

inpractice

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International Approaches

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Welcome

Confronted by the possibility of ecosystem collapse due to human activities and climate change, we need a coordinated, international response if we are to avert potential catastrophe. Cooperation between countries and learning lessons from across the world are crucial, and it is more important than ever to question the adequacy of our customary approaches, tools and methods. Unfortunately, scopes of work typically preclude transformative change at the local level by sidelining indirect risks that require complex management solutions outside the remit of an individual developer. Biodiversity considerations rarely trigger substantive modifications of development proposals, with 'micro' adjustments and mitigation being the norm. Achieving good outcomes for biodiversity and safeguarding the benefits people derive from ecosystems requires carefully integrated social and ecological assessment that is rarely possible in time-constrained commercial assessments, especially in countries with limited data and weak regulatory capacity. Even if robust technical assessments are possible, the 'teeth' needed to enforce delivery of outcomes on the ground are often lacking.

Whilst initiatives such as IMPEL (European Network for the Implementation and Enforcement of Environmental Law) aim to encourage more effective coordination between prosecutors, judges, NGOs and scientific institutes (see Visbeen, this issue), worldwide there is a very long way to go. Hope may lie in the enlightened self-interest of the corporate and financial sectors, with growing recognition of the need to manage Environment, Social and Governance (ESG) risks to future-proof business and investment models. The devastating bushfires in Australia prompted victims and Friends of the Earth Australia to issue a complaint to ANZ Bank that it had failed to 'meaningfully adhere' to the Paris Agreement reduction targets (whereby the world's nations pledged to limit global warming to well below 2.0°C above pre-industrial levels) in its lending portfolio, had 'inadequate systems of due diligence' and was insufficiently accountable for the risks associated with the oil and gas investments in its portfolio.

Shareholders want to see explicit consideration of global environmental risks, but ecosystems and biodiversity are poorly addressed in ESG-oriented investing. Compared with climate change, few financial products exist for investors primarily concerned with biodiversity. This is often attributed to the complexity of biodiversity, which cannot be defined by a single metric, meaning businesses may have to work with several indicators according to their position in a value chain, relationship with nature, and/or geographic location. Some progress has been made in unpicking the complexity of some business supply chains, however, and new coalitions such as the international Science Based Targets Network are developing resources to enable companies to set science-based targets for ecosystems and biodiversity across their value chains that are underpinned by current science. This may help professionals commonly accused of making biodiversity risk management 'too complicated' and help practice move beyond 'tick-box' methods. The need for high quality professional input to underpin sustainable development has never been greater and it is important not to forget the need for good ecological evidence and understanding to support new approaches to accounting.

Against this backdrop, there is a clear role for central and local governments in setting policy and implementing those policies, respectively. There is also a strong demand for international consultancy advice, whether to help business clients conform with environmental laws and requirements, develop corporate approaches to management of ESG risks, establish methods for natural capital accounting, assess biodiversity risks and impacts throughout supply chains or conduct more conventional environmental impact assessments and associated technical studies. In addition, there is a need for expertise in due diligence evaluation on behalf of financial lenders to ensure that their environmental and social safeguard policies or standards are met when they provide financial support to clients and to help clients conform with Principles for Responsible Investment (PRI).

This edition of *In Practice* presents a series of articles on international approaches to conservation and environmental assessment. They illustrate a variety of efforts to share experiences, build on lessons learned, strengthen implementation, improve regulation and carry theory into practice. Providing a forum for these initiatives is timely; the need to take action to protect the biosphere is urgent and success is dependent on international coordination to improve biodiversity resilience.

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Front cover: Mangroves provide a unique nature-based solution to many issues in tropical regions.

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Did you know that you can unsubscribe from the hardcopy of *In Practice* and receive only the digital version. If you would like to take up this option, please contact enquiries@cieem.net to change your preferences.

CIEEM on BBC to discuss Environment Bill

CIEEM's Head of Policy and Communications, Jason Reeves, appeared on BBC Radio 4's *Farming Today* programme on 7 February to discuss the Environment Bill and the forthcoming Office for Environmental Protection.

<https://www.bbc.co.uk/programmes/m000dxv>

CIEEM response to the new Environment Bill

As expected, Biodiversity Net Gain will become mandatory and we are pleased to see a requirement on the Secretary of State to set long-term targets for improving the environment. There are however concerns regarding short-term, interim targets and the limitations on the independence of the Office for Environmental Protection.

<https://cieem.net/cieem-statement-on-the-new-environment-bill>

CIEEM statement on the new Agriculture Bill

The Agriculture Bill aims to replace the European Union's Common Agricultural Policy with one that pays farmers and land managers to provide public benefits. This is the overarching ambition of the Bill but there are concerns regarding support for "productivity" and "profitability".

<https://cieem.net/cieem-response-to-the-new-agriculture-bill/>

Referencing environmental legislation post-Brexit

Now that the UK has left the EU, members may be asking how to reference EU-derived legislation in their reports. We've put together a brief item of information and links to other sources.

<https://cieem.net/referencing-environmental-eu-legislation-post-brexit/>

Rachel Hoskin

We regret to inform readers of the sudden and unexpected death of Rachel Hoskin. Rachel was one of the main contributors to the Biodiversity Net Gain guidance, which CIEEM developed in partnership with IEMA and CIRIA. She also spoke at CIEEM conferences and delivered training on our behalf. Rachel was a Director at Footprint Ecology. Our thoughts are with her family, friends and colleagues at this sad time.



CIEEM Medal Winner Awarded Tyler Prize for Environmental Achievement

Pavan Sukhdev has been awarded the 2020 Tyler Prize for Environmental Achievement for his work bringing the finance and environmental sectors together. His work on the economic benefits of biodiversity and the economic costs of its degradation and loss led to the publication of the first report of 'The Economics of Ecosystems and Biodiversity' (TEEB) in 2008. Following the publication, news outlets around the world began to dedicate headlines to the staggering cost of deforestation to the global economy. The TEEB report went on to become a foundation for the Green Economy movement.

Pavan was awarded the CIEEM Medal in 2011 for his distinguished contribution to the economic valuation of the natural environment.

Staff Changes

The Membership Team is currently recruiting a replacement for Rohan Seeliger-Morley, who left at the end of last year. We are also recruiting a new post to the Membership Team, reflecting the increased workload from membership applications and upgrades.

Conferences 2020		
21-22 April 2020	Irish Conference 2020 Building on Conservation Approaches to Benefit National Biodiversity: Big Ideas for Big Challenges	Galway
22 September 2020 TBC	Welsh Conference 2020 Managing Welsh Rivers, Lakes and Streams	Aberystwyth
October TBC	Scottish Conference 2020 Land Use Change	Perth
1-2 December 2020	Autumn Conference 2020 Time to Change: New Challenges and Opportunities	Bristol

In Practice themes

Edition	Theme	Article submission deadline
108 – June 2020	Not themed – all topics welcome	n/a
109 – September 2020	Practical Action for Climate Change	25 May 2020
110 – December 2020	Nitrogen	24 August 2020

If you would like to contribute to one of these themes please contact the Editor at GillKerby@cieem.net.

Breeding bird survey guidelines published

As part of a new initiative to provide ecological consultants with a single source of information on ornithological assessments, guidance has been published on breeding bird surveys at www.birdsurveyguidelines.org. The recommendations were drafted by a steering group comprising representatives from the BTO, RSPB, NE, CIEEM and commercial consultancies. The guidance describes approaches to scoping, survey planning and execution, and interpretation of data for ornithological impact assessments in the UK and Ireland. In future the website will also include guidance on other types of bird surveys, research questions aimed at filling evidence gaps, and recommendations for assessing the competency of bird surveyors.

Committee on Climate Change (CCC) warn rapid changes in UK land use needed to deliver Net Zero

The CCC has published its *Land Use: Policies for a Net Zero UK* report, which gives its first ever in-depth advice on UK agricultural policies. The report encourages an increase in tree planting, low carbon farming practices and restoration of peatlands. The CCC also say emissions from agriculture, land use and peatlands can, and should, be reduced by 64% by 2050.

<https://www.theccc.org.uk/2020/01/23/major-shift-in-uk-land-use-needed-to-deliver-net-zero-emissions/>

Scotland's National Nature Reserves' natural capital valued at £683m

Scottish Natural Heritage (SNH) has published a set of natural capital accounts taking stock of the climate, tourism, recreational and health benefits from Scotland's National Nature Reserves (NNRs). SNH calculated the net natural capital value to be £683 million over 60 years. Overall, the report shows that the value of the benefits from SNH land is eight times higher than the costs to maintain them.

<https://www.endsreport.com/article/1667731/scotlands-national-nature-reserves-valued-683m>

Natural Resources Wales urge people to take note of new invasive species laws

Natural Resources Wales (NRW) is urging people to take note of the Invasive Alien Species (Enforcement & Permitting) Order which took effect on the 1 December 2019 and will apply to 66 animals and plants that are species of concern in the UK and in Europe. <https://naturalresources.wales/about-us/news-and-events/news/nrw-shedding-light-on-new-invasive-species-laws/?lang=en>

Welsh Government publish a new climate adaptation plan

Following the publication of a climate change mitigation plan earlier this year, the Minister for Environment, Energy and Rural Affairs, Lesley Griffiths, has published a climate adaptation plan for Wales: *'Prosperity for All: A Climate Conscious Wales'*. The plan sets out actions over the next 5 years to address the areas of greatest risk.

<https://gov.wales/written-statement-prosperity-all-climate-conscious-wales>

European Commission launch European Green Deal

The European Commission has today proposed a 'European Green Deal'. The Commission has pledged to present a Biodiversity Strategy by March 2020, propose a global target at the UN Biodiversity Conference, prepare a new EU Forest Strategy and reduce the use of pesticides and fertilisers in agriculture. The Commission has also pledged to present the first European Climate Law by March 2020 to enshrine the goal of carbon neutrality by 2050.

<https://www.theguardian.com/>

UN publish draft plan to halt biodiversity crisis

The United Nations Convention on Biological Diversity (CBD) has published a draft version of the Post-2020 Global Biodiversity Framework which aims to reverse biodiversity decline and increase resilience of ecosystems. The proposal aims to halt biodiversity loss by 2030 and achieve recovery of at least 20% of natural ecosystems by 2050.

<https://cieem.net/un-publish-draft-plan-to-halt-biodiversity-crisis/>

Northern Irish minister 'open' to independent EPA

Northern Ireland's Environment Minister, Edwin Poots, has said he was "open" to the plans set out in the new Stormont power sharing agreement for an environmental protection agency. He also said that laying a new environment strategy before Stormont is high on the agenda. We responded to the recent consultation on developing an environment strategy for Northern Ireland

(<https://cieem.net/resource/environment-strategy-for-northern-ireland-response/>).

<https://www.endsreport.com/article/1671868/northern-irish-minister-open-independent-epa-commentisfree/2019/dec/11/europe-climate-crisis-european-green-deal-growth>

Urgent action needed for Europe to meet 2030 goals for the environment

The European Environment Agency (EEA) has published a report on the *'State of the Environment'* for 2020 (SOER 2020), which warns that Europe faces environmental challenges of unprecedented scale and urgency. While European environment and climate policies have helped to improve the environment over recent decades, Europe is not making enough progress to meet its 2030 goals, it reports.

<https://www.eea.europa.eu/highlights/soer2020-europes-environment-state-and-outlook-report>

UN International Climate Conference – Madrid 2019

Talks at the recent UN international climate conference, COP25, failed to reach a consensus on the 'rulebook' underpinning the Paris Agreement climate ambitions. Discussions centred on setting rules for carbon markets and other forms of international cooperation. Sign-off on these issues and reporting requirements for transparency and 'common timeframes' will now be pushed back to the next COP in Glasgow in 2020.

<https://www.endsreport.com/article/1668878/major-climate-conference-disappointment>

Baseline Data Collection for International Projects: Limitations, Opportunities and Lessons Learned

Keywords: baseline, collaboration, guidance, lessons, monitoring

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Undertaking biodiversity assessments for international projects is often very different to working in the UK or Ireland, not least because of the challenges of collecting adequate baseline data in difficult circumstances. International projects in developing countries are frequently subject to constraints including knowledge gaps, scarce local resources, and significant access limitations. These can sometimes be overcome through bespoke surveys, detailed stakeholder liaison and consultation, remote survey techniques, and survey of proxy sites but extensive pre-construction and operational monitoring, coupled with adaptive management, may also be necessary. This article considers how challenges can be overcome and what lessons can be learned for baseline data collection in a domestic situation.

Introduction

At the fifth Conference on Wind Energy and Wildlife Impacts, held in Scotland in August 2019, there was an interesting



Figure 1. International projects often have prominent social and environmental considerations.

panel discussion led by representatives of the World Bank around reconciling the variation in quality and availability of baseline data for international projects with the need for a robust assessment of environmental risks and impacts (Figure 1). It is a common problem with international projects, often representing the biggest challenge to those involved, and it was refreshing to hear the topic being subject to such a frank discussion.

This article focusses on international projects where environmental consultants from the UK provide technical expertise in biodiversity assessment. In many cases, in-country baseline data collection in developing countries will be undertaken by local experts but assessed by a consultant from overseas. There is often a strong reliance on third party expertise and information must be sourced from a range of providers to ensure that biodiversity risk management can be adequately appraised.

The Equator Principles

The assessment of biodiversity impacts on international projects is underpinned by the Equator Principles (see <https://equator-principles.com>). These were established in 2003, based upon an existing framework adopted by the International Finance Corporation (IFC). They are intended to provide a minimum standard for due diligence and monitoring to support responsible risk decision-making. They provide a risk management framework for identifying, assessing and managing environmental and social risks associated with a project, explicitly including risks to biodiversity. Those organisations which sign up to the Equator Principles (currently 101 International Financial Institutions in 38 countries) commit to not providing finance for projects that do not meet minimum standards for environmental and social performance. The management and evolution of the Equator Principles is overseen by the signatories (see <https://equator-principles.com/ep4/>).

The challenge

The Equator Principles state that reporting on a project's potential impacts '*...will be an adequate, accurate and objective evaluation and presentation of the environmental and social risks and impacts...*'. This places the onus on those undertaking the assessment to decide how best to achieve this within the context of the limitations operating. Major practical limitations include lack of access to entire regions due to political instability or government restrictions; health and safety considerations which may include tropical diseases, dangerous wild animals, and inhospitable environments; lack of 'standardised' survey methods and study area guidance; limited local or national information on the status and distribution of key species or habitats; and the logistics of conducting field work overseas in remote locations. There may also be project limitations, such as those driven by financing windows, which will need consideration.

There is some published advice such as the good practice guidelines for the collection of biodiversity baseline data in international projects provided by Gullison *et al.* (2015). This includes guidance on appropriate desk-based resources, ways to

address field survey limitations, bespoke field survey design, and the importance of input from local stakeholders and experts. Whilst many of the same issues are relevant to domestic projects, the specific limitations will differ in nature or scale. However, in the UK and Ireland there is a prescriptive framework for baseline data collection, with an established set of guidance documents and procedures. The limitations are often relatively minor and measures can usually be put in place to address them. For some International Financial Institutions, there is explicit alignment with 'Western' legislation and guidance for certain sectors, which mirrors the domestic situation when it comes to the scope of baseline collection (e.g. the World Bank Group wind energy guidelines are aligned with survey and assessment methodologies used by Scottish Natural Heritage and EUROBATS).

But what if 'conventional' field surveys are not possible in international projects?

The solutions

Gathering adequate baseline data for overseas projects relies on experience, an inquisitive and open mind, and tenacity. There are some obvious steps to take, such as a comprehensive desk study, but other approaches may need to be more innovative.

Desk study

An important first step is to thoroughly review existing information bearing in mind that it may be multi-faceted and more wide-reaching than is usual for domestic projects. Finding out what is available and where can be difficult, and it may not be easily accessible. Some material may need translating into English.

In many cases, an Environmental Impact Assessment will already have been undertaken at a local or national level which will include a biodiversity baseline. There may not be a great deal of directly relevant information but the report will always be a useful starting point. Consider other material as well, such as publications with a more social focus or related to other disciplines. For example, reports related to farming can include data on livestock predation (of critical importance in some regions) and the occurrence of large carnivores, which are key indicators of biodiversity for baseline assessments.

International organisations and Non-Governmental Organisations (NGOs) like Birdlife International or Flora & Fauna International (FFI) produce high quality reports that will be relevant. For example, a management plan produced recently by FFI for ancient fruit and nut tree forests in Tajikistan provided vital information (including graphics and recent estimates of forest cover) about the proximity of a new road scheme to these forest sites. The plan also discussed the social value of these trees in terms of a genetic reservoir for cultivated varieties potentially at risk from climate change. This highlighted the broader context that can sometimes be found in such resources and which can be extremely valuable.

Remote survey and proxy sites

Information from remote survey tools is becoming increasingly available worldwide and can be invaluable. In particular, search for data from the Integrated Biodiversity Assessment Tool (IBAT), which uses extensive datasets to provide a project or site-specific biodiversity review, LiDAR, and drones. Google Earth can also provide important landscape and topographical context. Its timeline function provides a useful starting point for retrospective assessments, especially for projects where construction activities have already begun (Figure 2).



Figure 2. Sometimes it will be necessary to make a baseline assessment at a site where work has already started; in such situations, proxy sites can provide important information.

Feature Article: Baseline Data Collection for International Projects: Limitations, Opportunities and Lessons Learned (contd)

In such cases, a proxy site can be identified from Google Earth and used to provide a representative baseline. This technique was successfully employed for a mining project in Central Asia, where habitat loss had already occurred when the biodiversity project commenced. The project was located in an area of high biodiversity value forest. With the aid of the timeline function in Google Earth, it was possible to make a preliminary assessment of what was present prior to construction. Importantly, additional verification was obtained from two further sources: local community leaders who had detailed knowledge of use of the local forests for provisioning by villagers (as a vital ecosystem service), and local academics who had completed botanical studies in the area. This corroboration enabled us to identify a suitable proxy site close to the project site and undertake surveys across this area to inform a baseline assessment that, while obviously limited, provided vital empirical data.

Local knowledge

Individuals with intimate local knowledge of an area can play a valuable role in baseline surveys. For example, a representative of the forestry authority provided important information on the Tajikistan road project. His organisation had carried out supplementary feeding of snow leopards and wolves to prevent predation of livestock during harsh winter conditions and so he was able to provide data on numbers of predators in the vicinity.

Local experts can also highlight what is important within a social context locally. Whilst this local perspective can sometimes be a source of bias, if robustly critiqued it can be of great benefit. Clearly, project compliance within the context of social governance is not part of a baseline biodiversity assessment, nevertheless it is important that the value of biodiversity to local communities is understood.

What next?

There will be instances where gaps in the baseline data cannot be filled, either because the limitations are insurmountable or because of other restrictions. In these circumstances the quality of the baseline survey must be weighed against the likely biodiversity risks to judge whether a robust

assessment is possible. Inevitably, there will be some projects where the biodiversity risks in the absence of an adequate dataset will be considered too great to support funding; it is of paramount importance that this is recognised, both from the environmental consultant's perspective and that of the developer and financial lender.

The general lack of guidance for biodiversity assessments on international projects means that the importance of the consultant's advice is much greater than is typically the case in a domestic situation. For example, although no 'conventional' baseline biodiversity surveys may have been undertaken, this does not mean that the information collected will not be sufficient to inform a robust assessment but it is down to the environmental consultant to make that judgement based on their own expertise.

Given the lack of a formal planning framework for many international projects, there is a less rigid requirement for complete datasets to be available for the Environmental and Social Impact Assessment (ESIA), especially for projects with lower perceived biodiversity risks. Therefore, a greater focus on 'post-assessment' work is not uncommon, including measures such as extensive pre-construction surveys to corroborate ESIA findings, and long-term operational monitoring and associated adaptive

management. To commit to these measures often requires an impressive level of collaborative working, with developers, key stakeholders and lenders in agreement over the principles of the development, and a commitment to long-term mitigation frequently a condition of financing.

Cooperation and good communication is paramount in these situations. For example, during project work in the south of Ukraine, a population of a species of significant conservation concern was identified in relation to a proposed solar power plant development. In order to robustly review the project in light of these risks, and ultimately to decide on its fate, a workshop was organised involving all key project stakeholders. Participants were able to talk through the project and design a strategy to demonstrate how it could be progressed and remain compliant with the relevant IFI standards including, in this case, securing a Net Gain for the species in question. While, in itself, a project workshop is not unusual, the level of engagement from all parties involved was greater than is normal in domestic situations and is a specific benefit identified within the Equator Principles. An impromptu, less formal, workshop was undertaken during a subsequent visit to the site, which allowed the mitigation strategy to be updated to reflect design changes and to be agreed immediately (Figure 3).



Figure 3. The willingness of key stakeholders to engage and reach solutions is one of the benefits of working in a less bureaucratic process.

Lessons for the UK and Ireland

Successful delivery of biodiversity assessments for international projects invariably relies on flexibility, innovation and the ability to extract information from wide-ranging resources, as much as it does from field survey effort. When done well, the results of this mixed approach can be impressive.

In the domestic setting, there is often a resistance to engaging with individuals not directly linked to the project: confidentiality clauses, local politics, and concerns over budget all play a part in constraining a more free-thinking approach to understanding the biodiversity baseline. However, there is no reason why a more open outlook cannot be adopted. There is a huge depth of knowledge amongst 'ordinary' people and specialist biodiversity interest groups, with citizen science increasingly recognised as a valid way to collect scientific information. While there will obviously be restrictions, there is certainly room for more collaboration. Wider engagement, for example through workshops, can also foster a sense of inclusivity which will be of benefit in ongoing consultations.

More generally, there are differences in the approach to biodiversity assessment overseas compared to in a domestic setting. Assessments tend to be more wide-ranging and are underpinned by defined conservation measures and overall biodiversity value, rather than focusing on narrower themes such as protected species. With an increasing awareness of the importance of biodiversity, ecosystem services and natural capital, and a greater understanding of the links to well-being, it seems a logical progression for biodiversity to be considered more holistically within the domestic setting, as within international projects.

Conclusions

International work requires environmental consultants to think outside the box. The landscape and geography, economics, political and social situations all differ, and novel limitations and new challenges have to be overcome. However, the biggest adjustment is to accept the unorthodox

when it comes to baseline data collection along with a willingness to take opportunities to gather information where and when they exist, without recourse to the tightly worded guidance and policy documents that shape domestic work. Alternative approaches must be explored when conventional field survey is not possible. Effort is often required to identify and then extract relevant information from novel sources, while wide-ranging, and open-minded stakeholder engagement can produce impressive results, especially with individuals or communities closely associated with the project area and benefitting from provisioning and other ecosystem services.

In certain situations, survey effort across a proxy site may be appropriate, and this can produce robust, representative datasets of significant value in biodiversity assessments. Again, the success of this approach is dependent on access to local expertise, whether from academics, or those making use of the habitats being studied. Attempting to complete retrospective baseline surveys is at odds with domestic project work but it is a reality for international projects where funding can be volatile. There are opportunities to use this approach wherever significant access constraints exist, either at home or overseas.

In some circumstances, it will not be possible to compile adequate datasets for an acceptable biodiversity assessment. In these cases, the environmental consultant will need to advise on whether this represents an insurmountable problem, heralding the end of the project in its current form, or whether an indicative assessment may be appropriate, with commitments to full survey work in advance of and during construction and development.

There is often an extensive commitment to ongoing monitoring and adaptive management in international projects, together with explicit No Let Loss or Net Gain required by most lenders. Among other lessons, this recognition of the value of biodiversity and acceptance that it must be protected and enhanced should be applied to project work closer to home.

References and online resources

Gullison, R.E., Hardner, J., Anstee, S. and Meyer, M. (2015). *Good Practices for the Collection of Biodiversity Baseline Data*. Prepared for the Multilateral Financing Institutions Biodiversity Working Group & Cross-Sector Biodiversity Initiative. Available at http://www.csbi.org.uk/wp-content/uploads/2017/11/Biodiversity_Baseline_JULY_4a-2.pdf. Accessed 16 January 2020.

World Bank Group (2015). *Environmental, Health, and Safety Guidelines for Wind Energy*. World Bank Group. Available at https://www.ifc.org/wps/wcm/connect/b82d0563-b39a-42a7-b94e-0b926b4a82f9/FINAL_Aug%2B2015_Wind%2BEnergy_EHS%2BGuideline.pdf?MOD=AJPERES&CVID=mpusVXy. Accessed 16 January 2020.

Equator Principles. See <https://equator-principles.com/about/352/>

Integrated Biodiversity Assessment Tool (IBAT). See www.ibat-alliance.org

IUCN Red List of Threatened Species. See <https://www.iucnredlist.org/>

About the Author



Jon Seller is an Associate Director for WSP and has been working as an ecologist for around 15 years. He has worked on many international projects over the past six years, focussing mainly on Eastern Europe, North Africa and Central Asia.

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Think Fungi! Taking Inspiration from Chile's Approach to Fungi in EIA

Keywords: Chile, functional ecology, fungi, fungi conservation, mycology, waxcap

Matt Wainhouse MCIEM and Giuliana Furci



Figure 1. Surveying fungi in a southern beech *Nothofagus* forest in Chile. Photo credit Giuliana Furci.

The fungal community is often neglected in Environmental Impact Assessments (EIA) despite their diversity, importance for ecosystem function and conservation status. Fungi can be challenging to survey but changes to Chile's EIA Regulations has led to a step-

change in how they account for fungi in their assessments. The UK is much better placed to take a similar approach and must follow their lead.

Introduction

Fungi are often called the 'Hidden Kingdom'. The epithet is fitting, simultaneously reflecting their immense

diversity and their concealed nature. The part of the fungus we usually see is the fruitbody, whether it's the bright yellow bracket of chicken-of-the-woods *Laetiporus sulphurous* emerging from a beech tree or the red and white toadstool of the fly agaric *Amanita muscaria* in autumn. Most of the fungal network of mycelium is hidden within the substrate it lives in – the decaying log or the woodland soil. In this sense the fruitbody is analogous to the flowers that appear on plants at

certain times of year, whereas most of the biomass of the plant is in the leaves and roots that are there all the time.

The fungal lifestyle also makes them hidden in another sense – from public and policy attention and, we would argue, from many ecologists. Despite their functional role in decomposition, nutrient cycling and plant productivity, they are rarely considered in ecological assessments. Protected species tend to dominate much of our profession because of the legal implications. At present, legal protection covers too few species to make it a useful conservation tool for the fungal community. Statutory legislation only protects four non-lichenised fungi under the Wildlife and Countryside Act 1981, with another 60 or so listed as a 'Priority' in country-specific biodiversity legislation. This is in spite of some 400 species listed as Threatened on the most recent fungi Red List for the UK (Evans, Henrici and Ings 2006). The same issue affects other species-rich groups like plants and invertebrates but a good Ecological Impact Assessment (EiA) will account for these regardless of legal protection. However, as a profession, we are largely failing to similarly account for impacts on fungal biodiversity. Here we reflect on Chile's approach to fungi in EIA and discuss how the UK might follow their lead.

A Chilean approach to fungi in EIA

In 2013, Chile's new Environmental Impact Assessment System Regulation came into force. This updated legislation included a subtle amendment. Whereas previous legislation referred only to flora and fauna, the updated Regulations also included fungi. This change made fungal baseline surveys a statutory obligation for all EIAs in Chile.

This amendment was not a whimsical decision made by green-thinking ministers; it was the outcome of a hard-fought, grassroots campaign led by the Chilean NGO Fundación Fungi who spotted a rare opportunity to influence the political dialogue. Every day of the two years that the Regulations were under review, campaigners picketed the doors to parliament, speaking to each politician individually to emphasise the importance and neglect of fungal biodiversity. Their message, '*Think Fungi*' was simple,

but the campaign was underpinned by sound policy advice (Fundación Fungi 2019). Fundación Fungi drew on Organization for Economic Cooperation and Development (OECD) guidance for member countries to adopt an 'ecosystem approach' which integrates biodiversity, ecosystem function and land-use in their domestic legislation. They made a powerful argument for the link between fungi and ecosystem function that ministers could not ignore. Further success was built on another important influential policy taken from an IUCN circular which pushed for inclusion of fungi in national conservation strategies. The success of Fundación Fungi's campaign has made Chile the only country in the world to make fungal baseline surveys a statutory requirement for all terrestrial EIAs.

When the new Regulations came into force there was very little mycological expertise in the country to implement the new legislation. Unlike the UK, there was no active recording community nor even a national or local species inventory, let alone a fungi Red List. Adaptation was initially slow but after seven years change is now reverberating through the Chilean ecology industry. The top-down approach driven by the change in the law meant government officials needed to be trained first. This was followed by upskilling of ecologists who now routinely assess the status of fungi prior to development (Figure 1). Jobs have been created as the market demand for mycologists has risen. New businesses and charities have been established and continue the work that Fundación Fungi started. University courses have put stronger emphasis on mycology, particularly on morphological and molecular identification. Field guides have been written to support the fledgling industry and IUCN species status reports are being published to support decision making. The precedent that Chile has set for fungal conservation in such a short amount of time is an inspiration to the rest of the world.

Fungi assessment in the UK

In the UK, fungi are undoubtedly neglected in EIA and we need to get better at accounting for them. With the emerging enthusiasm for 'Rewilding' 'Natural capital' and 'Biodiversity

Net Gain', wilful fungi blindness, by legislators, ecologists, developers and conservationists, cannot be a long-term option. These concepts are a fallacy if they don't recognise the functional role of fungal biodiversity. Of course, the same is true of other less-charismatic components of the biota such as invertebrates and most below-ground communities.

The UK's new Environment Bill certainly represents an opportunity to strengthen protection for fungal biodiversity in the post-Brexit landscape. Unlike Chile, the UK does not appear to have a strong advocate for fungi like Fundación Fungi, willing to take advantage of the political opportunity and to inspire the legislative change. An obvious alternative to Chile's top-down regulation is for an industry-led approach where we, as a professional community, take control of the issue.

The great advantage of industry-led inclusion of fungi in the Ecological Impact Assessment (EiA) process is that the tools and information are available to begin immediately. The UK has a rich history in mycology and, compared to Chile, is far better equipped to carry out fungal baseline studies. There is a great deal of accessible and freely available resources that can be used to help guide our impact assessments. But equally there are knowledge gaps that need to be recognised, not least for mitigating impacts.

Finding fungi – establishing the baseline

Fungal surveys have traditionally relied on counting fruitbodies and this itself presents constraints. There is no doubt that mycological field skills are in short supply (European Mycological Association 2008). However, the evidence from Chile shows that the industry response was to upskill in fungal taxonomy and ecology once there was a market for the skills. Fundación Fungi, other NGOs and some universities have stepped in to address the need for mycology training. In the UK, their role could easily be filled by organisations like the British Mycological Society, CIEEM or other groups if the demand for training was there.

A second issue with fungal fruitbody surveys is the seasonal constraint of a short survey window for most fungi and the

highly variable fruiting patterns between years. The tight deadlines for a baseline survey might mean that only a small proportion of the fungal community is ever found or there are costly project delays if more surveys are needed in subsequent years. In Chile, the method adopted in most EIAs has been to make two visits in spring and two in autumn, over two consecutive years. This is a pragmatic approach that balances the erratic fruiting against the time constraints of a development. It could easily be adopted by the UK.

Another way to get round this problem is to take advantage of modern molecular survey methods that use environmental DNA (eDNA) and species barcoding to identify species through differences in their DNA (Griffith 2013). Metabarcoding of fungal DNA extracted directly from the substrate (e.g. soil from a waxcap grassland or wood from a veteran tree) means an entire assemblage can be identified from eDNA following a single visit (Figure 2). This approach reduces dependence on taxonomic field skills (although these are still important), extends the survey window and identifies species which rarely fruit. The drawback is that the results are only as good as the reference database and so interpretation requires some expertise.

Although rarely used in Chile, the advantages of metabarcoding in the UK have already been demonstrated. Molecular survey methods have been used to provide evidence about the presence and distribution of the charismatic waxcap fungi in development planning applications and metabarcoding was a valuable tool in the designation of a new SSSI for grassland fungi (see Box 1). Metabarcoding methods are increasingly affordable and the benefits are recognised by UK statutory bodies (Nisbett and Bruce 2018). Molecular survey methods are rapidly expanding our knowledge of the British mycobiota and species barcoding is even starting to be used by amateur mycology groups (Harries 2017). Therefore, the challenges of surveying fungi should no longer be a barrier to their inclusion in EIA.

Valuing the fungal community

Generating a species list can be meaningless if the value of the assemblage cannot be properly interpreted. The value



Figure 2. Soil sampling for fungi eDNA by IBERS, Aberystwyth University, at Hardcastle Crag, Hebden Bridge. Photo credit Gareth Griffith.

Box 1 – Assessing waxcap grassland in the UK

In Europe, the greatest progress towards valuing, assessing and mitigating for fungi has been with the grassland fungi, and the charismatic waxcaps (*Hygrocybe*) in particular. Waxcap grasslands are often species-poor in terms of higher plants, making this habitat difficult to identify outside of the fungal fruiting season. The quality of a grassland for fungi can be determined from a survey based on the five groups found mainly in grassland: Clavariaceae, Hygrophoraceae, Entolomataceae, Geoglossaceae, and *Dermoloma* (CHEGD survey, Griffith *et al.* 2013). This well-established method scores different species of grassland fungi by their assemblage, with rarer species receiving a greater weighting. The scores can act as a good indicator for important fungi sites but the ephemeral fruiting patterns of the fungi mean several years of survey are needed to produce a complete species list (Figure 3).

A modern alternative to a CHEGD survey is to identify species using DNA barcoding from eDNA in soil samples coupled with next-generation

sequencing. With this approach the whole community of grassland fungi can be identified from a single sample without years of repeat survey. In the UK, this method is being used to verify the value of sites for waxcap fungi. At a site near Porthmadog in Wales, objections were raised to the extension of a caravan site into an adjoining patch of coastal grassland that supported waxcaps. After an eDNA survey of soil from the site, the waxcap flora was found to be limited to a few common species and the development was permitted without issue. In another case, a 63-hectare site known as The Leasowes, near Dudley in the West Midlands, was known to support 22 waxcap species but an eDNA survey found a further six species. Although DNA evidence is not admissible in SSSI notification (at present), ecologists undertook surveys around the area where the particular soil sample was taken and fruitbodies of four of these rarities were found the following season. This put the total count of waxcap species to 26 and in February 2019 the site was designated a SSSI (Natural England 2019).

of an assemblage is often derived from the number of notable (i.e. Red Listed) species within a specific habitat type or area. This continues to be an issue for Chile because so little was known about the country's mycobiota pre-2013. With the increased interest and investment in fungi, this is beginning to change. Since 2014, Chile's Ministry of Environment has systematically added new fungi to the national Red List, making valuation of the assemblage increasingly robust. Several endemics have even been adopted by the IUCN as Endangered.

In the UK, valuing a community within the context of an EclA should be more straightforward because we have a far greater knowledge of species distributions and ecology (although with significant gaps), a provisional Red List and guidance on what is valuable at national and local levels in the form of selection guidelines for designated sites. Valuing an assemblage based on rarity of species can be done for

fungi in the same way as it is done for invertebrates at the moment. But caution may be needed if preservation of the function of the community (e.g. ectomycorrhizal, heartrot, soil saprotrophs) is important to prevent functional roles becoming secondary to rarity. This is, in part, the approach taken by Natural England when they updated the SSSI selection guidelines in 2018. The new guidelines include criteria for 'ecologically coherent assemblages' and includes some functional guilds such as oak deadwood communities and ectomycorrhizal species in Caledonian pinewoods (Bosanquet *et al.* 2018). The aim of these guidelines is 'to ensure fungi receive adequate protection through their recognition as features', noting that the increased level of information available on the British mycobiota, much of which is derived from DNA barcoding, is such that robust criteria could be developed. While the guidelines do not take a purely functional approach,

and rarity and threat status continue to be key attributes of the assemblage, they do show how valuing the community can account for function with rarity.

Predicting and mitigating impacts on fungi

To act with confidence, decision-makers need a degree of certainty from EIA. What is the severity of the impact? Can it be mitigated? What will the outcome be? However, predicting the impact of development on fungi and creating mitigation plans with any certainty is problematic. At the species level, any country will struggle to make confident long-term predictions because we often lack basic autecology information to support them. The same vulnerabilities to habitat loss, edge effects, pollution and loss of connectivity all exist for fungi, as they do for other taxa, but specific activities will affect different guilds of the fungal community in different ways. In this respect, it may make more sense to assess impacts on functional assemblages rather than individual species and to mitigate accordingly (Molina *et al.* 2011), for example the impact of the loss of trees on the heartrot community, nitrogen deposition on mycorrhizal communities or groundworks on soil saprotrophs. Thinking about fungi in this way has the benefit of conserving the functional role of the fungal community even if we cannot be sure how individual species will respond in the long term.

One of the unresolved issues with the Chilean system is that the legal requirement is for baseline surveys with no obligation to enact any of the ecologist's recommendations. Without a centralised register or monitoring of schemes it has been near impossible to ascertain whether any mitigation for fungi has actually been carried out, let alone worked. In the UK, the situation is somewhat better, but sharing mitigation monitoring results can also be inadequate.

Fungi mitigation methods are largely unresearched and so it is vital that this is made clear in any EIA to avoid a scenario analogous to the installation of unused bat gantries designed to mitigate against the impact of roads on bats (Sutherland and Wordley 2017). However, total inaction in the face of uncertainty should not be an



Figure 3. Waxcap fruitbodies – *Hygrocybe punicea* is one of the best indicators of diverse grassland fungal populations. Photo credit Gareth Griffith.

Feature Article: Think Fungi! Taking Inspiration from Chile's Approach to Fungi in EIA (contd)



Figure 4. Trialling artificial inoculation of trees as a conservation measure for the rare fungi coral-tooth *Hericium coraloides*. Photo credit Matt Wainhouse.

option (Molina *et al.* 2011). Where there is doubt, take expert advice, come up with an ecologically coherent mitigation plan, be honest when there is uncertainty, ensure there is adequate funding for monitoring, share information about what has been done and publish the results (Figure 4).

What next?

Chile is leading the world with their approach to fungal conservation and specifically how fungi are accounted for in EIA. The UK's upcoming Environment Bill is a political opportunity to follow their lead. We have some of the best mycological resources of any nation and the ecology profession must recognise the importance of fungal biodiversity and act without top-down regulation. There are challenges, not least for surveying and predicting the effects of mitigation, but this is something to be overcome rather than ignored. If you would like to help drive the change that fungi need, please get in touch with the lead author to continue the discussion. In the words of Fundación Fungi – 'Think Fungi'.

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IMPEL – Nature Protection in the European Union

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Keywords: collaboration, Habitats Directive, illegal killing of birds, Nature Protection, wildlife crime

The European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) is an international non-profit association between the environmental authorities of the European Union (EU) Member States. The network's objective is to drive forward the effective implementation of environmental legislation in each member state. The Nature Protection Expert team within IMPEL works to improve the implementation of EU nature legislation through awareness raising, encouraging network participation, sharing best practice, strengthening collaboration with EU prosecutors and judges, peer review, and building on collaboration and sharing with Non-Governmental Organisations (NGOs).

Network for the Implementation and Enforcement of Environmental Law (IMPEL)

IMPEL works to raise awareness, build capacity, exchange information and experience on environmental law enforcement, collaborate on implementation, review and share good practice, and provide support on the practicalities and enforceability of EU environmental legislation. The network



focuses on five overarching themes: Industry and Air, Waste and Trans-Frontier Shipments, Water and Land, Nature Protection, and Cross-Cutting.

The network comprises representatives from EU Member States including Government Ministries, environmental agencies, water boards, and sometimes local and regional governments. Participants in the network initiate projects based on relevance to member states. Proposals are discussed by expert teams and final decisions are taken by the General Assembly. Each member state appoints a national IMPEL coordinator who

identifies relevant contacts and attends meetings with the IMPEL Board.

IMPEL Nature Protection Expert team

Halting and reversing the loss of biodiversity by 2020 is a priority within the European Union. The implementation of EU nature legislation (Birds and Habitat Directives) is essential to achieving EU 2020 biodiversity targets (European Commission 2015), however currently the legislation is not always implemented and enforced effectively. This is reflected in the relatively high number of complaints

and infringement procedures related to the Nature Directives reaching the European Commission every year. There is a clear need to strengthen inspection and enforcement, which IMPEL believes is best achieved by cooperation between countries and environmental networks across the EU.

The Nature Protection Expert team works to improve the implementation of EU nature legislation through the raising of awareness and understanding, extending our Green Expert network to exchange best practice, strengthening collaboration, understanding and knowledge sharing with EU prosecutors, judges, enforcement experts, and NGOs, and by objectively reviewing member state compliance through the informal review of environmental authority procedures (IMPEL Review Initiative).

The team builds on IMPEL's network of environmental regulatory expertise through joint audits of environmental authority procedural effectiveness, with a view to sharing best practice and promoting transboundary collaboration when investigating environmental crime cases. A recent example is a project to calculate a 'value' for the damage to species arising from environmental crime, which can be used during court cases. The project was initiated in partnership with the European Union Forum of Judges for the Environment (EUFJE) and is based on the Finnish 'pricelist' already in use in legal proceedings.

The Nature Protection Expert team is currently working on a number of projects:

1. Tackling illegal hunting tourism
2. Sharing best practice to tackle wildlife trafficking
3. Exchange of information between NGOs and authorities (IMPEL-ESIX)
4. Development of a planning tool for inspection frequency in Natura 2000 sites
5. Sharing good practice to improve the effectiveness of environmental authorities - the IMPEL Review Initiative.

1. Combatting illegal hunting tourism

In 2015, the IMPEL Nature Protection Expert team identified the need to establish the scope and legality of activities related to hunting tourism as an opportunity to



Figure 1. Illegal trapping of birds.

work together across member states. The project arose from evidence presented by a prosecutor in Romania where Italian hunters had illegally killed birds and transported them to Italy for the purpose of eating them (Figure 1). These illegal activities were also highlighted during the first 'Four Networks Conference' in Utrecht in the Netherlands (2016) with IMPEL, EUFJE, European Network of Prosecutors for the Environment (ENPE) and Envicrimenet, and unfortunately they continue to occur in Romania today.

The project is led by Slovenia and the Netherlands, and started with a scoping survey of IMPEL partners, Birdlife and the European Federation of Associations for Hunting and Conservation of the EU (FACE). After gathering different viewpoints to understand the breadth of the problem, the project will work with enforcement and customs officials to develop joint cross-border inspections, scope out revised border check procedures and consider legal deterrents. A workshop to discuss the results of a recent questionnaire and organisation of a joint inspection will take place in March 2020.

2. Wildlife trafficking – sharing good practice

The implementation of the EU Action Plan against Wildlife Trafficking (European Commission 2016) requires broad support from EU institutions, EU agencies (Europol/

Eurojust), member states and associated environmental agencies, EU delegations and member state embassies in third world countries.

A project to share good practice on wildlife trafficking is being led by Portugal. The scale of wildlife trafficking is such that it now poses a genuine threat to the survival of some of nature's most emblematic species. Wildlife trafficking has become a billion-euro criminal industry dominated by organised criminal groups. Though the countries most affected are those with the highest biodiversity - generally outside the EU - Europe is still directly concerned and affected. Endangered birds and reptiles are offered for sale in the EU, protected timber and ivory has been smuggled through harbours, and highly endangered glass eels *Anguilla anguilla* from Europe are offered for sale in Asia.

In 2018, IMPEL organised a workshop that focused on glass eel investigations in Portugal and Spain and brought all participants to the same level of understanding. The workshop identified good practice used thus far, and identified key loopholes such as the illegal use of closed foot rings and captive-bred species. Next steps include detailed consideration of how each loophole can be closed and what mitigation is needed. A guidance document is currently being prepared with a second workshop in early 2020 to review progress.

3. Exchange of information between NGOs and EU environmental authorities – IMPEL-ESIX

Wildlife crime is a cross-border problem, and enforcement is often uncoordinated. Information and intelligence are essential to good enforcement but this relies on cooperation between different organisations. The IMPEL-ESIX (Enforcement and Stakeholders Information eXchange) project involves the exchange of information between NGOs and environmental authorities to support this work.

In 2016, IMPEL began building the IMPEL-ESIX website (www.IMPEL-ESIX.eu) as an online platform for sharing information. It is used to exchange information on criminal activities and wildlife trafficking seizures including the illegal killing of birds. It is also used to share information on infringements to timber regulations. It is based on the success of an existing EU tool - EU TWIX (Trade in Wildlife Information eXchange; www.eu-twix.org).

IMPEL ESIX can track information on spatial and time-connected incidents. By way of example, the tool recorded the seizures of 1349 dead birds covering 13 protected species at the Slovenian border on 5 October 2018, and 800 dead skylarks *Alauda arvensis* at the Slovenian border on 20 October 2018. A second example in October 2019 saw 331 birds seized at the Croatian border, and police in Northern Italy caught several poachers and confiscated hundreds of siskins *Carduelis spinus*, common crossbills *Loxia curvirostra*, chaffinches *Fringilla coelebs*, robins *Erithacus rubecula* and other protected songbirds. This information has been added to the online platform. An investigation into similar crimes in Romania was also initiated based on the exchange of information between the authorities and an NGO from Italy.

The online platform is open to all member state environmental authorities and NGOs. It is planned to widen the scope of the platform to include information on best practice based on field experience and information relating to seizures, and to exchange information on habitat loss based on analyses of satellite images.

4. Planning tool for inspections of Natura 2000 sites (NIRAM)

Within the scope of the Habitats Directive, a sub-group of the Nature Protection Expert team are developing a planning tool for the frequency of inspection of Natura 2000 sites based on a risk criteria database and using a Nature Integrated Risk Assessment Methodology (NIRAM, see <https://www.impel.eu/publications/impel-project-abstract-development-of-a-planning-tool-concerning-inspection-of-natura-2000-sites-niram/>). This project identifies relevant criteria and provides an IT platform to plan the frequency of inspections based on existing threats and pressures in the locality, taking into account the requirements of the Habitats

Directive (e.g. in-combination and precautionary principle).

The Birds and Habitats Directives are central to achieving the EU 2020 target of halting and reversing the loss of biodiversity. The Action Plan for nature, people and the economy (European Commission 2017) identifies key shortcomings as limited resources, weak enforcement, poor integration of nature objectives into other policy areas, insufficient knowledge and poor access to data. These points were picked up as part of the Recommendation on Minimum Criteria for Environmental Inspections in the Member States (RMCEI), Recommendation 2001/331/EC (see <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32001H0331>),

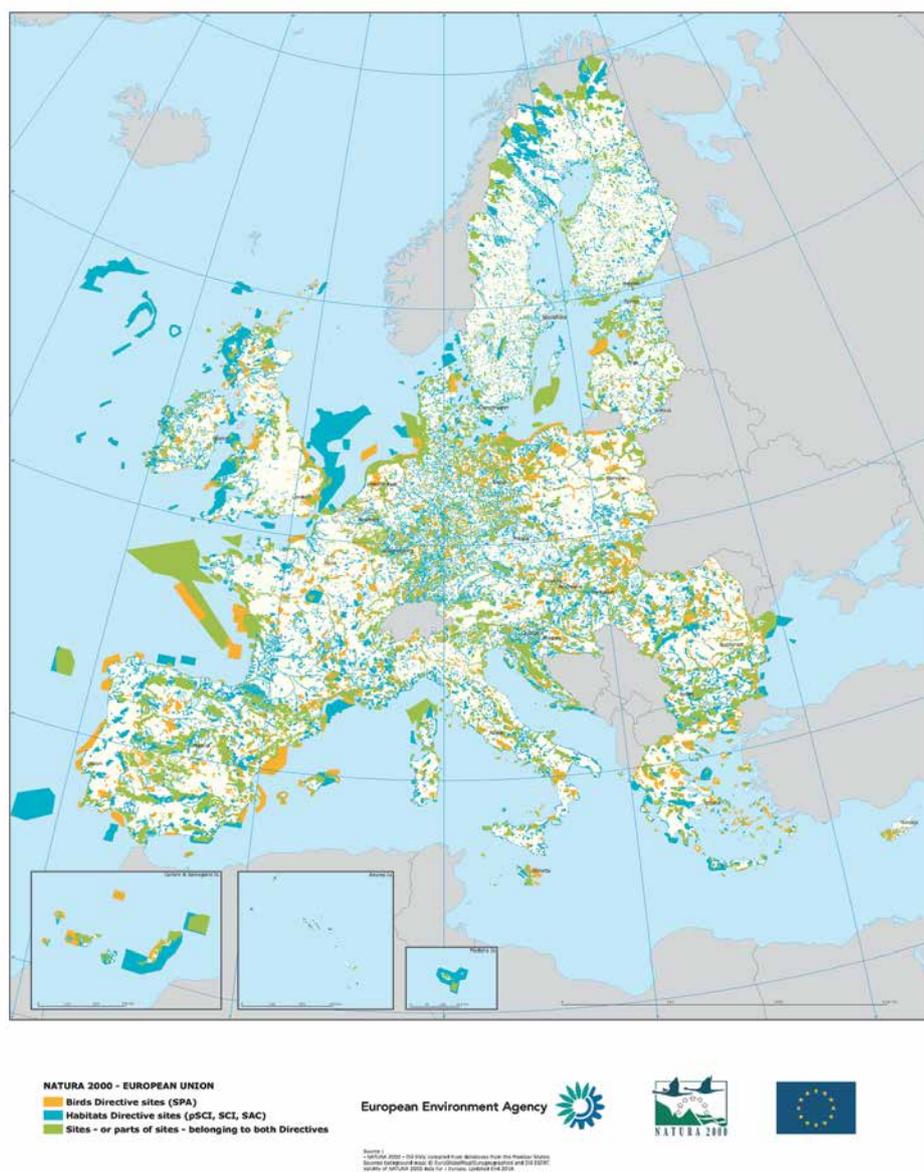


Figure 2. Natura 2000 sites as of the end of 2018 (copyright European Environment Agency).

which contains non-binding criteria for the planning, execution, follow-up and reporting of environmental inspections. The IT tool developed in this project allows member states to plan inspection frequency for Natura 2000 sites. It provides a systematic approach that allows resources to be targeted at key areas of concern by utilising data on threats and pressures in or around the Natura 2000 area based on previous experience.

The IT platform builds on an existing, successful tool known as IRAM (Integrated Risk Assessment Methodology) which is used to assess the frequency of regulatory/compliance visits to industry. The IRAM tool was expanded to include criteria for inspecting Natura 2000 sites. The resultant NIRAM (Nature Integrated Risk Assessment Methodology) tool is currently being rolled out across a pilot group of EU member states. The next steps include consideration of the ability of the tool to store data long-term to support research and policy decisions.

5. IMPEL Review Initiative – sharing good practice to improve organisation

One of the key activities of IMPEL for a number of years has been the execution of the IRI (Impel Review Initiative). This is a voluntary scheme providing for informal reviews of environmental authorities in IMPEL member countries; it is not an audit process. The IRI explores how an authority carries out its environmental tasks, and aims to identify areas of good practice together with opportunities to further develop existing practice across the reviewed authority and in other member states. The IRI uses the IMPEL 'Doing the Right Thing' environmental inspection cycle guidance developed to support Inspectorates in implementing the Recommended Minimum Criteria for Environmental Inspections (RMCEI, European Commission 2001). Sharing good practice improves the quality of the work of environmental authorities, and contributes towards continuous improvement in the quality and consistency of the application of environmental law across the EU. This helps deliver the long-held objective of achieving a 'level playing field' across member states.

During IRI reviews, the implementation and enforcement of a broad range of 'environmental' activities are examined. These include combatting illegal killing, trapping and trade of wild birds, protection of conservation areas, fighting wildlife trafficking, and illegal hunting and fishing, and controlling illegal logging, amongst others. The review team can focus on the quality and quantity of inspections, effectiveness in the chain of inspection, sharing of intelligence and information, promoting cooperation with networks of practitioners, collaboration with NGOs and public participation.

In 2014, the first 'environmental' IRI was organised in Romania in the Danube Delta, where the main recommendation was to improve the chain of inspection, prosecution and verdict. Further recommendations included changing legislation to better control access to prevent poaching, and increasing the numbers of boat and fuel inspectors to carry out more effective surveillance in the Delta. In 2016, a second environmental IRI was organised in Italy focussing on illegal activities during the migration of raptors and this has since been followed up with biennial IRI events in other member states. In 2018, an environmental IRI was carried out in Albania examining moratoria and collaboration.

IMPEL will continue the IRI process given the successful results to date.

Conclusion

With the current strong political focus on the environment in the EU, and globally, the IMPEL network will continue to strive towards effective implementation and enforcement of environmental law in the EU – and beyond. IMPEL cannot achieve this alone, so we cooperate with other parties and networks to improve the impact of our work.

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About the Author



John Visbeen started his career as a Police Officer in Rotterdam in the Netherlands specialising in environmental crimes and working with environmental agencies and prosecutors. After moving to become head of environmental departments at Lelystad, and then the province of Flevoland and the province of Utrecht, John became involved with IMPEL. Currently, John is board member and expert team leader on Nature Protection for IMPEL. John is deputy head of unit Strategy & Policy in the province of Flevoland.

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Resources

Useful websites:

- IMPEL: www.IMPEL.eu
- IMPEL-ESIX: www.IMPEL-ESIX.eu
- IMPEL events: www.impwl.eu/events/

Events:

- Workshop on closed foot rings and captive-bred glass eels, 27-28 February 2020, Lelystad, Flevoland, The Netherlands.
- Workshop on wildlife trafficking and illegal activities related to hunting tourism, 16-17 March 2020, Lisbon, Portugal.

Raising the Standard of Veteran Tree Care Across Europe

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Keywords: ancient trees, ancient tree management, EU projects, VETcert, veteran trees, veteran tree management



Figure 1. 'Classic' ancient oak tree with large, hollowing trunk and small crown. Photo credit Jim Mullholland.

Two European Union funded projects offered an opportunity to improve the management of veteran trees across Europe. Working internationally, the projects brought veteran tree management experts together

to develop new training resources and a certification scheme for veteran tree management. By promoting appreciation of these trees and providing guidance on management, the prospects for

veteran trees, and the species they support, have been much improved. In addition, the skills of those involved in veteran tree management have been formally recognised.

Introduction

The term veteran tree describes trees of ecological, cultural and/or historical value. These trees may have played an important role in historic and cultural landscapes and/or were of importance for their products. They were often retained due to their aesthetic value or for the value they offered local people; examples include formally designed landscapes or trees cut for firewood. A tree's ecological value typically increases with age. In the UK, the term ancient tree is often used in relation to chronologically old trees (see further information on the Ancient Tree Forum website <http://www.ancienttreeforum.co.uk>). All ancient trees are veteran, but not all veterans are old enough to be ancient.

Veteran trees typically exhibit key wood-decay characteristics such as heart-rot or hollowing in the trunk or major limbs, or bark characteristics that have altered with age (Figure 1). Wood decay provides habitats for saproxylic organisms that are associated with the process of fungal decay of wood or the products of fungal decay in living as well as dead trees (Alexander 2008). These include many rare and specialised beetles. Intact, coarse bark offers a stable substrate for a range of epiphytes, including lichens and mosses (Fritz *et al.* 2008). Further information on species associated with veteran trees is available at <http://www.ancienttreeforum.co.uk/ancient-trees/ancient-tree-ecology-wildlife/>.

Unfortunately, veteran trees are under threat from changes in land use such as intensification of agriculture and development; neglect including lapses in traditional management and cessation of grazing of the land around the tree; inappropriate management including unnecessary felling and burning of grasslands; over-zealous risk management; and pests and diseases (Lonsdale 2013). Many old trees have been lost along with the unique species they support and the habitats they provide. As a consequence, the International Union for Conservation of Nature (IUCN) identified saproxylic beetles as the most threatened group of species in Europe (Cálix *et al.* 2018).

Veteran tree management

The range of professionals working with veteran trees is considerable. Conservation

site managers and historians working on designed landscapes such as those of Capability Brown may be responsible for overall site management including the care of veteran trees. Ecologists and taxonomic specialists may be asked to carry out tree inventory work and to give guidance on management, often to inform development. Veteran trees can often be found among commercial plantations managed by foresters, whereas trees in more urban areas may be the responsibility of Local Authority Tree Officers, and are frequently the subject of tree risk assessments. Whatever the background to the management, arborists will be responsible for undertaking the work.

The challenges faced by those responsible for managing veteran trees are many, varied and potentially unique to veteran trees. There have been huge losses of veteran trees over many decades due to intensification of agricultural practices (e.g. hedgerow loss) and urbanisation. For example, tens of thousands of pollards were felled in Epping Forest in the 19th century (Dagley and Burman 1996, Farjon 2017). In Norfolk, around 50% of veteran trees were lost between the 1880s and 1946 (Barnes and Williamson 2011), and data from Sweden suggest there may only be 1-2% of veteran trees remaining compared with 200 years ago (Ranius *et al.* 2008). The veteran

trees that remain are susceptible to an increased risk of structural collapse due to extensive decay caused by poor management or lapses in traditional management techniques such as pollarding. Furthermore, reduced health and vigour due to the natural aging process may make these trees competitively weaker than younger trees, which grow around them and can shade them out.

Veteran trees throughout Europe face similar threats to those in the UK and the people responsible for their management struggle with similar issues. However cultural differences have resulted in a variety of approaches and techniques to address the problem, generating valuable management experience. International cooperation and collaboration offers the best way to pool knowledge, promote the values of veteran trees and reverse their decline. To improve the future for our old trees and the species that depend on them, two European Union funded projects, VETree and VETcert, aim to raise the standard of veteran tree care across Europe and improve the opportunities for professionals involved in their management.

The projects

VETree (www.vetree.eu) was a European Union Leonardo da Vinci funded project that ran between 2012 and 2014. It



Figure 2. The VETcert project team at Djursö, Norrköping, Sweden. Photo credit VETcert.

brought together partners from the UK, Sweden, Belgium, Romania and Spain. The primary aim of the project was to develop a suite of training materials on veteran tree management. These included a series of videos about management and two training courses: an introductory one-day course on 'Valuing and Managing Veteran Trees' and a three-day 'Train the Trainer' course designed to provide people with the skills and materials to deliver the one-day course. All training materials were produced in English, Swedish, Flemish, Romanian, Basque and Spanish, and have subsequently been translated into Czech, Polish and French.

Following on from VETree, VETcert (www.vetcert.eu) was a European Union Erasmus+ funded project that ran between 2016 and 2019 and involved partners from seven different European countries: the UK, Sweden, Belgium, Spain, France, Germany and the Czech Republic (Figure 2). The objective was to build on the success of the VETree project by creating a certification system for professionals involved in the management of veteran trees. The VETcert project also produced supplementary training materials including an advanced two-day course 'Understanding and Managing Veteran Trees', a series of eleven information videos, fact sheets, case studies and technical illustrations. So far, these materials have been produced in English, Swedish and Czech.

Training

In the UK, the Ancient Tree Forum is the main training provider of VETree and VETcert courses and has delivered the one-day course to over a hundred people since 2014 and the three-day 'Train the Trainer' course to a further 130 people. Most courses are open to all but some training courses have been run for specific conservation organisations. For example, staff from the National Trust, Natural England and Woodland Trust have attended the three-day course with the aim of appointing a veteran tree lead in each of their regions. Participants acquired the knowledge and materials to deliver the one-day course to colleagues in their region, thus cascading information throughout their organisation. The one-day course has been delivered more widely to organisations such as English Heritage and



Figure 3. Delegates on a training course in Finland. Photo credit Jim Mullholland.

The City of London Corporation. All three training courses have been utilised both in the original partner countries as well as in other European countries such as the Republic of Ireland and Finland (Figure 3). All training materials are freely available and the training courses will continue to be delivered in the UK for the foreseeable future (see <http://www.ancienttreeforum.co.uk/resources/videos/> and <http://www.ancienttreeforum.co.uk/events/> for more information).

Certification scheme

Whilst the development of training material was an important step towards raising standards in veteran tree care, the main aim of VETcert was to develop a certification scheme. The scheme benefits professionals who manage veteran trees, enabling them to demonstrate that they meet a European standard for veteran tree care with formal recognition of their expertise. The certification is accepted as a standard of skill throughout Europe, which will improve professional mobility and help people to work in different countries. It will also benefit organisations that procure veteran tree management services, enabling them to find a suitable professional. A list of VETcert professionals can be found at <https://www.vetcert.eu/certified-specialists>.

The first step towards certification was to develop a minimum standard of knowledge and skills, drawing on the experience of all the partners and led by the Ancient Tree Forum (UK). The Veteran Tree Management Standards have two levels: Practising, i.e. those who undertake tree management work, and Consulting, i.e. those who advise on the management of veteran trees. The Standards act as a benchmark for professionals to measure themselves against, but also underpin the assessment procedure of VETcert. The Standards are available in English, Swedish, Flemish, Spanish, Czech and French from <https://www.vetcert.eu/standards-certificates>.

The development of the examination procedure for the Standards was led by the Arboricultural Association (UK) with input from all project partners. To date professionals from the UK, Sweden, Belgium, Spain, the Czech Republic, Italy, Poland, Croatia, the Netherlands and Austria have taken and passed exams, indicating that they are veteran tree specialists. The Arboricultural Association is responsible for delivering examinations in the UK. The 2020 schedule is available from <https://www.trees.org.uk/Training-Events/VETcert>.

Benefits of an international approach

Nature conservation is not a single-country issue; action needs to be taken on a larger scale if it is to be effective in the long term. VETree and VETcert brought together experts from eight European countries to raise standards in veteran tree care and to improve the management of veteran trees across Europe. Working internationally over a large geographic area brings both challenges and opportunities. For example, one of the biggest problems was agreeing a definition of a veteran tree that was acceptable in all countries, particularly as some definitions are enshrined in national law.

There was also considerable variation in professional standards for arboriculture, with the industry being relatively well established in some countries, for example the UK and Czech Republic, but with no professional standards in place in other countries such as Spain. By working collaboratively across country boundaries, each partner had the opportunity to consider and compare different professional standards, and move forward more quickly than may otherwise have been possible. The geographical variation presented some challenges but also meant that we had the opportunity to learn and share experiences from a range of tree species, climates and cultural histories. Bringing together such a diverse group of cultures has ensured that the standards and certification process are much more robust and cover a wider range of subjects than might have been the case had it just been a UK system. The production of the training materials also benefitted from the greater pool of expertise (Figure 4).

Challenges and knowledge sharing

Whilst many of the issues faced by veteran trees across Europe are similar, there are



Figure 4. The final VETcert event in Norrköping, Sweden. Photo credit Daniel Daggfeldt.



Figure 5. *Osmoderma eremita*, a European Protected saproxylic beetle (female left, male right). Photo credit Jim Mullholland.

also many unique management challenges. Sharing experiences and techniques can help to improve approaches to management, as well as raising awareness of the diverse management challenges faced by different countries or regions.

For example, a standard practice adopted by Romanian shepherds is to burn off grasslands to improve soil fertility. With veteran trees scattered across the grassland, the fires cause serious damage to these trees, many of which are hollow and act like chimneys. Addressing the threat to the trees posed by this pastoral management system is far from straightforward.

In northern Spain, there are large areas of lapsed pollards. These are trees that were once cut regularly but have now been abandoned, a situation similar to the UK. Following a period of considerable re-growth, many veteran trees are now being cut again with the aim of keeping them alive as well as generating wood fuel. However, the traditional management skills have largely been lost and the large wounds created when the trees are cut causes extensive dysfunction, accelerating the rate of decay and speeding up their demise.

Arboriculture, the science of the care of trees, is a very young science, having

become distinct from forestry in the 1960s. Whilst there is a great deal of overlap in management practices between countries, there are also differences. In the Czech Republic, for example, there is a long history of cabling and bracing trees, in contrast to the UK where this technique is less commonly prescribed. The UK therefore has much to learn about this aspect of veteran tree care from the experiences and publications in the Czech Republic.

There are other benefits of working with a range of European partners, for example our Belgium partner speaks several languages including French, Dutch and English. He has studied the French concept of tree architecture and brought it to the attention of the English-speaking world for the first time, approximately 40 years after it was first developed. This alternative to the Linnaean approach of identifying trees has direct relevance to the pruning of trees, including veteran trees.

Benefits to UK veteran trees

Veteran tree management crosses many professional boundaries. This includes arboriculture and forestry, in particular, with their focus on the growth and management of trees for primarily aesthetic or economic values. Trees are habitats in their own right as well as being important components of

wider habitats (Figure 5). Veteran trees are studied by ecologists who are interested in the particular features that depend on their longevity, but these trees are also intrinsically linked with cultures, historic events and designed landscapes. This complexity surrounding veteran trees can lead to no single professional group taking responsibility or 'ownership' of veteran trees, and 'silo working' leading to a lack of protection and poor-quality management.

This problem is clearly evident during the planning application process in England where, despite receiving planning policy protection at the highest level through direct inclusion of ancient and veteran trees into the National Planning Policy Framework (Ministry of Housing, Communities and Local Government 2019), often these trees are still not adequately protected. One of the underlying issues is that they are assessed from only one perspective (e.g. ecological or arboricultural) and their full value and management needs are not considered comprehensively. By producing a certification scheme that requires professionals to demonstrate the full spectrum of knowledge required for effective veteran tree management, VETree and VETcert encourage a more holistic approach leading to more joined-up thinking and improved protection for veteran trees.

By achieving the VETcert qualification, the expertise of veteran tree professionals is acknowledged and recognised. This will be helpful when a veteran tree specialist is required to demonstrate their competency, for example in the production of reports in support of Countryside Stewardships grants such as where 'BE6: Veteran tree surgery' requires that 'Tree surgery must be identified in a report by a professionally qualified arboriculturist' (Rural Payments Agency and Natural England 2019). The VETcert certification will fulfil this requirement as well as helping to standardise the approach for this type of survey.

Conclusion

The VETree and VETcert projects have drawn on a wide range of international experiences and different cultures to produce a truly European product that will benefit people, trees and wildlife across the continent. The freely available training materials

provide accurate information that can be accessed by anyone, thereby contributing to good veteran tree management. The certification scheme also allows experienced professionals to test their knowledge and skills against a European standard.

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In summary, the development of VETree and VETcert is a good example of an international approach that has led to an improved appreciation and understanding of veteran trees across Europe.

Resources

Ancient Tree Forum Website: <http://www.ancienttreeforum.co.uk/>. The website contains details of events, training and resources for those who manage veteran trees.

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Eurasian Otter Conservation: Contrasting Experiences in the UK and Hong Kong

Keywords: conservation, Eurasian otter,
Hong Kong, human-wildlife conflict,
local ecological knowledge, *Lutra lutra*

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Eurasian otter *Lutra lutra*.

Eurasian otter *Lutra lutra* is native to both the UK and Hong Kong, but our knowledge of this species and hence the respective management and conservation within these localities differs. Here we describe how we are facing the challenges of otter conservation in Hong Kong by

contrasting the experiences of otter research and management between these two regions.

Introduction

With the broadest distribution of all 13 otter species, Eurasian otter *Lutra lutra* is not only found in the UK but its geographic range extends across Europe, Northern Africa and Asia, including the People's Republic of China and the Hong

Kong Special Administrative Region. Eurasian otter once had a wide ranging distribution in Hong Kong (Herklots 1951) but like the UK otter population, it declined significantly in the 1900s (Hill and Phillipps 1981, Jefferies 1989, Mason and MacDonald 2004). In Hong Kong, otter is now considered rare and a species of conservation concern.

In contrast with the UK where the otter population has seen significant expansion, the Hong Kong population is restricted to a

Feature Article: Eurasian Otter Conservation: Contrasting Experiences in the UK and Hong Kong (contd)

wetland area along the east coast of Inner Deep Bay in the northwest New Territories (herein referred to as the Mai Po wetlands, Figure 1) (Shek 2006). Located adjacent to the Mainland China border in the Pearl River Delta, the surrounding area has seen rapid urban expansion since the 1980s. It now forms part of the world's largest megacity, covering an urban area of nearly 7,000 km² and supporting more than 42 million people (World Bank Group 2015).

This sub-tropical environment comprises a mosaic of commercially active and abandoned fish/shrimp ponds (locally called *gei wais*) and reedbeds, dissected by freshwater and intertidal watercourses, and fringed by coastal mangrove and mudflat habitats. The commercial fishponds have been managed and operated since the 1930s (Irving and Morton 1988) and predominantly engage in polyculture including various carp species. In 2018, an estimated 660 aquaculture fish farmers operated ponds in the area (Hong Kong Agriculture, Fisheries and Conservation Department *pers. comm.*).

The Eurasian otter has been well-studied in the UK and Europe (Kruuk 2006) but its ecology in Asia remains relatively unknown. National otter surveys across the UK have revealed the extent of the otter population's recovery since its virtual extinction in the early 1970s. By contrast, only occasional sightings have provided evidence of the continued existence of Hong Kong's otter population since its near extirpation around the 1980-1990s. Its rarity, and its elusive and mostly nocturnal nature (Kruuk 2006) has resulted in limited knowledge of the otter's ecology or population status in Hong Kong. However, adequate knowledge of a species' distribution, population size, and ecology is fundamental for its conservation. Further, the Mai Po wetlands are under ever-increasing pressure and threats from population growth and development (Yuen 2006). Therefore, to fill information gaps, we started to investigate the Hong Kong otter population in 2016. At the outset, there was significant concern that we would not collect enough data to make informed conservation decisions given the difficulty of studying this species.

Local ecological knowledge

During our reconnaissance visits to familiarise ourselves with the study area and prepare for comprehensive surveys, we found no evidence of otters such as tracks or spraints. However, we heard anecdotes that some local people living amongst and/or managing the fishponds in the area had sightings of otters and therefore had the potential to provide valuable information. This type of information, known as local ecological knowledge (LEK), includes a person's general knowledge of nature, typically acquired from their observations and experiences over their lifetime (Yli-Pelkonen and Kohl 2005). Local ecological knowledge is becoming increasingly recognised as an important source of data to inform wildlife management (Henri *et al.* 2010, Turvey *et al.* 2013) that can reveal the status and distribution of rare, elusive, or declining species (Anadón *et al.* 2009).

We used an interview survey to collect data on the status of Eurasian otter as well as to determine how local people perceived management and conservation issues surrounding the species. The interviewees were predominantly fish farmers, but also included residents who worked outside the study area, agricultural farmers, and recreational fishermen. Over 40% of the 211 people interviewed had observed otter at least once in the time they had spent living, working, and/or visiting the study area. Otter sightings were predominantly among commercial fish farmers over 60 years old, and the majority had lived or



Figure 1. Hong Kong's otter population is now restricted to wetlands in northwest Hong Kong.

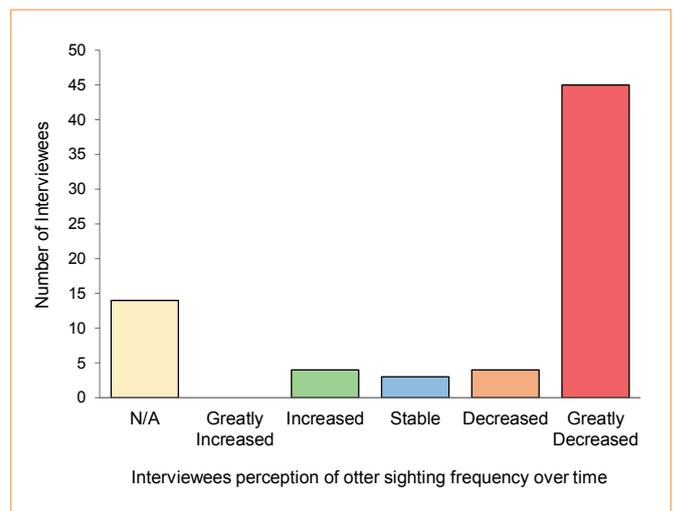


Figure 2. Evidence of historical decline of Hong Kong's otter population (adapted from McMillan *et al.*, *Conservation Science and Practice*, 2019).

worked in the area for 20+ years. Otter sightings were from the 1950s to 2017, producing the first comprehensive account of historical and recent otter distribution in Hong Kong (McMillan *et al.* 2019). Further, most of the interviewees reported that they believed the otter population had significantly declined over time (Figure 2), with many commenting that they had not seen otter for many years, sometimes since their childhood. Some interviewees believed otters to be extirpated in Hong Kong altogether (McMillan *et al.* 2019).

Local ecological knowledge also provided important information about attitudes toward otters and otter habitats. The fish farmers generally had positive attitudes towards otter protection. However, where

otters had real or perceived effects on livelihoods such as predating fish stocks, then opinions about their conservation were mixed and cautious, revealing the potential for a shift toward negative attitudes and human-otter conflict in the future if otter numbers were to increase. In many places where species are recovering and recolonising parts of their range, competition with humans for space and biological resources brings challenges (Václavíková *et al.* 2011). This has been observed in the UK where human-otter conflict has followed the increase in otter numbers.

Over time, these issues can become complex and well-established, making long-term conflict resolution difficult to achieve (Dickman 2010). This is particularly important in Hong Kong where the area now supporting the otter population is heavily dominated by human presence but is likely to represent the otter's last stronghold. Having this insight whilst otter numbers are still very low therefore gives Hong Kong a unique and timely opportunity

to develop and implement management actions that involve and account for local people, before conflict has had a chance to develop, escalate, and become engrained (McMillan *et al.* 2019) (Figure 3).

Field surveys

Collecting local ecological knowledge through an interview survey was a useful first step in our research and yielded important circumstantial information. However, we also needed to carry out comprehensive field surveys to further our knowledge of the otter population. As Hong Kong does not have standard methodologies for species surveys, we adapted the standard otter sign survey method used in the UK. We searched for otter signs (spraints, paths and slides, footprints and scratchings) around pond edges and along watercourses where access permitted. In addition, we carried out an infra-red camera survey. The aim of the field surveys was to provide data to confirm otter distribution, collect spraint samples for molecular analysis and

subsequent estimation of the population size, determine the otters' diet, and identify important habitats and resources, as well as threats, through spatial analysis. Hong Kong's dense vegetation and intertidal habitats made field survey for otter signs difficult (Figure 4). What's more, typical sprainting sites such as large rocks, logs, ledges under bridges, etc., are rare at the waterbody edges in the study area. Despite these practical challenges, we collected some spraint samples, albeit in low numbers. Data analysis is ongoing but our findings thus far have increased our understanding of the population's distribution and some of the threats it is facing. We are also starting to see some success in our molecular study which uses DNA extracted from the spraints to genotype individuals and we hope this will enable us to estimate population size in the coming months. The initial findings of the diet study, which uses spraint survey to determine species consumed and their relative bulk, potentially indicate a preference for some non-commercial

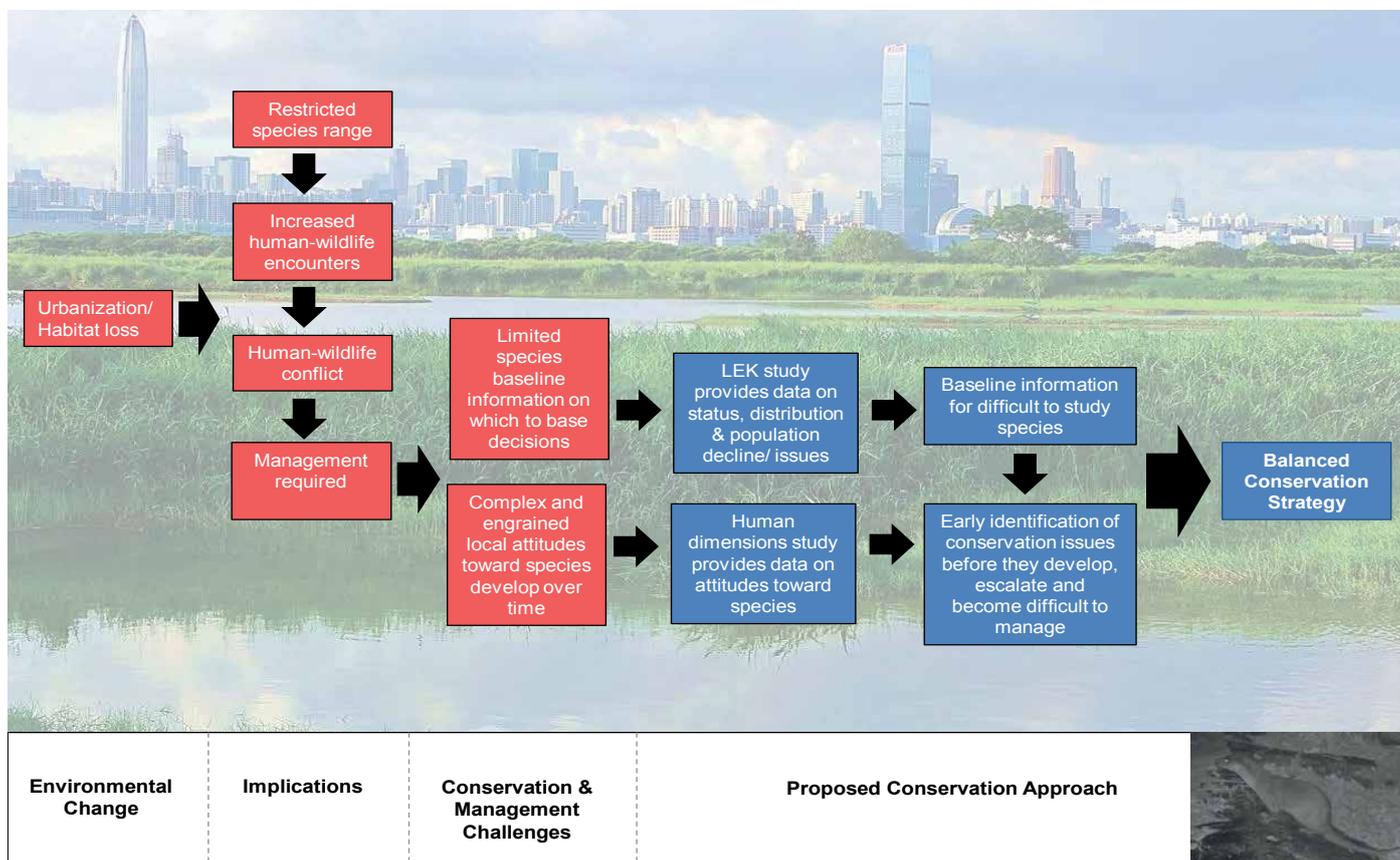


Figure 3. The value of local ecological knowledge (LEK) in providing baseline ecological data and assessing local attitudes and perceptions for species management and conservation (McMillan *et al.*, *Conservation Science and Practice*, 2019). Image: Mai Po wetlands shown in the foreground with the city of Shenzhen in Mainland China in the background.

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Figure 4. Hong Kong wetland habitats including overgrown pond banks, reedbeds, active fishponds, and intertidal watercourses and mangrove habitat, which provide limited sprinting features (left to right).

fish species such as tilapia, which will be important in managing any future human-otter conflict.

Application of research findings

The otter populations in both Hong Kong and the UK face many of the same conservation challenges, including habitat loss, water pollution, and the potential for human-otter conflict. The otter is a European Protected Species, and in some parts of the UK it receives protection under the Wildlife and Countryside Act 1981. It is illegal to capture, kill, disturb or injure otters; damage or destroy a breeding or resting place; obstruct access to their resting or sheltering places; or possess, sell, control or transport live or dead otters, or parts of otters. Similarly, in Hong Kong it is a protected species under the Wild Animals Protection Ordinance (Cap. 170), making it illegal to capture, kill, disturb, injure or possess the animal.

Prior to the start of our study in 2016, environmental impact assessment (EIA) for any proposed development in the wetland area was based on limited otter survey data, a reflection of the lack of awareness and understanding of this species. As a result, it is likely that development impacts were underestimated and the design of any mitigation lacked local context due to the absence of knowledge of local otter ecology (e.g. resting sites, natal dens).

For example, the provision and design of artificial resting places as a form of habitat enhancement was typically based on examples from the UK and Europe (e.g. underground holts). However, during our surveys we have been unable to find any evidence of underground holts but instead have recorded anecdotes about couch-like structures used by otters for resting and breeding, which the local people refer to as 'otter nests'. It may therefore be the case that above-ground resting places and natal (breeding) dens are typically preferred in the Hong Kong environment. Further research is required to confirm this; however, it highlights the importance of having an adequate understanding of the local ecology for ensuring successful mitigation and management actions.

Like the UK, Hong Kong has a well-established EIA system, known as the Environmental Impact Assessment Ordinance. A positive aspect of Hong Kong's EIA process is that it includes a statutory environmental monitoring and audit programme (EM&A), which consists of recommendations from the EIA that are formalised in the environmental permit issued with planning consent. Although EIAs for major development in the wetland area were undertaken prior to the start of our study, some are entering the construction phase at the same time that our study has started to analyse data and

increase our understanding of the otter population. Through consultation with the development proponent we have had the opportunity to use our research findings to guide retrospective mitigation for these developments. In addition, we are working with environmental consultancies and NGOs to inform separate management actions in areas we now know to support otters. In all cases we are encouraging appropriate monitoring of any actions to evaluate success and hence inform future decision making. As our study draws to completion in late 2020, we plan to use our data to develop Hong Kong specific survey methodology along with training to promote long-term monitoring of the otter population and appropriate survey standards for future ecological assessment. The research will also form the basis of a species conservation action plan for otter in Hong Kong. Dissemination of scientific data and involving a wide range of decision makers and stakeholders is important for threatened species conservation (Scheele *et al.* 2018). Our research provides an opportunity to engage stakeholders and exchange knowledge regarding the otter population (e.g. population size, otter diet, etc.) hence facilitating informed decision making. The importance of considering local attitudes and perceptions when developing conservation actions was highlighted in the findings of our interview

study. In Hong Kong, we are in a fortunate position to be able to pre-empt future human-otter conflict and therefore take timely action to minimise it. Tools such as species conservation planning workshops facilitate collaborative decision making which is fundamental to species recovery. By using a combination of scientific data and the diverse perspectives and knowledge of relevant stakeholders when developing the species conservation action plan, we aim to foster positive attitudes and stewardship toward otter protection and conservation. As wildlife is increasingly driven into compact, urban spaces, a holistic conservation approach is becoming more

important. The conservation of Hong Kong's otter population is a prime example of this, where without commitment from local people long-term conservation is probably impossible (Clark and Wallace 2002).

Although the UK and Hong Kong both support Eurasian otter, and both regions have seen historical declines, our understanding of the species' local ecology and hence approach to protection and conservation have followed different trajectories. The UK has a significant head-start in otter research which has allowed development of specific survey methodology and monitoring, and an understanding of threats and mitigation

requirements. We know from the UK experience that if the threats facing this adaptable species can be alleviated, population recovery is possible. We hope that Hong Kong can learn from the UK's success and that our study is the first step for the successful conservation of Eurasian otter in Hong Kong.

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'Golden Tides' – A Collaborative Search for a Sustainable Solution to the Seaweed Inundations on Caribbean Beaches

Debbie Bartlett FCIEEM

Keywords: British Overseas Territories, environmental impact, Sargassum

This article describes the collaboration between the University of Greenwich, CIEEM's Overseas Territories Special Interest Group, and the School for Field Studies and the Department of Environment and Coastal Resources, Turks and Caicos Island Government, to tackle the seaweed deposited on beaches in these islands. The issue is not restricted to this area but is widespread across the Caribbean and has received media attention due to the impact on the tourism industry. Our interest was firstly to see if the resources of the Algal Biotechnology group in the University could find a commercial use for the seaweed biomass, and secondly to determine the environmental impact of the inundations and potential consequences of removal.

Introduction

In recent years, there have been massive inundations of seaweed on the beaches of the Caribbean, Gulf of Mexico and West Africa, causing considerable damage to the local economy and environment. This

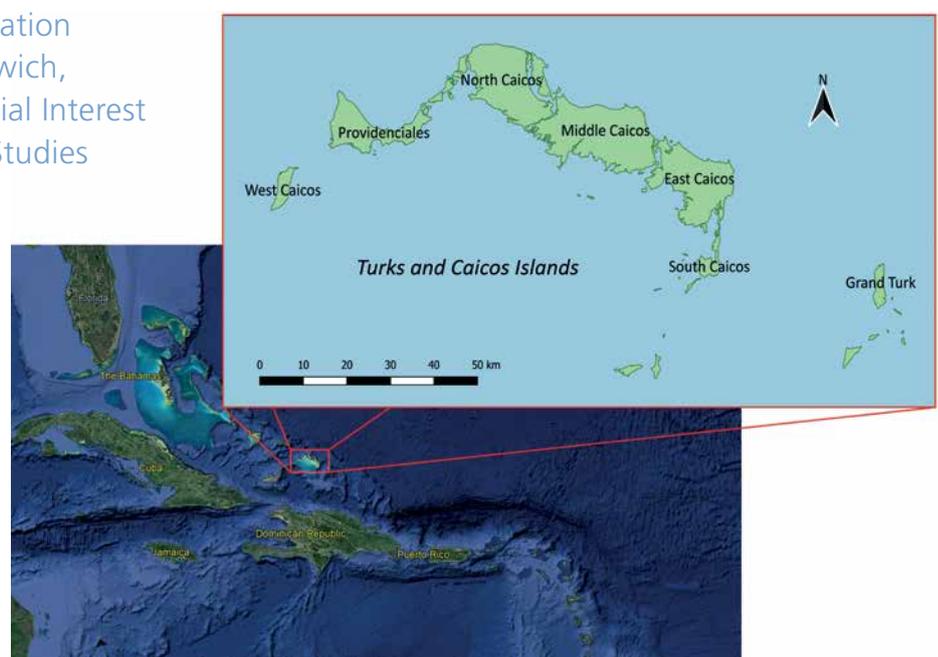


Figure 1. Location of the Turks and Caicos Islands in the Caribbean.

has been widely reported in the press and is variously attributed to climate change and eutrophication as a consequence of deforestation in the Amazon, however the cause has not been established and is likely to result from a combination of factors. The impact on the white sandy beaches beloved of tourism brochures is significant – it is unsightly and there is a distinct whiff of rotten eggs as it decays, leading to health concerns.

Commercial exploitation of this biomass for food, fuel, and pharmaceutical products could fund the clean-up of the beaches and offset the economic impact of these 'golden tides'. A research group at the University of Greenwich working on macro

algae, including the invasive *Sargassum muticum* (Japanese wireweed), is exploring the potential for biofuel and pharmaceutical products. Following publication of some of this work (Milledge and Harvey 2016), the Department of Environment and Coastal Resources from the Turks and Caicos Islands Government, contacted the group to express concerns about the impact of seaweed on the tourism-based economy of the islands (Figure 1). While it was acknowledged that additional research would be required to characterise the 'golden tides', it was agreed that the feasibility of commercial exploitation, particularly as biofuel, was an interesting challenge, particularly as the islands are dependent on fossil fuels for energy.

The research project

A general call from the UK Government for Darwin Plus projects provided an opportunity to carry out some research overseas to explore the potential for addressing the problem of Sargassum inundations, including finding a viable use for the seaweed. Darwin Plus projects are funded by Defra from The Overseas Territories Environment and Climate Fund specifically to facilitate environmental projects in UK Overseas Territories. We set up a partnership to progress a bid for funding involving the CIEEM Overseas Territories Special Interest Group, providing technical expertise and local contacts with naturalists; the School for Field Studies, based on South Caicos, who have students on residential placements who could carry out survey and monitoring; the Department of Environment and Coastal Resources (DECR), Turks and Caicos Islands Government; and led by the University of Greenwich. The chemists were clear about what they needed to find out in order to investigate the potential of using Sargassum as a biofuel or in pharmaceutical products, and required samples to be brought back to the laboratories. From the environmental perspective, we were interested in the effect the Sargassum inundations might be having on coastal ecology and the impact of removing it.

The research bid for Darwin Plus funding was successful and so fieldwork on the islands had to be planned in detail. Students had been included in the funding bid as research assistants, so the Environmental Conservation MSc students at the University of Greenwich were invited to compete for the two places available. The project became the focus of their individual research projects, beginning with intensive desk study, looking at the literature and finding out as much as possible about the Islands. It was only then that we began to appreciate the significant logistical details, such as the distances between the different islands, their different cultures and histories and – importantly – that there were three different morphotypes of Sargassum arriving on the beaches (Schell *et al.* 2015, Amaral-Zettler 2017). One of the selected MSc projects focused on the distribution



Figure 2. Sargassum on the beach and floating rafts in the water.

and composition of the Sargassum with the second looking at the impact on businesses and the environment.

Sargassum ecology

There are over 350 species of *Sargassum* of which just two, *S. fluitans* and *S. natans*, are holopelagic, forming floating rafts and spending their entire lifecycle at sea rather than attaching to a substrate. The rafts support a wide variety of wildlife, even being described as ‘golden rainforests’, and ten species are thought to be endemic to the floating rafts. The rafts are also spawning grounds for economically important and iconic species such as the American eel *Anguilla rostrata*, European eel *Anguilla Anguilla*, flying fish *Exocoetidae* spp., white marlin *Tetrapturus albidus* and blue marlin *Makaira nigricans*. Various species use the rafts as floating nurseries such as swordfish *Xiphias gladius*, green turtles *Chelonia mydas*, hawksbill turtles *Eretmochelys imbricate*, loggerhead turtles *Caretta caretta*, and Kemp’s Ridley turtles *Lepidochelys kempii*. Predators such as tuna *Thunnus* spp. and various sharks *Selachimorpha* spp. are attracted to the rafts as they provide good hunting grounds (Laffoley *et al.* 2011). The rafts reach a considerable size and, depending on currents and weather, can be deposited onto beaches (Figure 2).

Fieldwork

The team from the University of Greenwich travelled out to the Turks and Caicos Islands in June 2019. Fieldwork began with visits to beaches to establish the distribution of Sargassum round the islands and to formulate a monitoring regime. With staff from the School for Field Studies on South Caicos, we cleared measured areas and weighed the seaweed to assess quantities of Sargassum, measured the depth at intervals, and set up transects to determine how far up the beach the seaweed extended. Samples were collected for laboratory analysis back in the UK (Figure 3).

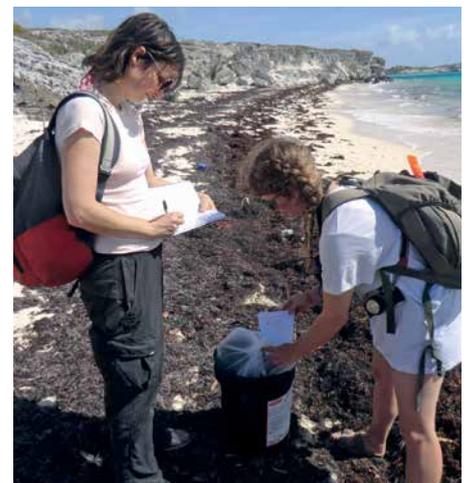


Figure 3. Collecting samples of Sargassum.

Feature Article: 'Golden Tides' – A Collaborative Search for a Sustainable Solution to the Seaweed Inundations on Caribbean Beaches (contd)

The samples were sorted into the three morphological forms: *S. fluitans III*, *S. natans I* and *S. natans VIII* and a simple identification guide was produced (Figure 4). Although we had not originally budgeted for analysis of three separate samples, once we knew all three morphotypes were found on the islands it was important to determine the relative proportions. Contamination of samples was a potential problem that could be an issue in subsequent chemical analyses but there was surprising little, just small amounts of manatee grass *Syringodium filiforme*, turtle grass *Thalassia testudinum* and shoal grass *Halodule wrightii*; there was very little plastic.

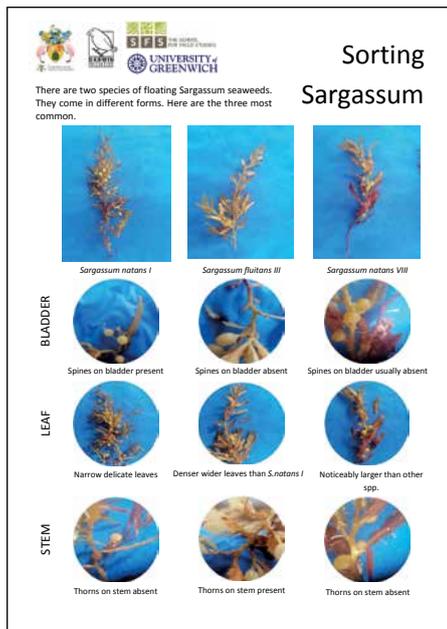


Figure 4. Sorting Sargassum. Identification guide for three Sargassum morphotypes found on beaches during the study.

Local citizen science

Presentations about the project were given in local schools and the identification guide was distributed to enable pupils to recognise the three types, and to encourage fieldwork and ongoing monitoring as 'citizen science'. This work is being led by the School for Field Studies and is an integral part of the project. Without this ongoing monitoring it would be impossible to identify seasonal variation in the quantities of Sargassum washing onto the beaches or to determine if there were links with particular weather events.

Table 1. Finding sustainable solutions for Sargassum inundations in the Turks and Caicos Islands: achievements in the first six months of the project.

- Produced a report on the impact of Sargassum on tourist industries based on interviews with 100 operators
- Two MSc research projects completed
- Easily reproducible identification sheets produced and distributed to enable the different morphotypes of *Sargassum* affecting the islands to be identified (Figure 4)
- Set up monitoring to determine the locations, quantity and seasonality of *Sargassum* deposition around the Turks and Caicos Islands
- Collected and analysed samples *in situ* to determine the relative proportions of the different morphotypes deposited and to identify contaminants, both biological and of anthropogenic origin
- Collected samples and brought them back to the UK under the appropriate licenses
- Carried out laboratory analyses in the UK of moisture and ash content, calorific value, protein, lipid and fibre content, amino acid profile, fatty acid profile, X-ray diffraction analysis of ash, carbon, hydrogen and nitrogen analysis, and metal and arsenic contents. Further chemical and methane potential analyses are ongoing and we expect full results to be available in the next six months.

Impacts on local business

So, what of the impact on businesses? At the outset of the collaboration, this was the principle concern of DECR but no real assessment had been made. To rectify this, focus groups were held on three islands - Providenciales, South Caicos and Grand Turk - with invited participants representing local businesses. The workshops revealed that the majority of the Sargassum is deposited on the easterly beaches, driven by the prevailing wind and affecting holiday resorts there. The worst affected island is Grand Turk, the most easterly island. However, although Grand Turk has a cruise ship port and a huge number of short-term visitors, all the development

is on the west side of the island. A lot of Sargassum accumulates in the creeks, which may well be adversely affecting mangroves and the former salt pans on the island. These areas are known to be important for birds and there may be conservation issues.

South Caicos and Providenciales receive fewer visitors but the hoteliers are very concerned that the Sargassum is affecting the pristine, white, sandy beaches that are the key marketing feature of the islands. Consequently, they are actively removing Sargassum using various methods including manual raking up, bagging and removing to landfill, and mechanical raking and removal (Figure 5) with the



Figure 5. Mechanical removal of Sargassum from tourist beaches.

Sargassum being piled up or dumped into the former salt pans. There was one case of a boom being used to keep the Sargassum off the beaches and other hoteliers were considering this option. These management interventions require significant resources and will have an impact on profit margins; as the Sargassum can come in on every tide, removal is an ongoing task.

A report on the impact of Sargassum on businesses was produced, based on the views of 100 people. It has been distributed widely and in addition to providing evidence on the impact of Sargassum, the amount being removed by various businesses and the effect of seasonal factors, this exercise raised awareness of the project. It also provided an opportunity to invite people to get involved by sending photos with the date and location to the Caribbean-wide 'Sargassum Watch' monitoring initiative using the EpiCollect5 App (<https://five.epicollect.net/project/sargassum-watch>), which will help to build a picture of Sargassum inundations over time.

Impact on wildlife

The impact of Sargassum deposition and removal on wildlife is difficult to establish. We were hoping to establish links with local naturalists but this proved surprisingly difficult. There is a limited amount of bird-based tourism on Grand Turk but this seems to be focused inland, on the salt pans. Fishing is the main industry apart from tourism, mainly for conch *Strombus giga*, harvested by free diving, and spiny lobster *Panulirus argus*, both of which are exported in quantity. These are associated respectively with sea grass beds and coral reefs, which can be adversely affected by shading from the floating rafts of Sargassum. Conversely, the rafts are beneficial for many species of fish and considered beneficial by game fishers – although several mentioned that removing seaweed from lines is an annoyance and that the increase in sharks, particularly, means their haul is often half-eaten. We saw many turtles swimming in the shallows and, particularly as these are endangered, were surprised to find there was very little data on breeding sites. While there is anecdotal and some historical records, it would seem likely that Sargassum build-up

Acknowledgements

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could impede nesting and make the journey of turtle hatchlings to the sea very difficult. Removal could equally be damaging.

Future directions

The stages of the project that have been successfully completed in the first six months are shown in Table 1 together with the main results. There are many strands to be investigated in the future before any realistic management solution to the problem of Sargassum inundations can be implemented – if that is even possible. The cause of the 'golden tides' is not established; it is not clear whether deposition has seasonal patterns, which will now happen every year, or if it is a one-off phenomenon. These questions are areas of active research and, although we are focusing on just one group of islands, we are collaborating with an extensive group of researchers sharing information on this issue.

The project runs until April 2021 and if anyone has any information about wildlife on the Turks and Caicos Islands or is in contact with any naturalists there please do get in touch. The CIEEM Overseas Territories Special Interest Group are instrumental in this including via their links with the British Overseas Territories Conservation Forum. The environmental impact of Sargassum deposition and removal will be the focus going forward, alongside monitoring and sampling to establish if there is any pattern in the proportions of the three morphotypes found on the beaches. The results of this project will be widely disseminated and a CIEEM webinar led by the Special Interest Group is planned.

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CIEEM Featured Training

Survey, Ecology and Identification

Reptiles: Ecology, Surveys and Mitigation

London, 7 April 2020

This one-day training course delivered by Demian Lyle will cover the following key areas:

- Identification of the six native UK reptile species and more common non-native reptile species.
- The ecology, including habitat requirements of reptiles in the UK.
- The legislation and guidance documents pertaining to reptiles in England and Wales.
- Designing and undertaking an appropriate reptile survey.
- Mitigation and enhancement measures.

The training will include classroom-based activities and learning as well as a field element where delegates will undertake their own reptile survey as the site supports good populations of three native reptile species; grass snake, slow worm and common lizard.

Bat Ecology and Survey

Newtownbutler, Ireland, 4 June 2020

This one-day course delivered by Emma Boston will provide an introduction to the key knowledge and skills necessary for undertaking professional bat work in the UK and Ireland.

The course will introduce bat legislation, bat ecology and identification. It will provide an overview of the bat survey types and requirements following the latest good practice guidance through presentations, demonstrations, case studies and a site visit to known bat roosts.

Delegates will gain a good understanding of bat ecology, the ability to differentiate bat species, a working knowledge of bat law and licencing, an ability to assess the need for surveys, to plan and prepare for surveys, as well as be able to select appropriate equipment and resources and be able to analyse and interpret results in order to write good reports.

Planning and Development

Biodiversity Net Gain Through Development

Leeds, 9 April 2020

This one-day classroom-based course provides training on designing biodiversity net gain for development projects. It is based on the UK's good practice principles for biodiversity net gain (CIEEM/IEMA/CIRIA, 2016) and the associated practical guidance (CIEEM/IEMA/CIRIA, 2019).

Calculating and Using Biodiversity Units with Metric 2.0

London, 4 June 2020

This one-day classroom-based course is based on the Biodiversity Metric 2.0 (Natural England, 2019). It provides training on undertaking biodiversity unit calculations for a development and its impacts on biodiversity. It also provides training on utilising biodiversity unit calculations to support designs of Biodiversity Net Gain, and the long-term maintenance and monitoring of Biodiversity Net Gain measures.

Mitigation and Management

Bats: Impact Assessment and Mitigation

Wareham, 23 April 2020

This one-day course co-delivered by Katie Pollard and Danny Alder will cover the impacts on bats of development, roads, tree surgery and single wind turbines and the requirement for appropriate bat mitigation and enhancement in line with current legislative requirements. The day will be a mix of presentations, case studies and scenarios with small group working, quizzes and short tests on knowledge of bat mitigation.

Effective communication with clients will also be discussed to assist practitioners in ensuring clients are aware of, and understand, the laws protecting bats and the requirements for mitigation.

The course is suitable for those who have some knowledge of bat ecology and surveys (or have attended an Introduction to Bat Ecology and Bat Surveys course running next on 22 April).

Bat Impacts and Mitigation

Newtownbutler, Ireland, 5 June 2020

This one-day course delivered by Emma Boston will introduce bat impact assessments and demonstrate how to assess impact for various development types, including residential developments, roads or other large infrastructure projects and wind farms.

Delegates will explore the measures currently available to mitigate the impact of development in line with current legislation, using presentations, question and answer sessions and case studies of bat mitigation and enhancements appropriate for a variety of bat species. In the afternoon, delegates will have the opportunity to work through and discuss example scenarios in groups.

The course is suitable for those who have some knowledge of bat ecology and surveys (or have attended the Bat Ecology and Surveys course running next on 4 June).

If you would like one of our training courses to be delivered at your organisation, please contact us at training@cieem.net

Reflections on Professor David Bellamy 1933-2019

Annie Say MCIEEM



Cooking octopus on a camp stove in the glow of the sunset below the craggy limestone mountains of the Dolomites, while sharing stories and experiences from a wonderful day exploring the montane flora with Dave, is unforgettable. I will also remember Dave's enthusiasm which was totally infectious for this as it was for so many things. His summer field trips for Durham University second year Botany students were legendary, combining exploring peat bogs near Murnau in Bavaria with the mountains near Cortina. All Dave's field trips were inspiring, filled with anecdotal stories and rhymes or catch phrases to help remember facts and Latin names. Dave loved the outdoors; he loved plants (all plants) and was passionate about sharing his joy of them both.

Born in London in 1933 and following a botany degree at Chelsea College of Science and Technology, marrying his beloved Rosemary and studying European mires for his PhD at Bedford College supervised by Francis Rose, Dave was appointed as a lecturer at Durham University in 1960. His lectures inspired so many of us – engaging, unconventional, challenging, interesting and fun. His skills and special talents in sharing and discussing the wonders of the world, ecological interactions and conservation simply and in ways that made sense led to his success over many years in the media and on television with one of the first interviews being about the Torrey Canyon oil spill in 1967. *Bellamy on Botany* was perhaps one of Dave's most engaging programmes, allowing him to share his love of plants and all things botanical.

Diving was another keen interest, and his love of the seas. He was part of diving trips to the Aldabra Atoll and the islands of the Chagos Archipelago as well as closer to home.

Dave's ongoing love of bogs and peatlands (and his favourite *Sphagna*) gave us all



Ecology Research Team 1974.

fascinating perspectives into this wonderful world and his interest in phytosociology and the marine environment encouraged a team of research students, many of whom are well-known and still involved in science – David Shimwell, David John, Bryan Wheeler, Judith Roper Lindsay, Charles Sheppard and many others. Dave and Rosemary were so kind to us and we all have stories to tell about our times with Dave. The Bellamy family also had a wonderful habit of collecting people along the way and sharing their home with them and encouraging them on life's path, often in science or conservation.

Dave's life was so full with so many things – not least his home and family of five children to fit around trips all over the globe, involvements with many organisations including the Wildlife Trusts and the Conservation Foundation (which he founded with David Shreeve), and writing books and papers – it is hard to imagine how he managed it all and in fact thrived on it. He relied hugely on Rosemary who was a stalwart in keeping Dave's life organised. Rosemary was a good botanist

in her own right and they both enjoyed trips to their house in Italy and to the Durrell Wildlife Conservation Trust in Corfu to relax.

Dave was an early Patron of IEEM but parted company when his views on global warming became increasingly controversial. These views also precipitated the end of his broadcasting career and led to close ties being cut with some organisations with which he had had long connections. He never halted his mission as a global environmental campaigner or interacting with young people in conservation projects until ill health and frailty took away his ability to communicate.

It is as a lecturer, PhD supervisor and friend that I will remember this unique man and I will always be grateful for his inspiration, his kindness and his support.

To quote one of Dave's research students: *"I never really thought of him as a celebrity – he was just Dave – a thoroughly decent human being and a kind and generous mentor. We owe him a great deal and mourn his passing."*

The Holistic Ecologist: A Vocational Tale

Richard Birch CEcol MCIEEM

Keywords: Carboniferous reef, defensive reporting, holism, *Hygrocybe*, training

As ecologists, we are conditioned by legislation that focusses on specific habitats and species which have been identified as conservation priorities. Consequently, the features, habitats and species that underpin everything else are often disregarded. Ecologists need to broaden their horizons by taking a more holistic approach that recognises the interconnectedness of the natural world and does not overlook the 'base of the pyramid'.

Holistic (adj.): 'The belief that the parts of something are intimately interconnected and explicable only by reference to the whole' (<https://www.dictionary.com>).

Imagine we are asked to undertake an ecological assessment of **Site X**¹ for a proposed development. As part of the Desk Study, we access Local Environment Records Centre (LERC) data, scan through for the 'Big Boys' – bats, newts, badgers, whatever. We have a few hours to walk around the site looking for clues: a trail through the grass here, an overgrown pond full of rotting leaves there. We focus down on those, do the relevant surveys, probably find nothing in this depleted world...

We are conditioned by the legislation to work in this way, and I would follow this procedure myself, knowing full well that it is wholly inadequate. The legislation itself encourages this. The European Protection (the 'Habitats Directive' 1992 and species included in its Annexes) is the scary stuff: it can stop the diggers moving in unless there is sufficient mitigation, so our attention is concentrated on



Hygrocybe irrigates.

those habitats and species. We might acknowledge birds, particularly in the breeding season, but otherwise they get a raw deal unless they're listed on Schedule 1 of the Wildlife and Countryside Act 1982 (as amended), and they can usually be dismissed as a risk by avoidance strategies. Seldom is there time to scroll down to the lower half of Section 41 species (Section 7 in Wales, where the Natural Environment & Rural Communities Act was supplanted by the Environment (Wales) Act in 2016). Hands up all those in Wales who consider TAN 5 (with its 'where possible' prefixes and *get-out-of-jail* caveats – <https://gov.wales/technical-advice-note-tan-5-nature-conservation-and-planning>), or the worthy but nigh impossible to enforce Health & Well-being of Future Generations Act 2016

(<https://gov.wales/well-being-future-generations-wales-act-2015-guidance>).

Arguably, these are not the sole responsibility of the ecologist, but require collective responsibility from everybody. Biodiversity, the integrity of the natural world, it belongs to us all. In reality, who else is accepting responsibility? The ecologist will be regarded as a hindrance to progress if they choose to do so. While there may be dozens of workmen, engineers and managers on site, there may only be one ecologist in the tearoom. Intimidation is often subliminal, but it is there.

Ultimately this forces us to concentrate only on those matters in which we are likely to get some success: where the law is clear, or where the strengths of the profession lie. The environmental report will satisfy the letter of the law, give the



Figure 1. Groundworks expose a coral reef with drop-off (a). Mapping the reef (b). Coral *in situ* (c).

thumbs-up, bish-bash-bosh and let's go!
No-one can fight every battle.

I call this *defensive reporting*: a term I hope will catch on so that it can be legitimately challenged. Here's an example. **Site X** is ostensibly a boring field of semi-improved grassland in a rural setting, and the vegetation strip has already begun before the ecologist is on site (that *never* happens!). There are no ponds, the hedges were eaten out by livestock long ago, leaving only an earth bank with no burrows or setts. This could be dismissed in seconds. But the strip has exposed the bedrock. In this instance, it's a platform of

Carboniferous limestone etched by acidified rainwater percolating through the overlying soil. This process has picked out an ancient coral reef in extraordinary detail (Figure 1). There is even a drop-off into what was deeper water where the coral could not grow (Figure 1a), and horn-shaped solitary corals identify it as Namurian in age. It is part of an archipelago of coral atolls formed during an incursion of the sea some 300 million years ago. It is not our job to consider this, but then whose job is it? There is unlikely to be a geologist on site, it falls outside the remit of the geotechnician and its age

is millennia before the interests of the archaeologist. Trawl through the various Acts and there are clauses that require a duty of protection, but palaeontological features slip through the gap because no-one has direct responsibility for them.

Site X contains few herbs of note, and we barely notice the dull red fungi, let alone confirm their identification as *Hygrocybe puniceus* (Figure 2). If we knew this, we might also know that *H. puniceus* is an indicator of fungal diversity, and as a general rule of thumb, its presence in pasture indicates that there are at least eleven other species of waxcap present (Rotheroe 2001). Floral diversity is no indicator of mycological diversity. If we could return to the site in September, we may well record a suite of grassland fungi, including *Hygrocybe*, *Geoglossum* and *Cordyceps* parasitic on the grubs of subterranean insects. These qualify it as significant.... but very few ecologists concern themselves with fungi, and statutory bodies don't ask for mycological surveys these days, although they certainly used to (Wright 2015).

One more thing about **Site X**: the proposed development will be floodlit. It's an open site with no bat interest. The topography will screen it from nearby settlement so there are no objections. The fact that it will blot out the night sky and obscure the stars escapes attention, but that's not our job either. Ever tried to tell the design team that their lighting proposals will block views of Uranus? Try it sometime.

The ecological report for **Site X** ignored all these and gave a clean bill of health for development to proceed, with the proviso that some 'enhancements' were incorporated. A few trees would



Figure 2. *Hygrocybe puniceus* and eleven other species by default

Viewpoint: The Holistic Ecologist: A Vocational Tale (contd)

be planted. Quite apart from the fact that enhancements are completely unenforceable and included at the discretion of the developer (which means they have to be easy), these do not compensate for the priceless nature of what is to be lost.

It so happens that **Site X** was a battle worth fighting. Time was granted to map the nature of the reef and an article published in the newsletter of the North Wales Geological Association (Birch 2018) ensuring a degree of posterity. It was difficult to secure the grassland fungi, but some of the earth banks were retained so that at least the bees and parasitic fungi could persist. The lighting was modified to reduce spill – at least a little.

But the cost of this in wear and tear on the ecologist was enormous! It required backtracking on a defensive report undertaken by another consultant, citing secondary legislation which lacks firm definition, and you can imagine how popular that was with the developer: “*You want me to do WHAT?*”

I stress that the ecologist producing the original report did nothing wrong. Superficially, **Site X** was uninteresting in a purely prescriptive assessment, which is often all there is time for if the costs are to be competitive. But the industry must hold itself partly responsible for the overlooking of the multiplicity of features that ought to be included in an ecological assessment.

CIEEM has a training policy that emphasises the issues we as ecologists are likely to confront, but arguably that is a self-fulfilling prophecy. Bats are protected by top-tier legislation; we encounter bats often, therefore we train ecologists to know about bats. Incidentally, it helps that there is a plethora of sexy gadgetry available to the batworker. How can the bryologist armed with a x20 lens and a guide to bryophytes compete with that? No wonder so few come forward to study these, ‘the *insignificants*’.

Expertise in entomology, bryology, mycology or any of the other *-ologies* that concern themselves with the fundamental components of ecosystems are rare things that require years of experience to acquire, but recognition of their importance beyond that of the upper tier of vertebrates featured in legislation

ought to be the foundation stone of the profession. Ecology is, after all ‘*the branch of biology that deals with the relationship of all organisms to one another*’ (<https://www.dictionary.com>) and not simply the reductionist approach to more ‘charismatic’ organisms.

The task of developing a ‘holistic’ level of ecological skill may seem daunting: how can a newcomer acquire the knowledge necessary to avoid resorting to defensive reporting? I do not advocate relying solely on training courses, but suggest a subliminal approach, with experience gained as much by osmosis as orthodox learning. Here are some suggestions to increase awareness of the holistic nature of ecology:

1. Listen to ‘*Farming Today*’ at 05.45 am every weekday on Radio 4 (or the omnibus on Saturday at 06.30 am); 80% of Britain is farmed and it makes sense to understand how.
2. Seek out your local bryologist/mycologist/botanist or entomologist group (perhaps affiliated to CIEEM’s training programme) and attend *at least one* field event. In my experience they’ll be pleased to see new people, and these groups are made up of experts keen to share their knowledge.
3. Get a ‘local patch’ and visit it once a week. The exercise alone is worth it but make a note of what you see. Data sets like this are priceless and will provide a barometer of your own progress. Then:
4. Submit records to your local LERC. Better still, get competitive with a colleague to see who can get the most verified records for a chosen site; you will have to get good at the small stuff to win.

And not least:

5. *Keep watching the skies...*

This last point can be summarised by saying ‘*go off-beam*’: look at the things that nobody else looks at. I’ve noticed that many of my long-standing colleagues started off by focussing on birds, or snakes or some other charismatic organism and worked their way through to mosses, rust fungi, spiders, crane flies or aquatic algae, ending up as ‘geeks’ at the neglected end of biodiversity. In such a way do holistic ecologists evolve!

Newcomers to the profession might balk at the thought of ending up as a geek, but local specialists in my area invariably carry their knowledge with justifiable pride. It helps in that if I don’t know something, I know someone who does. It’s an extension of the holistic approach: after all, even the most holistic of ecologists can’t know everything.

Note

1. Site X is a composite, but these are all real examples.

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About the Author



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New Versions of TABLEFIT Released: Programs for Allocating Unknown Samples to the National Vegetation Classification

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Keywords: community classification, computer methods, National Vegetation Classification, MAVIS, EUNIS, Tablefit

This article describes changes to TABLEFIT, a computer program that allows the user to fit samples of vegetation to the descriptive tables of the British National Vegetation Classification. Although the program has been in use for almost 30 years, it was not very user-friendly especially for the handling of large numbers of quadrat data. Moreover, there was no ability to access new plant communities that have recently been described. Two new versions of TABLEFIT are described, the first (v3) is a faithful representation of the original, whereas v4 includes newly described wet grassland communities. Some utilities are also included to assist with data preparation. The benefits of the new programs are outlined.

Introduction

The British National Vegetation Classification (NVC) provides a stable,



common language for describing the species composition of terrestrial and aquatic plant communities. This is required so that vegetation can be evaluated for its conservation importance as part of environmental assessments, and monitored to determine change to and from undesirable or desirable end-points defined in terms of the units of the classification. Assignment of vegetation stands to the

NVC typically relies on the judgement of an experienced 'expert' who may support their decision using software tools. While these tools are not a substitute for expertise they provide an impartial and repeatable method that is especially useful when classifying large datasets of vegetation samples (quadrats) or when repeatedly assessing how vegetation is changing over time in response to management.



Figure 1. Some examples of NVC communities: (a) M20b [*Eriophorum vaginatum* raised and blanket mire] in middle distance with *Eriophorum vaginatum* in flower and U2b [*Deschampsia flexuosa* grassland] in the foreground. (b) U6 [*Juncus squarrosus*-*Festuca ovina* grassland] with variously improved (MG5, MG6 and MG10) grasslands in the more productive valley bottoms [*Centaurea*-*Cynosuretum*, *Lolium*-*Cynosuretum*, and *Holcus lanatus*-*Juncus effusus* communities respectively]. (c) CG9b [*Sesleria albicans*-*Galium sternerii* grassland- Typical], and (d) MG5 [*Centaurea*-*Cynosuretum* grassland]. Photo credits S.M. Smart (a-c) and E. Villa (d).

The five volumes of the National Vegetation Classification (NVC) are the standard reference works for the description of British vegetation (Rodwell 1991a,b, 1992, 1995, 2000), whether used by conservationists describing SSSIs, environmental consultants carrying out habitat surveys or developers involved in mitigation and offsetting. Some examples of NVC communities are shown in Figure 1. The issue for the ecologist, of course, is the correct and appropriate allocation of unknown samples to the NVC tables. To assist with this process, there are currently two computerized 'expert systems' to help with the allocation of the 'unknowns' to the correct community: the first is called TABLEFIT (Hill 1989, 1996, 2015) and the second, MAVIS (**M**odular **A**nalysis of **V**egetation **I**nformation **S**ystem (Smart *et al.* 2016). MAVIS was based on an earlier program called MATCH (Malloch 1998).

Currently, there are more than 2,500 users of these programs. Both programs are, however, best viewed as tools to assist in making the correct allocation, as Rodwell (2006) points out they are '*Like written keys, they are simply a guide to negotiating a way around a complex classificatory landscape and to understanding variation that, in reality, is extremely complex*'. Moreover, it must be remembered that these tools are only as good as the data input to them; they rely on accurate identification of the plant species within the inputted sample; the acronym RIRO is apt here – '*Rubbish in – Rubbish out*'.

TABLEFIT was written almost thirty years ago by one of us (Mark Hill) and has been consistently developed and improved. It not only provides a list of 'best-fit' NVC communities, it also gives a 'goodness-of-fit' value that allows the user to judge which community is most appropriate.

Moreover, it also provides a direct linkage to the EUNIS European habitat classification system (European Environment Agency 2007). However, TABLEFIT in its previous versions (v1.0, v1.1, v2) suffered from some drawbacks which hopefully we have improved upon in this new version. The need for this was identified by the two senior authors when using TABLEFIT for very large numbers of samples.

Essentially, previous versions of TABLEFIT, originally coded in the FORTRAN programming language, were designed to handle small numbers of individual quadrats input by keyboard, and although a batch processing facility was present it was rather cumbersome to use for both inputting data and specifically in the interpretation of outputs. The new versions have been completely re-written in the C# programming language by Dart Computing. They run quickly and in their new form they

Sample	Analysis_Type	Fit#	Eunis_Comm	NVC_Comm	Mean_GoF	GoF_1	GoF_2	GoF_3	GoF_4	NVC_Comm_Name
Sample.#1	Results	1	F2.25	H18a	58	97	52	58	68	Vacc_myrr-Desc_fle_heath
Sample.#1	Results	2	F2.25	H20d	54	86	42	68	61	Vacc_myrr-Raco_lan_heath
Sample.#1	Results	3	F2.25	H20	52	89	54	47	64	Vacc_myrr-Raco_lan_heath
Sample.#1	Results	4	F2.25	H18	50	96	43	54	60	Vacc_myrr-Desc_fle_heath
Sample.#1	Results	5	E5.5	U16	50	100	45	53	52	Luzul_sylv-Vaccin_myrr
Sample.#1	Analysis	1	H18a	NVC_&_Sample	20	alch alpi;anth odor;blec spic;care bige;desc flex;gali saxa;luzu sylv;mela				
Sample.#1	Analysis	1	H18a	Sample_only	12	caly fiss;cetr isla;clad bell;clad carn; et seq.				
Sample.#1	Analysis	1	H18a	NVC_only	13	agro cani;agro capi;call vulg;cham succ;empe nigr;fest filli;oxal acet; et				
Sample.#1	Only the Analysis outputs for Fit #1 are shown for brevity, but similar information is provided for Fit#s 2-5 in succeeding rows									

Table 1. New improved output in TABLEFIT v3 and v4. The results are output as a comma-delimited file (.csv format), making it very easy to transfer the information in a readily useable columnar format to an EXCEL spreadsheet or statistical package (e.g. R). Results are provided for one sample based on fitting the five top communities (Fit#, this is under user control, the default =5); options chosen by the user were: (a) all species were included, (b) cover was input as a % and (c) both species and cover data were used. The output is organised in two parts:

- NVC fits (Green section):** This is the standard TABLEFIT output for each Fit#, i.e. the EUNIS community code (EUNIS_Comm), NVC community (NVC_Comm) and where allocated a NVC sub-community (NVC_Sub_Name), along with the mean Goodness-of-fit (Mean_GoF) and its component parts (GoF_1, GoF_2, GoF_3, GoF_4). Also provided on each row, but not shown here because of space limitations, is information on the options selected during the analysis: (a) Vasc_Param = the parameters under which the run was performed (here All_sp), (b) Cover_Scale = the cover scale used (here Cover%), and (c) Ana_Param = the analytical parameters (here Species and Cover, Sp_&_Cov).
- Species information (Red section):** This is additional information that has not been presented in TABLEFIT before. For each of the fits, information on the number (column 6) and identity (column 7) of species is presented in the following groups:
 - Species that were in both the sample and the NVC community/sub-community type (NVC_&_Sample)
 - Species that were only in the sample (Sample_only)
 - Species that were only in the NVC community/sub-community type (NVC_only).

The red and green data can be easily separated by filtering or sorting on the Analysis_Type field (column 2) for further calculations.

Note each line of data has a unique set of identification variables based on Sample/Analysis_type /Fit#

The identity of species (column 7) is in semi-colon (;) delimited list form for simplification of the output, these can be easily converted in EXCEL using the 'text to columns' utility. In this example, not all species are illustrated – hence et seq.

can be updated easily. We believe the new versions are much improved, especially for batch processing, specifically:

- Some new utilities are bundled with the new TABLEFIT software to enable the rapid creation of batch data input files. It is impossible to be perfect in producing a generic data input system that involve species names, given the vagaries of taxonomic changes, etc., but we hope the modifications help in minimising the hassles of data input.
- The number of batch samples that can be processed has been increased. The previous restriction to 9,999 was a major drawback for some users, and it has now been increased to 100,000 samples (~ 2.5 times the maximum number of samples we use routinely).
- The sample codenames can now be up to 30 characters, which means that much more information can be included to assist the user in cataloguing the data.
- The number of communities fitted to a sample is no longer restricted to five, but is under user control; this removes one of the drawbacks of TABLEFIT noted by Rodwell (2006).
- The new output has been redesigned so that it produces files that can be easily processed either as an EXCEL worksheet or by statistical packages which require data in columnar format such as R (R Core Team 2018). There should be no need for much post-TABLEFIT-processing work (Table 1); previously this was extremely tedious.
- The new output includes some extra information which can be used as a guide to assist in developing ecological restoration efforts, namely lists of species that:
 - occur in the sample and in the selected NVC community
 - occur in the sample but not in the selected NVC community
 - occur in the selected NVC community but not in the sample.
 If this information is not needed, it can be filtered or sorted out in EXCEL very easily.
- A major drawback to previous versions of TABLEFIT was that new community types were not available within the program, for example, the new wet grassland communities described by the Floodplain Meadows Partnership (2016). This is of course difficult scientifically because if new communities are added, analysing data with the original and updated versions of TABLEFIT may yield different results. Hence, here we have taken a pragmatic view and produced two new versions of TABLEFIT:
 - TABLEFIT v3 - this version is a faithful reproduction of the old TABLEFIT and in extensive testing gave the same outputs.

NVC_Sub_Name	Eunis_Name
Hyl_spl-Rhy_lor	Boreo-alpine_heath
Rhy_lor-Hyl_spl	Boreo-alpine_heath
	Boreo-alpine_heath
	Boreo-alpine_heath
	Subalp_tall-herb/fern
prat;nard stri; et seq.	
seq.	

Acknowledgements

The production of the new versions of TABLEFIT arose as a by-product of a collaborative University of Liverpool Knowledge Exchange Voucher scheme (Grant Ref No: 2017-26) between the University of Liverpool, the Centre for Ecology & Hydrology and Dart Computing.

- b. TABLEFIT v4 - this version includes the new wet grassland communities and now has data tables that are common to those in the latest version of MAVIS (Smart *et al.* 2016). This means that in future both TABLEFIT v4 and MAVIS can be upgraded with new communities concurrently.

Thus, we believe the updated version of TABLEFIT is now much improved from a user's viewpoint. However, original methods of use are still available: the user can still input single or a limited number of samples from the keyboard, and the old output structures for the results can still be used if needed.

The new versions of TABLEFIT can be downloaded free-of-charge from <https://www.ceh.ac.uk/services/tablefit-and-tablcom>.

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Dr Mark Hill was formerly head of the Biological Records Centre (UKCEH). He has written several well-known computer programs routinely used in ecology (DECORANA,

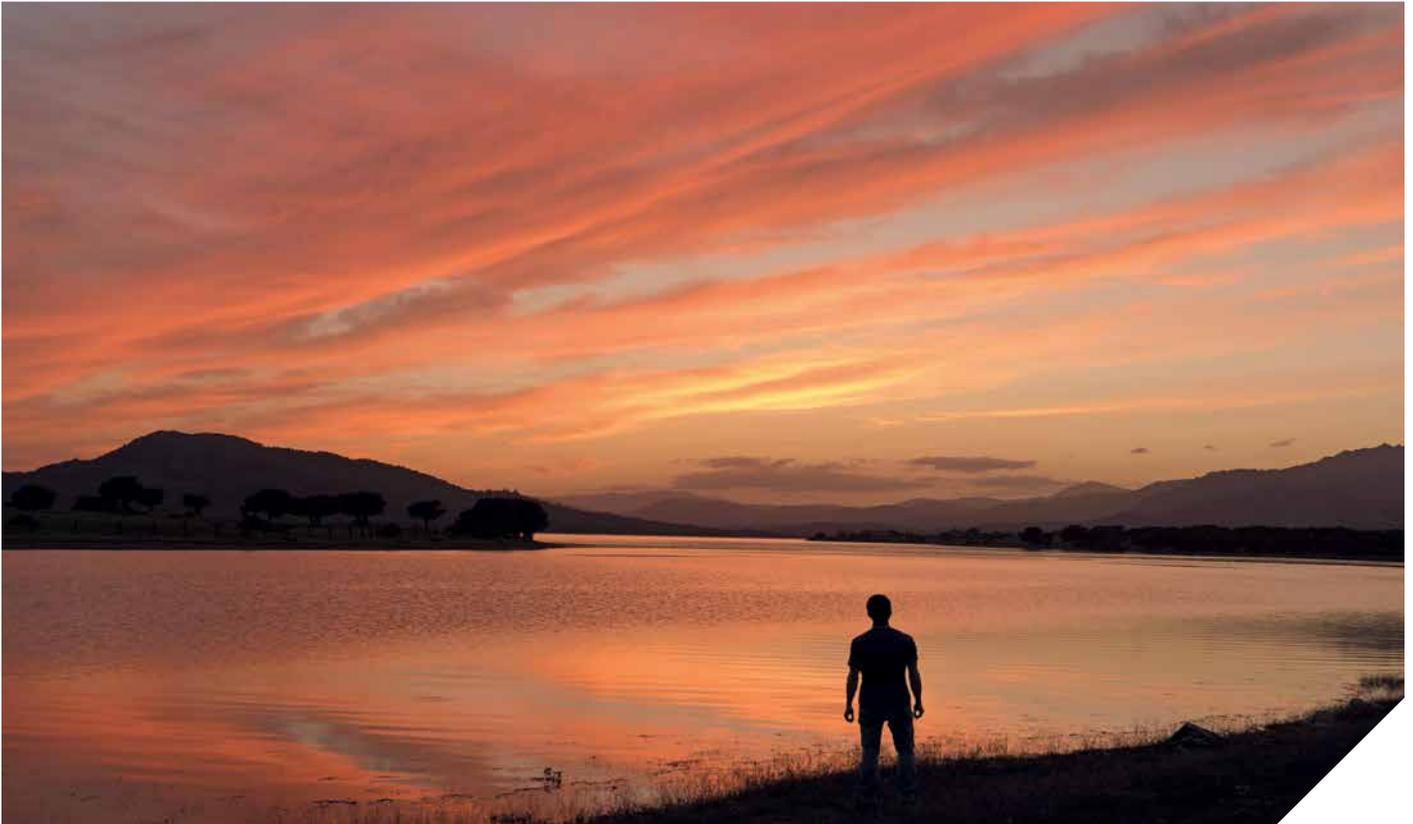
TWINSpan and TABLEFIT) and has made his major contributions to the techniques for analysing biological records.

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A Journey to Well-Being in Ecology

Emma Toovey MCIEEM

UK Ecology Team Lead, Wood Plc



As I stepped down from the stage at my son's primary school in the summer last year I was suddenly surrounded by a sea of very excited, smiling and enthusiastic little faces. I had just delivered a talk to the whole school as part of their 'Aspirations' programme where parents are encouraged to come and talk to the children during the school assembly about their inspiring jobs. I am an ecologist (albeit too many of my days are sat at a desk). I talked to the children about wildflower meadows, handling dormice and the wonders of a bat detector. I showed them newt traps and how to catch an adder (crocheted of course!). I talked about the global decline of biodiversity and what we need to do to help. The children's eyes were wide and the hall was alive with an excited buzz. It was wonderful. To share my passion for the environment and inspire a generation

of children to consider a job in ecology – what a privilege. *"And you can actually do this as a job and they pay you?!"* one child asked. *"If I wasn't a teacher, I would be an ecologist too"* said the Deputy Head. *"And what is the very best part of your job?"* came the question from one child. And I said, as I frequently do, *"the best thing is feeling like I am making a positive difference every day I go to work"*. A Year 6 girl trilled, *"That is literally the best job in the world!"*.

A few weeks after the school assembly, I left a meeting room following a three-hour lessons-learned workshop, instigated as a result of several members of the team working on a particular project needing to take leave from work as a result of mental ill health. Things needed to change. The number of colleagues affected on this project was perhaps unprecedented in

our team but ecologists facing well-being challenges that are in part triggered by their working life is, worryingly, nothing new. In CIEEM's recent health and well-being survey, 20% of respondents reported significant or very significant mental health problems. Commonly cited issues include working unsociable hours, sleep deprivation and disturbance, long working weeks and heavy workloads. Certainly, in my own team, challenges and pressure from clients and contractors is a contributor on projects. As is the need for individuals to work away from home for extended periods at a time, away from their support and social network. Not being able to go to their regular gym session, read their son a story at bedtime or meet at the cinema with friends – simple things that bring us balance and happiness – all adds to the strain.

The market is also (always) changing. There is plenty of work out there, but clients want more bang for their buck, to do more for the same amount of money. Do we truly understand the financial cost of a team impacted by mental ill health (there are some good statistics out there) and should we be talking to our clients about the value added from 'pricing-in' positive health and well-being? It's not an easy job. It's certainly not just skipping around wildflower meadows in our wellies on a sunny day (I'm fairly sure this is what my mum thinks I do). So should I be encouraging a young generation of budding ecologists to pursue a career in ecology and environmental management? And will they be happy?

I work for Wood plc – a global multi-disciplinary consultancy of 60,000+ staff. Big consultancy has its pros and cons but when reflecting on our mental health and well-being journey over the past few years I do believe I am in a business that now gets it and is trying to make strides forward. It's early days but the business has made a commitment to focus on the health and well-being positives that can be offered through the workplace, as well as trying to make it easier to talk about suffering from stress, anxiety and depression.

There is practical support. A dedicated intranet site provides access to a range of resources, information and training on how to improve both physical and psychological health, develop healthy relationships at work and specific guidance on how to create a good working culture within teams that promotes mutual trust and respect. We have an enviable employee assistance programme offering independent and confidential support and access to occupational health professionals. The business has also trained individuals, Well-being Focal Points, in all offices, offering a listening ear to those in need and directing people towards further help. Wood is engaging and talking to its employees, undertaking surveys on health and well-being and organising activities during Mental Health Week in 2019 that were underpinned brilliantly by the *Five Ways to Well-being* (NEF 2011)¹. The foundations are solid and there is a wealth of new information that certainly wasn't available five years ago... and I am not sure

I would have felt comfortable asking for it then either.

And for me, that is the most powerful change. There is a new openness. The language is changing. A new culture is emerging and it feels different. I don't feel awkward talking about mental health in the workplace (although I don't doubt that many others still do) and I am learning how to do exactly that with my team: how to listen and really hear what is being said, and what language to use. Well-being Moments before meetings felt a little odd for some at first but now are part of who we are and what we do day-to-day. Health, safety *and* well-being are represented and it is coming right from the top. One of the most powerful actions delivered in 2019 was a short 12-minute video that captured the very personal reflections and experiences of some senior managers within the business. Speaking up took considerable bravery on their part and I believe inspired more people to share their challenges, recognise the signs of mental ill health in ourselves and others and seek support. It was a game changer for me.

But with all these resources and the culture beginning to change, there were still ecologists absent from work last summer as a result of mental ill health that was in part triggered by work stressors. The life of an ecologist brings layers of complex challenges that combine to put significant pressure on our well-being. Is this just the nature of the job? Should we just accept the rough with the smooth?

The ecology team at Wood don't think so. We have sought practical solutions over the years to help manage some of these challenges but in the spirit of a new openness and a desire to ensure a consistent fairness within the team we are currently drafting a new and simple set of guidelines for team leaders to apply all year (not just when it's quiet and easy to do so). These guidelines will include regularly planning in time for staff to come into the office and engage with their teams face-to-face, and offer a forum for their voice to be heard. This has to be a positive step for all. Team meetings are important, even when it's the peak field season – we are social beings and it's good for business to share knowledge, continue to develop healthy relationships and eat biscuits.

Night work is bad for our sleep and sleep is good for us. Having parameters around how much night work individuals should do and avoiding back-to-back bat work is essential. We are making sure that we plan in sufficient time for resting as well as working (and playing!) and a truly flexible working culture based on trust and respect is fully embraced.

Proactively considering the issues when bidding, resourcing and delivering projects and being open with our clients about this (pricing-in well-being!) is key to helping to prevent mental health stressors from occurring in the first place and we will continue to have lessons-learned workshops to understand the best way forward. And the big one for me that we can all work on – listening and asking. Instead of guessing what individuals need, let's ask them (especially when they are returning from work after suffering from mental ill health). We should acknowledge that we don't necessarily know best when it comes to someone else's mental health.

We've not nailed this. Not by any means. But we are talking about it and looking at ways to do better. We have the resources to support us, we have buy-in right from the top and we are beginning to learn the language. Now we need to listen, learn and act.

So should I encourage my sons or daughter to be an ecologist? No doubt a career in ecology can be exciting, rewarding and fascinating. Despite the complex challenges that we face, I do feel optimistic that the culture is changing and we will continue to progress, understand how to do better and improve well-being and mental health in this industry. Ecologists should not have to sacrifice their own mental health because they care about the environment and are passionate about their careers. With collective efforts I strongly believe they won't have to. It is a fantastic choice for a career. So yes, I will continue to do assemblies at primary schools and I will tell them about wading through chalk rivers and building artificial otter holts. But maybe I will also talk about the *Five Ways to Well-being*¹ and that, whatever career they choose, they should be kind to themselves and others.

Five things we can all do to improve mental health and well-being – a personal reflection

Jess Welch MCIEEM

Principal Consultant Ecologist, Wood

With CIEEM's Health and Well-being Survey Report² indicating that 68% of respondents have experienced mental health problems that affected their work, my personal well-being story is perhaps not that different to some of your own. I have experienced mental health issues for several years whilst working as an ecological consultant; at times these were exacerbated by the demands of working long, often unsociable hours and workload pressures. Despite seeking support from my partner, friends, family and GP, my implementation of strategies I knew I *should* employ to improve my health and well-being at work often left a lot to be desired. In 2019, after a particularly challenging few months at work, this all culminated in me being off sick for several weeks, due to work-related stress.

So, what could I have changed? Below are my personal reflections on five things that everyone in our profession can do to improve mental health and well-being, which I hope you find beneficial:

- **Create healthy boundaries between home and work life (and encourage colleagues to do the same).** The lines between work and home life are already blurred for many ecologists working long, unsociable hours. However, defining boundaries

to ensure we are not always contactable and not always thinking about work is critical in finding time to recharge and to do many other things which are good for our mental health – including regular exercise, eating healthily and connecting with friends and family. For me, this means switching my work phone off when I leave work for the day, making working my contracted hours the norm, not working at weekends or whilst on annual leave and taking the breaks I'm entitled to. Having other members of my team remind me when it's time to step away from my desk to have lunch, for example, is a huge help in achieving this.

- **Be more open and honest in conversations.** As highlighted by CIEEM, "*openness is critically important to managing well-being effectively*"². For me, talking more honestly to my peers and senior managers about mental health has been a key step in improving my well-being at work, even when it still feels difficult and uncomfortable. Talking to senior managers gives me an opportunity to check in to ensure my workload stays realistic. In turn, sharing experiences with colleagues creates a more relaxed atmosphere in which they feel they can also talk about challenges they face and ask for help as soon as possible.
- **Keep in regular contact with staff who are working away from home.** Whilst different people experience working away from home differently, I have always struggled with maintaining work-life balance when travelling for work, and I know

that I'm not alone in that. Long hours of trying to keep on top of desk-based work as well as field work or meetings without regular contact from colleagues can quickly become overwhelming. A phone call from a manager to check in on how things are and discuss any issues from the day, really can make a huge difference.

- **Have regular development discussions, even during busy periods.** Whilst recently preparing for my end-of-year development review, it was clear to me that focus on my technical development had slipped during 2019, given the incredibly busy periods and ill-health I had faced. With a lack of development opportunities being cited within our industry as one of the top five well-being issues faced², still making time for our own professional development and that of the staff we manage is vital. Scheduling regular time to check in with my development plan, and to work with junior staff to help them achieve their goals is something I'm looking to accomplish in 2020.
- **Ask for help, as early as possible.** Asking for help sooner may have been the single most important thing which could have improved my well-being at work in 2019. Whilst dramatic peaks in workload during the busy survey season may be considered typical for many ecologists, if you are struggling at work, early intervention following on from speaking to a colleague, manager, human resources representative or health professional can prevent more serious issues arising.

References

1 New Economics Foundation (NEF) (2011) *Five Ways to Well-being – New applications, new ways of thinking*. NEF, London.

2 CIEEM (2019) *Health and Well-being Survey Report*. Accessed online 13 January 2019. <https://cieem.net/resource/health-and-well-being-survey-report-august-2019/>

Volunteering Opportunities with CIEEM

Training, Education and Careers Development Committee

The work of CIEEM's Training, Education and Careers Development Committee (TECDC) includes oversight of the Institute's professional development programme (training, webinars and conferences), as well as degree accreditation, career promotion and new initiatives such as apprenticeships and mentoring.

There will be four places opening up on the Committee from September 2020 and applications are invited from members.

In order to best serve our members, we strive to ensure diversity on all of our committees and as such are particularly keen

for applications from members at Graduate or Qualifying grades, those that work for an NGO or local authority, and/or those who work in the island of Ireland. Applications will close on **Friday 1 May 2020**.

TECDC members are invited to attend four meetings a year in London and to contribute to working groups as and when required. If you have any questions please contact training@cieem.net.

Membership Assessors

CIEEM is growing! Last year we received, on average, over 100 membership applications per month, which is fantastic

news for CIEEM, for the profession, and for the environment.

We are therefore looking to add to our pool of volunteer assessors, who offer a few hours each month to help to process these applications. Our amazing volunteers are both the cornerstones and the glue of this organisation and support our work in so many ways. But we need more of them.

If you're interested in joining TECDC or helping out as a Membership Assessor, role descriptions and application forms can be found in the members' area of the website under 'Volunteering with CIEEM'.



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Extending the Health and Safety at Work Conversation

Phil Smith ACIEEM

Partner, Phil Smith Conservation Consultant

I was interested to see the Health and Safety article in the December 2019 issue of *In Practice*¹. As ecologists dealing with planning applications our prime aim is to ensure that biodiversity interests are taken into account, mitigated for and where appropriate enhancements are made. This is perhaps a bit simplistic, but it's an overview of our work in that field. I have a deep passion for ensuring Health and Safety are maintained and want to explore a wider field that I feel is overlooked.

This article is aimed more for managers and owners of companies that employ staff and who have direct responsibility for the Health and Safety of staff, but everyone is responsible for Health and Safety and cannot avoid their responsibilities in this area.

The Health and Safety at Work Act 1974 (HASAWA) lays down wide-ranging duties on employers. Employers must protect the 'health, safety and welfare', at work of all their employees, as well as others on their premises, including temps, casual workers, the self-employed, clients, visitors and the general public. Additionally, various regulations have been brought into force (e.g. manual handling). I don't intend to provide an article of these matters as it is very comprehensively detailed in the aforementioned article.

My concern is a subject that I believe is grossly overlooked for a variety of reasons,

some of which are personal viewpoints: lack of knowledge and understanding, demands by our industry, and financial pressures to get work done.

The subject I wish to talk about is sleep. I have read a number of articles and books by eminent academic authors who advise on the subject and if we ignore these issues we do so at our peril, both for immediate health and safety issues and long-term healthcare issues. I am 63 and my time has been spent in my younger years carrying out several roles where I have seen the impact of the lack of sleep.

Apart from the matter of physical health problems caused by lack of sleep, there arise mental health issues which have been very prominent in the media recently. Additionally, problems such as driving while tired have a more immediate impact. Furthermore, lack of concentration through tiredness can cause bad decision-

making and potentially conflict with clients who are already demanding and perhaps negative towards our goals, which can have a negative impact on your bottom line.

Our average need for good quality sleep, developed through evolution (the circadian rhythm), is a recommended seven hours a night. This is accepted by the academics who study sleep, to be best achieved between 11pm and 7am. In terms of bat survey work, what times are we working in the summer months? Dusk surveys are conducted usually between 15 to 30 minutes prior to sunset until up to two hours after sunset. Dawn surveys are conducted usually two hours before sunrise to perhaps 15 minutes after sunrise. Sometimes the surveyor will do a dusk followed by a dawn, resulting in a very low number of hours of sleep, especially when driving is included. Catching up is not the answer. The damage is done.

When we sleep our brains enter a profoundly altered state, dimming our consciousness. The purpose of sleep in simple terms is consolidation. The brain decides which memories to keep and which to erase, and which thoughts and ideas become long-term memory. Sleep conducts physiological housekeeping and repair, it reinforces our memory. The day's events are processed, we dream, new neurons are connected. Humans cycle through four or five different stages of sleep each night. Each is essential for good physical health, good mental health and concentration abilities. The human brain continues to develop until our 30s. Good sleep is therefore essential for brain development.

Lack of sleep exposes us to increased health risks such as diabetes, heart disease, dementia and some cancers. I have read from one researcher that if you want the flu jab to work well, make sure you have had a good 7-8 hours of sleep each day for the week before, to let a good immune reaction take place. Tiredness is so much more powerful at causing deterioration in driving that it is becoming accepted that a tired person is more of a risk on the road than a drunk person!

A lot of the data used in sleep studies come from the USA but we are the same species. Fatigue contributes to a million car crashes each year and, additionally, a

significant number of medical errors. This is serious stuff. The Monday after daylight saving time changes in the USA there is a 24% increase in heart attacks compared to other Mondays and a jump in fatal car crashes too. I accept that daylight saving changes are outside the summer months but the example serves to demonstrate how serious a lack of sleep is.

Bat workers drive when tired. How far do they drive? Drivers, especially in the early morning are subject to micro sleeps while driving. They and any other car occupants may not be aware of this or even aware of each other's actions in this respect. As managers we have a responsibility for the Health and Safety of our workers. If going up a ladder, you have to go on a course. If asbestos is mentioned, major panic sets in. Ladders can cause life changing injuries or death, asbestos usually causes death in the long-term. People are blasé about sleep and driving, almost to the extent that it's a macho thing: *"I can survive all night without sleep!"* and *"I'm a good driver!"*. Work colleagues look at others and wonder why they are weak if they can't drive safely with little sleep.

When you get to my age, having spent 15 years looking after a mother with dementia and now an in-law with it, you start to wonder. I'm not saying these situations were caused by lack of sleep. But I know how my body and mind reacts to lack of sleep. If we are concerned about future health with asbestos, why not lack of sleep.

So taking this further I would actually question the need for dawn surveys. Air pressure and other atmospheric changes allow bats to forecast changes in weather, and they can return to roost early before we get on site. The surveyor's concentration abilities can also contribute to poor surveys. And in the dark it's very easy to miss bats, especially in more heavily wooded environments. And ok, the later arriving species (e.g. pipistrelles) we will see. The early arriving ones (e.g. brown long-eared bats, which are quiet too and you can't rely on a bat detector signalling their presence) – do we see every one? Is it essential to see every one? Bats come out to feed even in poor weather (and I don't mean gales and torrential rain) and we are more alert in the evening so stand a better chance.

I have heard that Natural England may not demand dawn surveys if adequate emphasis is placed on limitations and why they weren't carried out. I think avoiding death while driving and helping to prevent future health issues is a reasonable attitude.

So back to the role of management providing quality Health and Safety for employees and themselves. How many of you push your staff to do long hours in the summer – assuming catching up on sleep or time of in lieu is the answer – and wonder why staff are tired, and possibly snappy, which results in poor team work, missed deadlines or worse while driving home.

Food for thought? My advice – get out there and do some reading and research, become informed and respond before someone gets hurt.

Notes

1 Trehwella, W. (2019). Health and Safety for Field Ecologists: A Flexible and Cost-Effective Approach. *In Practice - Bulletin of the Chartered Institute of Ecology and Environmental Management*, **106**: 44-46.

About the Author

Phil is the lead partner in his organisation. His work has included a number of management roles including financial and IT. He has been a licenced bat worker for almost 15 years, also working as a Volunteer Bat Roost Visitor for the Bat Conservation Trust and Natural England. He has held bat European Protected Species licences, worked in bat rescue and rehabilitation, and is currently a trained Marine Mammal Medic. He holds licences to survey for bats, barn owls, great crested newts, smooth snakes and sand lizards, and white clawed crayfish.

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Learning from Professional Conduct Inquiries

Helen Byron MCIEEM and Sally Hayns CEcol MCIEEM

Keywords: Professional Conduct Code, Inquiry Procedures, report quality, professional judgement, quality assurance

Abstract

Codes of Professional Conduct and the complaints inquiry processes which underpin them are key elements of maintaining and demonstrating the professional competence of the profession. All professional bodies are expected to have them and use them appropriately in order to maintain public confidence in their members. This article summarises CIEEM's Code and Inquiry Procedures. It then presents some of the most common professional conduct issues which have arisen in recent inquiries, alongside suggestions as to how members can easily avoid these.

CIEEM Code and Inquiry Procedures

The *Code of Professional Conduct* describes CIEEM's expectations of its members' professional competence and integrity in support of the organisation's 'Objects' (see Box 1). Through continuing membership of CIEEM, members are required to adhere to the Code and accept decisions in relation to alleged breaches of the Code made in accordance with the published Inquiry Procedures.

An important principle (and one that is often misunderstood) is that a professional

body does not exist solely to serve its members. Professional bodies must have oversight of the knowledge, skills, conduct and practice of a profession to ensure that it benefits society. Its primary duty is to the public although it should, of course, support its members to be good professionals. The primary purpose of a Code of Professional Conduct is to maintain public confidence in the integrity of the profession, uphold proper professional standards, and where appropriate, direct members on how to improve practice. It is not intended to punish except in the most severe cases

where loss of accreditation is deemed to be required in order to protect the public.

CIEEM's *Code of Professional Conduct* (CIEEM 2019a) has 10 clauses (see Box 2) supported by a series of supplementary notes which aid interpretation.

Complaints of alleged breaches of the Code may be made by any member or non-member (individuals and organisations) and also by CIEEM. The process for investigating an alleged breach is set out in the *CIEEM Professional Conduct Inquiry Procedures* (CIEEM 2019b).

A complaint inquiry has three stages and detailed process that CIEEM must follow

Box 2. Code of Professional Conduct

As a member of CIEEM I shall:

1. Uphold the Objects of CIEEM and the reputation of the profession.
2. Maintain my professional knowledge and skills, including undertaking and recording such continued professional development as CIEEM shall require and providing evidence therefore when requested to do so.
3. Only undertake work that I have the competence to do and undertake that work to the expected standard and seek appropriate advice, training and assistance if I am involved in topics beyond my competence.
4. Exercise sound professional judgement in my work, identifying clearly the limitations and applying objectivity, relevance, accuracy, proportionality and impartiality to information and professional advice I provide, including having regard to the relevant published technical guidance and standards and complying with all relevant laws.
5. Act at all times with professional integrity, avoiding or managing any conflicts of interest and avoiding actions that are inconsistent with my professional obligations and the Objects of CIEEM.
6. Ensure those working for me are appropriately qualified, trained, competent and supervised and supported.
7. Cooperate fully with, and provide full assistance to, CIEEM in any Professional Conduct Inquiry Process undertaken under CIEEM's Professional Conduct Inquiry Procedures.
8. Not interfere with, frustrate or otherwise seek to compromise, whether through any act or omission, the due process of any Professional Conduct Inquiry Process undertaken under CIEEM's Professional Conduct Inquiry Procedures.
9. Demonstrate a commitment to avoiding discriminatory practices in my professional activities.
10. Accept responsibility for my professional actions and decisions.

Box 1. CIEEM's Objects

CIEEM's Objects are to:

- advance the understanding and standards of practice of ecology and environmental management for the benefit of the natural environment and the public good, and
- further the conservation, management and enhancement of biodiversity the maintenance of ecological processes and life support systems essential to a fully functional biosphere.

Box 3. Professional Conduct Inquiry Process

Core principles:

- No-one shall be considered to be in breach of the Code until judged as a result of the Professional Conduct Inquiry Process;
- Any investigation under the Professional Conduct Inquiry Process shall be transparent and fair; and
- Breaches of the Code shall receive a proportionate response.

Three stages:

Stage One: The Preliminary Investigation verifying that a complaint can be considered by CIEEM and establishing that there is sufficient evidence of a possible breach to justify further inquiry. A referral to the next stage does not presume a breach has occurred, it may only mean that further information is needed to be sure that a breach has not occurred, and that information is best obtained at a hearing.

Stage Two: Further inquiry at a Professional Conduct Hearing conducted by a Professional Conduct Panel to establish whether any breach of the Code has occurred, and, if so, what sanction is appropriate.

Stage Three: A right to seek leave to appeal the Professional Conduct Panel's decision.

Table 1. Key Terms.

Term	Definition
Complainant(s)	The individual(s) or organisation making the complaint. In some instances (e.g. alleged misuse of post-nominals) this will be CIEEM itself.
Preliminary Investigation Panel (PIP)	A sub-committee, normally of three members of the Professional Standards Committee (PSC), responsible for deciding whether there is a need for further inquiry.
Professional Conduct Panel	A panel, normally of three members from the Professional Conduct Pool (a group of people trained in implementation of the Professional Conduct Inquiry Procedures and normally including one non-CIEEM member), responsible for inquiring into an alleged breach.
Subject	Member(s) of CIEEM against whom the complaint is made.

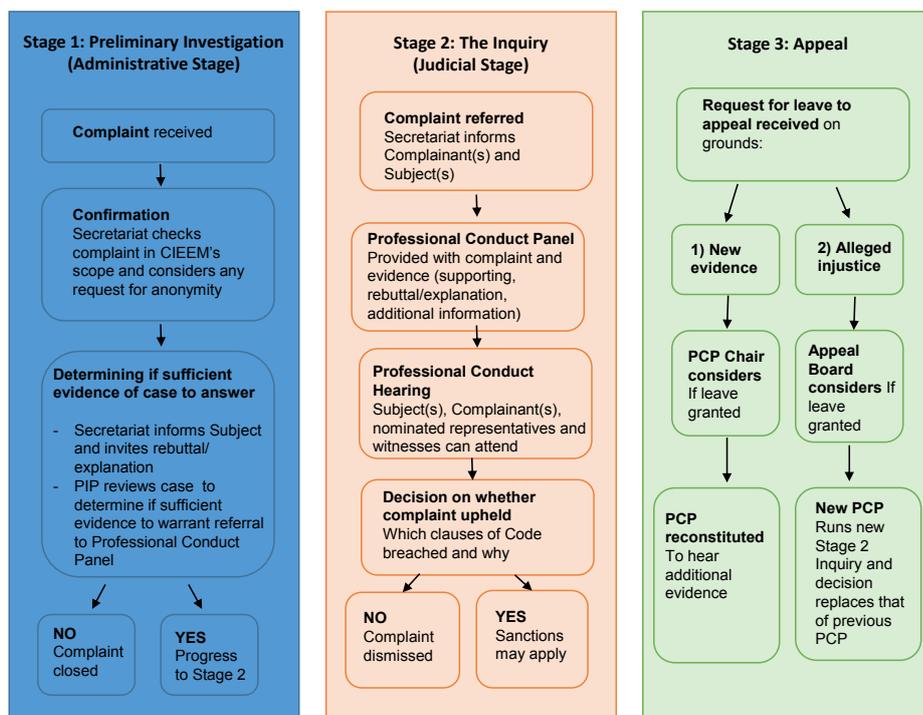


Figure 1. The three stages of the Professional Conduct Inquiry Process.

(see Box 3). Like the Code, the Inquiry Procedures have been refined over time in the light of experience and follow good practice in professional conduct inquiries.

Table 1 explains key terms and Figure 1 summarises the process.

Where a Professional Conduct Panel concludes that the Code has been breached it may apply one or more of the following sanctions:

- Reprimand the Subject(s) with advice;
- Reprimand the Subject(s) with conditions e.g. stipulating training and requiring evidence of completion within a specified time;

- Recommend downgrading of the Subject's membership status and/or chartered status; or
- Exclude the Subject(s) from membership of CIEEM for a given period.

Where the complaint has been upheld, this is published in accordance with the *Professional Conduct Inquiries Publications Policy* (CIEEM 2019c). This includes publication in *In Practice* and on the CIEEM website. Where appropriate it may include correspondence with external stakeholders such as employers or statutory agencies. Publication of the outcome of inquiries

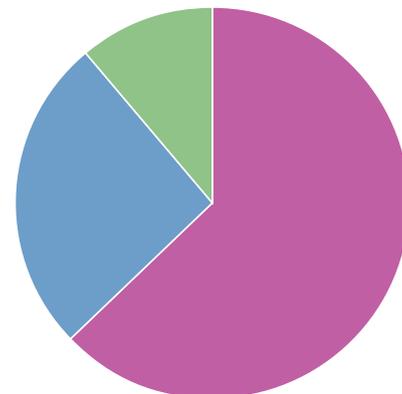
where a member has been found to be in breach of the Code is recognised good practice as it is important not to be seen to be hiding the fact that a complaint has been upheld.

Review of recent complaints

The CIEEM Secretariat organises regular training workshops on the Professional Code and Conduct Inquiry Procedures for members of CIEEM's Professional Standards Committee (PSC) and the Professional Conduct Pool. These workshops provide a useful opportunity for those involved in the implementation of professional

Table 2. Overview.

Status of complaint	No. of complaints	% of all complaints
Not referred beyond PIP	28	63%
Professional Conduct Panel (previously called Disciplinary Board) upheld complaint and found breach	12	26%
Professional Conduct Panel (previously called Disciplinary Board) dismissed complaint and found no breach	5	11%
Total	45	100%



conduct inquiries to review the pattern of complaints and breaches.

The Professional Conduct Pool and PSC have noted that it is most commonly clauses 3 (competence) and 4 (sound professional judgement) of the Code that are found to have been breached.

They commissioned a further review of all complaints received over the previous three years. This yielded data about the number of complaints which progressed

through the different stages of the Inquiry Procedure and the issues most commonly raised. The complaints were reviewed using agreed 'criteria' to categorise the issues raised by each case. Where a particular complaint raised a number of issues, all were recorded.

Overall, 45 complaints were received during the period. Of these, 28 cases were not referred beyond Stage 1, 17 cases were referred to Stage 2 (and one of these on to

Stage 3), and there was found to have been a breach of the Code in 12 cases. See Table 2 for more information.

As can be seen, in over 60% of all complaints received the PIP concluded that there was not sufficient evidence of a case to answer to warrant referral of the complaint to Stage 2. In three of these cases the PIP noted that there was little behind the complaint beyond the motivation of the complainant to oppose development rather than a genuine concern about professional conduct.

The high percentage of referred cases where a breach of the Code was found suggests that the current complaints system is working effectively (i.e. cases with little substance are screened out). Often when a complaint was not upheld at a hearing it was because further information had been made available by the Subject following referral. Sometimes, where a complaint is not referred for a hearing, a letter of advice was sent to the Subject where it was felt this would be beneficial. It should be stressed that such letters are advisory

Table 3. All Complaints – Most common issues/mistakes overview.

Issue	Relevant clauses of Code	No. of complaints	% of all 45 complaints raising the issue*
Report quality/accuracy	3 & 4	33	73%
Error of professional judgement	4	14	31%
Survey issues: – Thoroughness – Scope of – Both	3 & 4	15 – 9 – 4 – 2	33%
Legal/policy issues: – Licensing – LPA guidance – Wildlife law	2, 3 & 4	12 – 3 – 6 – 5	27%
Quality Assurance procedures	3 & 6	9	20%
Continuing Professional Development (CPD)	2	5	11%
Conflict of interest	5	3	7%
Professional integrity	5	5	11%

(Note: * adds up to more than 100% as complaints raised more than one issue.)

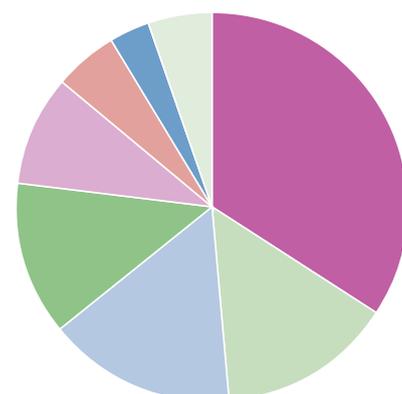
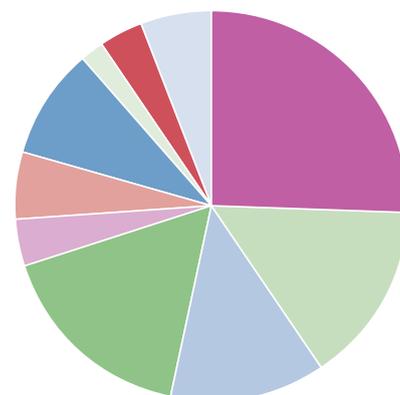


Table 4. Complaints referred to PCP (DB) – Most common issues/mistakes overview.

Issue	Relevant clauses of Code	No. of complaints	% of the 17 complaints referred to Stage 2 raising the issue*
Report quality	3 & 4	14	82%
Error of professional judgement	4	8	47%
Quality Assurance procedures	3 & 6	7	41%
Poor survey methodology/survey effort	3	9	53%
Acting outside competence	3	2	12%
Managing conflicts of interest	5	3	18%
Unsubstantiated conclusions/recommendations	4	5	29%
Upholding reputation of the profession	1	1	6%
Lack of CPD	2	2	12%
Poor supervision of staff/contractors	6	3	18%

(Note: * adds up to more than 100% as some complaints concerned more than one issue.)



Acknowledgments

Thanks to Deborah Alexander for helping to review the professional conduct cases to produce the summary of common mistakes which underpins this article.

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- CIEEM (2019a) *Code of Professional Conduct*. January 2019. Available at: <https://cieem.net/resource/code-of-conduct/>
- CIEEM (2019b) *Professional Conduct Inquiry Procedures*. January 2019. Available at: <https://cieem.net/resource/professional-conduct-inquiry-procedures/>
- CIEEM (2019c) *Professional Conduct Inquiries Publications Policy*. January 2019. Available at: <https://cieem.net/resource/professional-conduct-inquiries-publications-policy/>

and are intended as a means of supporting members. The member has not been found in breach of the Code. They are a proactive means to help improve standards and avoid future allegations of breaches of the Code on the same specific issues.

Common mistakes

Table 3 below summarises the most common issues raised across all complaints received during the period in question. Table 4 shows the most common issues raised in all complaints referred to Stage 2 (Professional Conduct Panel, previously Disciplinary Board). Typically, inquiries involved more than one of these common issues, most commonly they involved three issues.

Avoiding breaches

Being the Subject of a complaint can be upsetting and time consuming. We do not want to see members involved in complaints inquiries which are avoidable with more care and attention. We encourage all members to use this information about the most common issues arising in inquiries to audit their own practice. Take time to refresh your understanding of good practice guidance (which is regularly updated). Think about your quality assurance processes. Review your CPD and identify appropriate training courses that could help you to improve. Record your CPD. Perhaps, above all, take time to reflect on the work that you are doing and satisfy yourself that you are doing it to a standard that you can be proud of.

About the Authors

Dr Helen Byron is a member of CIEEM's Professional Standards Committee. She specialises in environmental assessment and environmental planning and has worked in the nature conservation sector for the last 20 years, principally at RSPB, but with brief stints in academia and consultancy. Helen is now working in one of Northern England's Protected Landscapes (Nidderdale AONB).

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Ethical Dilemmas

Professional Standards Committee



This is our new series of problems and conundrums that can face members during their professional practice. The purpose of the feature is to encourage you to reflect on

and explore scenarios that you may face during the course of your work and to consider the appropriate ways to respond to ensure compliance with the *Code of Professional Conduct*.

In the December issue of *In Practice* we set out a dilemma for a consultant ecologist whose desk survey had indicated a number of important ecological features likely to support great crested newts (GCN) but, on visiting the site, finds it has been very recently cleared by the client. What do you do?

There is often not a right or wrong answer but here is the Professional Standards Committee's thoughts.

1. What do you do?

In practical terms, you should do two key things during your site visit:

- a. Look for evidence that a wildlife crime has been committed. You have a professional duty to report it if you have evidence that it has. Record any evidence you find.
- b. Take lots of photos. You should always have a camera with you (e.g. a good quality phone camera) during a site visit. These photos may well be important in any future prosecution and may also enable you to defend your own personal position. Remember to take general views of the site as well as close up photos of specific features, as well as any machinery on site.

You should contact your client as soon as possible and ask whether they are aware of what has happened. Is this something that they have done/commissioned? If not, do they know who has done it? And when was it done? It's important not to assume that any particular individual/organisation is responsible before you have this conversation.

Once you have established who is likely to have been responsible, you should make it clear that no further clearance works should take place (vital if the site hasn't been completely cleared).

You should inform your client that the clearance works could be considered a wildlife crime and that, even if you cannot be certain that an offence has occurred, your report must inevitably highlight this issue.

If you have found clear evidence of a wildlife crime, you should report this to the police. Either way, you should report the situation to the local planning authority. It is better to be upfront with the local authority about what has happened, rather than leaving this to when they read your ecology report. You should have first

explained to your client the importance of doing this. They may not be keen on this course of action, but you do need to make it clear that it is the right thing to do (see also 2. below). If it is the client who is responsible for the clearance you may want to consider persuading them to agree to appropriate compensation from the outset, although this will not necessarily protect them from further action.

The conversations that need to take place really need to happen in person (either face-to-face or over the phone) as the tone of the discussion is important, and a written communication could easily be misinterpreted. However, it is vital that you follow up the initial 'in person' conversation in writing to ensure that you have a record of what has been discussed, the advice you have given, or action you have taken. Refer directly to the phone call (including time, date and persons involved) in that email or letter.

When you write the Preliminary Ecological Assessment (PEA) Report (and any subsequent Ecological Impact Assessment (EclA) Report) you need to highlight that recent clearance work had happened prior to the site visit, and explain that this is a significant limitation when it comes to assessing the ecological value of the site. Your baseline will need to try to take account of the likely habitats present before the works took place. This will be difficult to do (tools such as aerial photos will be helpful here), and the uncertainties need to be carefully explained in the report. The local planning authority will expect you to be precautionary in your assessment as a result – assuming the highest likely value/suitability that could reasonably be expected to have applied. The recommendations for mitigation and further survey will need to be similarly precautionary.

2. What might the implications be for you depending on your course of action?

The approach set out above could potentially cost you a client if they are at

fault, or if they react badly. You should therefore be careful about how you approach it. Keep an open mind and do not be confrontational. Try to be helpful. Even if the client is at fault, it may have been an honest mistake.

If your client is not at fault your proactive approach is likely to help to protect them as well as you, and this will be seen in a very positive light.

On the other hand, inaction (i.e. not taking the proactive approach set out above), could lead to:

- a. Questions over your professional integrity.
- b. Direct or indirect involvement in any future prosecution (if one were to occur), and all the ramifications that will follow.
- c. Further damage to biodiversity resources, both at this site and potentially at other sites as well if those at fault are not dissuaded from doing the same thing again.

3. Would your actions differ if there were desk study records of GCN in the pond within 50m of the site?

This scenario increases the likelihood that an offence has been committed. It still does not guarantee that one has been committed. And the lack of desk study records in the first scenario does not mean that there are not likely to be GCN in the pond – there may just have been no previous survey.

It may also increase the likelihood of police interest in the incident and potentially a prosecution. NB: The police will only want to take action if there is strong evidence that a wildlife crime has been committed, otherwise the issue will be dealt with through the local planning authority and the precautionary approach outlined above.

So, now for this issue's dilemma (they won't all be about consultant ecologists!).

See overleaf

You are an ecological consultant and have been commissioned by a developer to undertake ecological survey and assessment work in relation to a proposed development site, which is an area of farmland in southern England. You have completed a PEA, further ecological surveys for a range of protected and priority species, and written a subsequent EclA Report. In undertaking your surveys you have spoken regularly with local residents whose gardens back onto the site, and who have an interest in the area's wildlife. The EclA report has been submitted by the developer as part of the planning application for the development. The application has not yet been determined. The developer has informed you that the application is likely to go to planning committee in early April, and so planning consent (if granted) would be received thereafter. The developer's Project Manager (PM) is aware that they need to remove a 20m length of hedgerow to create the new permanent site access. The temporary construction access will have to use the same route. The hedgerow is likely to be used by nesting birds during the nesting period. Slow-worms and hedgehogs

are also known to be on site and could use the base of the hedgerow. You've identified these issues in your EclA Report and proposed removal of the hedgerow outside of the bird nesting season, and that an ecologist is present during the works to search for slow-worms and hedgehogs; if the work needs to take place during the bird nesting season then surveys to confirm the absence of nests are proposed, prior to works commencing. You have advised against netting the hedgerow, given CIEEM's position (<https://cieem.net/cieem-and-rspb-advise-against-netting-on-hedges-and-trees/>).

For commercial reasons, the developer needs to get started with the development this coming summer. The PM therefore wants to remove the hedgerow before planning consent has been granted, to avoid the possibility of birds nesting in it when they want to start on site. The developer doesn't yet own the site but has asked the landowner if they can do so, and they have agreed. The PM has therefore asked you to oversee the works (primarily to deal with slow-worms and hedgehogs). Given the interest of local residents, it is likely that any works being

undertaken will be seen by members of the public. The PM is concerned that the works may be seen as the developer starting before they have planning consent, and are likely to generate bad feelings. She/he has therefore informed you that, if challenged by a member of the public, you are to say that you are working for the landowner and that this work has nothing to do with the proposed development.

1. What is your response to the PM's proposed approach of removing the hedgerow before planning consent has been granted?
 - a. Is this acceptable in the circumstances?
 - b. Are there other options?
 - c. Are there any other issues you need to consider beyond those of nesting birds, slow-worms and hedgehogs?
4. What is your response to the PM's requirement that you tell anyone challenging you during the work, that you are working for the landowner and that this work has nothing to do with the proposed development?

Add your thoughts to the CIEEM LinkedIn group discussion at: www.linkedin.com/groups/4306428/

Complaints Update Breaches of the Code of Professional Conduct

At a hearing on 14 January 2020, Mr Stuart Johnson MCIEEM was found to be in breach of clauses 4, 5, 6 and 10 of the *Code of Professional Conduct* having failed to meet the required standard of accuracy and objectivity in ecological survey reporting, not

ensuring those working for him were adequately trained and experienced and failing to adequately use professional judgement in planning and undertaking his work. Mr Johnson was given a reprimand with conditions related to future improvement.

Setting CPD Limits: Helping You Achieve Your Goals

Krystie Hamilton
Professional Development
Co-ordinator, CIEEM

Since 1 October 2019, CIEEM has set maximum annual limits on some types of CPD in order to encourage members to engage in a range of development activities and avoid repetition between years, where it does not appear to aid development of skills. There may be circumstances when you go beyond a maximum limit for a type of CPD. Please indicate on your CPD record the reasons for different CPD limits and explain why and these will be considered by our Training, Education, Development and Careers Committee, who review the CPD records of those members drawn out in the CPD audit. CIEEM will endeavour to be flexible where possible. Full details of the limits can be found below:

For any further questions or queries, please do contact cpd@cieem.net.

Structured CPD (minimum 20 hours out of the 30 required).

Type of CPD	Maximum Hours	% of Requirement
Distance learning programmes and webinars	20 hours	100%
Attending face to face training courses	20 hours	100%
Attending conferences, workshops, seminars, technical events, talks and site visits (including member network events)	20 hours	100%
Designing, running and assessment of new teaching/training courses or where the material has been significantly amended	15 hours	75%
Design of new education materials such as workbooks, online or face to face and new public engagement/outreach	10 hours	50%
Presenting papers/giving talks	10 hours	50%
Mentoring scheme participation (as a mentor or mentee)	10 hours	50%
Work shadowing to develop your role, knowledge and skills	20 hours	100%
Involvement in technical working groups and committees	10 hours	50%
Supervised research where there is evidence of progression and development (includes supervising of research where this is not a core part of your job)	20 hours	100%
Volunteer work where you are learning new skills	10 hours	50%
Secondment/staff exchange	20 hours	100%

Unstructured CPD (maximum 10 hours out of the 30 hours required)

Type of CPD	Maximum Hours	% of Allowance
Online research and engaging with online discussions	5 hours	50%
Reading technical publications and listening to podcasts	5 hours	50%
Networking professionally	4 hours	40%
Maintaining a blog or website	5 hours	50%
Involvement in new project work that develops your role or is outside of your normal role	10 hours	100%

Congratulations to our Bursary Award Winners

Many congratulations to our two 2019 CIEEM Bursary Award winners. **Leah Farquharson** and **Amy Basford** beat off 22 other rivals for the coveted £2,000 awards and we hope that the funding will be a very positive boost to establishing their careers.

Leah graduated from the University of Edinburgh in 2014 with a BSc in Conservation and Ecological Management (Hons). Since that time, she has applied herself through volunteer and work experience in both UK and tropical ecology. Her knowledge and experience ranges from research and practical based roles (e.g. for the Royal Botanic Gardens Edinburgh and the Institute of Tropical Ecology and Conservation) to engagement and fundraising positions for the Woodland Trust. Leah has primarily worked in the engagement and education

side of conservation in the last few years but is now trying to make the move to a practical, land-based employment role.

To achieve this, Leah left full-time employment and started a self-funded MSc in Environmental Protection (Conservation) at the University of Stirling last September whilst continuing to build on her volunteering experience. She intends to use the bursary to fund a number of additional CIEEM and non-CIEEM training courses including the Tropical Plant Identification course at Kew Gardens and environmental consultancy-related training.



Leah Farquharson

Amy is a recent graduate from the University of Swansea, having achieved a first-class honours degree in Zoology. She is now undertaking an MSc in Environmental Biology: Conservation and Resource Management at the same university. In addition to her studies she has been a volunteer for the Birmingham and Black Country Wildlife Trust and is also a member of the Birmingham and Black Country Bat Group, participating in the 2019 Batlas survey project.

Like Leah, Amy is planning to use her bursary to undertake further training external to, but complementing, her postgraduate studies. These courses are likely to cover survey and identification of a range of protected species and habitats. Bats are, of course, a particular passion and Amy intends to buy her own bat detector as well as learning how to handle bats with a view to becoming a voluntary bat carer.



Amy Basford

We wish Leah and Amy well with their plans and look forward to reporting on how they spent their bursaries and the impact that they have had in a future issue of *In Practice*. We would also like to thank this year's judges (drawn from the Fellows) for their hard work. Thank you to Debbie Bartlett, Gary Grant, Richard Jefferson, Martyn Kelly, Jenny Neff and Claire Wansbury.

Can you help?

We would like to offer more bursaries to aspiring ecologists and environmental managers like Leah and Amy. Could you or your company fund or donate towards a bursary in 2020?

We are seeking sponsorship of £1500 and £2000 to offer to those looking to get their first foot on the ladder of an exciting career. But it isn't just your money we want. As a bursary sponsor

could you also offer some practical support such as work experience opportunities or mentoring?

If this is too much but you want to help – then how about donating to our Bursary Fund? All donations over £100 will be acknowledged in *In Practice*.

Please do get in touch via enquiries@cieem.net if you think you would like to be involved.

Mangrove Restoration in the British Virgin Islands

An Update from CIEEM's Overseas Territories Special Interest Group (OT-SIG)

The OT-SIG aims to highlight the work being undertaken in the UK's Overseas Territories to support their unique and globally important biodiversity. This short article gives you a flavour of the importance of a key habitat type in the Caribbean and what is being done to protect it. One of our committee members, Dr Katie Medcalf CEnv MCIEEM from Environment Systems, is part of the project team.

The British Virgin Islands' mangroves were severally damaged in 2017 by hurricanes Irma and Maria. Mangroves play a very important part in the ecology of the islands. They support a rich biodiversity. The trees are partially submerged in the ocean, with a tangled web of roots creating a unique and complex habitat for many species of marine, and terrestrial, life. Marine species in particular are attracted to mangrove forests not only for the refuge they provide, but also because of the high food availability from bacteria and mangrove tree detritus. Amongst the complex structures, juvenile fish species can find readily available food sources and shelter from predation by larger animals. The water quality also differs to the open sea as it tends to be cooler with a higher oxygen content. Numerous marine species, including fish and shrimp, use mangroves as nurseries during the early stages of their lives. Mangroves therefore act as a critical source to replenish key species of the ocean's fish stock.

Not only are mangroves an essential part of the Caribbean ecosystem, they also play a critical role in coastal protection, performing key ecosystem services of breaking the energy of the waves and preventing flooding during storm events. The trees are complex structures and are extremely flexible, able to disperse the kinetic energy of the waves, thereby protecting infrastructure on the shores behind them.

To ensure both that existing areas of mangroves recover fully from the hurricanes and that any new areas with the potential to support mangroves are restored, a new phase of the Department of Disaster Management and the Caribbean Development Bank (CDB)-funded SMART Communities Project has been started. A key project goal is to map potential locations for planting mangroves. These maps not only need to account for the biophysical conditions that allow mangroves to thrive, they also need to take account of demand for coastal protection, i.e. identify where they may protect the highest number of people from future storm surges.

The project has high-level support from the British Virgin Islands Government with a drive to move more aggressively towards caring for their mangroves. The Territory has amassed a great deal of data over the years when it comes to planting mangroves, and they are confident the CDB project will spur a more strategic approach to mangrove restoration.

One of the most important aspects of the project is building community partnerships into each step of the project, from consultations with stakeholders, training in mangrove restoration, to ongoing mangrove management. It is essential that the local community learns to value the mangroves for all the biodiversity and ecosystem services they provide, as



Young mangrove. Photo credit Katie Medcalf.

following the devastation there was a move to completely remove dead trees as they were considered unsightly. This would have been very damaging for the restoration of the sites following the hurricanes as it would have altered the site condition, maybe beyond the thresholds necessary for regrowth. The public will have the opportunity to participate in mangrove restoration activities, such as mangrove clean-ups and planting days. The project also hopes to facilitate discussions around the potential for creating a mangrove nursery on Tortola.

This work is part of the wider SMART Communities project. Beginning in 2017 the project seeks to build flood-resilient communities in the Territory through strong partnerships between Government and NGOs. Work on the project should be completed this year.

For more information about the above project, please contact Katie Medcalf (katie.medcalf@enssys.co.uk). For queries about the OT-SIG, please contact Simon Boulter (SBoulter@rsk.co.uk).

CIEEM Overseas Territories Special Interest Group

In 2012 CIEEM formed the Overseas Territories Special Interest Group (OT-SIG). Since its inception, the Group has held conferences and raised awareness among CIEEM members of the Territories and the ecological/conservation work being done across them. Topics have ranged from botanical surveys informing Important Plant Area recognition, marine protected areas and the control of introduced pests. The aim of the OT-SIG is to promote work going on in the Territories, build connections with relevant organisations directly operating in the Territories and provide CIEEM support where possible and appropriate.

International Focus

A Summary of the New IUCN Guidance on Other Effective Area-Based Conservation Measures

Corin Simmonds CEcol CEnv MCIEEM



The IUCN has recently published new guidance entitled *Recognising and reporting other effective area-based conservation measures* with the aim of defining and understanding the role of other effective area-based conservation measures in conserving biodiversity. These are areas that can contribute to conservation but are not formally designated or protected. This work was developed because there was no effective definition of these areas, which form part of the Strategic Plan for Biodiversity (the framework for implementing the Convention on Biological Diversity (CBD)) which states that ‘conservation will be achieved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures’ (Aichi Target 11). In November 2018, parties to the CBD agreed a definition of other effective area-based conservation measures (OECM) and subsequently a task force (within the IUCN World Commission on Protected Areas (WCPA)) was developed to produce these guidelines. They assist interpretation and understanding of OECMs and set out good practice for defining and monitoring OECMs.

The accepted definition of an OECM is ‘a geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in situ conservation of biodiversity with associated ecosystem functions and services and where applicable, cultural, spiritual, socio-economic, and other locally relevant values.’

The main difference between protected areas and OECMs is that protected areas have a primary conservation objective, whereas an OECM’s main objective is not always biodiversity-related but it provides effective in situ conservation of biodiversity, regardless of its objectives. The definition of an OECM is further discussed under four criteria which are explained in detail in the guidance

document. The criteria cover aspects such as determining whether the area is already protected, how the area is governed, how it achieves sustained and effective contributions to in situ conservation of biodiversity, and what associated ecosystem services or other services it provides.

A screening tool has been developed as part of the guidance to assist with the identification of areas qualifying as OECM. The tool includes four tests which are related to the determination criteria:

- **Test 1.** Ensure that the area is not already recognised and/or recorded as a protected area.
- **Test 2.** Ensure that the area has the essential characteristics as defined for OECMs.
- **Test 3.** Ensure that the conservation outcome will endure over the long-term.
- **Test 4.** Ensure that an in situ area-based conservation target (e.g. Aichi Target 11), as opposed to a sustainable use target, is the right focus for reporting.

Following this screening, a more detailed evidence-based assessment will be undertaken on a case by case basis before the area can be considered as an OECM and be included in the World Database on Protected Areas (WDPA).

Some examples of the types of areas that could become OECMs include:

- Territories or areas managed by indigenous communities with primary or explicit conservation objectives.
- Privately owned areas which are managed for conservation.
- Urban or municipal parks managed for recreation but of a size and nature to enable in situ conservation.
- Military areas that are primarily managed for defence but with secondary objectives of conservation.

Some areas have ancillary conservation objectives, for example, areas which are managed for archaeology or cultural heritage.

Examples of types of areas that are not considered suitable include land managed under grant-maintained land stewardship and commercially managed forests which also support some conservation actions.

Monitoring is required to ensure that the OECMs are effective in the long-term and will include baseline biodiversity monitoring, community-based monitoring and monitoring governance and stakeholder involvement. An important element of the OECM definition is that they should be ‘governed and managed in ways that achieve positive and sustained long-term biodiversity outcomes’. A pragmatic approach to monitoring is to use the *Measuring Protected Area Management Effectiveness* publication by Cifuentes *et al.* (2000), which is commonly used for monitoring protected areas management.

There are two sources of information on OECMs. These are the WDPA managed by UNEP-WCMC (www.iucn.org/theme/protected-areas/our-work/world-database-protected-areas) and the Protected Planet Initiative which encompasses several databases that can be accessed through its website (www.protectedplanet.net).

In order to effectively understand project-related impacts during an Environmental Impact Assessment or other mechanism it is important to understand the contribution of OECMs to biodiversity, and the impact of the project on OECMs should be considered alongside impacts on protected and formally designated areas. For more information the full guidance document can be accessed at www.iucn.org/commissions/world-commission-protected-areas/our-work/oecms.

Reference

Cifuentes, M.A., Izurieta, A.V. and de Faria, H.H. (2000). *Measuring Protected Area Management Effectiveness*. IUCN, Gland, Switzerland.

Student Hub: Stress, Structure, Sanity and the Importance of a Little Self-Care #2

Back in December 2019 we heard from two Student members who were well on their way to winning at life – juggling work, study, hobbies and even managing to hang onto some semblance of a social life. Seemingly miraculous, right?! Certainly impressive.

But how many of you read about the three jobs, the entrepreneurial start-ups and the mammoth list of extra curriculums and thought:

- *“Yeah, alright, but you don’t have kids! You don’t know what sleep deprivation is! I dream of five hours sleep a night!”*
- *“You think undergrad is hard? Wait until you’re trying to adult and do a PhD!”*
- *“You guys don’t know the meaning of stress! I’m so stressed out over being stressed out that I can’t even remember why I’m stressed out... And it’s stressing me out!”*

Sound familiar? If that was you, well, we got you. Or Matt and Naveed do at any rate. They’re somehow managing it all. Literally all of it. All at once. And they’re here to help, so buckle in.

Matt Wainhouse MCIEEM

Matt is precariously balancing his full-time PhD studies in fungal ecology at Cardiff University with part-time consultancy work, something that vaguely resembles a social life... and a new-born baby.

1. Treat it like a 9-5. The temptation is to get in late, leave very late, work the weekends, and take *ad hoc* days off when you feel like it. My advice is: get in for 9am leave at 5pm. Don’t take work home with you and don’t work the weekends (though this is easier said than done). For PhD students – plan your annual leave – you need days off!
2. Know your support network. Studying can be stressful and the amount of work competing for your attention can be overwhelming. Make sure you know who to ask for help. Talking about how you feel is cathartic, so find people that will listen – family, friend, old man on the bus. Check your university’s well-being service if you don’t feel you have anyone to turn to.
3. Have a life outside of it. Student is not your identity. It can certainly feel like it with pound-a-pint and discounted rail fares, but there’s more to you than three years at university. Find something else you’re passionate about.
4. Make time for your passion.

Naveed Bhatti

Naveed is a mature PhD student, based at the University of Aberdeen, balancing his time between writing up his thesis and home life in Inverness. His project is to develop monitoring tools for conservation priority species, with a focus on lichens in Scotland and other sessile taxa. His work involves woodland ecology, statistical methods for population ecology, occupancy modelling and Bayesian analysis.

1. Make sure you look after yourself. You’re no use to anyone if you’re run down, so even if it seems selfish at times, you have to look after number one. Eat healthily, sleep well and make time to exercise – especially walking, which is great for thinking! You may feel you don’t have time for all that self-care, but what you *really* don’t have time for is getting ill!
2. Keep connected with others. That means socialising and not thinking or talking about work *at all*. It’s so easy to become a hermit when you’re up against it all the time, but social connections with friends and family are essential for your mental health, for your productivity and because, when you emerge, blinking, into the daylight at the end of the studying tunnel, it’d be really nice to have someone to celebrate with! And on the flip side, when you *absolutely must* talk about work, it can be really helpful to discuss your research problems with others. A problem shared...
3. And lastly, remember it’s a marathon and not a sprint – just keep nibbling away! Your to-do list may seem gargantuan, but you’ll get there if you take it one day at a time.

Thanks to our contributors, both Full members of CIEEM, who are supported by our return to study subscription discount. If you’re returning to full-time study (and aren’t currently a Student member), then get in touch to get 50% off your membership. Because who needs financial stress on top of everything else?

Policy Activities Update

Amber Connett GradCIEEM

Policy and Communications Officer, CIEEM

Following the general election in December, the Conservative's now have a significant majority in Parliament. This meant the Withdrawal Agreement Bill sailed through the Commons and the Agriculture and Environment Bills have been resurrected. At the time of writing, the Westminster Select Committees are just reforming, and we are expecting a Cabinet reshuffle.

UK and England

Due to the general election, our planned meeting with Environment Minister Rebecca Pow MP in November last year was cancelled. However, we have managed to rearrange the meeting for March.

In January, Jason Reeves (CIEEM Head of Policy and Communications) spoke with Defra regarding the setting up of the Office for Environmental Protection (OEP), and in February was interviewed for BBC Radio 4's *Farming Today* programme on the potential shortcomings of the OEP. In February, Sally Hayns (CIEEM CEO) delivered a talk to the Westminster Energy, Environment & Transport Forum on the role and priorities for the OEP, and in March is due to meet with Defra officials regarding the implementation of Biodiversity Net Gain. In February they both spoke to the National Audit Office in relation to a study on how the UK government is organised to deliver its environment and climate change objectives.

The All-Party Parliamentary Group for Nature (APPG for Nature) was automatically dissolved at the general election. We are pleased to report that all Officers except one who lost her seat (Angela Smith) have agreed to sign up again. Barry Gardiner will also Chair the Group again. At the time of writing, we are planning an event on nature and mental health for February which will also serve to re-elect Parliamentarians as Officers.

We recently attended a meeting of the Environmental Policy Forum, which focused on environmental target-setting. We discussed what specific targets should look like and how the target-setting process

can ensure action on the ground, agreeing that the future national targets need to be simple and fully measurable.

In December, we also attended the Climate Advisory Council of the Society for the Environment to discuss what actions need to be taken in response to the climate emergency and biodiversity crisis both as individual organisations and as a coalition of environmental professional bodies.

Scotland

Annie Robinson (CIEEM Scotland Project Officer) has recently met with the Scottish Policy Officer at the British Ecological Society to share information and updates on policy developments. We have also agreed to jointly host a BES 'Pie and a Pint' policy event in Scotland on Biodiversity Net Gain (BNG) on 1 April.

In February, we held a Member Network event with Scottish Natural Heritage (SNH) on current developments in species licensing in Scotland to offer an opportunity to hear about the latest Species Licensing developments and a chance to feedback on members' questions and comments.

The Scotland Policy Group recently met and agreed to continue work on BNG in Scotland, by producing a briefing on the use of metrics and on implementation. This will form the basis of future engagement with Scottish Government and SNH.

The group is also responding to several consultations over the coming months on planning fees, water management and Scottish Forestry's corporate plan.

Action 2030

As part of our action on the climate emergency and biodiversity crisis (see our declaration and briefing on the website), we have launched a new working group called Action 2030 (www.cieem.net/action-2030). The group held their first meeting in January and started work on getting CIEEM to net zero carbon emissions by 2030. They will soon start developing ideas of how members can incorporate action on these joint crises into their work – keep an eye out for updates!

Wales

The Wales Policy Group are taking forward work on flood mitigation using nature-based solutions, having recently submitted a response to the consultation on Technical Advice Note 15: Development, flooding and coastal erosion.

Diana Clark (CIEEM Wales Project Officer) held a successful meeting with Natural Resources Wales in early January to set up regular liaison meetings, as have been set up with Natural England and SNH.

Ireland

Liz O'Reilly (CIEEM Ireland Project Officer) and our Vice President (Ireland), Will Woodrow, recently met with the Northern Ireland Environment Agency to introduce CIEEM and discuss ways in which we can contribute to their work. We hope to continue building this relationship in the future.

Liz and the Ireland Policy Group have also recently held a workshop on cross-border ecology at the BES Annual Meeting in Belfast in December 2019.

Consultations

We have recently responded to the following consultations:

- Draft National Development Framework (Welsh Government)
- Environment Strategy for Northern Ireland (DAERA; Northern Ireland)
- Technical Advice Note 15: Development, flooding and coastal erosion (Welsh Government)

- Review of the use of Peat in the Horticultural Industry (National Parks and Wildlife Service (Republic of Ireland))

Future Priorities

Our priorities for the next few months will include: engaging with Parliamentarians on the Environment and Agriculture Bills, supporting the work of the new Action 2030 group, getting a full programme of events underway for the All-Party

Parliamentary Group for Nature (APPG for Nature), and activities surrounding the post-2020 biodiversity and climate frameworks.

Contact Amber at:
AmberConnett@cieem.net

CIEEM is grateful to the following organisations for investing in our policy engagement activities:



Membership Update

Stuart Parks

Head of Membership and Marketing, CIEEM

Four months into the 2019-2020 subscription year it is good to be able to report to members that the level of interest in joining CIEEM that we enjoyed throughout the whole of the previous subscription year has been sustained.

In the 2018-2019 subscription year (ending 30 September 2019) we processed 1,396 applications to either become a member or upgrade an existing membership. From October 2019 until the end of January 2020 we had already processed 40% of that number. In fact, January 2020 saw the highest number of applications received in the last six years, with 189 applications being processed. Of course, we could not deal with this volume of applications without the support of our dedicated team

of volunteers, and we know that many of you also play a role in encouraging, sponsoring and mentoring applicants, as well as acting as advocates for the Institute. Thank you.

What is important too is that we continue to provide a valued service to our members, so it is also good to be able to share the latest membership retention statistics with you. After a recent change to the application process for Fellowship, we have seen an increase in interest and can also report a 94% retention rate for this grade. Full and Associate members are also overwhelmingly keen to maintain their membership, with retention rates of 98% and 96% respectively. A fantastic 98% of our new Qualifying members renewed their subscriptions, as did 91% of our current Graduate members. As anticipated, our lowest retention rate applies to our Student membership at 52%. Although

this is our fastest growing sector, it is still the reality that many Students then simply make other career choices and do not renew their membership. This figure is also lower than in previous years since we have now introduced a limit on Student membership of 12 months post-graduation, so a significant proportion of Student members were simply ineligible to renew at that grade.

It is fair to say we are busy! We are therefore adding a new colleague to the membership team in the coming weeks and will of course introduce them to you in a forthcoming issue of *In Practice*.

Contact the Membership Team at:
membership@cieem.net

CIEEM Welcomes New Fellows

CIEEM Fellows are role models and ambassadors for CIEEM, inspiring others and often having a strong track record of having given back to the profession. They are highly respected and have reached a demonstrable level of professional excellence within the disciplines of ecology and/or environmental management. CIEEM's Fellows help to shape and set the strategic direction of our Institute and more widely through the professional careers and varied roles. Fellowship matters, both to the individual and the Institute.

Mike Alexander FCIEEM



Mike Alexander has been at the forefront of developments in countryside management planning for over 30 years. In the late 1980s he was instrumental in the development of the first computerised management planning system, the Countryside Management System (CMS), that was subsequently adopted by many conservation NGOs and statutory nature conservation bodies.

Working with colleagues, initially in the Nature Conservancy Council, Mike led the development of conservation objectives with quantified and measurable performance indicators. This approach provided the structure for the earliest development of what became the Joint Nature Conservation Committee's (JNCC) common standards for monitoring. This work concluded with the development of an adaptive management planning system, appropriate for all statutory sites

with an emphasis on the Natura 2000 sites. In 2003 he led the production of the current Ramsar adaptive management planning guidelines.

Mike has provided management planning training and support in Uganda, Tanzania, India, Estonia, Latvia, Slovenia, Poland, the Netherlands, Belgium and the Isle of Man, as well as all over the UK.

Mike was presented with his fellowship at the Autumn Conference in Llandudno last November.

Dr Judy England CEcol CEnv FCIEEM



Judy's outstanding research in the areas of sustainable river management, hydro-ecology, ecological assessment and monitoring coupled

with her leadership skills and drive to take such work forward through practical application has made her fellowship thoroughly deserved.

Both within the Environment Agency, for whom she works, and with external partners she has always pushed for innovative and practical approaches and solutions. She has applied her expertise and skills to influence the evolution of best practice relating to hydro-ecology and to river restoration, giving freely of her time to train, coach and mentor others. Many ecologists' professional development has benefitted from her technical knowledge and expertise.

Judy is an advisor for the UK River Restoration Centre, represents the Environment Agency on the steering group of the International Union for the Conservation of Nature National Committee UK (IUCN NCUK) collaborative project on River Restoration and Biodiversity, as well as representing the UK on the management committee of the Science and Management of Intermittent Rivers and Ephemeral Streams (SMIRES), an international research collaboration spanning 33 countries.

Dr Peter Gilchrist CEnv FCIEEM



Peter is currently a Director of Operations for Jacobs, a global engineering and professional services consultancy, and is their Global Solutions and

Technology Leader for biology and ecology. He facilitates the global collaboration of 600 biologists and ecologists and has a business management responsibility for innovation in their environmental services.

Peter is a champion for investigating new technologies and is currently supervisor on a NERC/Jacobs-funded PhD collaborating with Hull and Leeds universities, Yorkshire Water and NatureMetrics researching detection protocols for invasive non-native species. He developed the digital field data capture capacity within Jacobs as well as inaugurating an eDNA and molecular monitoring practice community that connects the teams innovating in this key new area.

Peter is recognised by the European Investment Bank as an international expert on the European Commission Habitats Directive and has delivered training for the Commission's Directorate-General Environment department on the application of the Directive's provisions for infrastructure development.

Luke Gorman CEcol FCIEEM



Luke is currently an Associate Director for Atkins and forms part of the ecology practice's Senior Leadership Team. He is particularly well known for his innovative

approach to great crested newt (GCN) mitigation. In collaboration with Natural England (NE) and Tarmac Ltd, Luke has implemented an innovative GCN mitigation licence from 2004 to date which has allowed normal extraction in an active quarry in Cheshire without the need for newt fences and yet has demonstrated a significant increase in GCN population size. Luke has ensured that this valuable

knowledge and experience has been shared widely with the ecological and mineral extraction industries through numerous publications. This innovative approach to GCN licensing provided part of the evidence base that allowed NE to create new European Protected Species policies in 2017.

Luke is also a key member of the first scientific research into the use of sniffer dogs for GCN detection, assisting Atkins to obtain the first NE and Natural Resources Wales development licences that specified the use of a detection dog as the primary method of GCN search and capture. He is a member of a new working group which is aiming to develop and standardise training of ecology detection dogs in Britain and Ireland.

Diana Pound CEnv FCIEEM



Diana is the founder and Managing Director of Dialogue Matters, a consultancy specialising in stakeholder consultation, consensus-building and facilitation

within the environmental sector. Diana has a well-deserved international reputation for her expertise in this field, having delivered numerous high-profile projects for governments at home and overseas including for clients such as Defra, JNCC, the UK Overseas Territories, the European Union and the United Nations. Diana is passionate about promoting high standards of stakeholder engagement and facilitation, providing training and organising high profile knowledge-sharing events for the sector.

Diana's work has received widespread recognition including the CIEEM 2018 Best Practice Award (Stakeholder Engagement) and the 2018 Tony Bradshaw Award 2018, as well as being highly commended in the Society for the Environment's Chartered Environmentalist of the Year awards in 2019.

Her work and recognition by the IUCN as a global Commissioner is an example of how much she is held in high regard in an international context and how she is well known by a wide cross section of leaders and organisations.

Dr Mark Webb CEcol CEnv FCIEEM



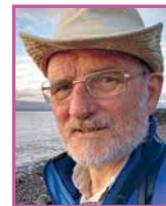
Mark is the UK Ecology Team Lead at WSP, a global engineering and environmental consultancy. Since joining five years ago, Mark has more than

doubled the size of the ecology team from 60 to over 150 staff.

Mark has made a significant contribution to the raising of professional standards and the promotion of ecological professionalism at a variety of scales and to a wide range of people throughout his career. He has applied care, innovation, good science, and intellectual thought to his work which includes the design of a highly regarded MSc course, consultancy work on a large number of high-profile projects and the delivery of high-quality training to colleagues and peers.

Those that meet him professionally, comment on how he always acts in accordance with sound ethical principles. He cares deeply about the environment, is highly knowledgeable on many aspects of it and can apply good judgement and defend professional arguments authoritatively. His knowledge and expertise give him the capability to advise, support and educate at all levels and he has done so with genuine care for the well-being of staff and the attainment of high professional standards.

Mike Willis CEcol FCIEEM



Over a long career covering the local authority, voluntary and statutory nature conservation organisation sectors, Mike has been an

enthusiastic advocate of both the profession and of nature conservation.

Mike has led the field in site protection work in Wales, including the survey, classification, designation, purchase, management and protection of sites of international, national and local importance. He has extensive experience of working across a wide variety of habitats, and of providing input to strategic plans, planning application consultations and planning inquiries at a range of spatial scales.

In addition to his lifelong commitment to nature, Mike actively helped to establish the CIEEM Welsh Geographic Section in 2008, taking on a number of Committee roles over the years including that of Convenor. He was elected CIEEM Vice President for Wales in 2012 and held that role for six years. He has also served (and still serves) on numerous other CIEEM committees and working groups including the Membership Admissions Committee, Registration Authority and Awards Judging Panel. He currently chairs the Wales Policy Group.

Thinking of Applying for Fellowship?

It is important that we have a strong Fellowship and we recognise that becoming a Fellow should bring personal reward and accolade. Becoming a Fellow is a public statement that you are recognised by your peers as having made, and continuing to make, a significant contribution to addressing the ecological and environmental management challenges facing people and ecosystems around the world. It is an endorsement of your leadership, knowledge and skills.

Does this sound like you?

Find out more and apply for Fellowship.

www.cieem.net/fellowship

British Ecological Society

Working Towards a World in which Nature and People Thrive



Hazel Norman

Chief Executive, British Ecological Society

We've been thinking hard about the British Ecological Society's purpose and have launched a new plan to advance our science and increase our impact at a time when ecology has never been more important.

What is the role of the British Ecological Society? What should our goals be? And how can we achieve more? We explored these questions and others last year, taking input from many of our members and the wider ecological community. The result is a newly published plan to guide the Society's work over the next four years.

We were agreed on one thing above all others: that ecology has never been more relevant. The climate and biodiversity crises gave us great motivation and we have encapsulated this in the new vision that opens our Strategic Plan for 2020-2023: 'Nature and people thrive in a world inspired by ecology'.

It is a vision that reflects our passion as ecologists for the natural world. It expresses the capacity of ecological science to help us understand life on earth, show us where it is under threat and provide solutions to the environmental challenges we face. And crucially, it recognises that we're dependent on nature for our own well-being and prosperity.

We fully intend to live up to our three, newly-stated values for the British Ecological Society: we will be bold, inclusive and evidence-based. These values spell out how we want to be seen, how we intend to go about our work and what we will use to focus our activities and guide our decision-making.

At the heart of our new strategy will be our members. We are a membership society, here to advance our science, support careers and build a strong community of ecologists. Our activities span journals, events, research funding, policy work, education, careers support and public engagement. All these run

successfully thanks to our members and the global community of ecologists.

Our strong hope and belief is that this new vision and these values resonate with you. They motivate the three goals we have set out in the strategy for our Society:

1. Advance and promote ecological science and its applications
2. Raise the profile of ecology to make a difference
3. Foster a strong and diverse ecological community

Ecological science will absolutely remain at the core of all the Society does. Goal 1 includes plans which will keep our world-class journals, grants and conferences right at the forefront of the research endeavour.

But we also want to raise the profile of ecology in the wider world. Goal 2 is all about demonstrating the relevance of ecology among our many different audiences and increasing its influence in tackling the environmental challenges society faces.

Ecology is not going to make a difference, however, if ecologists aren't properly supported. Goal 3 affirms our ambitions for a Society that is a welcoming and inclusive home for all in ecology. It also outlines how we will facilitate those seeking a career in ecology.

So what will it look like in practice? Here are some examples of the plans we have made for the next four years under each of these goals:

- This year we are launching a new type of resource to make information on the management of biodiversity and the environment easier to discover. Applied Ecology Resources will combine a new journal, *Ecological Solutions and Evidence*, and a repository of grey literature.
- We want to develop better training and resources on open science, making



Hazel Norman

sure there are appropriate rewards and acknowledgement for data contributors. We will also produce better guidance to encourage data sharing, archiving and reuse.

- We aim to establish a regular programme of training for ecologists, and introduce new events that facilitate dialogue between researchers, practitioners and the policy community.
- We will increase the reach of our successful summer school for 16-18 year-olds by making more use of digital platforms, and we want to provide young ecologists at secondary school with the opportunity to build networks with like-minded peers.
- We will work proactively to assemble the best evidence on topics of clear public interest to enable better policy-making, and showcase the range of people and disciplines that contribute to ecology.

Now comes the real work. But with this clarity of purpose, we believe we can achieve a great deal for our science.

Find out more:

<https://www.britishecologicalsociety.org/about/strategic-aims/>

New Members

The decision on admission is usually taken by the Membership Admissions Committee or Registration Authority under delegated authority from the Governing Board but may be taken by the Governing Board itself.

CIEM is pleased to welcome the following individuals as new and Chartered members:

ADMISSIONS

Chartered Ecologist (CEcol)

Lee Bagnall, Hannah Bilston, William O'Connor, Dr Daniel Simpson

Chartered Environmentalist (CEnv)

James Hicks, Jason Reeves, Tim Sykes

Full Members (MCIEEM)

Colette Beckham, Richard Castell, Lisa Curtis, Micah Duckworth, Emma Fambely, Dr Martin Gaywood, Christian Gunn, Pippa Jordan, Jack Kellett, Lea Likozar, Sarah Rauch-Lynch, Dr Monica Sullivan, Marc Woodhall, Lotte Wren

Upgrades to Full Membership (MCIEEM)

David Blakemore, Jessica Boath, Rachael Boden-Hall, David Byett, Alison Cockburn, Emma Davis, Jack Fenwick, Natasha Firth, Rachel Griffiths, Verity Heard, Catherine Jones, Ben Lansbury, Juliette Linford, Kathryn Loat, Rosie McLaughlin, Patrick O'Shea, Charlotte Rimmer, Henry Smith, Carolyn Smith, Elisabeth Weidt

Associate Members (ACIEEM)

Joseph Beale, Andrew Francis, John Harvey, James Howsam, David Idebolo, Kurt Lane, Christopher Merrick, Benjamin Moore, Lydia Murphy, Hannah Rawnsley, Kathryn Rimmer, Alexandra Robinson, James Salisbury, Joshua Sowden, Andy Symes, Alex Walker, Thomas Whitlock, Suzie Whitnall

Upgrades to Associate Membership (ACIEEM)

Edward Church, Heather Clayson, Dean Cordelle, Georgina Davey, William Davis, Chelsea Fletcher, Henry Gunning, Kathryn Jones, Amy Kennedy, Georgina Knibbs, Sebastian Phelan, Joanne Richmond, John Salisbury, Rozanna Shah, Jessica Snow, Melissa Sullivan, Emma Telfer, Matthew Wisby, Alexandra Yates

Qualifying Members

Traci Adams, Emilia Adamson, James Allitt, Catherine Ashdown, Jacob Assirati, Tania Atherton, Luke Atherton, Amber Avery, Katy Baily, Joseph Bamforth, Alex Blackburn, Ryan Boyle, Nadine Bradbury, Josh Brown, Jessie Buller, Alex Bullock, Elliott Burns, Alexander Burrows, Hannah Bushnell, Rebecca Butler, Sarah Carruthers, Bradley Collins, Henry Cooper,

Sophia Couchman, Joseph D'Souza, Laura Davey, Andrew Davies, Jennifer Dawson, Luke Dodebier, Lydia Dowell, Christopher Dunn, Harry Eastwood, William Eden, Elizabeth England, Sophie Evans, Dr Erfan Fadaei, David Feitschinger, Hannah Frame, Niamh Gibson, Ray Hackett, Mark Halliwell, Jessica Hancock, Elizabeth Hankard, Luc Hanse-Foster, Charlotte Harris, Immy Hathaway, Caitlin Marie Hayman, Alexander Hendry, George Hicks, Amos Higgins, Eleanor Hinde, William Hirst, Georgina Hislop, Katherine Hope, Jessica Hosier, Bethany Howes, Daniel Howgego, Alexandra Jackson, Gemma Johns, Ben Jolliffe, Aoife Joyce, Sarah Kelliher, Daisy Kennard, Linsey King, Remi Kitazono, Jake Locke, Criostoir Mac Cuirc, Conor Mackenzie, Aleah Maltby, Louisa Mamalis, Thomas Marceau, Elizabeth Maxim, Hannah Maxwell, Christopher McIlwaine, Ellen Miller, Katherine Moore, Richard Mosson, Hannah Mulcahy, Ivan Newell, Jennifer Paget, Alice Petherick, Lucy Reed, Katie Rees, Sam Reynolds, Kay Richardson, Samuel Richardson, Samuel Richardson, Stephanie Ridge, Ellie Samways, Matthew Sanders, Myles Sedgwick, Amy Sherwin, Timothy Slack, Sarah Spotswood, Georgia Stephens, Joseph Storey, Dorothy Tang, Lucy Taylor, Callum Taylor, Agatha Thompson, Calvin Townsend-Smyth, Elizabeth Trayhurn, Julie Trevellick, Sallie Turnbull, Chloe Turner, Lydia Waite, Annabel Walker-Evans, Charlie Ward, Kristie Watkin-Bourne, Gareth Watkins, Rowena Webb, Georgina Westwood, Thomas Wilson, Lisa Wood, Hannah Worthington

Upgrades to Qualifying Membership

Olly Bevan, Katherine Carter, Joe Earnshaw, Sophie Elliott, Laura Farrar, Charles Gardiner, Luke Hammond, Maja Hudej, Stephanie James-Melling, Liam Maries, Jake Matthews, Leanne Meldrum, Lowri Thomas, Justine Thompson, Lucy Treasure, Dominic Wallace, Ian Weller, Chloe White

Student Members

Tolga Aktas, Eleanor Allen, Cassie Allson, Emma Andersen, Christopher Annesley, Lauren Annetts, Caitlin Anthony,

Jonathan Bardwell-Dix, Ciara Barry-Hannon, Paul Barton, Jack Bongard, Oliver Brassington, Sarah Brouder, Anna Burnham, Jack Capon, Abigail Catherall, Eve Cavey, Jenna Churchill, Lorna Clark, Hannah Clarke, Dan Connors, Megan Cox, Jordan Cuff, Sebastian Dixon, Alex Donovan, Matthew Duffy, Amelia Earley, Megan Evans, Emilia Fahlströmová, Stephen Farey, Megan Farish, Daniel Festorazzi, Roswitha Fiala, Gillian Finnerty, Devin Fitzpatrick, Amelie Frommel, Thomas Gall, Felicity Gannon, Trevor George, Rosa Gilmore, Emily Goodman, William Green, Mitchel Greenhalgh, Max Grindle, Paul Hammond, Bethany Hanson, Neil Harpur, Ben Harrison, Jennifer Harvey, Marcia Henshaw, Katie Hepburn, Claire Hesketh, Marcus Hogg, Jake Holmes, Rozel Hopkins, Alexandra Howard, Sarah Hoyle, Christopher Hupp, Emma Hurrell, Craig Jackson, Rosie Jaques, Amber Jardine, Nicola Johansen, Jack Jopson, Elizabeth Keysell, Cathy Kompfner, Alicja Kordula, Sigourney Kornjaca, Georgina Kynaston, Kimberley Lamb, Jude Lamph, Damaris Landers, Chloe Lawrence, Isabel Lewis, Annie Lilac, Oliver Longstaffe, Lisa Manning, Gwendal Marie, Lucy Marsden, Roisin McGrory, Alice Miller, Ella Milne, Aoife Molloy, Stephen Mulkearn, Laura Murdoch, Jane Murray, Bradley Neal, Philip Neilson, Cliona Ní Bhreáruín, Jamie Nicholson-Grime, Ellie Orme, Clare Pailing, Jessica Painter, Zoe Louise Parkes, Emma Pearce, Ana Pires, Gregory Pitcher, Carolyn Postlethwaite, Holly Potter, Natalie Rhoades, Dr Kathryn Riddington, Ellie Riley, Vincent Riozzi, Matthew Robertson-Jones, Daisy Robinson, Charlotte Rose, William Rose, Eli Rowson, Debs Rylands, Rebecca Saint, Rebecca Sanders, Kai Sandon-Fox, Joseph Scully, Sonja Seaton, Liisi Selmet, Bhawna Sharma, Samuel Sharpe, Rosie Simpson, Tom Sloan, Katie Smirnova, Rory Smith, Iain Smith, Maria Staines, Theodore Staszynski, Eleri Stevenson, Megan Stigling, Aaron Symes, Daniel-James Tackie, Evie Templeman, Laura Tindle, Cansu Turkoglu, Rachel Walker, Jessica Ware, Ellie Welch, Richard Wellington, Luke West, Martin White, Joseph Lawrence Wilcock, Jackie Williams, Josef Williams, Fraser Wilson

Member Network News



With regional Section Committees across England and national Sections in Wales, Ireland and Scotland, as well as Special Interest Groups (SIGs) focussing on specific topics, we have something for everyone.

Each network is run by a committee of volunteers, providing opportunities to share knowledge, meet like-minded people and learn more about the science and practice of our profession.

There are currently about 170 Member Network volunteers doing amazing work all over the UK, Ireland and beyond. If you'd like to find out about what they

get up to and how you can get involved, please visit www.cieem.net/member-networks.



ANNUAL MEMBERS NETWORK CONVENORS MEETING

16 December 2019, Birmingham

Representatives from nine Member Networks and Special Interest Groups (SIGs) assembled in Birmingham for a meeting to discuss how CIEEM can better assist and enable volunteers leading its

members groups in 2020. The meeting itself was led by Drew Lyness, the new Volunteer Engagement Officer at the Secretariat (who has been in post since September 2019). Drew has been keen to meet as many volunteers as possible from CIEEM Member Networks, all of whom do fantastic work to keep their groups active, fun and beneficial to their members. The Institute's President, Max Wade, was also in attendance to show his support for Members Groups.

Several topics were discussed at the meeting, including:

1. individual members group highlights of 2019;
2. how to increase and maintain the relevance of future events to group members;

3. recruiting and supporting volunteers within members groups; and
4. where members groups fit into the long-term objectives of CIEEM and how the Secretariat can further equip members groups to help them achieve the Institute's aims.

Drew would like to give a huge thank you to all the volunteers who came along to the meeting, and for all their valuable input. Points raised at the meeting will be used to shape the direction of CIEEM's brilliant members groups in the future.

If you are interested in getting more involved with Member Networks, or perhaps even step forward and volunteer some of your time to assist one of our members group committees, please visit: https://events.cieem.net/Portal/Memberbenefits/Member_Networks.aspx

YORKSHIRE AND HUMBER

**Annual Members Meeting & End of Year Social
27 November 2019, Leeds**

A fantastic group of over 30 members (included several who were new to the group) met together in a private room at the Editor's Draught Pub in Leeds, for networking, an ecology-themed quiz, and a round-up of the Member Network's events of both past and future. Drew Lyness (CIEEM's Volunteer Engagement Officer) from the Secretariat provided an update on CIEEM from a HQ perspective, followed by an informative summary of the group's activities in 2019. After a

filling buffet dinner, the quiz went down particularly well, as teams were thoroughly in the competitive spirit. The mystery image round featuring the nose of a proboscis monkey left many scratching their heads, but the victorious team showed excellent sportsmanship, sharing their winner's chocolates among the rest of the competing teams.

Whilst annual members meetings do have necessary formalities, this event was designed to be informal, relaxed and a great opportunity to welcome new volunteers and members alike. It is worth reflecting on the importance of these type of events in a professional networking context, as social events like this are often of the greatest value when



it comes to sharing best practice and experience. The event's participants came from all corners of the ecology and environmental management sector and were at different stages of their careers. Having the opportunity to meet and network with so many people from a variety of backgrounds in the sector in a friendly, welcoming setting is always appreciated by new members and (we hope) will keep them coming back!



IRELAND

A Field Trip to Stagrennan Polder 18 October 2019, Drogheda, Co. Louth

The Stagrennan Polder restoration works project is located on the south bank of the Boyne estuary. Ireland Member Network Volunteer, Aebhin Cawley, led a successful event for 16 participants which presented attendees with a summary of restoration works which took place in 2006 and the challenges of how they were implemented. They examined, 13 years on from restoration, how the target habitats (mudflats, saltmarsh and reedbed) and features (nesting islands and artificial lakes) have become established and evolved, showing the habitat succession taking place.

The group had a morning revising inter-tidal habitat and winter bird field identification skills, before then heading back to the port company's offices for a presentation of the restoration project, by the port staff as well as Scott Cawley ecologists who developed, implemented and monitored the restoration works. The project is focusing on restoring habitat for several bird species of conservation interest including Little Tern, Lapwing and Redshank.

IRELAND

Environmental Law Workshop 13 November 2019, Dublin

Back by popular demand, the Ireland Committee supported McCann



FitzGerald Solicitor's experts on Environmental and Planning Law, the Habitats Directive, and litigation, to host a lunchtime workshop to a full house of 35 attendees. This event provided updates on recent case law (including key Irish and CJEU cases). It was an advanced workshop aimed towards experienced practitioners, dealing with recent case law as well as providing the opportunity for the usual extended interactive 'Questions and Answers' session with the legal personnel. Once again, this event proved very successful, and only goes to show the importance of staying up to date with this subject.

WEST MIDLANDS

Annual Members Meeting 4 December 2019, Birmingham

The West Midlands Committee hosted an excellent Annual Members Meeting, welcoming members to the refurbished AECOM offices, with drinks on arrival and chance to take part in some nibbles and networking with fellow members. The room was alive with activity, with forty members of the group in attendance.

In classic AMM fashion, there was an update on the Committee and Section activities, update from the Secretariat and opportunity for questions and discussions. This was followed by some fascinating presentations on a wide variety of subjects. There included Simon Barker, National Trust



Wildlife Adviser for the West Midlands on 'The Avifauna of Traditional Orchards – What Makes Orchards Great for Birds', from AECOM on 'Bat Trapping and Radio Tracking and Innovations in Bat Licensing'. The talks were rounded off by Graham Worton, Keeper of Geology at Dudley Council on 'The forthcoming Black Country Geopark'. The West Midlands Member Network would like to thank all the guest speakers for their talks, as well as its members for making it another successful meeting.

EMPOWERING AND SUPPORTING STUDENTS THROUGH MEMBER NETWORKS

Did you know, both CIEEM Member Networks and Special Interest Groups have a vital role to play in enlightening students on where a career in ecology



and environmental management might take them?

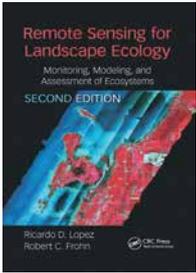
Volunteers from our member groups regularly attend university careers fairs to share their expertise on breaking into the sector, as well as showcasing what life is really like for on ecologist/environmental manager. They do an excellent job in flying the flag for CIEEM, running stands and delivering presentations, and continue to bring more students on board with the Institute. To help with this, some Member Networks also have an elected student representative on their committee. This is an active student member of CIEEM, who listens to the voices of students in

their area and makes suggestions for how their member network can better support them.

If you know of an upcoming student even that might benefit from a CIEEM member network attending, please get in touch with us by emailing membernetworks@cieem.net.

Look out for upcoming events in your area and keep up to date with what's been going on at www.cieem.net/member-networks.

Recent Publications



Remote Sensing for Landscape Ecology: New Metric Indicators

Authors: Ricardo Lopez and Robert Frohn
ISBN: 9780367876388
Price: £45.99

Available from: www.routledge.com

This book provides the practical basis for the use of remote sensing in landscape ecological projects. This new edition features a combination of landscape ecology metrics, quantitative field measurements, and geospatial analyses, demonstrating the evolution of the fields of remote sensing and landscape ecology in recent years.



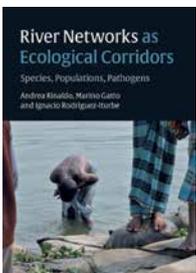
Grassland Plants of the British and Irish Lowlands

Authors: Peter Stroh, Kevin Walker, Stuart Smith, Richard Jefferson, Clare Pinches and Tim Blackstock
ISBN: 9780901158611

Price: £35.00

Available from: www.summerfieldbooks.com

This book provides in-depth species accounts for over 100 grassland plants of greatest conservation concern. The history and types of lowland grassland and the reasons behind the drastic changes seen in these habitats over the last 80 years, are also described. Species accounts include identification features, typical habitat, distribution maps, species ecology, threats and management requirements making it a one-stop-shop for those working with these species.



River Networks as Ecological Corridors: Species, Populations, Pathogens

Authors: Andrea Rinaldo, Marino Gatto, Ignacio Rodríguez-Iturbe
ISBN: 9781108477826
Price: £49.99

Available from: www.nhbs.com

River networks are critically important ecosystems. This book describes how the physical structure of the river environment impacts biodiversity, species invasions, population dynamics, and the spread of waterborne disease. The latest research, including lab, field and theoretical evidence is summarised and presented with practical implications for management.

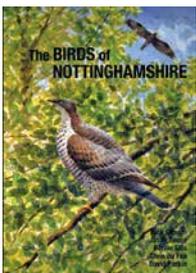


The Birds of Shropshire

Author: Leo Smith
ISBN: 9781781382592
Price: £45.00

Available from: www.liverpooluniversitypress.com

This book, produced by Shropshire Ornithological Society, presents stunning pictures, species accounts and distribution maps for over 300 species recorded in the country of Shropshire. Current breeding and winter maps are also compared with those shown in atlases of breeding birds from 1986 and 1992, showing massive changes for many species. Other chapters include a History of Bird Recording and Ornithology in Shropshire; Changes in Migrant Arrival Dates; Shropshire and its Bird Habitats; Changes in the Status of Breeding Species; and Conclusions and Further Action.



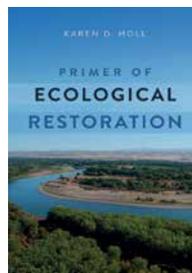
The Birds of Nottinghamshire

Authors: Nick Crouch, Jason Reece, Bernie Ellis, Chris du Feu & David Parkin
ISBN: 9781789620092

Price: £45.00

Available from: www.liverpooluniversitypress.com

This book incorporates historic reports, records from the county bird club, regional and national data to present an account of the state of the county's birdlife in the context of environmental change. The status of 334 species is described and illustrated. Species recorded since the 19th Century include nationally rare cases such as Egyptian Nightjar, Lesser Yellowlegs, Bufflehead, Redhead, Cedar Waxwing, Black-winged Stilts and a nesting attempt by European Bee-eaters.



Primer of Ecological Restoration

Author: Karen D Holl
ISBN: 9781610919722
Price: £25.99

Available from: www.nhbs.com

Humans have drastically altered landscapes, waterways and ecosystems in recent decades resulting in reduction in biodiversity and public health impacts. Aimed at those taking introductory classes or practitioners seeking guidance, this book is an introduction to the theory and practice of ecological restoration as a strategy to conserve biodiversity and ecosystems, in order to reverse the worst of these effects. The basics of restoration project planning, monitoring, and adaptive management are covered, along with topics such as invasive species and legal and financial considerations.

Free downloads that may be of interest to members:

Day, J., Dudley, N., Hockings, M., Holmes, G., Laffoley, D., Stolton, S., Wells, S. and Wenzel, L. (eds.) (2019). *Guidelines for applying the IUCN protected area management categories to marine protected areas. Second edition.* Gland, Switzerland: IUCN. Available at: <https://portals.iucn.org/library/sites/library/files/documents/PAG-019-2nd%20ed.-En.pdf>

High ecosystem service delivery potential of small woodlands in agricultural landscapes

Alicia Valdes *et al.*

Journal of Applied Ecology 2020, 57(1): 4-16 (Open Access)
<https://doi.org/10.1111/1365-2664.13537>

Little is known about the biodiversity and ecosystem service potential of small, fragmented woodlands. This study collected data on six taxonomic groups and ecosystem service potential in 224 woodlands across Europe. Results show that smaller woodlands have a higher potential to deliver multiple services per area than larger woodlands. Authors urge the need for targeted policy instruments to conserve and manage these areas and maximize benefits.



Correspondence: aliciavaldes1501@gmail.com

A united front against marine invaders: Developing a cost-effective marine biosecurity surveillance partnership between government and industry

Justin I. McDonald *et al.*

Journal of Applied Ecology 2020, 57(1): 77-84 (Open Access)
<https://doi.org/10.1111/1365-2664.13557>

Successful detection of introduced marine pests relies upon effective surveillance. However, the expedience of responding following detection is often dependent upon the relationship between regulators and stakeholders. This paper outlines the approach used by the State-Wide Array Surveillance Program (SWASP) in Australia to deliver a united and collaborative approach to marine biosecurity surveillance. The SWASP collaboration uses passive settlement arrays and molecular analyses to provide regular marine pest surveillance from the tropics to temperate regions of Western Australia.

Correspondence: justin.mcdonald@dpird.wa.gov.au

Predicting reintroduction costs for wildlife populations under anthropogenic stress

Jelle P. Hilbers, Mark A. J. Huijbregts and Aafke M. Schipper

Journal of Applied Ecology 2020, 57(1): 192-201 (Open Access)
<https://doi.org/10.1111/1365-2664.13523>



This study presents an approach to predict the costs of maintaining a wildlife population at a user-defined size through reintroduction. It can be applied to any wildlife population in order to obtain the number of individuals and corresponding costs required to sustain a population under current and future influence of an anthropogenic stressor. Authors applied their approach to calculate the reintroduction costs required to restore a minimum viable population of peregrine falcons in California over the period 1970–1994, when the population was exposed to the toxicant dichlorodiphenyldichloroethylene.

Correspondence: j.hilbers@science.ru.nl



Spatially balanced designs for transect-based surveys

Scott D. Foster *et al.*

Methods in Ecology and Evolution 2020, 11(1): 95-105 (Open Access)

<https://doi.org/10.1111/2041-210X.13321>

Many sampling techniques rely on taking measurements along a transect, however methods to generate randomized survey designs have not been developed. This study aims to develop such methods which respect the user-defined probability of sampling each grid cell. The method is demonstrated on a towed-camera survey of deep-sea (500–2,000 m depths) seamounts off Tasmania, Australia. Practitioners can access the methods through the R-package MBHdesign, which is available from CRAN.

Correspondence: scott.foster@data61.csiro.au

Direct effects of a non-native invader erode native plant fitness in the forest understory

Lalasia Bialic-Murphy, Nathan L. Brouwer and Susan Kalisz

Journal of Ecology 2020, 108(1): 189-198
<https://doi.org/10.1111/1365-2745.13233>

While many studies have examined the effects of non-native species on components of native plant performance, there is a lack of those that distinguish the net fitness effects of non-natives from other anthropogenic stressors on population growth rate. This study provides novel empirical support for the claim that non-native invasive species can significantly and directly reduce the fitness of native plants, using 6 years of detailed demographic data on an invader, *Alliaria petiolate* and an understory perennial, *Trillium erectum*.



Correspondence: lalasia.murphy@gmail.com

The risk of ignoring fear: underestimating the effects of habitat loss and fragmentation on biodiversity

Lisa Teckentrup, Stephanie Kramer-Schadt and Florian Jeltsch

Landscape Ecology 2019, 34(12): 2851–2868
<https://doi.org/10.1007/s10980-019-00922-8>

Habitat loss and fragmentation threaten species not only through structural landscape changes and resource reduction, but also through modifications to species' interactions, including the predator-prey relationship. This study investigated how fear changes prey community structures under habitat loss and fragmentation and identified habitat properties driving these changes. Results show that fear intensified the negative effects of habitat loss and fragmentation on prey communities, causing a diversity loss of up to 30%.



Road verges provide connectivity for small mammals: A case study with wood mice (*Apodemus sylvaticus*) in an agro-silvo pastoral system

Ana Galantinho *et al.*

Journal of Environmental Management 2020, 258: 110033
<https://doi.org/10.1016/j.jenvman.2019.110033>

Small mammals may use road verges as habitat or corridor, thus increasing migration across intensively managed landscapes. This study aimed to quantify the effects of road verges and paved lanes on the fine-scale landscape connectivity for the wood mouse (*Apodemus sylvaticus*) in a well-preserved Mediterranean woodland. Results showed that verges had a key role in promoting movement on road surroundings, however vegetation cutting and land ploughing in the surrounding landscape compromised connectivity.



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A framework linking ecosystem services and human well-being: Saltmarsh as a case study

Olivia R. Rendon *et al.*

People and Nature 2019, 1: 486-496
<https://doi.org/10.1002/pan3.10050>

While the ecosystem services approach is well developed, the impacts on human well-being is currently unstructured. In this study, a conceptual framework was developed by adapting and linking the UK National Ecosystem Assessment-Follow On framework with human well-being domains, using saltmarsh habitats as a case study. In addition to benefits, notion of disbenefits was incorporated to recognise the potentially detrimental effects from interacting with nature. This research can be a useful tool to guide environmental and health policy and management, as well as stakeholder engagement.



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Altered leaf elemental composition with climate change is linked to reductions in photosynthesis, growth and survival in a semi-arid shrubland

Lupe León-Sánchez *et al.*

Journal of Ecology 2020, 108(1): 47-60
<https://doi.org/10.1111/1365-2745.13259>

Climate change will increase heat and drought stress in many dryland areas, which could reduce soil nutrient availability for plants and aggravate nutrient limitation. This study assessed the impacts of warming, rainfall reduction and a combination of both on the leaf nutrient status of six shrub species in a semi-arid ecosystem.



Warming reduced foliar nutrient concentrations, net photosynthetic rate and survival. The reduction in leaf nutrient contents with warming compromises plant nutritional quality for herbivores, with potential cascading negative effects across trophic levels.

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Influence of landscape and time of year on bat-wind turbines collision risks

Charlotte Roemer *et al.*

Landscape Ecology 2019, 34(12): 2869-2881
<https://doi.org/10.1007/s10980-019-00927-3>



Collisions with wind turbines threaten bat populations worldwide. In this study, more than 16 bat species were monitored on 48 wind masts using acoustic surveying to model bat density and vertical distribution. The proportion

of flights at heights with collision risk was maximum in spring and autumn and minimum in summer for three species. The landscape also had a stronger effect on bat density than on bat vertical distribution. Authors recommend studying topography when planning wind farm positioning.

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Co-management of culturally important species: A tool to promote biodiversity conservation and human well-being

Carolina Tavares de Freitas *et al.*

People and Nature 2019, Early View (Open Access)
<https://doi.org/10.1002/pan3.10064>

Co-management has been advocated as an effective tool to achieve natural resource conservation worldwide. Yet, the potential of co-management arrangements can fail to be realized when there is insufficient local engagement. In this paper, the authors argue that co-management schemes focusing on culturally important species (CIS) can help overcome this issue by engaging local people's interest. A compilation of CIS examples throughout the world is also given.

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Effectiveness of translocation in mitigating reptile-development conflict in the UK

Nash D.J., Humphries N. and Griffiths R.A.

Conservation Evidence 2020, 17: 7-11 (Open Access)
<https://www.conservationevidence.com/individual-study/7228>

The translocation of reptiles from development sites is a common occurrence despite a lack of post-translocation monitoring. This study reports on the outcome of six reptile translocations carried out to mitigate the impacts of development and aims to determine whether translocated reptiles established populations within the receptor sites. The researchers recaptured very few of the translocated individuals suggesting dispersal and mortality. Therefore, no confirmatory evidence was found that the mitigation is compensating for the development.

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Forthcoming Events

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

Conferences

Date	Title	Location
21-22 April 2020	Irish Conference 2020 Building on Conservation Approaches to Benefit National Biodiversity: Big Ideas for Big Challenges	Galway
22 September 2020 TBC	Welsh Conference 2020 Managing Welsh Rivers, Lakes and Streams	Aberystwyth
October TBC	Scottish Conference 2020 Land Use Change'	Perth
1-2 December 2020	Autumn Conference 2020 Time to Change: New Challenges and Opportunities	Bristol

Training

March 2020

2-3	Ground Water Dependent Terrestrial Ecosystems	Birnam
5	Using Bioacoustics for Field Survey	Derbyshire
6	QField for Ecologists and Environmental Practitioners	Kingston
10	Habitats Regulations Assessment (HRA) of Projects (England & Wales)	Cardiff
10	Calculating and Using Biodiversity Units with Metric 2.0	Birmingham
11	Ecological Clerk of Works	Perth
11	Effective Workplace Mentoring (Scotland)	Perth
12	Effective Communication Skills (Scotland)	Perth
12-13	Intermediate QGIS for Ecologists and Environmental Practitioners	Kingston
12-13	Intermediate QGIS for Ecologists and Environmental Practitioners (Ireland)	Athlone
16	Badger Ecology and Surveys	Dorchester
17	Badger Mitigation	Dorchester
19	Peregrine Falcon: Ecology, Survey and Mitigation	Tamworth
19	Calculating and Using Biodiversity Units with Metric 2.0	Manchester
24	Breeding Bird Surveys and Checks	Tamworth
25	Barn Owl: Ecology, Surveying and Mitigation	Birmingham
26	Otter Ecology and Surveys	Cirencester
31-1	Train the Trainer for Ecologists (Ireland)	Belfast

April 2020

1	Lichen Identification	Porlock
7	Habitats Regulations Assessment (HRA) of Plans (England & Wales)	Birmingham
7	Reptiles: Ecology, Surveys & Mitigation	London
9	Biodiversity Net Gain Through Development	Leeds
15	Calculating and Using Biodiversity Units with Metric 2.0	London
22	Ancient Woodland Indicators	Bristol
22	Introduction to Bat Ecology and Bat Surveys	Wareham
23	Bats: Impact Assessment and Mitigation	Wareham
23	Biodiversity Net Gain Through Development	Manchester
27-28	An Introduction to the NVC	Birnam
29	Calculating and Using Biodiversity Units with Metric 2.0	London

May 2020

13	Biodiversity Net Gain Through Development	Birmingham
19-20	Introduction to Phase One Habitat Survey	London
20	Calculating and Using Biodiversity Units with Metric 2.0	London
21	Plant Identification and Botanical Keys	Wrexham
21	Botany for Beginners	Bristol
27	Calculating and Using Biodiversity Units with Metric 2.0	London
28-29	Introduction to UK Habitat Classification	London

June 2020

4	Bat Ecology and Surveys	Newtownbutler
5	Bat Impacts and Mitigation	Newtownbutler
8	Water Vole Ecology & Surveys	Cirencester
9	Water Vole Mitigation	Cirencester
11	Vegetation Survey Techniques – Extended Phase 1/Phase 2 using NVC, Botanical ID & Recording Techniques	Wrexham
11	UK Habitat Classification for Practitioners	Richmond

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