Cotswold-Canals-Restoration-UK/>

Stroud District Council: <http://www.stroud.gov.uk/docs/planning/developmentmanagement.asp#s=sectioncontent4&p=cproject>

About the Author

Liza Hollinghurst is an ecologist with Halcrow Group Ltd (a CH2M Hill company) and an experienced Ecological Clerk of Works (ECOW); being a full member of the Association of Environmental and Ecological Clerks of Works (AEECoW). Liza has been actively involved with the Cotswold Canals Regeneration Project since 2010 providing ecological surveys, impact assessment and mitigation measures. She is also the designated ECOW for Phase 1a of the Project.

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The A63 in South-West France: Green Infrastructure gets an opportunity to recover

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Summary

During a road-widening project in the south-west of France, opportunities were taken to improve the connectivity of watercourses for semi-aquatic species. The mitigation for semi-aquatic mammals was based on a landscape scale, committing to the enhancement of the connectivity of rivers in the catchments surrounding the project, as well as improving connectivity across the project itself. This green infrastructure project considers the bio-geographical range of impacted species which can often be forgotten when our attention is focused on the physical project footprint.

Introduction

Road infrastructures can have a detrimental effect on animal species. Recently, ecologists and enlightened engineers have developed innovative ideas to ensure that wildlife corridors through infrastructure are maintained and/or enhanced. Examples include the construction of bat bridges, dormouse bridges and badger tunnels amongst other ingenious devices of varying potential effectiveness.

In France, since 2007 the concept of Green Infrastructure has been implemented by the Trame Verte et Bleue or (TVB) government policy. TVB is a notion that was developed from the Grenelle de l'Environnement round-table talks in Paris. The concept requires

that certain government departments and institutions identify 'biodiversity reservoirs' and fragmented parcels of high biodiversity value which are ecologically connected or isolated. The Trame Verte refers to natural and semi-natural terrestrial habitats such as woodland and heathland etc., while the Trame Bleue refers to freshwater and estuarine habitats such as rivers, streams, marshes, estuaries and lakes.

TVB policy has filtered down from the initial Grenelle working groups and has now become a large national strategic project. Specific objectives include:

- Stopping loss of biodiversity (of common and rare species), in an increasingly fragmented landscape. Attention is given to developing connectivity between habitat fragments on a countrywide and pan-European scale, in addition to achieving good water source quality in rivers.
- Facilitate the free movement of species potentially affected by climate change and improve the genetic exchange necessary for the survival of certain species.

The decret (statute) number 2012-1492 of the 27th December 2012 put into law the notion of TVBs and defined them. From it, a national strategy for the biodiversity was created similar to the UK's Biodiversity

Action Plans. The TVB/Green Infrastructure concept is therefore currently a framework and major tool for future planning policy in France and lays way for ecological restoration of an ecologically fragmented country. Implementation is a collaborative process involving government, charities and many stakeholders, whom since 2011 are obliged to develop regional schemes (Schémas Régionaux de Cohérence Ecologique) involving the creation of regional and local GIS habitat maps, development of eco-bridges and international ecological connectivity management and restoration.

Otter and European Mink, the subject of this article, are species that have benefited from the TVB with specific action plans associated with each. On the A63 improvement project, mitigation plans for these species were developed around ecological principles by consultant ecologists and were supported by the TVB/Green Infrastructure policy. The A63 project was therefore a rare opportunity to enhance habitat quality for these species outside of the initial project footprint.

The Project and its Context

Egis Structures et Environnement was asked by a French motorway concession company (Atlantes) to ensure ecological compliance and advice on a road project in the south-west of France. The assignment



Figure 1. The N10 2x2 lane road before construction of the 2x3 lane A63 – 2010

included a project to develop an existing dual carriageway (the N10) to motorway standards between Salles (20km east of the Arcachon Bay) and Saint Geours-de-Maremne (40km north-east of Bayonne). The new road would now be known as the 'A63'.

Since the 1960s the N10 had been developed section by section with the intention of improving traffic flow between the Iberian Peninsula and high-speed roads in France. Clusters of accidents and increased heavy goods vehicle traffic from Iberia towards northern Europe provided a spur for an improvement project. In 2003 an *ad hoc* inter-ministerial regional management committee, Le Comité Interministériel d'Aménagement du Territoire, agreed to upgrade the existing dual carriageway to a motorway standard 2x3 lanes with a hard-shoulder making use of an existing very wide central reservation.

A Great Opportunity

Even if the specifications for the motorway concession indicated the need to implement the environmental standards for the infrastructure, Egis and Atlandes saw the forthcoming construction as an opportunity to re-establish the existing green infrastructure which, it was assumed, had been fragmented and adversely altered by the incremental construction of the road since the 1960s.

A better understanding of the current state of the environment was needed. Within the context of a potential protected species application and regulatory hydrological requirements, specialists studied the reports, surveys and analysis undertaken during the Public Enquiry stage of the project development and complimentary hydrological surveys and ecological inventories were carried out. The ecological field studies included a full ecological cycle and were undertaken by Egis' own and associate

experts specialising in a full array of animal groups including, amphibians, reptiles, bats, terrestrial mammals, aquatic mammals (otter, European mink, water shrew), fish, crustaceans, insects and molluscs amongst other aptitudes.

The European mink *Mustela lutreola* is an Annex II and IV species of the European Habitats Directive. At a regional level in Aquitaine, the species is considered very rare which made this species of particular interest in the environmental assessments. Environmental Impact Assessments in 2005 indicated the presence of the species within five Natura 2000 sites affected by the project. Between 1987 and 2004, 120 observation points were made during survey effort with 107 observations being associated within streams that intercepted the project. Even if the observations were far from the actual construction, they were assessed as being potentially biogeographically linked. In addition, habitat surveys uncovered mink-favourable areas within the confines of the project or within close proximity. Mink favourable habitat included willow/alder marsh, wet heathland/bogs, wet alder and oak woodland, and flooded oak woodland with drainage channels characterized by deposits of sand, pine needles, deadwood and leaves.

It was rapidly established that the regional network of rivers had been fragmented by the incremental developments of the N10. Tunnels under the carriageway indeed currently carried water, but it was evident that there was a significant hindrance to effective migration of fish created by stepped concrete platforms, resulting in cascades of water in winter and impassable blockages up-stream in summer. Similar impediments were noted in the wider river network. Other incidences of connectivity impediment were

noted for the European otter *Lutra lutra* and of particular note the European mink *Mustela lutreola*. Within the project area there were a lack of banks along the existing culverts and inadequate physical habitat links with existing habitats. It was determined that European mink habitat in the wider landscape was adversely fragmented by departmental roads and railways.

Ecologists working on the project re-worked the design of the motorway to maintain and where possible improve the connectivity for protected species through its infrastructure, with an emphasis on the European mink, following the principles of landscape-ecology and respecting the directions of the Grenelle de l'Environnement. Solutions were found for amphibians, bats, mammals (red and roe deer, wild boar, European otter, Hedgehog, red squirrel and the European mink), fish, etc.



Figure 2. Water/wildlife corridors where European mink were identified and dispersal was considered to be hindered by the N10 as well as other construction projects in the region.

Specific Mitigation Measures for European Mink

The environmental assessment and mitigation measures chosen for this project focused on the river networks which flowed under the project. Engineers and ecologists worked together to improve the ability of mink to pass under the motorway and maintain dispersal routes into the wider landscape. Measures included the creation and/or improvement of ledges and integration of any existing ledges with the surrounding habitats.



Figure 3. Semi-aquatic mammal ledges at a range of heights to adapt to changes in seasonal water levels. These are integrated with the surrounding habitat.

Some ledges were modified to ensure that they would not have an impact on the water flow of the river. This included innovative and bespoke metal cantilevered frames which allowed water to pass without a significant change in flow rates, for which the hydrological experts on the project appreciated.



Figure 4. River flow rates remain unchanged by the installation of multi-height mink ledges built onto a steel cantilever frame bolted to the culvert.

While innovative and classical mitigation measures were employed along the project construction site, the value of these were maximised by the installation of similar apparatus within the wildlife corridors in the wider landscape. Culverts crossing departmental roads were improved such that the ancient web of rivers in the catchment would be enhanced and population dynamics in the region re-established. Partnerships and contracts were developed with the local authorities to facilitate these improvements.



Figure 5. Another example of a specific mink culvert correctly adjusted to the ground level.

Conclusions

As ecologists working on a particular development project it may be that we have tended to focus on the immediate impacts of our project on a very local scale. We ask questions about the connectivity of projects but are maybe looking at this problem through a microscope and missing important opportunities in the wider landscape.

In many projects it is likely that there is much value to be gained by improving habitat connections in the wider landscape via partnerships and compensation agreements than by adding wildlife crossings to our projects from a mitigation 'recipe book'. Egis Environnement and Atlandes are proud to make this case study an example for future green infrastructure projects. Ecologists should always think more widely. Indeed our

first objective is to properly advise the client to avoid impacts and reduce them where possible, but when it comes to enhancement opportunities why not consider improving the wider green infrastructure?

About the Author

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Is it Detrimental to Lichens to Move the Bricks Supporting Them?

Paul L. Smith CEnv MCIEEM

Introduction

This report outlines the implementation of mitigation introduced to protect lichens during restoration works at Stanford Park Site of Special Scientific Interest (SSSI) in Leicestershire in the period 2010-2012. Similar strategies have been discussed before (e.g. Fletcher 2001, Smith 2002, Acton 2010) but there is a need for practitioners to be confident about several, small, almost whimsical aspects of lichen ecology and protection in order to reassure themselves that they are giving sound advice. As the title indicates, this communication addresses such issues.

The Site and the Problem

Stanford Park SSSI was designated for supporting the richest assemblage of lichens in Leicestershire (Natural England, undated). A redbrick ha-ha forms part of the SSSI's boundary and has been known to support a lichen flora since 1980 (Fletcher 2000). In 2010 a programme of structural restoration was initiated at Stanford Hall, including works to the ha-ha. As a consequence, Natural England instructed Lockhart Garratt to survey the lichen flora and prepare a strategy for the protection of notable species during works. This survey revealed that the ha-ha supported 18 species of lichen, including a colony of *Opegrapha lithyriga*, a taxon new to Leicestershire (Smith 2010).

By 2010, component bricks had fallen out of the face of the ha-ha and some were crumbling (Figure 1). Restoration required a significant rebuild and therefore the extant lichen flora was vulnerable, presenting a situation inappropriate to the objectives of a lichenological SSSI (e.g. Defra 2003). A strategy for the preservation of the lichen interest was therefore devised and this included some translocation work to salvage *O. lithyriga*. The present communication provides a record of this process and an assessment of its success.



Figure 1. Western end of ha-ha pre-restoration.

The Lichen *Opegrapha lithyriga*

Opegrapha lithyriga (Figure 2) is nationally scarce (Woods and Coppins 2003), but not specifically legally protected. It is a species of deeply shaded, siliceous (acid) rocks and is considered similar to the corticolous *O. vulgata*. Although it occurs throughout the western British Isles, it is rare or absent elsewhere (Smith *et al.* 2009). Its presence on a ha-ha in the East Midlands is therefore of lichenological interest.

The exposed face of the ha-ha is north facing, damp and shaded. It forms a boundary between a lawn to the south and sheep-grazed pasture to the north. *Opegrapha lithyriga* may have colonised the ha-ha relatively recently, as there are no previous records for the site and the genus has been rare in Leicestershire (Fletcher 2000).

In 2010, the *Opegrapha* occurred in two clusters, one at either end of the structure. The eastern colony was shaded by an overhanging hawthorn *Crataegus monogyna*, the more western by a mature lime (*Tilia* sp.). No colonies were noted on those faces of the ha-ha that lacked overhanging vegetation



Figure 2. *Opegrapha lithyriga* on red brick. Inset shows ascus with multi-septate ascospores (spore dimensions 25µm x 3µm).

and it was speculated that the presence of a canopy might be significant.

Report of Mitigation Strategy

As several restoration projects were being monitored at Stanford Park and the lichen flora of each was significant, a means was needed by which the success of the mitigation works could be rapidly assessed at each stage. In order to avoid costly, detailed repeat species surveys of each structure's lichen flora at each stage of the works, and knowing that no specially protected or nationally rare species were present, it was

Feature Article: Is it Detrimental to Lichens to Move the Bricks Supporting Them? (contd)

proposed that the survival of conspicuous marker species would be used as indicators of the overall success of the lichen mitigation during the restoration of each feature. In the case of the ha-ha, *O. lithyriga* was selected as the marker.

A pre-restoration survey identified *Opegrapha* thalli on 27 bricks at the eastern end of the ha-ha, and on two at the western end.

These thalli varied in size from a few square mm to those covering the exposed faces of entire bricks. Following microscopical determination, thalli were identified in the field by their colour and presence of lirellae (fruiting structures). As restoration of the listed structure precluded the marking of bricks, it was accepted that it would prove difficult to follow all thalli through the process.

Pre-restoration lichenological toolbox talk

With a view to minimising restoration damage to the lichen flora, site meetings were held with the contractors. These included a specific lichenological toolbox talk with individuals who would actually carry out the restoration. On 31st January 2011 procedures and conservation priorities were agreed as follows:

- The ha-ha surfaces would not be covered with any foreign materials unsuitable for the survival of lichens.
- Should the ha-ha need to be covered with textiles of any kind for the purposes of allowing the setting of mortar in cold weather, the period of covering would be limited to the hours of night whenever possible and coverings would be removed during daylight hours, whenever temperatures were warm enough, in order to allow normal exposure of lichens to daylight. It was also agreed that any such covering would be raised above the surfaces of the ha-ha with inert supports to allow a measure of airflow around the lichens on its surfaces. The use of opaque covering materials would be avoided.
- The orientation of component stones and building materials would be preserved, i.e. the original external faces of the bricks would remain external whenever the same bricks could be re-used in the ha-ha, to prevent existing lichens from being buried in the structure.
- Bricks with notable lichens would be preserved and replaced wherever they



Figure 3. Paul Smith indicating 'marker thallus' pre-restoration.

were found to be structurally sound and would not be stacked, covered or subject to lichen-detrimental activities during operations.

- The hawthorn at the eastern end of the ha-ha had been removed because it was contributing to its failure and the bricks supporting *O. lithyriga* would need to be taken out of the wall. Those examples which were sufficiently structurally sound would be carefully replaced within the ha-ha, close to the small colony at its western end. The intention was that this would translocate the thalli on their supporting bricks to a location in the wall with a similar shade and drip regime to the site under the hawthorn.
- A range of structurally sound bricks supporting a representable selection of species from the lichen flora of the ha-ha would be salvaged for reinsertion in the restored ha-ha to provide a source of propagules for recolonisation after works. Time was taken to show the restoration team what lichens look like in various forms.

Acknowledging that non-ecologists do not always attribute lichens with the same needs as vascular plants, i.e. the need for light or air, the basics of lichen biology were explained. It was emphasised that covering a stone surface with opaque materials such as hessian and impervious plastic (a construction procedure in cold weather) would lead to a gradual

deterioration of any lichen flora present in the same way that excluding a green plant from light or enclosing it in the wrong humidity environment would lead to its senescence and death. It was emphasised that lichens are sensitive to changes in humidity, orientation and the prevailing chemical environment. It was then made sure by an on-site identification exercise and subsequent brief competency test that a representative of the on-site restoration team could readily identify thalli of *O. lithyriga* unaided, thus providing reassurance that the protection and salvage of these thalli could be carried out unsupervised. A photograph was taken of a distinguishable 'marker thallus' at the western end of the ha-ha as a means of visually following an individual lichen through the restoration process (Figure 3).

Mid-works lichenological supervision visit

The ha-ha was visited six weeks later, on 15 March 2011, to inspect the efficacy of the proposed mitigation. The ha-ha had then been largely reconstructed with the exception of a final series of capstones. The repairs represented a compromise between engineering exigencies and the desire to retain lichen flora:

- Most of the ha-ha had been constructed with new red bricks but certain, structurally-sound bricks supporting lichen thalli had been preserved and replaced at

intervals within the wall, creating a pattern amongst the new material and providing a source of propagules for colonization of new surfaces.

- The hawthorn at the eastern end of the ha-ha had been removed and bricks supporting *O. lithyrge* had been salvaged and replaced either within the ha-ha at the same location or moved to the western end beneath the lime tree.
- The distinctive 'marker thallus' was still present and apparently in good condition, though it had been moved seven rows of bricks down the wall and become inverted in the process.

Following restoration *O. lithyrge* occurred on the ha-ha in two places, on 8 bricks at the eastern end where the major colony was first identified in 2010 and from which the overhanging hawthorn had been removed, and on 11 bricks at the western end under the canopy of the lime tree. Only two bricks supported the species at this end in 2010 (one being the 'marker thallus'), so nine had been translocated 34m along the ha-ha from under a hawthorn to under a lime. During this period the thalli showed no signs of deterioration.

The post-restoration locations of the colonies of *Opegrapha* were recorded by Global Positioning System (Garmin eTrex H) as follows:

- Eastern end: One brick at SP 58774, BNG 79377 (accuracy 3m), seven bricks at SP58767 BNG 79376 (accuracy 3m)
- Western end: One brick plus a cluster of 10 at SP58736, BNG79390 (accuracy 4m)

Thalli of *O. lithyrge* had originally been recorded on 29 bricks in the ha-ha (two at the western end and 27 at the eastern). Some attrition was expected as some of these bricks were crumbling. Ten thalli had thus been lost in the restoration process by 15th March 2011.

Completion of works visit

Once all works on the ha-ha had been completed the site was lichenologically examined once more on 31st May 2011, confirming that the fitting of capstones had had no adverse effect on the residual lichen flora. A post-works monitoring visit was programmed to allow a re-examination for *O. lithyrge* 12 months later. This was intended to provide an indication of the



Figure 4. Marker thallus (circled) one-year post-restoration. Inset shows close up of marker thallus.

success of the mitigation as lichen thalli might be expected to deteriorate and decay within a 12-month period if the process had proved unfavourable.

Post works monitoring visit

The ha-ha was re-visited 12 months after the completion of restoration, on 31st May 2012. Colonies of *O. lithyrge* which were moved on their supporting bricks from the eastern to the western end of the ha-ha were of special interest as their survival could provide insight into potential suitability of the method for the translocation of saxicolous lichens.

In May 2011 the ha-ha had supported eight thalli of *O. lithyrge* at its eastern end and 11 at the western of which nine had been translocated from the eastern end. The post works monitoring visit found strong colonies of *Opegrapha* at both ends of the ha-ha with identifiable lirellae on 12 bricks on the eastern end and seven at the west. Some evidence of potential new but not fruiting thalli was also noted. Accepting some error in the number of thalli recorded due to difficulty in recognising small, non-fertile examples, the mitigation procedure seemed to have been successful in salvaging 19 colonies from an original 29 during the deconstruction and rebuilding of the structure. After 12 months 19 bricks still supported apparently healthy *Opegrapha* thalli, though there may have been some gains at the eastern end (plus four colonies) and a loss at the western end

(minus four colonies). The marker thallus had apparently survived well despite being moved down the wall, inverted and reinserted with a new mortar surround (Figure 4).

Conclusions and Discussion

It is concluded that the mitigation employed for the protection and salvage of a saxicolous lichen colony during the restoration of a ha-ha wall was successful (at least over 12 months).

Various translocations of saxicolous lichens have been reported (e.g. Richardson 1967, Seaward 1976, Gilbert 1977 (in Seaward 1977), Gilbert 1988, Armstrong 1993, Honegger 1996). In the present case, the translocation of *Opegrapha* thalli on supporting bricks from the eastern end to a similar environment at the western end of the ha-ha had proven successful in the short term (there are now seven colonies at the western end compared with just two pre-restoration).

Following the 'marker thallus' through the restoration process from 2010 to present has eased concerns about moving bricks with lichens on. Many corticolous lichens are known to have a specific vertical distribution on trees (Barkman 1958), some being base dwelling and some growing only above the tree's basal region. Factors considered to be involved in this vertical distribution are light, moisture, bark age, and presence/absence of accumulated organic matter on the bark (Brodo 1961). It is reasonable to assume

Feature Article: Is it Detrimental to Lichens to Move the Bricks Supporting Them? (contd)

that similar factors control lichen distribution on inorganic substrates and a cautious practitioner might wonder whether advising a client to spend money, salvaging bricks with particular thalli from a wall is also reasonable if the lichens might die anyway.

Brodo (1961) conducted a controlled experiment with the corticolous, lichen *Cladonia chlorophaea*, removing sets of lichen-bearing bark discs from a tree's base and repositioning them vertically on the same tree or replacing them in the same (or an adjacent) hole from which they were extracted. After only four months post translocation from a position at the base of a tree to one at breast height, over half of the vertically repositioned thalli showed signs of death whereas controls, which were repositioned on the same tree at the same height, appeared healthy.

The chance of success of a translocation is difficult to evaluate when the niche requirements of the target species are poorly known. Despite this difficulty, commercial practitioners have to put their reputation on the line when the client asks whether it can be achieved.

The apparent survival of the repositioned *Opegrapha* thalli, especially the 'marker thallus', suggests that this species may not be sensitive to vertical and horizontal position change within a relatively small distance within a single wall and that this species at least can be salvaged during restoration procedures by this method. The 'marker thallus' survived the movement of its substrate brick from the top of the ha-ha, seven bricks down towards the base and the inversion of the brick in the process (at least for 14 months). It could be argued that this result might have been predicted from the observation that *O. lithyrga* thalli naturally occurred at different heights within this range on the ha-ha anyway but it is the small unknowns that persecute the wary practitioner in the small hours.

Changes in chemical environment can be deleterious to sensitive lichen thalli and a change in position in a wall, may incur change in prevailing environmental gradients.

The effect on the *Opegrapha* of leaching from new mortar between the substrate bricks was a concern for a species typical of siliceous rocks. However, after 14 months the mortar around the brick supporting the 'marker thallus' had not had any noticeable adverse effect and other original bricks re-incorporated into the restored ha-ha also still carried a patina of lichen thalli, a source of colonising propagules for the new facings.

The lichen mitigation measures for the ha-ha represented a successful compromise between the constraints of rebuilding a failing structure and the need to retain its notable lichen flora but more importantly they taught the author that, as logic dictates, it can be ecologically benign to move bricks with notable lichens on them, even on the edge of a SSSI... sometimes!

Acknowledgements

James Whiteford MCIEEM (Lockhart Garratt), David Prichard (Natural England), Anthony Hughes-Onslow (Stanford Park Estate), Aaron McNamee and Sean Knight (E. Bowman & Sons Ltd).

About the Author

Paul trained as a plant taxonomist. He formed his commercial practice, Botanical Investigations, in 2007 after 18 years working in ecological impact assessment for various organisations. He is a specialist botanist with particular interests in designing mitigation and translocation protocols for bryophytes, lichens and fungi (www.botanicalinvestigations.co.uk).

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Assessing Coastal Habitat Loss: The Role of Coastal Squeeze

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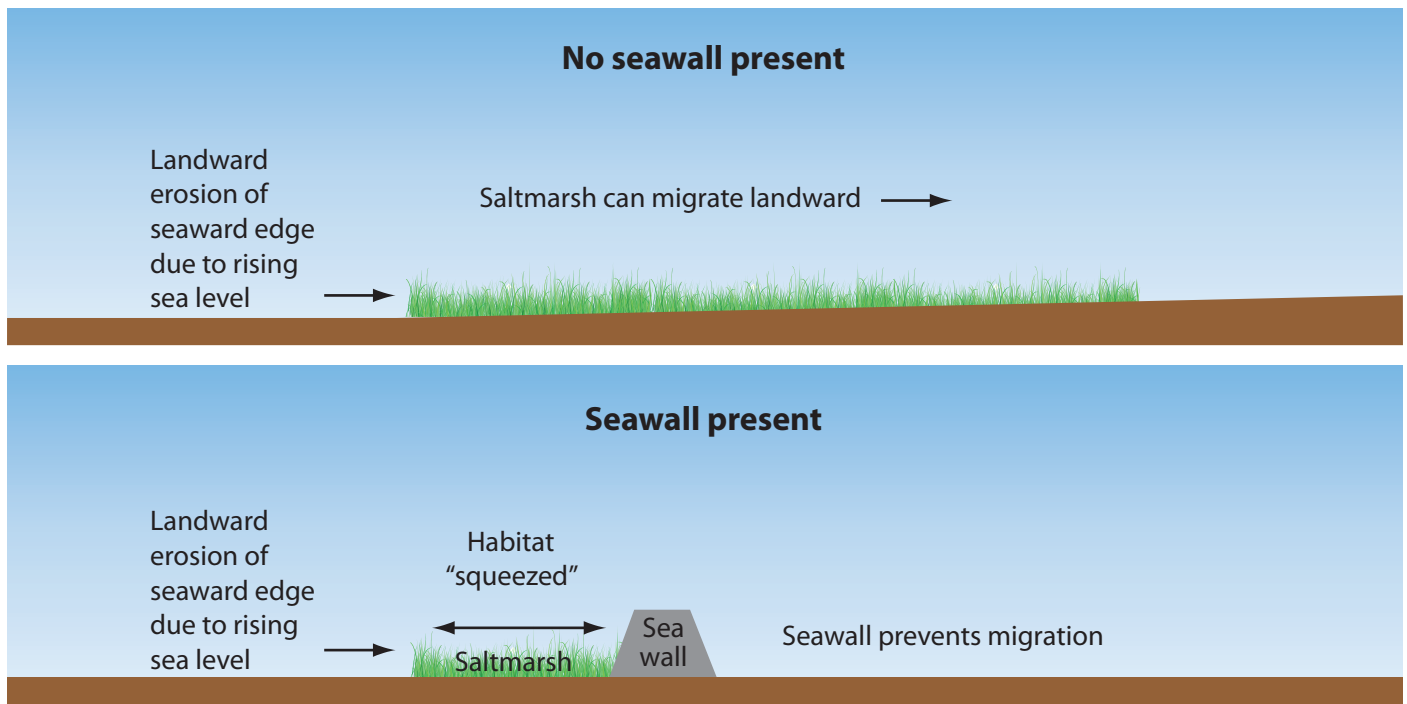


Figure 1. Simple illustration of the concept of coastal squeeze under rising sea level (modified after Black and Veatch 2006)

Introduction

This article clarifies the term 'coastal squeeze' as one type of coastal habitat loss. It arises due to the interaction of sea level rise, landward habitat migration and the presence of sea defences. Importantly, there are many other causes of habitat loss and therefore even where this does occur in front of defences, this loss may not necessarily be due to the presence of the defences themselves. A previous high level assessment of coastal squeeze along the northwest coast of England is used to demonstrate some of the additional causes of habitat loss. These causes are relevant to habitat changes elsewhere in the UK. The article argues that many previous estimates of coastal habitat change have overlooked these additional factors and are thus likely to have overestimated the losses due to coastal squeeze. The article concludes with some suggestions for better assessing future changes in coastal habitats.

Under rising sea levels¹ many coastal habitats can migrate landwards, maintaining their elevations with respect to wave and water levels. Where this landward movement is held up by anthropogenic structures, this can result in a loss of habitat. In the UK, the term 'coastal squeeze' has become widely used to describe this process.

However, the term coastal squeeze is not used consistently. Sometimes it is applied to intertidal habitats, whilst sometimes it is applied to the entire coastal zone (composed of subtidal, intertidal and supratidal habitats). In some instances the term is taken to refer to habitat losses due to anthropogenic effects alone, whilst in other instances it is used to describe both natural and anthropogenic effects. A further problem is that whilst the term coastal squeeze is widely used, the underlying processes controlling coastal habitat extent tend to be overlooked. Thus

the situation has arisen where anthropogenic defences are commonly assumed to be responsible for the majority of coastal habitat loss. In reality, any losses may be partially or fully due to other causes. This has important consequences for setting targets for the restoration of coastal habitats.

Origins of the Term 'Coastal Squeeze'

The origin of the term 'coastal squeeze' was documented by Doody (2004) who cited it as having arisen from the loss of saltmarsh and mudflat in the Wash due to reclamation and the loss of seaward portions of saltmarshes in Essex due to erosion. Doody went on to state that by the middle of the 1990s, following further studies in East Anglia and Kent, it was widely believed that there was a general loss of intertidal habitat in the southeast of England, where sea level was rising relative

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to the land. A Defra (2003) guidance note on managed realignment defined coastal squeeze as:

"The process by which coastal habitats and natural features are progressively lost or drowned, caught between coastal defences and rising sea levels."

A previous study of the northwest coast of England (Black and Veatch 2006) explained the process of coastal squeeze as follows:

"If sea levels rise without food defences in place, the inter-tidal area is able to gradually move inland over time and there is no net loss of habitat. With defences or other constraints present, the movement inland of the high water line is impeded but the low water line moves shoreward, which leads to a loss of the intertidal area."

This is shown in Figure 1.

English Nature (2006) commissioned an investigation into the changes in saltmarsh extent within Special Protection Areas (SPAs). This work demonstrated losses in saltmarsh area in most SPAs over the time period between designation (1982-2000) and 2004. English Nature interpreted these losses as indicating that coastal squeeze was a major threat to intertidal habitats on the south and east coasts of England. However, coastal squeeze, as defined above, represents only one factor responsible for intertidal habitat loss. There are a number of other factors which may be independent of "sea level

rise and the action of defences" which can also give rise to a reduction in the width of the intertidal zone. Furthermore, it is not always the case that sea level rise results in the landward movement of habitats. The following sections expand on these issues.

Factors Influencing Coastal Zone Width

There are a number of factors that combine to cause variations in retreat rates and width of the coastal zone at individual locations (Figure 2). Changes in these factors over time can explain why the coastal zone may be narrower in some years, or be narrower under present day conditions than it was during historical times. For example, it has been suggested that the main causes for the predominance of coastal erosion in Scotland under contemporary conditions are: the combined impact of increased rate of sea level rise, increased wave energy² and decreased sediment supply (Pontee 2006).

There are also a number of anthropogenic factors that can cause erosion, particularly where these reduce the sediment input to a particular beach. Examples include:

- sand and gravel extraction from beaches – which remove sediment from the coastal system;
- the construction of groynes, piers or breakwaters - which can interrupt alongshore sediment transport; and

- the construction of coastal defences - which can reduce the input of sediments to the littoral system by protecting eroding cliffs and dunes composed of unconsolidated sediments.

It is important to realise that the width of the coastal zone varies over a range of spatial and temporal scales. For example, on a seasonal timescale sandy beaches might vary significantly in width in response to differences in wave conditions between summer and winter months. On longer timescales such beaches might respond to changes in longshore sediment supply caused by the construction of breakwaters or longer term variations in the wind wave climate.

Landwards Movement of the Coastal Zone

The concept of coastal squeeze is based upon the assumption that the coastal zone and its constituent habitats are able to adapt to a rise in relative sea level by moving landwards. The process of landward movement involves the erosion of the lower seaward limit of the coastal habitats being considered and the re-deposition of these sediments further landwards – a process commonly referred to as 'rollover'. The rate of landward movement depends on:

- driving forces such as: sea level rise, tides, waves and storm activity; and
- controls such as: sediment supply (from onshore and alongshore), the mobility of sediments within coastal zone, the erodability of coastal zone, as well as the hinterland gradient and land use.

Landward movement can be considered for the coastal zone as a whole, which may be composed of an individual habitat type alone, or a number of different habitat types. In order for rollover to occur two criteria must be met:

- the physical and biological components of the habitats must be capable of being mobilised; and
- there must be suitable accommodation space for the habitats to migrate into.

Most depositional coastal habitats meet the first criteria including sand flats, sand beaches, sand dunes, gravel beaches, mixed sand and gravel beaches, mudflats, and saltmarshes. However, the rate of landward translation of different habitats varies since the processes of landward sediment transport



Figure 2. Burnham-on-Sea beach, Somerset: the width of the beach here is dependant on a number of controls in addition to sea level rise, including the position of the nearby estuary channel, the incident wave energy and the supply of sediment. Photo by Nigel Pontee

may be different. For example, estuarine saltmarshes may migrate slowly landwards to maintain their position within the tidal frame; whilst gravel beaches on the open coast may migrate landwards in a series of overwashing events driven by episodes of high wave and water levels.

A further point of note is that the processes that control the landward movement of the seaward extent of the habitat may differ from those that control the landward extent. For example, the recession of dune fronts may be due to wave action at high water, whilst the landward limits of dunes may be controlled by the occurrence of strong onshore winds which can blow sand inland. For saltmarshes, the lower limits may be controlled by erosive forces of waves which lead to the development of cliffs and the inundation frequency; whilst the upper limits are more likely to be determined by inundation frequency than wave action.

In order for the areal extent of coastal habitats to be maintained during landward movement, it is necessary for the seaward and landward extents to migrate at the same rate. Variations in these rates will lead to losses or gains of habitat extent. These gains or losses may exist for different lengths of time. For example there might be short term losses associated with the erosion of the seaward edge of habitats during storms (e.g. saltmarsh cliffling), followed by the longer term development of habitats further landwards after the repeated inundation of areas and colonisation by vegetation.

The second criterion, suitable accommodation space, depends on the topography and land use of the hinterland. Thus landward movement can occur if the hinterland is relatively low lying, but is likely to be hindered by steeply rising land composed of resilient materials or artificial structures such as sea defences.

Case Study

Pontee (2011) carried out a high level analysis of coastal habitats on the eastern coast of the Irish Sea from the Great Orme in North Wales to the Scottish border in the Solway Firth. The study was based on historical OS maps and recognised the limitations with this type of analysis including inaccuracies in early edition maps.

The study showed that only 7% of the locations analysed exhibited a response which



Figure 3. Grange-over-Sands, Cumbria – changes in saltmarsh habitat are critically dependant on the position of the estuarine channel. In the 1960s a channel ran close to Grange-over-Sands causing erosion of saltmarsh and lowering of the foreshore. However, by the 1970s this channel had moved east, initiating saltmarsh growth along the frontage. The marsh is currently eroding again as the channel moves westwards towards it. Photo courtesy of NW Coastal Group

was consistent with coastal squeeze. The limited occurrence of coastal habitat loss in this area is due to the several physical factors including the onshore supply of sediment (Pontee *et al.* 2011) and a history of low rates of relative sea level rise, or even a fall in northern parts of the region, due to isostatic uplift (Halcrow 2010).

The study demonstrated that the landward migration of the low water mark can be due to a number of additional factors other than sea level rise. These additional factors, which are relevant to other coastal locations in the UK, include:

- shifting positions of offshore banks and channels influencing wave energy, for example, the position of the Kent Estuary channel influences the extent of marsh at Grange-over-sands and Silverdale (Figure 3, Pringle 1995, Pye and Neal 1994);
- changes in the wind wave climate (Pye and Blott 2008);
- reductions in along shore sediment supply due to the construction of structures, such as harbour arms, groyne fields, etc.;
- reductions in alongshore sediment supply due to the protection of eroding cliffs; and
- reductions in alongshore sediment supply due to sand mining.

In the broader UK context, several previous publications have shown that sea level rise has been a minor factor leading to loss of saltmarsh and intertidal flats, compared with other factors such as fluctuations in wind/wave climate (e.g. Pye 2000, van der Wal and Pye 2004).

Conclusions

The term coastal squeeze is clarified as being one form of coastal habitat loss, where intertidal habitat is lost due to the high water mark being fixed by a defence (i.e. the high water mark resides against a hard defence such as a sea wall), and the low water mark migrating landwards in response to sea level rise. Whilst by definition, coastal squeeze can only occur in front of anthropogenic structures, it does not follow that all habitat loss in front of defences should be attributed to the presence of the defences.

Previous high level assessments of habitat losses have often suffered from limited appreciation of geomorphological processes. Consequently, they have failed to acknowledge that losses can result from factors other than sea level rise and have focussed too heavily on coastal squeeze. These approaches will invariably produce worst case scenarios of habitat loss due to

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coastal defence interventions and potentially result in inflated habitat compensation targets.

In most instances detailed geomorphological investigations are likely to be needed to understand the causes for habitat loss and the role of sea level rise. This applies to all coastal areas and such understanding is fundamental to the predictions of future change. Given the uncertainty in drivers such as sea level rise, plus our present limited ability to predict long-term morphological change, it is essential that use is made of monitoring data to document changes in coastal habitats. This information, plus ongoing improvements in coastal process understanding, should be used to revisit targets for coastal habitat creation in the future.

About the Author

Dr Nigel Pontee has 20 years' experience in coastal geomorphology and management. He has authored over 200 consultancy reports covering coastal process assessment, habitat creation scheme design, feasibility studies, impact assessment, coastal and estuarine shoreline management. Nigel has over 75 publications, including several book chapters, journal and conference papers, and best practice guides for CIRIA and PIANC.

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Notes

1 In this paper, sea level rise is taken to mean a rise in sea level relative to the stretch of coast being considered. This relative rise is dependant on a number of elements, including: global or eustatic changes, for example as a result of melting ice-caps; and isostatic elements, such as the local subsidence or uplift of land.

2 Increased wave energy can arise due to increased nearshore water depths, due to relative sea level rise, or changes in wind climate. It has been suggested that climate change will lead to future increases in wind speeds and thus the 'storminess' of the wave climate. To date, however, there is no clear scientific consensus that is the case (Environment Agency, 2011).

DNA Barcoding as a Tool for Fungal Conservation: Fast and Economical Identification at any Time of Year

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It is only in the past decade that fungi have achieved any form of profile in conservation planning, the result of the missionary zeal of a relatively small number of ardent mycologists. UK conservation efforts were catalysed by Eef Arnold's pioneering work on the loss of macrofungal diversity in the Netherlands and led to the first notification of a site for its fungal diversity (Roelcliffe Manor Site of Special Scientific Interest (SSSI), Leicestershire, 2001). Several other sites have since been notified in Wales, including Disgwylfa (Brecon, 2002) and Eithinog (Bangor, 2008) but most famously Llanishen and Lisvane Reservoir Embankment, where the Countryside Council for Wales' (CCW) decision to notify this site as an SSSI was upheld at a judicial review in the High Court (January 2007).



Figure 1. *Hygrocybe punicea*, sometimes called the crimson waxcap

The fungi that were the subject of these notifications were the waxcaps, a term now hopefully familiar to most conservation professionals. These members of the genus *Hygrocybe* form particularly colourful mushrooms and are unusually abundant and diverse in the undisturbed grasslands of northern Europe, and especially in the wetter and hillier regions of the UK.

At some grasslands sites, a remarkable diversity, 20-30 species, may occur within a site of 1ha or less. However, semi-natural grassland habitats in general are amongst the most threatened of all UK habitats but 'waxcap grasslands', of which less than 200ha remain in the Netherlands, are particularly vulnerable since the botanical diversity of many of these sites can be low

Feature Article: DNA Barcoding as a Tool for Fungal Conservation: Fast and Economical Identification at any Time of Year (contd)

due to inappropriate sward management and without specific autumn surveys the existence of these fungi may go unnoticed. A poignant example of this is Parkgrass haymeadow at Rothamsted Research Station, the most intensively studied grassland on the planet. The survey of Joseph Gilbert in 1874 (founder of this and the other 'classic' experiments) found that waxcaps occurred only on unfertilised plots but thereafter no formal fungal survey was conducted until we surveyed the site in 2004. One species we found in abundance is the majestic *Hygrocybe punicea* (Figure 1). Not only is it restricted to the fertiliser free plots but there are no other records of this species anywhere else in Hertfordshire.

To claim that attention has been lavished on waxcap fungi in the 21st century is an overstatement but we do now know a lot more about their ecology, distribution and habitat requirements. There is good guidance for habitat managers as to how to maintain healthy known populations but the specialist nature of fungal taxonomy is daunting to the general naturalist. Identification of waxcap grassland sites poses a problem in assessing the environmental impacts of building development and the need to undertake autumn surveys can lead to costly delays, even if a suitably skilled fungal surveyor can be found. More frustratingly still, very dry or wet autumns are unfavourable to fungal fruiting, so the full display of waxcap diversity will not occur every year.

At Aberystwyth University we have recently developed a truly cutting edge methodology for assessing fungal diversity based on sampling of the soil, where most of the biomass of these fungi is found. The method is based on high-throughput sequencing of DNA barcodes, which allows accurate identification of the fungi present and even quantification of the relative abundance of the different species. Driven by advances in medical research, this technology is advancing at a tremendous pace, so the costs have now fallen to a level that is competitive (and will become cheaper) compared to more traditional ecological surveying. However, its primary advantage is that analyses can be conducted rapidly (within a few weeks) and at any time of year.

Our work, which was kindly funded by the Welsh Assembly Government via CCW, examined 18 sites which had been subject to several autumn fruitbody surveys and were known to be home to diverse waxcap populations. By comparison with a database of reference waxcap DNA barcode sequences which we created, we were able to confirm the diversity and abundance of the waxcap fungi, even demonstrating the presence of species not previously observed at those sites. Equally, some species were missed, an inevitability when taking a 500g subsample from the approximately 10 tonnes of topsoil in our 900m² quadrats. We intend to develop and fine-tune this approach over the coming months but would welcome the opportunity to apply this further.

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About the Author

Dr Gareth Griffith is a fungal ecologist with a particular interest in the fungi which inhabit temperate grassland ecosystems. As well as the more visible macrofungi of conservation interest, such as waxcaps, his interests include the microfungi involved in mycorrhizal associations and anaerobic fungi found in the digestive systems of cattle, sheep, etc. Having worked at IBERS (Institute of Biological, Environmental and Rural Sciences), Aberystwyth University since 1996, he also runs the Microbiology degree scheme and contributes to the teaching of field-based ecology.

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Opinion Piece: Better for Man and Better for Beast – Bats, Newts and Article 12(4) of the Habitats Directive

Hugh Watson CEnv MCIEEM

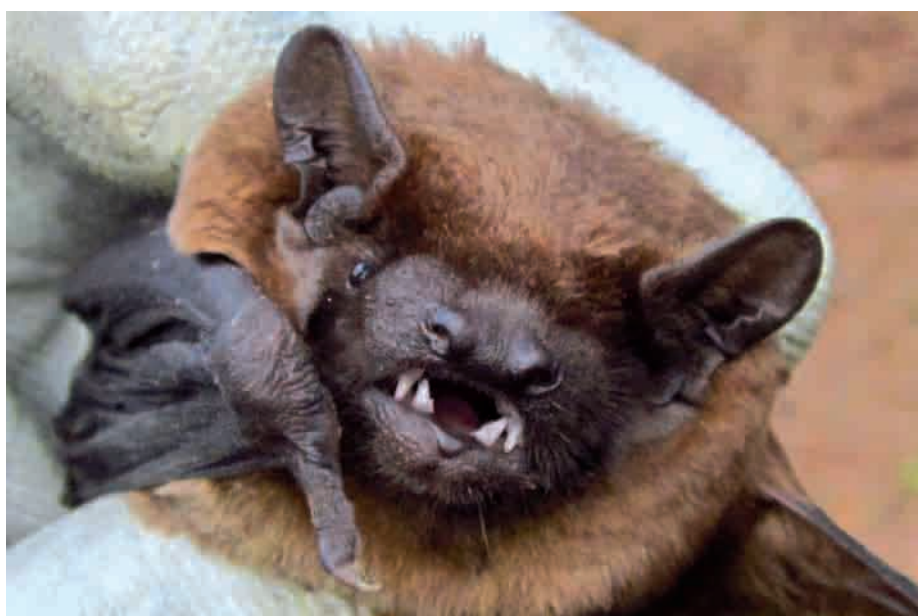
Amec Environmental and Infrastructure UK Ltd

One of the more taxing problems we have to address in applied ecology at present is the issue of bats colliding with wind turbines – why does it happen, can we predict it, and what should we do about it? All species of bats are included in Annex IVa of the Habitats Directive and are therefore “... *in need of strict protection*”. But what, in practice, does that mean? And should it mean something else?

As a piece of nature conservation legislation whose stated aim is “...to promote the maintenance of biodiversity”, the Habitats Directive is fundamentally unbalanced. As I see it, a policy delivery regime for biodiversity conservation needs three elements:

1. a mechanism for protecting special sites;
2. a mechanism for maintaining ecological links and habitat features in the wider landscape; and
3. a mechanism for protecting species threatened by killing or disturbance.

The Habitats Directive provides powerful tools for the delivery of elements 1 and 3, but is very weak in respect of element 2¹ - which is arguably the most important one for the conservation of widespread species of conservation concern such as most bats, great crested newts, otters and indeed the



Noctule Bat. Photo by Hugh Watson

majority of the strictly protected species found in Britain. This wouldn't matter if there were other equally strong legislation or policy instruments for delivering biodiversity conservation in the wider landscape, but there aren't. This makes the Habitats Directive something of a two-legged stool.

One of the consequences of this imbalance, this lack of a powerful means of protecting the habitats of widespread species, is that regulators and consultees tend to rely excessively on the tool they do have – Article 12 of the Habitats Directive – the one that deals with the 'protection of species'.

Now there are two sections of Article 12 that are relevant to situations where protected species may be killed.

Article 12(1) says that Member States shall “...establish a system of strict protection...

prohibiting... all forms of deliberate capture or killing of specimens of these species in the wild”.

In the legal sense, 'deliberate' has a wider meaning than it does in everyday use, and according to the European Commission's guidance document on the protected species provisions of the Directive (EC 2007²) deliberate actions are “...actions by a person who knows, in the light of... the general information delivered to the public, that his actions will most likely lead to an offence... or consciously accepts the foreseeable results of his actions.”

The prohibition on deliberate capture or killing can be lifted for a variety of reasons set out in Article 16 of the Directive, “provided that there is no satisfactory alternative and the derogation is not detrimental to

Feature Article: Opinion Piece: Better for Man and Better for Beast – Bats, Newts and Article 12(4) of the Habitats Directive (contd)

the maintenance of the populations of the species concerned at a favourable conservation status in their natural range..."

The second relevant section of Article 12, Article 12(4), says that "Member States shall establish a system to monitor the **incidental capture and killing** [of strictly protected species]. *In the light of the information gathered, Member States shall take further research or conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned.*"

The Habitats Directive itself does not make it clear when killing is 'incidental' as opposed to 'deliberate'. However, EC 2007 gives "... bat deaths in wind turbines or road kills" as specific examples of incidental killing that need to be monitored, a view endorsed by the judge in August 2012's 'Eaton Case'³ (summarised and commented on by Penny Simpson in last December's issue of *In Practice*⁴).

It would be tempting to think that treating bat deaths due to wind turbines as incidental rather than deliberate would necessarily be disadvantageous for bat conservation, but a comparison of the wording of Articles 12(1) and 12(4) indicates that this is far from the case. Article 12(1) is actually an animal welfare provision, and its ability to deliver biodiversity conservation (i.e. maintenance or establishment of thriving populations of the protected species) is entirely dependent on the context in which it is used. Indeed, as interpreted in England it actually discourages habitat enhancement⁵, and given the amount of time, effort and resources that go into making it workable (i.e. the protected species licensing system) and it is a serious distraction from more important, landscape-scale aspects of biodiversity conservation. Indeed, to the extent that it makes protected species a liability for property owners and developers it may actually work against biodiversity conservation – an issue I have explored previously in relation to great crested newts⁶.

By contrast, Article 12(4) is focussed on the species rather than the individual, and sets out a systematic, iterative and scientific approach which puts the obligation on the government to establish a system to monitor incidental capture and killing and if necessary to follow this up with research and conservation measures. We don't have an effective system for that at the moment – if we did, we might by now have a much

better understanding of the bat and wind farm issue and what, if anything, we need to do to prevent it from having an adverse effect on bat species; we might also have some idea of whether the UK great crested newt population is increasing or decreasing. Article 12(4) could also provide the legal underpinning for consistent application of robust monitoring conditions to planning consents, and for statutory guidance on ensuring that all forms of land management and development avoid significant negative impacts on protected species.

Am I being over-optimistic about the creative potential of Article 12(4)? Perhaps – although I am sure this is what the legislators had in mind when they were drafting the Habitats Directive, and that they would be disappointed at the extent to which it has become enmeshed in arcane arguments about the precise meaning of the word 'deliberate' and its implications. The European Commission certainly recognises the limitations of the Habitats Directive in this regard, judging by another passage from EC 2007:

"...it is important to recognise that proactive habitat management measures (such as restoration of habitats/populations, improvement of habitats) are not an obligation under Article 12... For example, if proactive biotope restoration is needed for a butterfly species listed only in Annex IV(a) because its habitat has nearly disappeared and only a larger habitat would ensure long-term survival, such a measure would not be covered by Article 12. Such situations could be avoided or corrected in the medium- to long-term by revision of the annexes or the Directive itself."

Ultimately, I'm sure the Commission is right, and that we need a revision of the law if we are to have a robust means of conserving species outside statutorily designated sites and if Europe is to have any prospect of ever achieving its goal of halting the loss of biodiversity, let alone by the current target date of 2020. However, in the meantime the judgement in the Eaton Case⁷ offers at least some hope that via Article 12(4) we can make much more constructive use of the Habitats Directive in its current form for the benefit of both man and beasts – not only the strictly protected species themselves but also the many others that share their habitats.

Notes

1 Note the weak wording of Article 10: "Member states shall endeavour, **where they consider it necessary**, in their land-use planning and development policies... to encourage the management of features of the landscape which are of major importance for wild flora and fauna..."

2 European Commission (2007) Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC.

3 Eaton vs RWE Npower and Natural England (Bradwell on Sea Wind Farm), August 2012.

4 Simpson, P. (2012) Ecology Legal Update: Court case on 'deliberate killing' of birds and bats by wind turbines. *In Practice* **78**: 39-40.

5 See, for example, Natural England (2009). The Myth – That providing excessive mitigation/compensation will guarantee a great crested newt mitigation licence.

6 Watson, H. (2008). Great crested newts and their conservation: are we getting it all wrong? *In Practice* **60**: 25-28.

7 Permission to appeal against the judgement was refused on 1st May 2013, but the legal reasoning was not yet available at the time of going to press.



About the Author

Hugh worked in ecological research (mainly otters) and conservation (otters, tropical rainforests and Northumberland) before becoming a consultant, initially freelance but for the past 15 years with Amec and its predecessors. Within ecology his interests are very wide, and he has experience in many sectors, but much of his work over the past 12 years has related to wind farms, both onshore and offshore. Currently, he is particularly focussed on trying to understand the bats and wind turbines issue and the most appropriate ways of addressing it. The opinions expressed in this article are purely personal.

Contact Hugh at:
hugh.watson@amec.com

Institute News

Chartered Environmentalist of the Year

As well as his Fellowship (see below), David Stubbs has become the first ever 'Chartered Environmentalist of the Year'. His award was announced by Society for the Environment President Tony Juniper and Chair Carolyn Roberts at the Sustain Awards 2013 held at The Guoman Tower Bridge Hotel, London on the evening of 5th March 2013. David won the award for his work as Head of Sustainability for the London Organising Committee for the Olympic Games (LOCOG) – the London Olympics 2012.

In congratulating David, Alex Galloway, Chief Executive of the Society for the Environment said: *"David's work for the London Olympics, on a world stage, and with the highest possible profile, promotes the vital contribution of Chartered Environmentalists in driving forward the sustainability agenda. David was instrumental in helping to ensure that the UK delivered on the promise that London 2012 would be the greenest games in the history of the Olympics."*

David was unable to attend the Awards in person as he was in Tokyo advising the Olympic committee on the sustainability merits of the three cities competing for the role of Olympic host city – 2020! However upon receiving his award, David said: *"It was a huge privilege to have led the sustainability team at London 2012 and I consider this a tribute to their work and that of the extended body of sustainability professionals who put so much effort and initiative into delivering our sustainability programme. I hope the achievements and lessons learned from London 2012 will inspire others in our profession to build on the legacy."*

We at CIEEM would like to congratulate David on the award and we are pleased and proud that the first ever Chartered Environmentalist of the year is one of our own!

Planning Naturally

CIEEM has been working with RSPB and RTPI on a new report on good practice in spatial planning with nature in mind. *Planning Naturally*, which identifies 12 principles of good spatial planning and uses case studies to exemplify them, will be published shortly. We are grateful to Dr Sarah Jackson MCIEEM of Penny Anderson Associates Ltd for representing CIEEM on the Steering Group.


Degree Accreditation Scheme

The next deadline for expressions of interest for our degree accreditation scheme is 4th October 2013. So far 12 degree programmes (undergraduate degrees or taught Masters) are being assessed for accreditation and we anticipate announcing the first accredited degrees later this month. We hope that accreditation will be the start of a developing relationship with the course programme leaders so that we can identify ways in which the Chartered Institute and its members can support students and graduates as they seek to take their first steps onto the career ladder.

Summer Conference 2013

We are delighted that our Summer Conference this year is being offered in partnership with the Landscape Institute. **Green Infrastructure: Interdisciplinary Design and Practical Delivery**, the second in our series of three Ecosystem Services events, will be held in Birmingham on the 10th July. Keynote speakers are CIEEM Patron Tony Juniper and Honorary Fellow of the Landscape Institute Pam Warhurst. This event is aimed at experienced practitioners and we are keen to explore how ecologists, environmental managers and landscape designers can work more holistically to achieve better green infrastructure outcomes. Bookings are now open – please go to www.cieem.net/events.

Endorsement of EA Training Development Frameworks

CIEEM has recently endorsed two of the  Environment Agency's Technical Development Frameworks (TDFs): the Biodiversity and Fisheries TDF; and the Environmental Monitoring TDF. Training Development Frameworks are a tool that have been developed by the Agency as a means of taking a more dynamic approach to staff learning and development. They put competence (in the form of capabilities) at the heart of the EA's performance management approach and are a mechanism to help individuals and teams identify and develop the skills and know-how that they need to perform their role effectively. These two TDFs cover the EA's frontline officers undertaking ecological, conservation management, environmental monitoring and environmental assessment activities and CIEEM has been pleased to endorse them.

2014 Professional Development Programme

It is never too early to start planning our Professional Development Programme and we are very keen to hear ideas and suggestions for new training courses and workshops. If you have suggestions for suitable courses that you would like to see included in the programme or you are able to offer training to others then please do get in touch with CIEEM's Training and Professional Development Officer, Helen Boulden, on 01962 868626 or at helenboulden@cieem.net.

Awards Luncheon 2013

CIEEM will be holding its inaugural Annual Awards Luncheon on 28th June 2013 at the Birmingham Botanic Gardens. This event will see the presentation of the Chartered Institute Medal, the Best Practice Awards and the new People Awards. For more information on the awards, or to book a place or table at the event, please visit www.cieem.net/awards.

Ecobuild – Promoting the Professional Directory

On 5-7th March this year, CIEEM exhibited at the huge Ecobuild exhibition at London ExCeL. With over 10,000 people in attendance, Ecobuild is the largest showcase of sustainable construction products and services in the world. CIEEM was primarily there to promote the Professional Directory (and the ecological services our members offer) but also answered a lot of enquiries about membership and training that we run. CIEEM actively promotes the Professional Directory at events attended by planners and developers such as Ecobuild and the RTPI Planning conference. For further information about the Professional Directory, please visit www.cieem.net/professional-directory-registration-274.

Staff Changes

In March we welcomed **Michelle Nash** who joined us as our Membership Officer after we said goodbye to Zacynthia Dunhill-Rice. Michelle, who hails from Melbourne in Australia, has previously been working in a number of temporary financial and administrative roles whilst she looked for a permanent position.

New Fellows

Congratulations to two members who have recently been admitted to Fellowship of the Chartered Institute.

Ann Skinner is a Senior Advisor in the National Biodiversity team at the Environment Agency. Ann has been awarded Fellowship of the Chartered Institute in recognition of her expertise in river and wetland ecology and her outstanding contribution to the development of policy and procedural guidance within the Environment Agency as well as her initiatives to promote professionalism within and outwith the Agency.

David Stubbs has been awarded Fellowship of the Chartered Institute for his outstanding contribution to the conservation of Mediterranean tortoises and to the development of good practice in relation to sustainable sports event management, not least as Head of Sustainability for the London Organising Committee of the Olympic and Paralympic Games (LOCOG).



Recent Fellows of the Institute, left to right, Mike Barker, Will Manley, Pam Nolan, Ann Skinner, Alastair Driver and David Stubbs

East of England Section News

Poppy McDonald CEnv MCIEEM

Secretary, East of England Geographic Section Committee
Poppy.McDonald@mottmac.com

Reptile Conference Report

Over 90 delegates from a variety of sectors attended a conference on 'Reptiles – Research Survey and Mitigation', which was held in the Green Centre at Wat Tyler Country Park in Basildon on 20th November 2012.

The conference aimed to broaden delegates' understanding of reptile ecology through a series of talks and case studies, with a focus on the East of England region.

The day kicked off with a talk from David Sewell from the Durrell Institute of Conservation and Ecology on Survey Methodology Options. David has been working on a project with statutory bodies and NGOs such as ARG to develop reptile survey protocols. These have changed little over the last 20 years but scientific studies and statistical analysis have developed, leading to a gap between science and practice. The project hopes to close this gap and a draft of the protocols are available on the ARG UK website (www.arguk.org).

Following David, Nigel Hand (Central Ecology) detailed the results of his research into radio tracking adders in the Wyre Forest. Nigel worked with Sylvia Sheldon, who is well known for her intimate knowledge of the individual adders in the forest, to capture adders at two sites and fit radio tags weighing just 1.1g. The tags were then used over their 8-10 week lifespan to track the movements and habitat use of the adders. There were a number of interesting findings including that males moved furthest (one moved over 600m in 3 days), that juveniles tended not to disperse to new areas but remained in a small area, and that mammal burrows appeared to be used regularly for hunting.

Taking on a more local stance Martin Horlock from the Norfolk Biodiversity Information Service spoke next about the distribution of reptiles in the East of England, and posed several questions to the delegates to get everyone thinking.

After a brief break for networking and refreshments Jim Foster (ARG) spoke on developing statutory guidance for reptile

mitigation, and gave positive reasons for issuing guidance, and its limitations. Following a casework review, practitioners said guidance should be specific, quantitative and practical, and that standards should be typical to allow the practitioner to interpret up or down, rather than setting a minimum requirement (for example the number of survey visits). Also on a guidance theme Paul Edgar (Natural England) spoke on the new herpetofauna strategy for England and Wales, which implements the aims of Biodiversity 2020. Paul discussed topics such as, the landscape scale approach, maintaining and improving protected areas, expanding and reconnecting habitats, Nature Improvement Areas, and good habitat management.

Two talks were given on mitigation case studies. First Jon Cranfield (Herpetologic) discussed two large reptile relocation projects, one on a Southend golf course, the other in Basildon where a large habitat creation area was constructed, including grassland scrub and wetland habitats. Secondly Christian Whiting (Halcrow) discussed a large scale mitigation project as part of the Broadland Flood Alleviation Project which involves the strengthening of some 250km of banks in the Norfolk Broads to protect over 21,300ha of land. Large banks were created from rush and reed bales, and 104 adders were moved to them as well as numerous other reptiles.

Tony Gent gave a thought-provoking talk on reptiles and biodiversity offsetting. Firstly running through the principles of offsetting, including habitat banking, conservation credits and assessing value. He then went on to discuss what these developments might mean in terms of reptile conservation.

David Collins (Vice Convener of the East of England Section) summed up the conference and then as part of CIEEM's 21st birthday celebrations, cake and wine were provided for delegates before the journey home. An enjoyable and informative day was had by all, and particular thanks go to Alanna Cooper (East of England Section) and Helen Boulden (CIEEM).



If anyone would like to become involved with the East of England Committee or has an idea for an event then please contact Sue Morgan, the Convenor, through the CIEEM website.

East of England Section Events 2013

Visit to Carlton Marshes Nature Reserve, Lowestoft

Led by **Matt Gooch (Suffolk Wildlife Trust)** and **Helen Smith (Co-ordinator, Fen Raft Spider Recovery Project)**

Tuesday 11th June 2013, 6.30-8.30pm

This Suffolk Wildlife Trust reserve extends to approximately 120ha of grazing marsh, fen and pools. Most of the site is a SSSI which forms part of the Broads SAC and Broadland SPA and Ramsar sites. The dykes support a fabulous variety of plants and invertebrates including Norfolk hawkers and several species of rare molluscs. Matt will talk about the management techniques that the Trust uses to maintain and improve the wildlife interest as well as the important education work

that they do. Carlton Marshes is one of a handful of sites in the Broads that have been selected as being suitable to try and establish new populations of the rare fen raft spider *Dolomedes plantarius*. Helen will tell us about the ups and downs of this long running project and hopefully be able to show us some of the spiders.

To book a place and receive details of the meeting point please contact Jeremy Halls (Jeremy.Halls@ch2m.com).

Visit to Little Ouse Headwaters Project Fen sites, Thelnetham

Led by **Tim Pankhurst (Regional Conservation Manager, Plantlife)**

Thursday 11th July 2013, 5.30-7.30pm

These sites form part of the Waveney and Little Ouse Fens SAC, the qualifying habitats

being *Molinia* meadows and calcareous fens with *Cladium mariscus*. Not surprisingly the area supports a wonderful array of plants including marsh helleborine, marsh lousewort and bog pimpernel. Tim will guide us on a route covering several sites and will explain some of the innovative restoration techniques that have been used to restore and improve the ecological value this special area. Voluntary effort has been a key part of the success and the project has an excellent website at www.lohp.org.uk.

To book a place and receive details of the meeting point please contact Jeremy Halls (Jeremy.Halls@ch2m.com).

West Midlands Section News

Veronica Lawrie CEnv MIEEM

Committee Member,
West Midlands
Geographic Section



The West Midlands Section Committee has been busy planning events for 2013. Our first event of the year, an informal discussion workshop on Green Infrastructure and Biodiversity Offsetting within Worcestershire and Warwickshire, was organised by our new Committee member Rachel Hufton MCIEEM. The event was held at the Worcester Woods Countryside Centre on 5th March 2013 and was well attended. Presentations were given by Emily Barker, Principal Biodiversity and Landscape Officer at Worcestershire County Council, and David Lowe, Principal Ecologist at Warwickshire County Council. These were followed by an open forum discussion. The consensus was that these are excellent initiatives, and key to their success will be the buy-in of our planner colleagues. The spreadsheet tool which measures areas of habitats that will be lost within developments, and takes into account associated species, was considered to be very positive, and a useful way of summarising a lot of information.

Details of upcoming events will be emailed to members shortly. We hope you will be able to join us at some of the events and look forward to seeing you there.

South East England Section News

Ben Benatt CEnv MCIEEM

Convenor, South East England Geographic Section

Visit to the Millennium Seed Bank, Wakehurst Place

We were welcomed by Michael Way CEnv MCIEEM, Head of Collecting and Network Support, who then delivered a presentation focusing on the UK Native Seed Hub. This fits within Kew's 'Breathing Planet Programme' and is contributing to initiatives such as the South Downs Way Ahead Nature Improvement Area. There is great potential for commercial application providing seed for restoration projects.

The group was split into two for the tour, and led by Michael and Ted Chapman, UK Native Seed Hub coordinator. We saw how seed from all over the world is stored and tested

for viability using state of the art equipment. Part of the role of the Worldwide Millennium Seed Bank Partnership is to build capacity in other institutions and the research area was populated with students and visiting researchers who, using these facilities, can identify precise germination requirements to enable more effective *in situ* and *ex situ* plant conservation worldwide.



South West England Section News

Hayley Scoffham CEnv MCIEEM

South West Geographic Section Committee Member

Following the re-forming of the South West Geographic Section Committee in autumn last year, under Stephen Holloway as Convenor, the Committee members have been busy promoting CIEEM in the South West region.

The South West region covers a large area, encompassing Cornwall, Devon, Somerset, Dorset, Bristol, Wiltshire and Gloucestershire. Our largest membership is amongst consultants, but we also have members who work for NGOs, Local Authorities, Statutory Agencies, teaching/research facilities, and others. The diversity of our membership is reflected amongst the South West Section Committee which includes: Stephen Holloway (SLR Consulting, Exeter), Abigail Smith (EnterpriseMouchel, Exeter), Carly Smith (Tyler Grange, Stroud), Hayley Scoffham (Cresswell,

Bristol), Julian Arthur (Tyler Grange, Stroud), Mike Dean (MD Ecology, Cirencester), Mike Oxford (Plymouth), and Tony Serjeant (Somerset County Council, Somerset).

We are looking to increase numbers of CIEEM members in the South West further; and earlier this year in February, Convenor Stephen Holloway, presented to Exeter University at their Working in the Environment and Sustainability Sector in a bid to generate interest amongst students about CIEEM, and about working in ecological consultancy in general. The event went well with good attendance at Exeter and across their satellite campuses via video conference, and we are hoping to work with students at Exeter University again in the near future. We are also looking to approach other academic institutions to hold similar events.

In the vast and varied landscape of the South West, the Section Committee is also keen to provide opportunities for networking,

learning, and sharing ecological best practice for our members. It is important that this is driven by what our members feel they need or would like. To this end, we recently sent out a survey to our members via our CIEEM South West Section LinkedIn Group and the central CIEEM mailing list. The survey asked members about what kinds of events they would like to attend in our region (e.g. seminars, field visits, conferences, training courses, social events), and how far they would be willing to travel. We were pleased to receive more than 150 responses to the survey! We are now busy collating the survey responses and hope to update our members on progress soon.

There is clearly a real appetite for CIEEM events and activities in the South West region, and we are excited about what the year ahead may hold.

Partnership News



Countryside Management Association

The CMA is organising a seminar, entitled Getting It Right, at Folly Farm in Pensford near Bristol on Wednesday 18th September 2013 (10:00-16:45). This is their first national conference-style event for a number of years and the theme for it is about how people can (should) put the best available evidence at the heart of their decision-making processes. CIEEM members can attend the event at the same delegate rates as CMA members.

Identifying the precise question and then answering it will establish needs, set goals, monitor progress and evaluate success. But what is the right question? To help guide you we will be bringing together a wide range of researchers and practitioners from not only

the natural environment but also sectors such as health and heritage.

This one day seminar is for anyone involved in planning a grant application, reviewing a service, evaluating the success of a project or just looking to put the best available evidence at the heart of their decision-making process.

For members of CMA, Natur, SCRA and CIEEM members the cost of the seminar is £150 per delegate. For non-members working for a charity/not-for-profit organisation it is £160 and all other organisations, including local authorities, it is £170. This includes a light lunch and evening meal, all refreshments during the day (pay as you go bar in the evening), overnight accommodation, breakfast on the Thursday and the site visit.

Day delegates are welcome. The cost for members of CMA, Natur, SCRA and CIEEM members is £70 per delegate. For non-members working for a charity/not-for-profit organisation it is £80 and all other organisations, including local authorities, it is £90. This includes a light lunch and all refreshments during the day.

There are 50 places available on the seminar and they will be sold on a first come first served basis. The CMA is also offering a reduced registration fee for a small number of places for people who are unwaged or on low income.

www.countrysideassociation.org.uk



European Network of Environmental Professionals

ENEP held its latest General Assembly on Thursday 11th and Friday 12th April 2013 in Brussels. The first day was a side event on 'Environmental Communication', with talks from the European Commission, the European Environmental Bureau, and the Institution of Environmental Sciences.

The General Assembly itself was held on the Friday, which included reports on recent and forthcoming activities.

ENEP applied for LIFE+ funding for a second time in 2012, but was again unfortunately unsuccessful and has decided not to apply again. In the feedback from the European Commission it was clear that ENEP did not match its priorities to those of the Commission closely enough. The lack of

permanent staff was also an issue for the Commission, who see this as a lack of organisational stability.

A proposed new Code of Conduct was discussed, which will be used for those member associations that do not have their own. For member associations with established Codes and disciplinary procedures (such as CIEEM) these will supersede the ENEP Code.

There was a highly engaged discussion on ENEP's future. ENEP is at a point now where its ambitions are limited by its lack of resources. Unfortunately many member associations are unable to put more resources into ENEP and there was some disagreement over how the existing resources should be allocated. The ENEP Executive Committee was tasked with preparing a business plan for the next General Assembly, which will be held in October.

The redevelopment of the ENEP website was discussed, as this is now somewhat outdated and has some security issues.

The General Assembly also saw Jim Thompson (former IEEM Executive Director) stand down as Treasurer after originally being



Jim Thompson (left) hands over the financial 'reins' to Herman Jan Wijnants

elected to the position in June 2005. Herman Jan Wijnants, from the Dutch member association Vereniging van Milieuprofessionals (VVM), was elected to take over the role. Jim was thanked for his long-standing commitment to ENEP.

www.environmentalprofessionals.org

Applicants and Admissions

If any existing Member has any good reason to object to someone being admitted to the Institute, especially if this relates to compliance with the Code of Professional Conduct, they must inform the Chief Executive Officer by telephone or letter before 1st July 2013. Any communications will be handled discreetly. The decision on admission is usually taken by the Membership Admissions Committee under delegated authority from the Governing Board but may be taken directly by the Board itself. IEEM is pleased to welcome applications for membership from the following:

APPLICANTS

Applications For Full Membership

Dr Patricia Byrne

Applications For Associate Membership

Miss Jane Wright

Applications to Upgrade to Associate Membership

Miss Kathryn James

ADMISSIONS

Full Members

Miss Heather Ball, Ms Yuki Blakeney, Mr Oliver Burke, Miss Hazel Burt, Miss Claire Collings, Miss Marianne Curtis, Miss Orla Daly, Mr Andrew Davidson, Mr James Davies, Dr Gwennan Dean, Mr Eamonn Flood, Miss Laura Grant, Mr Dyfrig Hubble, Mr Dermot Hughes, Ms Jackie Hunter, Mr Stephen Lees, Mr Simon Mahoney, Dr Bethan Morgan, Dr Stephanie Murphy, Dr Robert Oliver, Mr Tom Ormesher, Mr Mark Rose, Mr Graham Scholey, Mr Gary Sinclair, Mr Matthew Vernon, Mr Julian Vulliamy, Mr Robert Weaver

Associate Members

Mr Alexander Baldwin, Mr Graham Boswell, Dr Jonathan Daisley, Grieg Davies, Dr Matthew Davies, Mr Thomas Evans, Miss Rebecca Golder, Miss Vanessa Jury, Mr Ignacio Martin-Granizo, Mr Sean McGrogan, Mr Kevin Rich, Mr Lee Rudd, Miss Camilla Smith, Mr Jonathan Spencer, Mr Daniel Thomas, Miss Hannah Wilson, Mr Joseph Wilson

Upgrades to Full Membership

Mr Robert Bell, Mr Simon Boswell, Mr Rolf Brown, Miss Katie Burrough, Mr Matthew Cook, Mrs Fiona Davis, Mr John Daw, Mrs Tamsin Douglas, Mrs Mandy Elford, Miss Joanne Ellam, Miss Julia Ferguson, Mr Robert Forbes, Mrs Helen Frost, Mr Thomas Goater, Mr Tom Gray, Miss Rebecca Harris, Mr Joshua Hellon, Miss Sara Hill, Miss Eszter Horvath, Mr Peter Howe, Dr Robert Iredale, Mr Richard King, Miss Victoria Levett, Miss Sarah Love, Miss Sarah Lynes, Ms Sophie Mairesse, Mr Robert Nicholson, Ms Michelle O'Neill, Mr Brian Robinson, Mrs Jennifer Shaw, Mr Thomas Shelley, Miss Jennifer Spelling,

Mr Paul Stephen, Mrs Laura Thain, Mrs Laura Turnock, Mr Mark Vivian, Mr Steven Ward, Miss Elizabeth Webster, Miss Lauren West, Mr James Wilson, Mr Daniel Winchester

Upgrades to Associate Membership

Miss Corey Cannon, Miss Stephanie Cooling, Miss Emily Day, Mrs Kathleen Delaney, Miss Lisa Durrant, Mr Stuart Elsom, Miss Louise Gall, Mr Martin Green, Mr Espen Helland, Miss Charlotte Holliday, Mr Daniel Hunt, Miss Zoe Jackson, Miss Nicole Jenkins, Miss Kylie Jones, Miss Cassie Needham, Ms Abigail Oldham, Mr Gareth Parry, Miss Amy Richards, Mr Luke Roberts, Miss Elizabeth Sturgess, Miss Fiona Wallis, Miss Hannah Williams, Mr Mark Zammit

Recent Graduate Members

Miss Karen Akehurst, Mr Sergio Arenas Gayoso, Miss Amy Barnes, Miss Indre Barsketyte, Miss Paula Bateson, Mr James Bilham, Mr Ben Blowers, Miss Rachael Boden-Hall, Ms Christine Bryant, Mr James Bumphrey, Miss Rachel Burgess, Mr Matthew Buxton, Miss Kirsten Campbell, Miss Victoria Campen, Miss Charlotte Carroll, Miss Emma Castle-Smith, Mr David Chatterton, Miss Jenny Colam, Mrs Gemma Cone, Mr Robert Corcoran, Miss Thea Cox, Miss Emily Cummins, Mr Adam Day, Ms Zoe Demery, Mr Christopher Dennis, Miss Kelly Downward, Miss Sophie Eastwood, Miss Elizabeth Else, Miss Carrie-Ann Farquharson, Mrs Caroline French, Ms Rachel Graham, Miss Tracy Gray, Mr Christopher Grocock, Miss Nicola Hall, Miss Philippa Hamshaw, Miss Vivien Hartwell, Miss Verity Heard, Mr Paul Holman, Mr Kenneth Howman, Miss Emily Iles, Miss Kate Jackson, Mr Rory Jones, Mr Thomas Knight, Ms Abi Mansley, Miss Rosie McLaughlin, Miss Laura Mears, Miss Joanna Meeke, Mr John Milne, Miss Louisa Molloy, Mrs Simone Mordue, Mrs Helen Mossman, Miss Alexandra Mueller, Dr Sawti Nettleship, Mr John O'Connor, Mr Eamonn O'Sullivan, Ms Julie O'Sullivan, Mr Edward Parrott, Miss Jennifer Passmore, Miss Kirsten Pate, Miss Konstantina Ploumi, Mr Daniel Pointon, Mr Ashley Powell, Miss Olivia Richardson, Miss Rebecca Rowberry, Mr Jake Sales, Miss Emma Sheard, Mr Daniel Sidoli, Miss Rosemary Sigger,

Ms Lexie Slingerland, Miss Rose Stainthorp, Mr Roberto Teixeira, Dr Nick Underhill-Day, Miss Natalie Walsh, Miss Kathryn Walter, Miss Elizabeth Webb, Miss Elisabeth Welbourn, Mr Christopher West, Miss Charlotte Wevill, Miss Danielle Whitlock, Mr Daniel Widdowson, Mr Christopher Wildblood, Mr John Woods, Ms Susan Worsfold, Mr Robert Wreglesworth

Recent Upgrades to Graduate Members

Miss Charlotte Phillips, Mr Nigel Brooke-Smith, Ms Sarah Buck, Miss Frances Burrows, Mr William Dommett, Mr Benjamin Fitch, Miss Jacqueline Kumadoh, Miss Charlotte Phillips, Mr Finbarr Ryan, Miss Amy Sneap, Mr Etienne Swarts, Mr Sean Willmer

Recent Student Members

Ms Rachel Bamford, Mr Eliot Beeby, Miss Frances Bennett, Mr David Bodenham, Miss Katharine Boltwood, Mr Andrew Campbell-Sutton, Miss Fiona Carr, Mr Rory Carr, Mr Daniel Clark, Miss Rebecca Crothall, Ms Rachel Donnachie, Miss Naomi Eckersley, Mr James Edwards, Miss Claire Elliott, Mr David Ferguson, Mrs Verena Furmor-Dunman, Miss Bryonie Fox, Miss Clare Friel, Miss Alexandra Gill, Mr Simon Gladding, Mr James Harris, Mr Jack Haynes, Mr Kevin Heywood, Mr David Howells, Mr Elliott Hughes, Miss Natalie Jones, Miss Adrienne King, Miss Kaidi Kuusk, Ms Helen Larzleer, Mr Edward Lewis, Mr Mark Lovell, Miss Emily MacFarlan, Mr Scott Mackenzie, Mr Daniel Madden, Mr Hdnar Mahdi, Mr Iain Malzer, Mrs Eva Martin, Mr Juan Martin Delegrina, Miss Rachel Morrison, Mr Charles Ohia, Mr Levi Onyenweaku, Mr Steven Ord, Miss Laura Pozzi, Miss Amy Preston, Ms Naila Qasmi, Miss Hannah Reeves, Miss Sarah Rimmington, Mr Aidan Ryan, Miss Natasha Sprague, Miss Hollie Standall, Mr Szymon Szary, Miss Annie Talbot, Miss Cerian Thomas, Miss Lara Thurel, Mr Jeffrey Turton, Mr George Wallbank, Mr Karl Welch, Mr Mark Williams, Miss Amanda Wilson, Miss Joanna Witton, Mr Sean Woods, Mr Dimitrov Yulian, Miss Rebecca Zeroth

Recent Affiliate Members

Miss Rachel Coombes, Ms Elizabeth Hall, Miss Mhairi Jack, Mr Neil Robertson, Mrs Katherine Wright, Mrs Edel Yule

Conference Report

Ecosystem Services 1: Practical Methods for Demonstrating the Value of Nature to Decision Makers

Wednesday 20 March 2013,
Burlington Hotel, Birmingham

'What is the value in valuing nature?' has been a key question for ecologists and economists since the 1980s. **Peter Glaves MCIEEM** of Northumbria University opened the conference with a multimedia exploration of the ongoing efforts that have been made to economically place a value on nature and the full range of benefits – Ecosystem Services (ES) – that people derive from it.

To demonstrate how ES can, and is, being used for place-based decision-making, **Ruth Waters** went on to present the work of Natural England's upland ES pilots, including some of the tools being developed to help roll out this approach more widely. The European Union is increasingly integrating the concept of Payment for (PES) into its policy making, in response to increasing pressures on the natural environment. But are schemes that place a monetary value on ecosystems a safe method of bringing about the changes urgently needed in our production and consumption habits?

Alexandra Bosbeer CEnv MCIEEM from The Quaker Council for European Affairs, asked delegates to consider the ethical implications of this approach, as well as the economic, social and environmental risks of placing a monetary value on our natural capital.

At the local level, the valuation of ES is being used to assist decision-making through the development of practical tools such as biodiversity mapping. **Katie Medcalf CEnv MCIEEM** (Environment Systems), introduced work produced for the Dorset AONB and the Frome and Piddle Catchments, to identify ES using a series of spatial layers, including biophysical features within the landscape and a range of habitat data. Ecological networks have also been developed to highlight areas of greatest opportunity for enhancing habitat connectivity and ecosystem resilience to target habitat restoration. These and other case studies, as described in the sessions that followed, are all helping to integrate ecosystem service thinking into practical land

use projects and planning by decision-makers at all levels.

Spatial planning was next cited by **Dylan Bright** of the Westcountry Rivers Trust, as a catchment-level tool for mapping current land use and identifying areas that are, or could be, important for delivering ES. Dylan sees a potential trap in the current interpretation of PES, which is that if you cannot value a service then it is valueless, and that the total value of an ecosystem is made up of the sum of all the services. A cautionary approach has thus been deployed whereby only after stakeholder- and expert-led planning has been carried out is economics used to help deliver the process. Support has come from international colleagues accessed through the Rural Economic Land Use programme.

In Wales, **Natalie Small** is part of the SCCAN project - System Cynorthwyo Cynllunio Adnoddau Naturiol (Natural Resource Planning Support System), which takes a pragmatic approach to ES mapping, using readily available information and existing scientific knowledge. It considers the multiple benefits that ecosystems provide society and how these can contribute towards human wellbeing at a variety of spatial scales. The outputs from SCCAN are used to increase understanding of known issues, and provide evidence to help inform decisions around more sustainable planning and land use.

An ES Mapping Toolbox is something that **Jonathan Winn CEnv MCIEEM** and Durham Wildlife Trust's EcoServ-GIS project have developed using fine-scale maps of 10m or 50m, widely available datasets, and a standardised methodology. The toolbox can illustrate where the highest demand is for ecosystem services, as well as where there is capacity for service provision, and crucially where these areas coincide. Individual ecosystem service tools are independent of one another and can be run alone or as part of a multiple service assessment, giving great flexibility to decision-makers to make appropriate assessments.

Scottish Natural Heritage's ongoing natural capital project aims to develop a tool to help communicate the overall change in our natural environment, whilst helping speed development of a methodology for natural capital accounting. The Natural Capital Asset index is based in the year 2000 with annual calculations thereafter. In total there are around a hundred indicators of quality, added together to produce an overall index of natural capital. Quantity (ecosystem area) is multiplied by Quality (the ability to deliver ecosystem services), with each of the broad habitats weighted according to its relative importance. **Ralph Blaney** explained the latest results of the project up to 2011.

Coastal and oceanic biomes may provide up to two thirds of our planet's ecosystem services, but evidence on their value is still limited. In a markedly different approach to the preceding case studies, **Niels Jobstvogt** explained his project's investigation into the values held by key user groups (including divers and anglers) towards marine ecosystems, and how this research has sought to find evidence of shared values within these communities. The results will be added to the ongoing values evidence base being presented to key decision-makers to identify and designate Marine Protection Areas (MPAs) in the UK. The research is undertaken by an interdisciplinary team focusing on the UK National Ecosystem Assessment's 'Shared, Plural and Cultural Values' work package.

In the next session, delegates were asked to imagine a city where the economy, society and the environment are in balance; carbon consumption is low; and wellbeing is high. Then to imagine this city being realised somewhere in the UK. **Nick Grayson** from Birmingham City Council is keen to change people's mindsets and encourage interdisciplinary collaboration. These aspirations are key to the vision which drives Birmingham's political ambition to become one of the world's leading green cities. A first step along the way has been the development of a

draft Green Living Spaces Plan and its output project, the 'Natural Capital City Model for Birmingham'.

Esther Kieboom is an environmental economist with in-depth understanding of many cases of the practical application of economic concepts in valuing ES. 'Environmental Growth' is such a concept, which seeks to promote developments incorporating environmental gains from the outset. Other examples include tools and methodologies for valuing flood prevention, clean drinking water, recreation, and carbon sequestration. An assessment of a local economy was highlighted by Esther, exploring the link between the economy and the local landscape. Another case study showed how environmental improvements are being used to encourage economic regeneration. The audience were challenged to think how these concepts could be relevant to their work as ecologists or environmental managers, coupled with the warning not to assume that value equals 'cash' in terms of revenue or income.

Following on from this session, **Will Manley CEnv CIEEM** introduced the concept of stocks and flows in an ecosystem context. His experience is drawn from a collaborative and multidisciplinary project led by the Centre of

Ecology and Hydrology that includes a broad mix of natural scientists, social scientists, economists, policy makers and land managers. The project is set within the context of the NERC/Defra-funded Valuing Nature Network (VNN), focusing on a framework to target the underlying processes and stocks of natural and human capital in a valuation of ecosystem services. The framework has used agricultural landscapes as a model to illustrate relationships between people and ecosystems in both management and delivery of ES. A challenge is that many regulating and cultural services are not traded on the open market and can therefore fail to influence decision-making. However, models can go some way to raising the levels of understanding of what types and combinations of natural and human capital are required.

Bruce Howard from the Ecosystem Knowledge Network (EKN) was given the opportunity to communicate the benefits of this resource for anyone wanting to share knowledge or learn about the practical benefits of an ecosystems approach.

As part of the conference, delegates were asked throughout the day to undertake three interactive activities:

1. To list their main issues and concerns with ES and the valuation of nature;
2. To identify any opportunities they see with valuing ES; and
3. To list/draw the main ES and benefits they see in trees/woodlands.

The above exercises formed the basis of the conference plenary session presented by Peter Glaves MCIEEM and which is expanded on in the text linked to this article.

A full list of speakers and their biographies and information on further reading are all available at www.cieem.net/previous-conferences.

Upcoming CIEEM conferences:

- 10 July, Ecosystem Services 2 - 'GI: Interdisciplinary Design and Practical Delivery', CIEEM Summer Conference in partnership with the Landscape Institute (Birmingham)
- 6-7 November, Ecosystem Services 3 – Freshwater (title TBC), CIEEM Autumn Conference in partnership with the Environment Agency (Southampton)

Summary of the Conference Plenary Session

Ecosystem Services and Values of Trees/Woodland

Delegates identified a wide range of ecosystem services/values.

A frequency analysis of the ecosystem services was undertaken the results are presented in the wordle diagram below.



The top five most frequently listed values/ ecosystem services were:

- Habitat
- Biodiversity
- Carbon sequestration
- Wildlife
- Fibre/fuel

Interestingly, three out of the five most frequently listed values/services are services which are not listed in the Millennium Ecosystem Services Typology.

There were a number of ecosystems services/values from the Millennium Ecosystem Services Typology which were under-represented or not listed at all by delegates, these included:

- Genetic resources
- Ornamental resources

Peter Glaves MCIEEM
Northumbria University

- Disease and pest control
- Pollution control
- Employment
- Scientific
- Spiritual
- Social relations
- Education
- Pollination

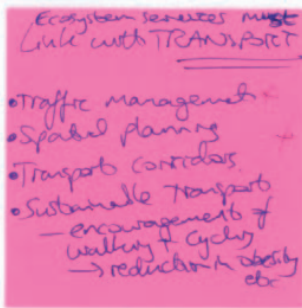
Delegates also identified a number of values/ ecosystem services that are not listed in the Millennium Assessment and most commonly used ecosystem services typologies:

- Biodiversity
- Habitat
- Wildlife
- Carbon sequestration
- Oxygen
- Landscape / landscape features

- Shade
- Shelter
- Tranquility
- Social justice
- Inspiration
- Awe
- Green / green space

Main Issues and Concerns with Valuing Ecosystem Services

Delegates identified a wide variety of issues and concerns with ecosystem services, example feedback is shown below:



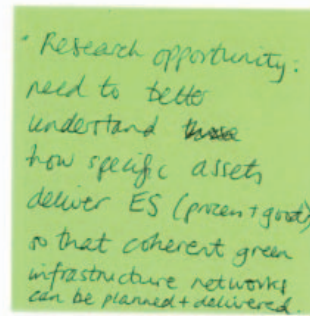
The main issues and concerns with ecosystem services and their valuation listed by delegates were:

- Language and communication
- Ignores some values – e.g. cultural
- Skepticism
- Training/Skill set – lack of
- Buy-in and Engagement
- ES in restoration of sites
- Tools – to apply in practice
- Blind alley/buzzwords
- Connecting people with the environment
- Linking to EIA, transport, etc.
- Marketing and trading in ES
- Current economics – CBA
- Not a legal requirement...
- Timescales and discounting
- If no data what can you do?
- ES role in protecting conservation
- Non-economic values e.g. biodiversity
- Essential vs Desirable ES
- Inconsistency in approach/results
- Underlying agenda – badger cull
- Application at site level
- Monetization – value vs price
- What to include – value of geology
- Complexity – too complex

A panel discussion and question and answer session was undertaken to discuss the top four issues: language and communication, buy-in and engagement, practical tools, and monetisation.

Potential Applications/Uses of Ecosystem Services

Delegates were also asked to suggest ways in which they could see ecosystem services being used, example feedback is shown below:



The potential applications most frequently listed by delegates were:

- Landscape Scale
- Protected Sites
- Attitude Change
- Consultation
- ES and GIS
- Planning and Decision Making
- Reaching consensus
- Price setting /agreeing
- Connecting people –environment
- Changing economic practice
- ES as a more holistic/sustainable approach

- Habitat specifics – orchards
- Development – EIA
- Toolkits
- Trade offs – mitigation
- Generating social values
- Participation – local people
- Raising nature values
- Understanding social values

A panel discussion and question and answer session was held to discuss the most frequently listed applications.

It was clear from the plenary sessions that conference delegates had clear concerns with applying ecosystem services approaches and valuing nature in this way. Many delegates were however able to identify benefits of such approaches and practical application for ecosystem services. Some delegates saw real, wider opportunities for an ecosystem services approach including:

- *“reconnecting people to the environment”*
- *“totally changing economic practice”* and
- *“could be the only real chance to deliver sustainable development”*.

CIEEM Summer Conference 2013

10 July 2013, Burlington Hotel, Birmingham

Green Infrastructure:

Interdisciplinary Design and Practical Delivery

CIEEM's 2013 Summer Conference in partnership with the Landscape Institute is the second in the series on Ecosystem Services.



Key speakers

Tony Juniper, CIEEM Patron
Pam Warhurst CBE

Spaces are limited, book your place now at

www.cieem.net/events

Overseas Territories Special Interest Group - Inaugural Conference Review

Introduction

At the Institute's 2011 Autumn Conference, Liz Charter spoke about the biodiversity challenges faced by the United Kingdom Overseas Territories (UKOTs). This presentation introduced delegates to the UKOTs (14 Territories around the world which have British sovereignty but are not constitutionally part of the UK), the biodiversity they support, their vulnerabilities and the conservation work already being undertaken by a range of organisations. At the end of the presentation the following question was raised: "How can IEEM [as it was then, before becoming Chartered] support the UK Overseas Territories?" This question resulted in the formation of the Institute's Overseas Territories Specialist Interest Group (OT-SIG).

Since the conference, the Foreign and Commonwealth Office has issued a White Paper which contains a number of principles to aid in the security, success and sustainability of the Territories. These include activities which are seen as key to preserving the biodiversity of the Territories. The Institute reviewed the document and used the recommendations to focus the aspirations of the OT-SIG. Of particular note in the White Paper is the need to raise awareness of the Overseas Territories within the UK, and strengthen co-operation between the UKOTs and both the non-governmental and scientific communities. To this end, on 31st January 2013 the Institute held its first Overseas Territories conference. The aim of the conference was to bring together a number of the organisations that are currently working in the UKOTs and update Institute members on the myriad projects underway. This also enabled the other organisations to make recommendations as to how they saw the Institute supporting the UKOTs.

Simon Boulter CEnv MCIEEM
Principal Consultant, RSK

Background to the United Kingdom Overseas Territories

For those who missed Liz's excellent talk, or who were unable to attend the outstanding OT-SIG conference, it might be best to explain a bit more about the UKOTs (in the spirit of raising awareness) to put the content of this conference review into context. As mentioned, the UKOTs comprise 14 Territories around the world [Anguilla; Bermuda; British Antarctic Territory; Cayman Islands; Sovereign Base Areas of Akrotiri and Dhekelia in Cyprus; Falkland Islands; Gibraltar; Montserrat; Pitcairn; Henderson; Ducie and Oeno Islands (commonly known as the Pitcairn Islands); St. Helena, Ascension and Tristan da Cunha; South Georgia & the South Sandwich Islands; Turks and Caicos Islands; and Virgin Islands (commonly known as the British Virgin Islands)]. Eleven of the Territories are permanently populated and, as noted in

Defra's January 2012 report, the Territories are diverse in size, economic and social development, and systems of governance.

Although the 'environment' is a responsibility devolved to the UKOTs (and the majority have produced their own Environmental Charter), the UK Government still has an obligation, under the Convention of Biological Diversity and other multilateral government agreements, to support the UKOTs in their commitment to protect biodiversity. Importantly, it is not for the UK Government to impose its own targets on the UKOTs. Instead, it is for the UKOTs to identify their own priorities and act accordingly. In terms of biodiversity, the White Paper, UKOTs Biodiversity Strategy and DEFRA's 2012 paper include some thought-provoking figures:

- the Territories are home to 90% of the biodiversity found within the UK and the Territories combined;
- UKOTs support:
 - 80 Critically Endangered (IUCN classification) species;
 - 73 Endangered species; and
 - 158 Vulnerable species.
- there have been 39 recorded global extinctions in the UKOTs;
- UKOTs support 340 endemic species (compared to about 60 in Metropolitan UK); and
- 2,261 non-native species have been recorded on the UKOTs and the Crown Dependencies of the Isle of Man and Jersey.



Mike Barker welcomes delegates to the event

The First Overseas Territories Specialist Interest Group Conference

The conference was held in London on 31st January and was well-attended by delegates and speakers from around the globe. The presentations were varied and ranged from policy-overview to practical implementation, from species protection to species eradication and from hands-on, in-country projects to remote-sensing technologies. What immediately became apparent was the range of organisations already working in the UKOTs. Organisations represented at the conference included the Joint Nature Conservation Committee (JNCC), RSPB, Ministry of Defence (MoD), Royal Botanic Gardens Kew, Birdlife Europe, Environment Systems, Pew Environment Group, Dialogue Matters, Food and Environment Research Agency (FERA) and the UKOTs Conservation Forum. All of the organisations spoke passionately about their individual projects in the UKOTs and there were common themes running throughout all of the presentations. The speakers' topics cannot be discussed in sufficient detail to do them justice in this article. Therefore, I would recommend that any interested readers investigate the presentations on CIEEM's website (<http://www.cieem.net/2013-ot-sig-conference>). The presentations looked at several themes throughout the day:

- **Policy and Implementation:** How to ensure that biodiversity is taken into consideration during the UKOTs decision-making processes;
- **Data Gathering and Establishing Baselines:** How to ensure that the habitats and species present in the UKOTs are accurately recorded and how this process should be funded; and
- **Threats:** Climate change, non-native species and habitat loss.

Tony Weighell from the JNCC opened the conference with his presentation on policy context. His first slide set the tone for the day: *"Setting Biodiversity Priorities in the UKOTs: For and By Whom?"* This question continued to be posed in presentations throughout the day. All those from the UKOTs, or who had been working in the UKOTs, echoed the sentiment that all priorities in the UKOTs had to be set by the UKOTs themselves. This was the only way that true priorities would

be identified and a sustainable approach be established. Those speakers who discussed conservation projects in the UKOTs [e.g. Clare Stringer (RSPB), John Turner (Bangor University)] reiterated that it was only by the engagement and involvement of local communities that projects had any chance of succeeding. Diana Pound (Dialogue Matters) continued this theme by explaining how she facilitated discussions between stakeholders in projects to achieve outcomes beneficial to all.

In order to protect biodiversity, one must first know what is there. The process of data collection (or lack of) was raised in several of the talks and included the use of remote-sensing techniques to highlight potential areas of biological importance (Katie Medcalf, Environment Systems), the collection of samples around a shipwreck to determine if it was having an adverse effect on the marine environment [Kim Purchase (MoD) and Anna Prior (RPS)] and the mapping of habitats and collection of seeds from the UKOTs (Colin Clubbe, Royal Botanic Gardens Kew). The former talk detailed how remote-sensing could also be used to identify vulnerable areas and clearly show the potential effects which developments/habitat removal could have (i.e. inform large-scale planning decisions). The latter talk showed how local communities could be involved in conservation projects, how skills could be passed to the UKOTs (capacity building) and how conservation projects could leave a lasting legacy.

Habitat loss and damage was a key concern during the conference. This included the loss of land due to development (the Environmental Charters contain principles

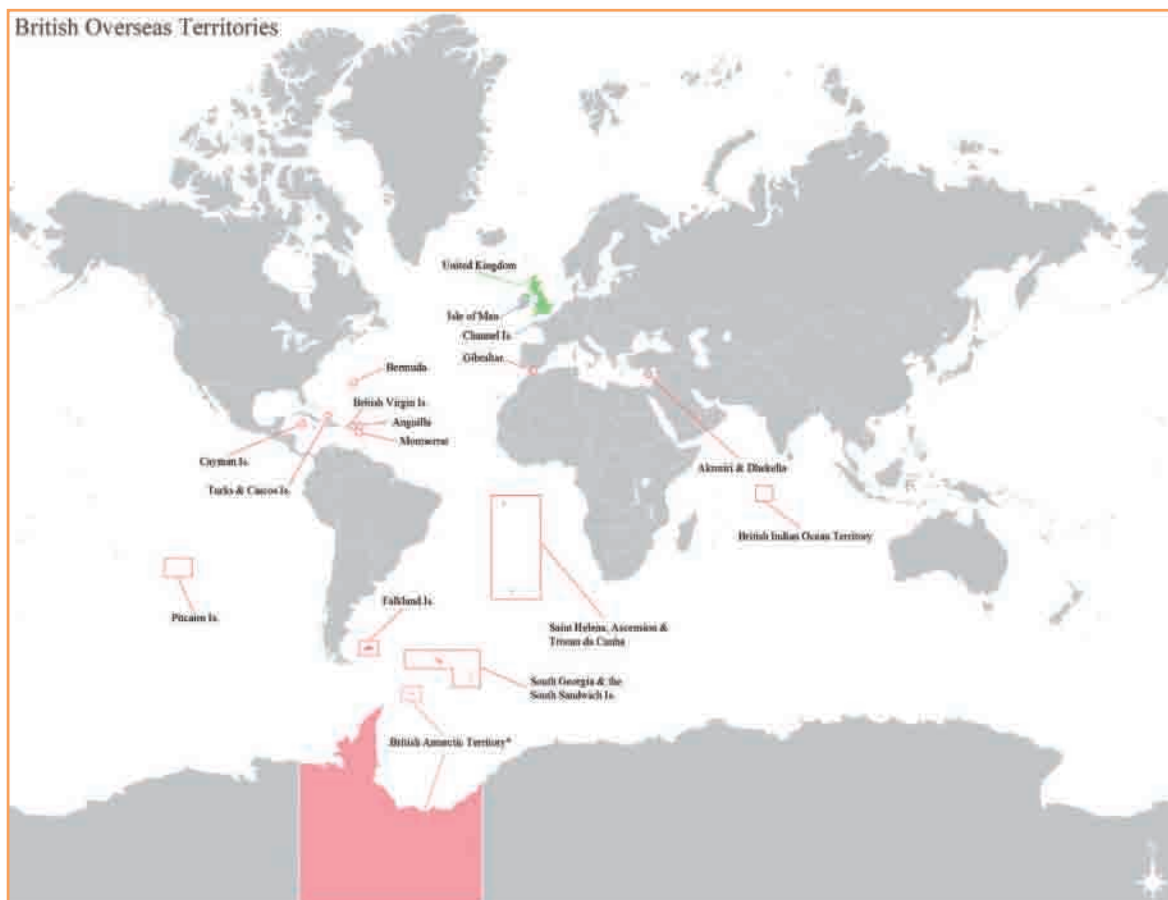
regarding the protection of biodiversity and not laws; this is not helped by the lack of a formal Environmental Impact Assessment in the UKOTs) and the degradation of habitats due to resource exploitation (e.g. overfishing). The former were discussed in depth by both Mike Pienkowski (UKOTs Conservation Forum) and Bruna Campos (Birdlife International/Conservation International - Europe). All present at the conference acknowledged the sensitive situation in many of the UKOTs, in that they need economic development to achieve self-sufficiency. However, developments (such as infrastructure improvement) need to include environmental considerations to make them truly sustainable.

In order to protect some of the UKOTs valuable terrestrial communities, the conservation community working in the UKOTs has initiated a campaign against non-native species. Examples were given of plant identification and eradication and the successful removal of introduced vertebrate predators from several of the islands. The latter included some uplifting success stories from Clare Stringer (RSPB) regarding the eradication of house mice from Gough Island, feral cats from Ascension Island and rats from Henderson Island. In addition, Sugoto Roy (FERA) presented the results of his study to control feral and domestic cats on Little Cayman. These projects showed what could be done in the field, with the good-will and involvement of the local people. They are real success stories for the bird and reptile communities of the UKOTs (where it is not a good place to be a mammal!).



Delegates network during the coffee break

British Overseas Territories
 United Kingdom
 Crown Dependencies
 Image by George Bozanko



The UKOTs support the world's largest Marine Protected Area around the British Indian Ocean Territory. However, the majority of the marine environments around the UKOTs receive little or no protection; this has a huge impact on local biodiversity and could impact globally given the percentage of the world's reef habitats contained within UKOTs maritime zones. To this end, a huge effort is being dedicated to the protection of marine habitats, including the establishment of 'no-fishing zones'. This is being promoted on a large scale by Pew Environment Group and a collaboration being led by John Turner (Bangor University). Both presentations discussed the immense size of the protected areas required (admirable ambition for both organisations) and reiterated the need for an understanding, and involvement, of local communities; it is no good establishing a no-fishing zone in the only area which supports the local community.

The Role of CIEEM's OT-SIG Going Forward

The conference has inspired the members of the OT-SIG to engage more with the UKOTs, and the organisations already working in the

UKOTs, to determine how CIEEM could best support them. In the short-term, CIEEM can help raise awareness about the UKOTs by reporting back to its membership on UKOTs projects and threats. In addition, CIEEM can facilitate discussions between scientific/non-governmental organisations in the UK and the UKOTs by holding annual conferences, such as the one described here. Hopefully, CIEEM can then establish what skills it is best placed to offer, and this will be wholly driven by the needs of the UKOTs.

It was clear from the conference that there are many successful, collaborative projects currently being undertaken in the UKOTs. In addition, attendance at the conference shows that there is an eagerness among CIEEM members to know more about the UKOTs. As such, it is hoped that CIEEM can contribute to the future protection of the UKOTs by supporting co-ordinated and strategic projects across all the Territories. The OT-SIG will be working to ensure the momentum from this first successful meeting is harnessed and will be organising future events, including a smaller meeting in the early autumn of 2013.

Further Reading

Foreign and Commonwealth Office White Paper <http://www.fco.gov.uk/resources/en/pdf/publications/overseas-territories-white-paper-0612/ot-wp-0612>

The Environment in the United Kingdom's Overseas Territories: UK Government and Civil Society Support <http://www.fco.gov.uk/resources/en/pdf/publications/overseas-territories-white-paper-0612/ot-wp-0612>

United Kingdom Overseas Territories Biodiversity Strategy <http://www.defra.gov.uk/publications/2011/05/26/pb13335-uk-ot-strategy/>

Parliamentary Office for Science and Technology POSTnote on the UK Overseas Territories <http://www.parliament.uk/briefing-papers/POST-PN-427>

About the Author

Simon Boulter works as a Principal Consultant for RSK and is a member of the newly formed CIEEM OT-SIG Committee.

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Royal Charter Celebration

On 9th April 2013, the Institute celebrated receiving its Royal Charter. The event in Westminster, London was attended by over 100 members and guests.

CIEEM Chief Executive, Sally Hayns, opened the event by welcoming all to the celebration, and introduced the first speaker, David Goode, who was Vice-President of the Institute from 1991 to 1994 and President from 1994 to 1997. David is now a Patron. David spoke about how the Institute came about at a time when public attitudes towards environmental issues were changing. This included the recognition of sustainable development, and the need for ecologists. Several threads came together at the end of the 1980s, including concern at the emergence of an unregulated ecology sector. David and others, including Tony Bradshaw (the Institute's first President), saw instead the opportunity to develop a new institute to provide a professional status to ecologists on a par with, for example, architects and engineers. The initial days of the Institute were not without problems but we have persisted, and have gone from strength to strength. David closed by saying that it is sad that Tony Bradshaw is unfortunately no longer



The CIEEM Royal Charter and Great Seal

with us to celebrate this occasion – he would have been immensely proud on this day. Lord Selborne, also a Patron of the Institute, outlined the importance of the Royal Charter. He noted that in recent weeks there had

been much public interest in Royal Charters because of the proposal to use a Royal Charter to regulate journalists, but that he suspected that the ensuing debate had done little to explain just what gaining a Charter of Incorporation really means. The criteria for satisfying the test as to suitability to petition for a Royal Charter are that the petitioning Society or Institute should be judged to be pre-eminent in its field of operation, that it is stable and permanent, that its members are suitably qualified, that the organisation is financially sound, that its membership is of a sufficient size and quality, that a grant would not be controversial as where another society also has a claim to leadership in its field of operation. Above all the key requirement is that it must be shown that it would be in the public interest for the Institute to be regulated through the Privy Council. Once the petition is submitted for consideration, the Privy Council Office conducts a detailed enquiry into the status and credentials of the petitioning organisation. Thus the granting of a Charter of Incorporation is the



Lord Selborne spoke about the value of Chartership

imprimatur of the State that the incorporated body is a significant and influential player in whatever field it operates, that it has passed all the tests of approval and that it is the sort of organisation on which Her Majesty's Government might rely for appropriate guidance and advice. Thus for an organisation which determines qualifications for Fellowships and members and for those that regulate professional practice, the powers of the body are affirmed by the State through the grant of the Charter. In the modern era the role of ecologists and environmental managers has come rapidly to the fore. This is certainly now a key profession and the interests of many government departments, of conservation organisations of the wider society and of nature itself will be better served as the new Institute provides enhanced professional support to its members, high standards of services and guidance to the nation in its field of ecology and environmental management. Lord Selborne concluded his speech by proposing a toast to the newly Chartered Institute.

Lastly, CIEEM President, John Box, spoke about the future challenges and opportunities that present themselves to the Chartered Institute. John said that the Institute is now 22 years old and has 5,000 members – and that he hoped that in 10 years it will have 10,000 members. He thanked all those early members and staff who had helped to create and maintain the Institute and get it to this special occasion. Moving forward, John spoke about the future of Chartered professionals, both Chartered Environmentalists and now also Chartered Ecologists. He said that we need to work with our external stakeholders, for example the major conservation NGOs and the Statutory Nature Conservation Organisations, to halt biodiversity loss and work towards biodiversity gain. In conclusion, John thanked everybody who had been involved with the Institute and helped it to get to this stage, and for all of the input that they will provide into the future. He gave special thanks to Keith Lawrey (Foundation for Science and Technology) and Di Thomas (Security Institute) for their help and advice in relation to applying for the Royal Charter. The event also saw the presentation of a number of Fellowship certificates (see Institute News on page 40).



Lord Selborne proposing a toast to the newly Chartered Institute



Guests networking at the event



David Goode, John Box and Lord Selborne with the Royal Charter



The Great Seal

Continuing Professional Development is Changing

Or, more strictly speaking, CIEEM's mandatory continuing professional development (CPD) requirement of members is changing with effect from the 1st October 2013.

CPD is the range of learning activities by which members maintain, improve and broaden their knowledge and skills throughout their career to ensure that they continue to practise to the highest standards. Undertaking CPD not only supports career development but is also a responsibility to clients, employers and society. Almost all professional bodies require certain membership grades to undertake regular CPD.

The Current Requirement

CIEEM's current CPD requirement for professional grades (Fellow, Full, Associate and Graduate) is a minimum of 20 hours per annum, half of which should be structured and half unstructured learning. Structured learning includes attendance on a training course, at a conference, formal home study and organised 'on-the-job' training. Unstructured learning includes reading of relevant literature, personal study, research, site visits and committee involvement. Members are expected to submit their CPD record in hard copy or electronic format when they renew their annual membership. Members cannot currently be considered for upgrade, Chartered Environmentalist (CEnv) assessment or inclusion in the professional directory without satisfactory evidence of CPD. Members on a career break or in abeyance are strongly recommended to undertake CPD and are required to show evidence of some CPD when applying for reinstatement. Unemployed members, part-time workers and retired members who are still practising are required to undertake CPD. Fully retired members are not required to undertake CPD. Members on a low income can apply for additional discounts for CIEEM-organised structured CPD activities.

The Changes

CIEEM's Training, Education and Careers Development Committee (TECDC) has reviewed the CPD requirement, including benchmarking against other professional bodies, and recommended changes to the current minimum requirement and the auditing process. These recommendations have been accepted by the Governing Board and will come into effect for existing members from 1st October 2013. These changes are:

- Members in professional grades are required to do a minimum of **30** hours relevant CPD per annum **averaged** over three years. Relevance is defined by CIEEM's Competency Framework. This recognises the likelihood that there will be some variation in the amount of CPD undertaken each year.
- At least 20 hours of the minimum average annual CPD requirement should be structured CPD. Structured CPD is defined in Professional Guidance Series no.2 on Continuing Professional Development, which is provided to new members and can be downloaded from the website.
- The CPD requirement for part-time workers will remain the same as for full-time workers. Whilst the potential issues over the time available to part-time workers to undertake CPD are recognised the Board also acknowledges that part-time workers are required to be as competent as full-time workers and CPD is integral to achieving this.
- Members in abeyance, on a career break or unemployed are still required to comply with the minimum CPD requirement but this can all be done as unstructured CPD if necessary.

- A new system of random auditing of 5% of all professional membership grades to ensure compliance with the CPD requirement will be introduced with effect from 1st October 2013. A failure by a member to provide evidence of meeting the mandatory CPD requirement when requested to do so will be viewed as possible evidence of not maintaining competence and may be treated as a potential breach of the Code of Professional Conduct.

The Secretariat will be revising the existing CPD guidance (Number 2 in the Professional Guidance Series) and reissuing this before 1st October 2013.

Further Changes

The Governing Board recognises that, in most cases, members do undertake CPD but may be less rigorous at recording it. Alongside these changes to the minimum CPD requirement will be other changes that are designed to make planning and recording CPD easier and more useful to your personal development plan. The CPD recording form is currently being revised and we hope to be able to offer online CPD recording within the next 12 months. TECDC are also looking into the possibility of a planning tool for those members who are self-employed or who otherwise do not have access to a planning tool/process with their employer. A more advanced version of this would enable members to link identified training and development needs through to suitable reading, training courses and mentoring opportunities through an interactive online solution.

Watch this space!

CPD Case Study

Petra Billings MCIEEM

Landscape Projects Officer, Sussex Wildlife Trust

Petra's CPD record was randomly selected for inclusion in the Institute's annual CPD audit for 2012-2013, the last audit to take place before moving to a new system for monitoring CPD (outlined in the article on page 54). Here Petra explains a little about her role and how she organises her CPD to inform her work.

What does being a Landscape Projects Officer involve?

I have one of the most interesting jobs in the world! I work for the Sussex Wildlife Trust as Landscape Projects Officer, my main role being project manager for the West Weald Landscape Project. The project is a partnership led by Sussex Wildlife Trust promoting "the integrated management of a viable and enhanced landscape in the West Weald of West Sussex and Surrey for people and nature". The project offers a free, targeted and proactive landowner advisory service, advising on integrating appropriate conservation management with existing land management practices, whilst guiding and supporting entry into agri-environmental schemes. Landowner advice is underpinned by a comprehensive programme of survey and monitoring which create a baseline from which we can monitor landscape connectivity.

This translates into a busy and extremely varied job. Work with farmers and landowners is core to project delivery, as is visiting and advising landowners, writing recommendations and preparing woodland management plans. Landowner workshops have proved a useful means of local landowner engagement, and each year I organise a couple of workshops on topical subjects such as deer management and tree health. Over the past four years we have carried out volunteer-based condition surveys of a number of BAP habitats, including

hedges, traditional orchards, ponds and woodlands. Not only do the results of these surveys help with landowner targeting, but perhaps unexpectedly, they have also proved a useful means of initial landowner engagement via the volunteer surveyors.

How does a varied and well balanced CPD plan help support your work?

A mixture of both structured and unstructured CPD has contributed hugely to my skills development and I am constantly learning through these activities. Last year, this included training days for volunteer surveyors on pond and woodland condition surveys, a landowner workshop on wetland management, and several short ecology courses I ran for the Sussex Wildlife Trust. I also attended a number

of training workshops on subjects as diverse as bumblebee identification, woodland management for dormice and a Deer Initiative training day. Then there were a couple of local Environmental Stewardship training events and a regional landowner engagement meeting I organised for South-East Wildlife Trusts. All this training has contributed greatly to my landowner advisory skills, at the same time reinforcing partnership relationships and networking with landowners at the various events.

Unstructured CPD also forms a large part of my working life. From last year this includes the planning of bat activity surveys with Anabat loggers, developing skills for submitting online English Woodland Grant Scheme applications, writing Farm Environment Plans and preparing Forestry Commission approved woodland management plans. I have found it all highly rewarding. This year I look forward to new challenges such as a Meadows Creation and Restoration workshop I am organising in July, and developing parish habitat-mapping and oral history projects in the West Weald.



Petra gets some help

Training for Trainers – CIEEM's Commitment to Raising Professional Standards

Clare O'Reilly MCIEEM
Phytix Ecology

Helen Boulden
CIEEM Training and Professional
Development Officer

CIEEM's bespoke Train the Trainer course is the first nationally to be specifically designed for the ecology and environmental management sector. It aims to share the techniques and best practice employed by the professional teaching and training trade, providing new trainers with the tools to compliment their expert knowledge, and giving experienced trainers the opportunity for continuing professional development and improving their training delivery. The course is delivered by two dual-qualified ecologists/professional trainers.

So why should an experienced tutor, who is already getting good participant feedback, bother to attend the training? Isn't teaching instinctive; some people are just naturally good at it?

I certainly held that view until about 12 years ago. I had changed role to work as a professional support lawyer delivering training for the environmental law group at a large corporate firm in London. I had so much technical content to get across that I hadn't time to think about training as a complex professional skill in its own right – but then I went on a course. Then another. And then I started to realise what I was getting myself into! As one course participant commented: *"You don't realise how much you can benefit from a teaching course until you actually do one!"*

Is CIEEM's Train the Trainer course something to consider as part of your professional development? The following questions may help you decide.

- How does professional training differ to a 'PowerPoint plus case study' approach?



- What should I do when a course is advertised as at an intermediate level yet beginners also attend, so I always end up with a mixed ability group?
- How can I make a dry subject fun to learn?
- How do I deal with difficult participant behaviours?
- What are my legal obligations as a trainer?
- What has educational research shown to be the two most effective ways to improve training delivery?

CIEEM's new two-day Train the Trainer course (advertised on page 57) covers all of these topics and more.

If you have any questions about the course, please contact enquiries@cieem.net

To book your place for the next available event visit
www.cieem.net/events

CIEEM Professional Development Programme 2013 – 2014

Featured training event

Train the Trainer

3-4 September 2013, Leeds

- Have you led a training day and wondered how to cope with the mix of abilities in your group?
- Want to know how to deliver effective learning sessions instead of lectures?
- Need tips to make teaching species ID fun and interactive?

This unique two-day course for ecologists and environmental professionals aims to develop participants' design and delivery skills to a professional standard of tuition.

Who should attend

This course is aimed at anyone who has not completed teacher or facilitator-training before. It is equally appropriate for experienced trainers who want to consolidate their knowledge, providing new ideas to use in their own training.

What is involved

The course includes a pre-course distance learning pack, preparing a session plan for your own course and the opportunity to deliver a training session at the event, including feedback on how to improve your tuition.

Participants on the 2012 and 2013 courses said:

"This was a very useful course ... I really feel my training will improve."

"I found how to deal with mixed ability groups and the legal aspects [of a professional trainer's obligations] the most useful".

"[This course] showed it is a lot of work to do it properly but I want to call myself a professional trainer as well as ecologist."

"Enjoyable; practical; applicable to my work."

"Really good ideas from the other people on the course too."

"I completely changed my approach to the training that I deliver."

The course is limited to 12 participants, so early booking is advisable. A special discounted rate is available to all existing CIEEM Trainers.

Have your say in CIEEM's training programme...

This edition of *InPractice* includes news about the changes afoot regarding CIEEM's Continuing Professional Development (CPD) requirement (page 54). Alongside this are being developed a suite of online tools designed to help members not only record their CPD, but identify gaps and plan the areas they need to target - through mentoring, reading, training opportunities etc.

To ensure we are delivering the training that *you* need to meet your CPD requirements, we would like to hear from members at all membership grades about the training you want to see CIEEM providing, and where. Some examples of areas we are looking to develop include marine EIA, cumulative impacts assessment and coastal themed topics.

To ensure that our training is delivered at a professional standard, we want to include the best providers within our programme, which is why we have incorporated a tailor-made 'Train the Trainer' course. If you are already a qualified trainer, or have expertise that you would like to develop into a CIEEM training course that complements our existing provision, or you can recommend an excellent trainer whose specialism would be of benefit to CIEEM members – we want to hear from you.

Please send your suggestions to: enquiries@cieem.net

Helen Boulden

CIEEM Training and Professional Development Officer

For more details about the programme and to book your place visit:

www.cieem.net/events

Achieving Chartered Member Status

Soon CIEEM members will have two routes to Chartered individual status: Chartered Environmentalist and Chartered Ecologist. Here we explain the difference between the two awards.

The Award of Chartered Environmentalist

CIEEM (and now CIEEM) has been pleased and proud to hold a licence from the Society for the Environment to award the title of Chartered Environmentalist (CEnv) to eligible members. Currently almost 900 of the 7,000 or so CEnvs are CIEEM members (the third highest number of any individual body) and we have recently been asked by some potential registrants whether we will continue to do so now that we are establishing the Register of Chartered Ecologists.

The answer is 'yes'! We fully intend to hold a licence and to offer and support the CEnv award for as long as we meet the requirements of the Society for the Environment. To quote from the Society's website *"Chartered Environmentalists are drawn from no one profession. They work across industry, government, education and the public sector. What they share is a commitment to environmental best practice and a high degree of expertise in their field."* We feel that it is essential that CIEEM ecologists and environmental managers are part of the CEnv 'family' and recognise that, for many of our members, Chartered Environmentalist is a more appropriate award than Chartered Ecologist.

Registration as a CEnv establishes proven knowledge, experience and commitment to professional standards. The application process for CEnv involves an initial application

to confirm eligibility and the submission of an environmental report demonstrating how the applicant meets the 12 mandatory competences (see below). These are reviewed by assessors who then conduct a Professional Review Interview to test these competences.

The 12 competences are spread over four themes as follows:

A. Application of knowledge and understanding of the environment to further the aims of sustainability

- A1. Have underpinning knowledge of sustainable development principles in the management of the environment
- A2. Apply environmental knowledge and principles in pursuit of sustainable development and environmental management
- A3. Analyse and evaluate problems from an environmental perspective, develop practical sustainable solutions and anticipate environmental trends to develop practical solutions

B. Leading sustainable management of the environment

- B1. Influence others to promote behavioural and cultural change to secure environmental improvement beyond legislative compliance
- B2. Promote a strategic environmental approach
- B3. Demonstrate leadership and management skills

C. Effective communication and interpersonal skills

- C1. Communicate the environmental case, confidently, clearly, autonomously and competently
- C2. Ability to liaise with, negotiate with, handle conflict and advise others, in individual and/or group environments (either as a leader or member)

D Personal commitment to professional standards, recognising obligations to society, the profession and the environment

- D1. Encourage others to promote and advance a sustainable and resilient approach by understanding their responsibility for environmental damage and improvement
- D2. Take responsibility for personal development and work towards and secure change and improvements for a sustainable future
- D3. Demonstrate an understanding of environmental ethical dilemmas
- D4. Comply with relevant codes of conduct and practice

Further details of the competence requirements and the application process can be downloaded from our website.

At CIEEM we believe that increased interdisciplinary understanding is crucial to achieving good environmental outcomes. The award of CEnv is becoming increasingly recognised nationally and internationally as a standard of professional competence in environmental management. We anticipate an exciting few years ahead as we work with all of our colleagues and fellow licensed bodies in SocEnv to promote it and to increase collaboration and co-operation amongst the professions.

If you would like further information about the CEnv award please contact Michelle Nash (michellenash@cieem.net).

For more information on Chartered Status please visit
www.cieem.net/chartered-status

The Award of Chartered Ecologist

Our new Royal Charter includes the power to establish a new professional Register, that of Chartered Ecologists (CEcol). Getting the criteria for, and process of, registration right is an important and challenging task. The award of CEcol provides the opportunity to create a new professional standard that can become widely recognised and valued. For that to be achieved it must be credible, robust and rigorous. It also needs to be distinct from the award of CEnv, focusing on ecological management rather than the wider environmental management. The two awards complement each other and we are confident that all of our professional members will be able to target one or other of these awards (should they wish to do so) depending on their experience, role and competences. Some of our members may choose to have both.

In order to establish the Register there have been a number of tasks that needed to be undertaken: determining the eligibility criteria, agreeing the competence standard, developing the assessment process, finalising the application process (especially in relation to when the Register is first opened), identifying the conditions for removal from the Register, considering the circumstances by which non-CIEEM members can apply and also the criteria for re-registration. Whilst some of these tasks may look straightforward, in practice they require considerable debate, and testing to ensure we do not fall into the myriad of potential potholes along the way.

To help with this task our governing body set up a Shadow Registration Authority to do all of the legwork and report back on its recommendations. Chaired by Past President Penny Anderson, we were fortunate to be able to call on the services of some senior members of the Chartered Institute and those with experience of involvement in establishing and managing the CEnv Register. We also invited some external stakeholders. This was seen as crucial to ensuring we were taking account of external perspectives on what the competence standard of a CEcol should be as well as paving the way for future recognition of what it means. We are very grateful to have had, for example, the Chief Scientists of Natural England, the former Countryside Council for Wales and the

Northern Ireland Environment Agency on the Shadow Registration Authority as well as the Head of Science for Scottish Natural Heritage.

The Shadow Registration Authority has made a number of recommendations to the Governing Board for approval and is now coming to the end of its work. Its ongoing responsibilities will shortly be taken over by a permanent Registration Authority.

We anticipate being able to announce details of the timescales, eligibility criteria, application process and assessment procedures for registration shortly. What we can tell you at his stage is that:

- a) A Chartered Ecologist will be someone who *"...applies their knowledge, experience and influence to promote and advance ecology as an applied discipline."*
- b) The award will be open to CIEEM Full members and Fellows and to the equivalent grade members of certain other professional bodies.
- c) The eligibility criteria will be based on CIEEM's Competency Framework and CPD compliance (details of the Competency Framework are available on the website). Chartered Ecologists will be required to evidence at least 'accomplished' level competence in a minimum number of the technical and transferable competency sub-themes.
- d) The assessment process will be a combination of desk-based review of applicant information and a Professional Review Interview.
- e) The award will be designated by the post-nominals 'CEcol'.
- f) There will not be a grandparenting process. This potentially creates a logistical problem if we receive a lot of applications in a short space of time. This will be managed as effectively as we can but we will be relying heavily on our volunteer assessors during the first 12-18 months of the Register.
- g) CIEEM Past Presidents and Fellows will be invited to apply first in order to create an initial pool of assessors.
- h) Non-CIEEM members will need to be a member of another professional body that meets certain criteria laid down by the Governing Board.
- i) Registrants will need to comply with a Code of Conduct (for CIEEM members

this is the same as our own Code of Professional Conduct) and alleged breaches of the Code will be treated in accordance with CIEEM's disciplinary process and regulations.

- j) Registrants will need to be re-assessed every 5-7 years. This is unlike CEnv where the registration is not time-limited but CEcol re-registration is a condition of our Royal Charter; and
- k) For the first 12-24 months there will be a series of deadlines for applications with assessments then being carried out on all those applications received before each deadline before moving on to the next batch.

We will be producing detailed guidance on the application process and updating our website regularly so if you are interested in applying for the award, please do look out for relevant emails and check the website. Please also be realistic about the timescales involved in processing applications and organising the assessments, especially the interviews. You should allow at least six months for the registration process.

The Governing Board and Secretariat would like to thank, on your behalf, the following members of the Shadow Registration Authority for their time and commitment to this work:

Professor Penny Anderson CEnv FCIEEM (Chair) – Penny Anderson Associates

Dr Ian Bainbridge MCIEEM – Scottish Natural Heritage

Dr Tim Hill – Natural England

Dr David Parker CEnv FCIEEM – formerly Countryside Council for Wales

Professor Howard Platt – Northern Ireland Environment Agency

Dr Paul Raven MCIEEM – Freshwater Biological Association

Professor Chris Spray MCIEEM – Dundee University

Dr Alex Tait CEnv MCIEEM(rtd)

Dr Eirene Williams CEnv FCIEEM

Media Mischief

Sally Hayns MCIEEM
Chief Executive Officer, CIEEM

Some of our members will be aware of an article in *Country Life* magazine and *The Daily Telegraph* earlier this year reporting the views of the President of the Condé Nast International media group, Mr Nicholas Coleridge, on his experience in gaining planning permission to convert an old barn into a home cinema. The articles bemoaned the cost and apparent lengthy delays resulting from the need to have the appropriate ecological surveys undertaken.

There is no point in repeating here the inflammatory language that was used in the articles, nor the paragraphs questioning the credibility of the consultants involved (who are members of CIEEM) and the profession in general. Suffice to say that, from the evidence in the public domain on the local planning authority's website it is clear that the 'facts' are not quite as they were presented.

CIEEM was alerted to the original article by members who were understandably upset at the attack on the profession (and on the members concerned whom they knew personally). There was also concern that readers of the article would be sufficiently alarmed by the perceived likelihood of having to spend thousands of pounds on bat surveys and mitigation that they would consider finding ways to remove bats from their property.

Initially we wrote to *Country Life* pointing out that as members of a professional body the consultants are subject to a code of professional conduct. This letter, which was published, pointed out that Mr Coleridge had the opportunity to bring any concerns over the consultants conduct to CIEEM's attention through the complaints process where they could then be properly and fairly investigated, rather than 'trial by media'. No complaint had been received (and there is no suggestion on anyone's part, other than that of Mr Coleridge, that the members concerned had done anything wrong).

The original *Country Life* article was republished online in a slightly modified form (with some information regarding the European Protected Species legislation from

Natural England) but still making the same allegations about the integrity of the profession. Having taken advice from our lawyers, we wrote to the editors of *Country Life* and *The Daily Telegraph* pointing out that the 'facts' in the story were questionable in places and suggesting that they publish an article, which we could help provide, explaining why bats are protected, some of the issues that arise when building work is undertaken, the process property owners have to go through and the role of the ecological consultant. *Country Life* replied refusing such an article and saying that they considered the story closed. No reply was ever received from *The Daily Telegraph*.

Several members expressed their frustration on CIEEM's LinkedIn group about the articles. In addition to their distaste at the way the story had been represented and the reputation of the profession maligned, there was also frustration at how CIEEM had dealt with the issue and failed to get a significant article published. As always, there are opportunities to learn from these events and as a result of this the Governing Board has acknowledged members' concerns and agreed a more active strategy on dealing with such issues in the future. However we would ask members to recognise that in responding to any adverse media coverage we do have to take into account the wishes of the members involved as well as the potential costs of any legal activity versus the likelihood of getting anything substantial published. It is also very true (if disappointing) that a story where someone has allegedly been done wrong by supposedly bad people will always gain more coverage than a story about professional people delivering a good service leading to positive outcomes for the client and for biodiversity.



Brown long-eared bat.. Photo by John Altringham

About the Author

Sally Hayns has been CEO of CIEEM since June 2010. Prior to joining the Institute she was Head of People and Wildlife at the Hampshire and Isle of Wight Wildlife Trust.

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Sustainable Drainage Systems: Maximising the Potential for People and Wildlife

Authors: Andy Graham, John Day, Bob Bray and Sally Mackenzie

Available from: http://www.rspb.org.uk/Images/SuDS_report_final_tcm9-338064.pdf

Price: free download

The Flood and Water Management Act in 2010 made compulsory sustainable drainage systems (SuDS – formerly Sustainable Urban Drainage Systems, SUDS), which environmentally-minded designers had been trying to cajole or otherwise persuade developers to accept and highways and drainage authorities to adopt for several years. The Act, which applies in England and Wales, aims to implement a sustainable mechanism to manage the risk of flooding as well as to protect against potential drought. Under this Act a SuDS Approving Body has to be established at the county or Unitary Authority level with responsibility for the approval of proposed drainage systems in new developments and redevelopments. The WWT and RSPB publication, which is co-authored by a Landscape Architect, Bob Bray, who has for years valiantly championed the cause, describes itself as “A Guide for Local Authorities and Developers”. It goes into detail to show what can be achieved, comparing traditional drainage systems with a more biodiverse, if not aesthetically-pleasing landscape, as much to encourage Approving Bodies as to inspire design (“informed by ecologists”). In this respect it complements the existing CIRIA (the research and information arm of the construction industry) guides, but goes further in examining what SuDS potentially represent as habitat, from ‘living walls’ to ‘swales’ and ‘filter strips’, and how they might be best managed to benefit biodiversity. The case studies are particularly useful for the potential practitioner in showing how good intentions can sometimes be thwarted by poor implementation or unforeseen consequences and, importantly for health and safety, how one goes about ‘designing-out risk’. The designers in most instances are, however, likely to be Landscape Architects or Hydrological Engineers and well aware of potential hazards through legislation such as the Construction (Design and Management) (CDM) Regulations covered in professional training.

The question – Is this the “Age of Ecological Engineering”? – is posed in the CIRIA online publication *Evolution* (winter 2012 edition), before the costs and benefits of retrofitting SuDS within the context of “the growing body of work on ecosystem services assessment and Green Infrastructure evaluation” is explored in its feature article. As the WWT and RSPB publication admirably demonstrates, the answer is yes, but unfortunately as yet few ecologists are involved in the process. The approach set out here is still ‘recipe-book’, but it is hoped the day is not far away when, with the aid of appropriate software, pH, field capacity, aspect, subsoils, permeability, lateral movement, wetting and drying cycles, root penetration, mycorrhiza, etc. will be the concern of said site-designing Ecological Engineers.

David Hackett CEnv MCIEM, Director, Solum Environmental Ltd



Methods of Sustainability Research in the Social Sciences

Authors: Frances Fahy and Henrike Rau

ISBN-13: 9780857025227

Available from: www.uk.sagepub.com

Price: £24.99

Conflicts in Ireland over how to best use natural resources – from oil and gas extraction to wind and fish farms

– continue to make headlines. This new book from researchers with the Ryan Institute at NUI Galway offers fresh insights into how to understand local conflicts over natural resources, and their connections with [un]sustainable development. The text offers a systematic and critical review of established and emerging methodological approaches, as well as tools for the integrated investigation of sustainability questions. Recognising the significance of scale for sustainability efforts and measurement, its scope ranges from the local to the global.



Bird Conservation: Global Evidence for the Effects of Interventions

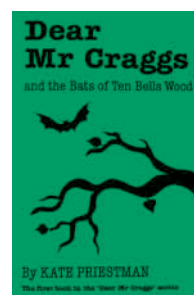
Authors: D.R. Williams, R.G. Pople, D.A. Showler, L.V. Dicks, M.F. Child, E.K.H.J. zu Ermgassen, W.J. Sutherland

ISBN-13: 9781907807190

Available from: www.nhbs.com

Price: £34.99

This book brings together scientific evidence and experience relevant to the practical conservation of wild birds. The authors worked with an international group of bird experts and conservationists to develop a global list of interventions that could benefit wild birds. For each intervention the book summarises studies captured by the Conservation Evidence project, where that intervention has been tested and its effects on birds quantified. The result is a thorough guide to what is known, or not known, about the effectiveness of bird conservation actions throughout the world.



Dear Mr Craggs and the Bats of Ten Bells Wood

Author: Kate Priestman CEnv MCIEM

ISBN-13: 9780957544109

Available from: www.amazon.co.uk

Price: £3.80

This is a great story for children and all bat lovers. Kate accurately describes some of the real issues facing bats from development but does it in a fun and

interesting way with good solutions. I thoroughly enjoyed the Mr Craggs character, and of course Bobo the dog.

Kelly Gunnell, Officer for the Built Environment, Bat Conservation Trust

Ecological mitigation measures in English Environmental Impact Assessment

K. Drayson and S. Thompson

Journal of Environmental Management 2013, 119: 103–110

Major built developments usually require an Environmental Impact Assessment (EIA) to be conducted, which frequently includes an Ecological Impact Assessment (EclA) chapter. By identifying the flaws in EclA mitigation measure proposals and their implementation in completed developments, it may be possible to develop measures to reduce biodiversity loss and help meet the UK's EU obligation to halt biodiversity loss by 2020. A review of 112 English EclAs from 2000 onwards was conducted to provide a broad-scale overview of the information provision and detail of ecological mitigation measures. Audits of seven EIA development case study sites provided finer-scale detail of mitigation measure implementation, and the effectiveness of their grassland and marginal habitat creation and management measures was assessed using standard NVC methodology. Despite higher than expected levels of mitigation measure implementation in completed developments, EclA mitigation proposal information and detail has seen little improvement since a 1997 review, and the effectiveness of the habitat mitigation measures studied was poor. This suggests that measures to improve ecological mitigation measures are best targeted at ecological consultants. A recommendation for EclA-specific training of Competent Authorities is also made.

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Organic Farming Favours Insect-Pollinated over Non-Insect Pollinated Forbs in Meadows and Wheat Fields

P. Batáry *et al.*

PLoS ONE 2013, 8(1): e54818

The aim of this study was to determine the relative effects of landscape-scale management intensity, local management intensity and edge effect on diversity patterns of insect-pollinated vs non-insect pollinated forbs in meadows and wheat fields. Both diversity and cover of forbs were positively affected by organic management in meadows and wheat fields. This effect, however, differed significantly between pollination types for species richness in both agroecosystem types (i.e. wheat fields and meadows) and for cover in meadows. The authors therefore show that insect-pollinated plants benefit more from organic management than non-insect pollinated plants regardless of agroecosystem type and landscape complexity. These benefits were more pronounced in meadows than wheat fields. Finally, the community composition of insect-pollinated and non-insect-pollinated forbs differed considerably between management types. The findings in both agroecosystem types indicate that organic management generally supports a higher species richness and cover of insect-pollinated plants, which is likely to be favourable for the density and diversity of bees and other pollinators.

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Light Pollution in Ultraviolet and Visible Spectrum: Effect on Different Visual Perceptions

H.A. Solano Lamphar and M. Kocifaj

PLoS ONE 2013, 8(2): e56563

By comparing five different lamps, the present study attempts to evaluate UV radiative fluxes relative to what humans and two species of insects perceive as sky glow level. The authors analysed three atmospheric situations: clear sky, overcast sky and evolving precipitable water content. One important finding suggests that when a constant illuminance of urban spaces has to be guaranteed the sky glow from the low pressure sodium lamps has the most significant effect on the visual perception of the insects tested. But having the fixed number of luminaires the situation changes and the low pressure sodium lamp would be the best choice for all three species. The sky glow effects can be interpreted correctly only if the lamp types and the required amount of scotopic luxes at the ground are taken into account simultaneously. If these two factors are combined properly, then the ecological consequences of sky glow can be partly reduced.

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Achieving landscape-scale deer management for biodiversity conservation:

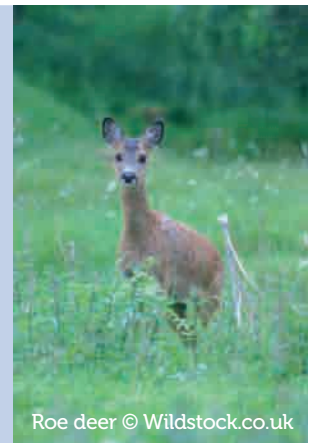
The need to consider sources and sinks

K. Wäber, J. Spencer and P.M. Dolman

The Journal of Wildlife Management 2013, doi: 10.1002/jwmg.530

In forest habitats in Europe, deer numbers are rarely assessed and management is mainly based on impacts. Even where managed areas achieve stable or improving impact levels, the extent to which they act as sinks or persist as sources exporting deer to the wider landscape remains unknown. The authors present a framework to quantify effectiveness of deer management at the landscape scale. Applied across 234km² of Eastern England, they assessed management of invasive Reeves' muntjac *Muntiacus reevesi* and native roe deer *Capreolus capreolus*, measuring deer density, fertility, neonatal survival, and culling to quantify source-sink dynamics over 2008–2010. Despite management that removed 23–40% of the annual population, 1,287 muntjac and 585 roe deer dispersed annually into the wider landscape, consistent with their ongoing range expansion. In this landscape, for roe and muntjac, an annual cull of at least 60% and 53%, respectively, is required to offset annual production.

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Roe deer © Wildstock.co.uk

Fearing the feline: domestic cats reduce avian fecundity through trait-mediated indirect effects that increase nest predation by other species

C. Bonnington, K.J. Gaston and K.L. Evans

Journal of Applied Ecology 2013, 50: 15–24

Urban areas contain high densities of non-native species, which in the UK include the domestic cat *Felis catus* and the grey squirrel *Sciurus carolinensis*. The direct predation effects of domestic cats on prey populations attract intense debate, and such influences of the nest-predatory grey squirrel are receiving increasing attention. In contrast, theory predicts that sub-lethal and indirect effects are more important, but empirical evidence is currently lacking. The authors conducted controlled model presentation experiments at active urban blackbird *Turdus merula* nests to provide the first empirical evidence that quantifies the potential sub-lethal and indirect effects of predators on avian reproductive success. Domestic cat models reduced subsequent parental provisioning rates, a strong indicator of sub-lethal effects, by one-third relative to a non-predatory rabbit *Oryctolagus cuniculus* control. There was no compensatory increase in food load size. Previous experiments demonstrate that this magnitude of reduced food delivery will reduce nestling growth rates by c. 40%. The grey squirrel model induced similar but weaker effects. Following the brief presence of the domestic cat model, subsequent daily nest predation rates, chiefly by corvids, increased by an order of magnitude relative to the squirrel and rabbit models. The intensity of parental nest defence elicited in response to model presentations predicts the probability of such third-party predator predation events, and the domestic cat model generated significant increases in nest defence behaviour. The brief presence of a domestic cat at avian nest sites reduces subsequent provisioning rates and induces lethal trait-mediated indirect effects. Full mitigation of the sub-lethal and indirect effects of domestic cats would problematically require permanent indoor housing.

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Biological Flora of the British Isles: *Silene suecica*

L. Nagy

Journal of Ecology 2013, 101: 532–544

This account presents information on all aspects of the biology of *Silene suecica* (Lodd.) Greuter & Burdet (*Lychnis alpina* L.) that are relevant to understanding its ecological characteristics and behaviour. The main topics are 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 disease, history and conservation. *Silene suecica* is native to the British flora, being found in just two confirmed localities (one in north-west England and the other in Scotland) on open fell-field and rocky outcrop habitats. Both locations are protected as SSSI and SAC (Natura 2000) within national parks.

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Integrating applied ecology and planning policy: the case of micro-turbines and wildlife conservation

K.J. Park, A. Turner and J. Minderman

Journal of Applied Ecology 2013, 50: 199–204

The authors present a case study of the planning process for micro-wind turbines (units generating <50kW) in the UK. Micro-turbines are now routinely installed in many European countries and the USA, and in spite of the rapid growth in numbers, there has been little study of their impact on wildlife. Consequently, the evidence-base upon which to establish planning guidance is very limited. Using the situation in the UK as an example, the authors show that (i) the planning process for micro-turbines varies widely among local authorities; (ii) a lack of data on their effects on wildlife makes interpretation of ecological surveys problematic; and (iii) recent changes to the planning process, designed to permit installation of micro-turbines in some contexts without requiring planning permission, are unlikely to change this status quo. The authors argue that (i) further research on the effects of micro-turbines on wildlife should take into account the needs of stakeholders, in particular, with regard to how effects may vary in different contexts; (ii) better planning guidance should be developed urgently, incorporating all available evidence and identifying further research needs; and (iii) a working group including representatives from the turbine industry, ecologists, policy makers and statutory bodies should be set up to streamline this process. These recommendations provide a starting point for on-the-ground turbine installers, planners and ecologists, and a way forward for managing the future planning process for micro-turbines.

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Fine-tuning the assessment of large-scale temporal trends in biodiversity using the example of British breeding birds

A.C. Studeny *et al.*

Journal of Applied Ecology 2013, 50: 190–198

The current headline indicator for ecosystem health and sustainability incorporates a geometric mean of relative abundances of breeding birds. Recently, a family of diversity measures (λ -measures) has been proposed as a novel instrument to separate diversity trends in dominant and rare species. This makes them an ecologically informative complement to current composite diversity indices. The authors studied habitat-specific temporal trends in the diversity of British breeding birds and predicted long-term trends. While the geometric mean reveals overall diversity trends by habitat type, supplementing these by the λ -measures provides a more nuanced picture of trends: a positive trend in the geometric mean may hide predominantly declining trends among the rarer species, which is then revealed by trends in the λ -measures. Understanding the population changes underlying the estimated trends is indispensable if we are to allocate limited resources more effectively. Employing a novel set of measures alongside the traditional geometric mean index, the authors analysed diversity trends among British breeding birds. It reveals that species that are scarce, but not yet in the focus of conservation action, may be the 'losers' in biodiversity action plans. This suggests that additional resources should be devoted to species showing long-term decline before they reach the low population levels that currently trigger large-scale species-specific rescue projects.

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Overcoming resistance and resilience of an invaded community is necessary for effective restoration: a multi-site bracken control study

J.G. Alday *et al.*

Journal of Applied Ecology 2013, 50: 156–167

The authors used *Pteridium*-invaded heath and grass communities as a test system and investigated the effects of recommended *Pteridium aquilinum* control treatments on vegetation composition and diversity. They evaluated seven field experiments in four regions of Great Britain designed to test five *Pteridium* control treatments, including 'one-off' (applied only at the start) and 'repeated' (applied regularly) treatments, against an untreated experimental control. The sites had context-dependent restoration targets, either a *Calluna* heathland or acid grassland. Species cover and diversity responses (higher plants, mosses plus lichens) to these treatments were monitored annually for 10 years. *Pteridium* control treatments induced significant change in species composition compared to experimental controls in both vegetation types. There are two important results for land managers: (i) where *Calluna* heathland is the target, 'repeated' treatments (cutting once or twice per year) were effective in overcoming the resistance of invaded community and moving species composition towards the target state, effectively creating an alternative state; (ii) where acid grassland is the target both 'one-off' and 'repeated' treatments overcame the invaded community resistance ('one-off' also overcame resilience) producing changes in species composition in the desired direction. The effectiveness of 'one-off' treatments was site dependent and produced alternative stable states within 10 years. In contrast, 'repeated' treatments were site independent but took longer to work and were more expensive.

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Landscape connectivity, habitat structure and activity of bat guilds in farmland-dominated matrices

A. Frey-Ehrenbold *et al.*

Journal of Applied Ecology 2013, 50: 252–261

The authors investigated the impact of connectivity and configuration of structural landscape elements on flight activity, species richness and diversity of insectivorous bats and distinguished three bat guilds according to species-specific bioacoustic characteristics. They tested whether bats with shorter-range echolocation were more sensitive to habitat fragmentation than bats with longer-range echolocation. They expected to find different connectivity thresholds for the three guilds and hypothesised that bats prefer linear over patchy landscape elements. Bat activity was significantly higher around landscape elements compared to open control areas. Short- and long-range echolocating bats were more active in well-connected landscapes, but optimal connectivity levels differed between the guilds. Species richness increased significantly with connectivity, while species diversity did not. Total bat activity was unaffected by the shape of landscape elements. This study highlights the importance of connectivity in farmland landscapes for bats, with shorter-range echolocating bats being particularly sensitive to habitat fragmentation. More structurally diverse landscape elements are likely to reduce population declines of bats and could improve conditions for other declining species, including birds. Activity was highest around optimal values of connectivity, which must be evaluated for the different guilds and spatially targeted for a region's habitat configuration. In a multi-species approach, the authors recommend the reintroduction of structural elements to increase habitat heterogeneity should become part of agri-environment schemes.

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Intraguild predation in winter wheat: prey choice by a common epigeal carabid consuming spiders

J.S. Davey *et al.*

Journal of Applied Ecology 2013, 50: 271–279

Intraguild predation, where predators compete for the same prey resource whilst consuming each other, may destabilise population dynamics and increase the risk of pest outbreaks. The authors tested the null hypothesis that predation by the epigeal predator *Pterostichus melanarius* (Coleoptera: Carabidae) on different spiders is species-independent (proportional to density). A combination of population monitoring in winter wheat, molecular identification of juvenile spiders, molecular analysis of predator gut contents and a Monte Carlo simulation model were used to analyse prey choice. *Pterostichus melanarius* were pitfall-trapped over three months, and 622 individuals were screened for the remains of four spider species. Predation rates on spiders were 43.6% in June and 33.3% in August and showed clear evidence of prey choice. Predation on the web-dependent *Tenuiphantes tenuis* (Linyphiidae) was significantly greater than predicted from a random choice model, while predation on *Bathypantes gracilis* (Linyphiidae) was significantly lower. The beetles may be selecting the most abundant species disproportionately (switching) or responding in some cases to spatial niche separation (*T. tenuis* locate their webs marginally lower than *B. gracilis*). However, two itinerant hunters, *Erigone* spp. (Linyphiidae) and *Pachygnatha degeeri* (Tetragnathidae), were consumed in proportion to their density. High levels of intraguild predation were revealed using molecular diagnostics. The gut analysis approach provided invaluable data that will inform the future design of appropriate pest management and integrated farming strategies that encourage these predators. The data showed strong evidence of prey choice. Managers can, however, probably encourage high densities of all these known aphid predators (spiders and carabids) because disproportionately high rates of predation on the most common spiders at the field sites (*T. tenuis*) were not sufficient to prevent strong growth in the density of this species between June and August (adults increased x1.6 and juveniles x 8.6). Such work is essential if we are to reveal the processes behind functional biodiversity in crops.

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Non-random extinctions dominate plant community changes in abandoned coppices

M. Kopecký, R. Hédl and P. Szabó

Journal of Applied Ecology 2013, 50: 79–87

The authors analysed temporal changes in forest plant communities after the mid-20th century abandonment of coppicing in a typical Central European forest, which had been managed as coppice for centuries. They used 122 semi-permanent plots first surveyed in the 1950s shortly after the last coppicing and again in the 2000s after half a century of natural succession. The studied vegetation has shifted from the species-rich assemblages of a relatively open and low-nutrient forest towards the impoverished flora of a closed-canopy forest dominated by a few shade-adapted species. The significant reduction in beta diversity indicated taxonomic homogenization of the forest understorey. Temporal species turnover was only a minor component of the community change, and recent assemblages are nested subsets of the former ones. Ecologically non-random extinctions dominated these changes. Light-demanding species with a persistent seed bank were the most prone to extinction, while species with high specific leaf area substantially increased in frequency. If forestry and conservation policies continue to prefer closed-canopy stands, many endangered species are likely to pay their extinction debts. To restore declining or even locally extinct species, canopy opening in abandoned coppices is urgently needed.

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Evaluating ecosystem goods and services after restoration of marginal upland peatlands in South-West England

E. Grand-Clement *et al.*

Journal of Applied Ecology 2013, 50: 324–334

This article uses a conceptual model to present the effects of restoration on ecosystem services, that is, water provision and quality, carbon storage, biodiversity, food and fibre provision and cultural services, both immediately after ditch blocking and in the few years post-restoration. The model is then applied in the context of Exmoor National Park, in South West England and used to perform a cost–benefit analysis of the restoration and monitoring programme, as these shallow peatlands are located in geographically marginal areas, and therefore more sensitive to climate change. Past research indicates that some processes tend to return progressively to their pre-disturbance state, but whether the complete recovery of peatlands to functioning mires occurs after restoration remains unclear, partly due to the difference between the temporal and spatial scale at which processes occur (i.e. up to decadal) and are monitored (typically a few years). Overall, on Exmoor, the long-term benefit of peatland restoration to some ecosystem services, such as a reduction in carbon losses and improvement of water storage and quality, has the potential to balance high financial investment. Gaining a better understanding of the effects of peatland restoration on ecosystem services provided is essential to assess the potential value of restoration projects. Using the case of the shallow peatlands of Exmoor National Park, located in geographically marginal areas in the UK and therefore more vulnerable to the effects of climate change, the authors found that there is potential for both the value of carbon storage and water provision to offset the costs of restoration in the long-term.

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Sustaining recreational quality of European lakes: minimizing the health risks from algal blooms through phosphorus control

L. Carvalho *et al.*

Journal of Applied Ecology 2013, 50: 315–323

Nutrient enrichment is thought to be the most important pressure responsible for the widespread increase in cyanobacterial blooms in recent decades. Quantifying how nutrients limit cyanobacterial abundance in lakes is, therefore, a key need for setting robust targets for the management of freshwaters. Using a data set from over 800 European lakes, the authors highlight the use of quantile regression modelling for understanding the maximum potential capacity of cyanobacteria in relation to total phosphorus (TP) and the use of a range of quantile responses, alongside World Health Organisation (WHO) health alert thresholds for recreational waters, for setting robust phosphorus targets for lake management in relation to water use. The analysis shows that cyanobacteria exhibit a nonlinear response to phosphorus with the sharpest increase in cyanobacterial abundance occurring in the TP range from about 20 µg.L⁻¹ up to about 100 µg.L⁻¹. The likelihood of exceeding the WHO 'low health alert' threshold increases from about 5% exceedance at 16 µg.L⁻¹ to 40% exceedance at 54 µg.L⁻¹. About 50% of the studied lakes remain below this WHO health alert threshold, irrespective of high summer TP concentrations, highlighting the importance of other factors affecting cyanobacteria population growth and loss processes, such as high flushing rate. Developing a more quantitative understanding of the effect of nutrients on cyanobacterial abundance in freshwater lakes provides important knowledge for restoring and sustaining a safe, clean water supply for multiple uses. These models can be used to set nutrient targets to sustain recreational services and provide different levels of precaution that can be chosen dependent on the importance of the service provision.

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Food production vs. biodiversity: comparing organic and conventional agriculture

D. Gabriel *et al.*

Journal of Applied Ecology 2013, 50: 355–364

To identify the benefits (in terms of biodiversity conservation) and costs (in terms of reduction in yields) of agricultural management, the authors examined the relationship between crop yield and abundance and species density of important taxa in winter cereal fields on both organic and conventional farms in lowland England. Of eight species groups examined, five (farmland plants, bumblebees, butterflies, solitary bees and epigeal arthropods) were negatively associated with crop yield, but the shape of this relationship varied between taxa. It was linear for the abundance of bumblebees and species density of butterflies, concave up for the abundance of epigeal arthropods and butterflies and concave down for species density of plants and bumblebees. Grain production per unit area was 54% lower in organic compared with conventional fields. When controlling for yield, diversity of bumblebees, butterflies, hoverflies and epigeal arthropods did not differ between farming systems, indicating that observed differences in biodiversity between organic and conventional fields are explained by lower yields in organic fields and not by different management practices *per se*. Only percentage cover and species density of plants were increased by organic field management after controlling for yield. The abundance of solitary wild bees and hoverflies was increased in landscapes with high amount of organic land. The results indicate that considerable gains in biodiversity require roughly proportionate reductions in yield in highly productive agricultural systems. They suggest that conservation efforts may be more cost effective in low-productivity agricultural systems or on non-agricultural land. In less productive agricultural landscapes, biodiversity benefit can be gained by concentrating organic farms into hotspots without a commensurate reduction in yield.

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Uncovering the links between foraging and breeding regions in a highly mobile mammal

D.J.F. Russell *et al.*

Journal of Applied Ecology 2013, 50: 499–509



Grey seal © Martha Tressler

The authors model the seasonal movements of the UK population of grey seals *Halichoerus grypus* and show how insights from the model can improve its management. For the study period, the authors detected an increase in the breeding performance of animals that foraged in the Hebrides and South-East Coast. Grey seal Special Areas of Conservation (SACs) were designed to encompass a significant proportion of the UK breeding population: c. 40% of the breeding females in this study area. Of the females breeding in SACs, only 15% breed in northern Scotland, but up to 50% forage there. The results indicate that, by only considering the breeding distribution of females that breed in SACs, the impact of anthropogenic activities on nearby SACs may be overestimated, whereas impacts on remote SACs may be underestimated. By quantifying the link between the foraging and breeding distributions of grey seals, management of breeding populations can be focused on the foraging regions where the resources necessary for reproduction are acquired. The construction of marine developments is dependent on demonstrating that they will not have an adverse effect on the integrity of Special Areas of Conservation (SACs), and the authors have shown that this requires consideration of the seasonal transition probabilities estimated in this study.

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Forthcoming Events

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

Conferences		
Date	Title	Location
10 July 2013	Summer Conference – Ecosystem Services II: Green Infrastructure – Interdisciplinary Design and Practical Delivery	Birmingham
6-7 November 2013	Autumn Conference – Ecosystem Services III: Freshwater Ecology	Southampton

Training Courses		
Date	Title	Location
11 June 2013	Invasive non-native species - Identification and site assessment	St Ives, Cambridgeshire
14 June 2013	Wildflower Identification for beginners	Wirksworth, Derbyshire
20-21 June 2013	Introduction to Marine Benthic Ecology	Dublin
25-26 June 2013	Getting to Grips With Grasses	Axminster, Devon
27-28 June 2013	Intro to NVC – Grasslands	Axminster, Devon
28 June 2013	Glow Worms – Surveying and habitat management	Wirksworth, Derbyshire
1 July 2013	Learning vascular plants of grassland habitats	Salisbury, Wiltshire
2 July 2013	Vascular Plant Identification – Heathland, Acid Grassland and Bogs	New Forest
3 July 2013	Invasive and Non-Native Fauna – ID, control and legislation	Swansea
4 July 2013	A Practical Guide to the Water Framework Directive (WFD)	Chester
5 July 2013	Introduction to Adult Dragonflies and Damselflies	Henfield, West Sussex
8 July 2013	Introduction to NVC	Farndon, Cheshire
10 July 2013	Invasive and Non-Native Flora – ID, control and legislation	Swansea
11-12 July 2013	Beginners Guide to Botany	Clyst St Mary, Devon
15 July 2013	Field ID of butterflies – woodland, grassland and hedgerows	Totnes, Devon
18 July 2013	Introduction to White-clawed Crayfish	Windermere, Cumbria
19-20 July 2013	Working with Crayfish: survey, ecology & mitigation	Malham Tarn, Yorkshire Dales
22-23 July 2013	Beginners Guide to Botany	Dublin (tbc)
24 July 2013	Bat Handling and Identification	Herne Bay, Kent
29 July 2013	Dormice – ecology, survey techniques and best practice	Totnes, Devon
30 July 2013	Identification of Invasive Alien Plants (Sch. 9 of Wildlife and Countryside Act)	Dorking, Surrey
2 August 2013	Wildflower Identification for Improvers	Wirksworth, Derbyshire
2 August 2013	Introduction to Butterflies – Ecology and Identification	Henfield, West Sussex
5 August 2013	Fern and Horsetail Identification	Cleeve, Somerset
7 August 2013	Hazel Dormouse: Handling and Survey Methods	Herne Bay, Kent
12 August 2013	Field ID of dragonflies and damselflies	Totnes, Devon
14 August 2013	Surveying and Report Writing for Protected Bird Species – Barn Owl	Tamworth, Staffordshire
19 August 2013	Lichens, Fungi and Bryophytes – Ecology, Surveying and Mitigation	Cleeve, Somerset
30 August 2013	Invasive non-native species – Biosecurity	London
2-3 September 2013	Working with Crayfish: survey, ecology & mitigation	Malham Tarn, Yorkshire Dales
3-4 September 2013	Train the Trainer	Leeds
4 September 2013	Using the Vegetative Key to British Flora	Southampton
11 September 2013	Phase 1 Habitat Survey	Cavenham Heath NNR, Suffolk
16 September 2013	Reptiles – survey techniques and mitigation	Totnes, Devon
19 September 2013	Crayfish in Britain – natives and invasive non-natives	Stanstead Abbots, Hertfordshire

Geographic Section Events		
Date	Title	Location
11 June 2013	East of England Section event – Visit to Carlton Marshes Nature Reserve	Suffolk
11 July 2013	East of England Section event – Visit to Little Ouse Headwaters Project Fen sites	Suffolk
8 September 2013	Yorkshire and Humber Section event – Marine and Coastal Wildlife at Flamborough	Flamborough

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