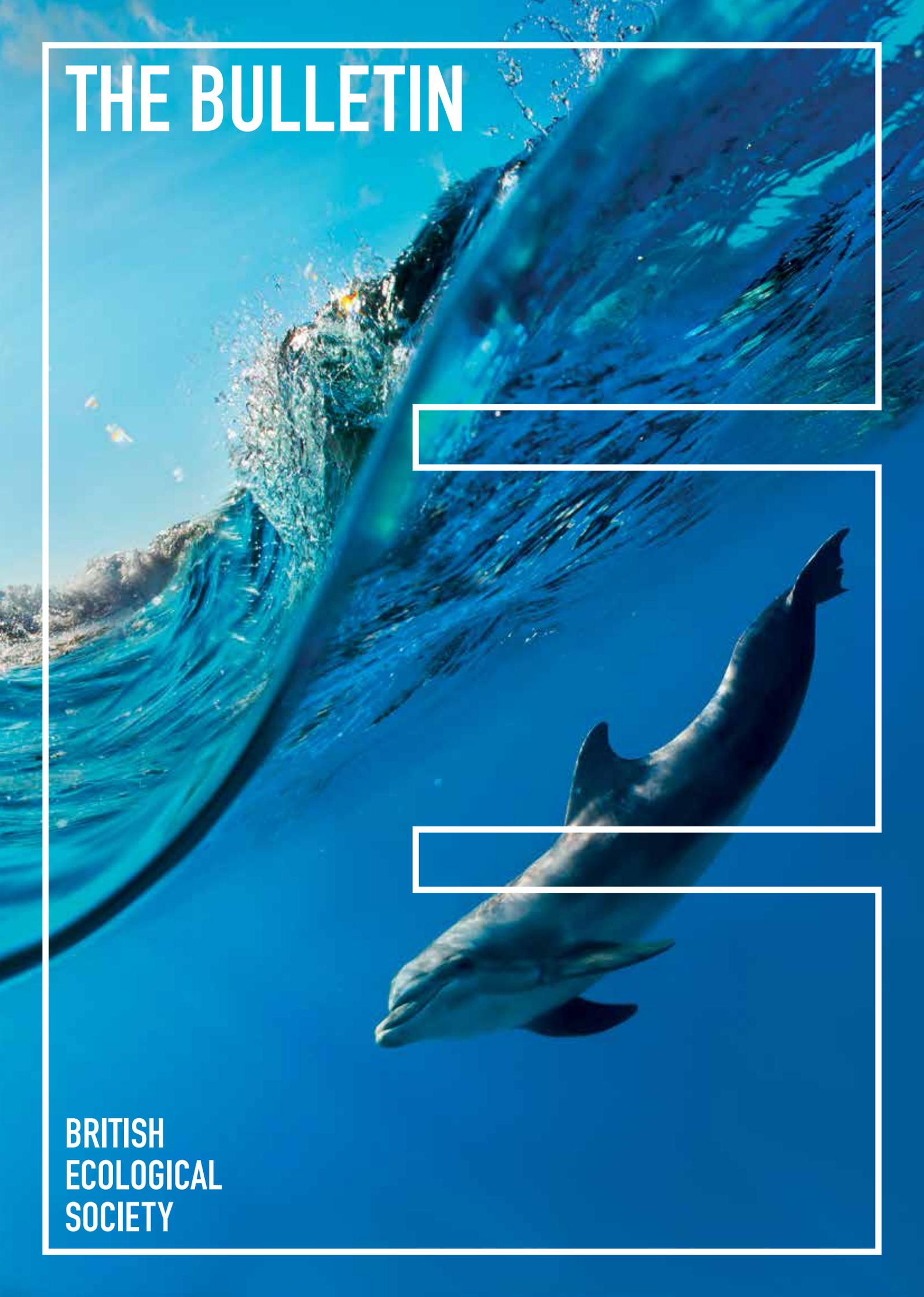


THE BULLETIN

A photograph of a dolphin leaping from the water in a clear blue ocean. The dolphin is captured mid-air, its body arched as it moves from the bottom right towards the top left. The water is a vibrant blue, with white foam and splashes visible where the dolphin has just exited. The sky is a clear, bright blue. The image is framed by a white border, and there are several white rectangular cutouts or overlays on the right side of the image.

BRITISH
ECOLOGICAL
SOCIETY

SPECIAL INTEREST GROUPS

OUR FRIENDLY, VOLUNTEER GROUPS PROVIDE FOCUSED ACTIVITY IN SPECIFIC AREAS OF ECOLOGY AND HOLD EVENTS TO NETWORK, RAISE AWARENESS AND OFFER CAREER SUPPORT. GET INVOLVED!



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PUBLISHING IN THE BES BULLETIN

The *Bulletin* is published four times a year in March, June, August and December. Contributions of all types are welcomed, but if you are planning to write we recommend you contact one of the editorial team in advance to discuss your plans (Bulletin@BritishEcologicalSociety.org).

Material should be sent to the editor by email or on a disk in Word or rtf format. Pictures should be sent as jpeg or TIFF (*tif) files suitable for printing at 300dpi.

Books to be considered for review should be sent directly to the Bulletin Editor.

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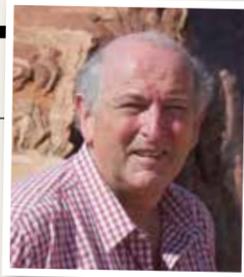
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WELCOME

CHANGING TIMES



Alan Crowden | Editor | bulletin@britishecologicalsociety.org

It's been an eventful few months hasn't it? Whatever the outcome of future negotiations to disengage some or all of the UK from the European Union, the message for ecologists is that we need to continue to work across all sorts of borders, whether between nations, or disciplines, or any other barriers to the free exchange of people and ideas.

Sue Hartley sets the tone with her opening piece on interdisciplinarity (p5); we need to cooperate across traditional disciplinary 'borders' if we are to make any progress in fostering good environmental management and inspiring, informing and influencing decision makers. The theme continues in the report by Ed Maltby and colleagues on the excellent People, Politics and the Planet session organized by the Society in collaboration with the Royal Geographical Society and the Sibthorp Trust (p7).

The British Ecological Society seeks to advance the field of ecology in all sorts of ways and the only way we will maximize our impact is by utilizing all the talent available to us regardless of background and beliefs; Hazel Norman and Sue Hartley on p9 set out what the BES is doing to make sure we are an open, encouraging and supportive Society to all ecologists. The previous sentence should probably omit the final 'ecologists'; we want to be open to all, and the public engagement programme being developed by Jessica Bays (superbly supported by members) helps take ecology to a wider group. There are three reports on recent events/activities on pp14-19.

The Special Interest Groups (SIGs) continue to thrive, and while many of their activities are reported on their individual webpages we encourage all of them to report back to the wider membership, since your subscriptions help towards supporting the SIG events (p22). Ian Montgomery describes

the latest development under the SIG banner, supporting the creation of a new Irish Ecological Association. Ian provides a fascinating insight into the different ways in which ecological ideas have developed in Ireland (p28). Another exciting example of the potential outreach of the SIGs is reported by Rosie Trevelyan and colleagues; the Tropical Biology Association and the BES co-sponsored a symposium in Nairobi on citizen science in Africa which generated great excitement and interest (p36).

Richard Hobbs, newly installed as an Honorary Member of the Ecological Society of America, combines statistics and ecology in one essay in a far more entertaining manner than most of us could achieve, while John Wiens has a happy knack of plucking subjects out of the air which combine well with other themes in the same issue; this time he revisits 'the Two Cultures', the apparent disconnection between literary and scientific intellectuals that C P Snow spoke and wrote about more than 50 years ago. Snow wrote about barriers and borders between disciplines, and the dangers this presented to good decision-making. Towards the end of the 1964 edition of his book he opines "Changes in education will not, by themselves solve our problems; but without these changes we shan't even realise what the problems are." We could do with a few more decision makers around the world who do realise what the problems are.

Alert readers will notice we have refreshed the typeface and layout of the Bulletin to match the wonderful reworking of the BES website and marketing materials; thanks to Matt Wood and colleagues for all the hard work.

The British Ecological Society is the oldest ecological society in the world, having been established in 1913. Since 1980 it has been a Registered Charity limited by guarantee. Membership is open to all who are genuinely interested in ecology, whether in the British Isles or abroad, and membership currently stands at about 5000, about half of whom are based outside the UK.

The Society holds a variety of meetings each year. The Annual Meeting attracts a wide range of papers, often by research students, and includes a series of informal specialist group discussions; whereas the Annual Symposium and many other smaller meetings are usually more specialised and include invited speakers from around the world.

Proceedings of some of these meetings are published by the Society in its Ecological Reviews book series. The Society distributes free to all members, four times a year, the *Bulletin* which contains news and views, meeting announcements, a comprehensive diary and many other features. In addition the Society produces five scientific journals. The *Journal of Ecology*, *Journal of Animal Ecology*, *Journal of Applied Ecology* and *Functional Ecology* are sold at a discounted rate to members. *Methods in Ecology and Evolution* is free to BES members. The Society also supports research and ecological education with grant aid. Further details about the Society and membership can be obtained from the Executive Director (address inside back cover).

The *Bulletin* circulates exclusively to members of the British Ecological Society. It carries information on meetings and other activities, comment and other topical items. Unsigned commentaries are the responsibility of the Editor and do not necessarily represent the views of the Society.

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PRESIDENT'S PIECE

IN PRAISE OF INTERDISCIPLINARITY



Sue Hartley | Sue.Hartley@york.ac.uk

I THINK IT'S FAIR TO SAY THAT A LOT HAS CHANGED SINCE I WROTE ABOUT THE BENEFITS OF INTERNATIONAL COLLABORATION IN MY LAST PRESIDENT'S PIECE!

The landscape looks rather different now Britain has voted to leave the EU and we wait to see what changes "Brexit" will bring. But some things won't change - the BES remains an inclusive, internationally-facing Society, committed to supporting and engaging with its members wherever they live. So it is perhaps particularly timely that our 2017 annual meeting is in Ghent, jointly organised with two of our European sister societies! It is also an important time for the BES to take a lead: the voice of ecologists is more critical than ever if we are to ensure that any Brexit-induced changes to current EU legislation protecting the environment are informed by the best evidence.

The BES is well placed to provide such evidence-informed solutions, with our excellent policy team of Ben, Camilla and Rebecca (check them out on the BES website; <http://www.britishecologicalsociety.org/about/people/>), our specialist policy groups, and our policy-focussed events, such as our recent "People, Politics and the Planet" debate (See <http://www.britishecologicalsociety.org/discussions-people-politics-planet-questions-event/>). Most importantly of all of course is the expertise of our membership - our voice is your voice, so make sure you sign up to our

database of experts (yes we DO still need experts despite some politician's opinions during the referendum campaign!) and get involved. There's never been a better time for ecologists to speak out!

But if ecology is to have an effective voice in policy arenas, we can't do it alone. We need to work with other disciplines, because of course it isn't only ecological evidence that plays into policy decisions. So that's my "i-word" for this month - interdisciplinarity. I want to focus on what value it adds, and why it is particularly important right now. I also want to emphasize the value of interdisciplinarity to policy implementation - we can have the most robust ecological evidence and the best conservation strategies underpinning policy, but if we can't get those policies implemented because we don't see, or don't understand, the bigger picture, then we won't move forward.

Other disciplines can help us get that wider perspective, which is vital to making a difference. I learnt that lesson early on in my career. Working in Malawi on a Christian Aid funded project on improving crop resilience to drought, I thought I had the answer: farmers should stop growing maize and grow the much more drought

tolerant millet instead. Consternation amongst the farmers greeted that suggestion! "But", they exclaimed in horror, "Dr Sue, we can't, we are married to maize"! Hopelessly naive, I had neglected the wider cultural and socioeconomic context; I'd focussed on the physiology of the plants, my discipline, and not on the sociology of farmer behaviour, someone else's discipline. The value of those other disciplines was brought home to me very clearly, and is something my research is continuing to benefit from. I'm now involved in another project on developing crops more resilient to climate change, one which combines the expertise of: rice geneticists, to produce novel rice varieties capable of maintaining yield under unpredictable rainfall; climate modellers, to predict the areas which will be most prone to drought under future climate change scenarios and hence where the new varieties will be most needed; and social scientists who can engage with farmers, understand their requirements and ensure their needs are built into our programme from the start, so ensuring our research delivers the most public good. Crucial to the success of this research programme is the concept of co-design - involving all the disciplines in the design of the research programme from the beginning. This ensures

all participants can contribute in a meaningful way, and produces innovative ideas which are a better match to end-user needs.

The co-designed rice project nicely illustrates the benefits, and challenges, of interdisciplinary research. Bringing together a diverse set of expertise and skill sets allows us to address complex societal challenges – so called “wicked” problems in the current jargon. These are multi-faceted issues resistant to resolution, which require integrated whole system thinking to solve. Dealing with them is going need the sort of innovative “left-field” approaches which can emerge when people from different disciplines interact. As ecologists, many of us are well-used to complexity and to systems thinking, so I think we are particularly well-placed to contribute to solving these sort of environmental challenges.

Generating the evidence base for sustainable solutions to environmental change will need a combination of ecological research and effective interdisciplinary partnerships, such as those facilitated by the York Environmental Sustainability Institute, the interdisciplinary research institute that I direct at the University of York. From the start I was convinced that the most effective way to encourage dialogue across disciplines, and develop the most exciting collaborative research, was to promote an equal partnership between physical, natural and social sciences. I wanted to avoid a “hierarchy” of disciplines where, as often seems to be the case, natural or physical science is seen as the focus of projects and social science is brought in, almost as an afterthought, because the research call requires it. The opposite approach to co-design!

Diverse disciplines can only work together as effective partners in an atmosphere of trust and mutual respect, something which takes time and effort to develop, as well as commitment and the appropriate skills to foster. But I’m not sure ecologists can easily gain access to those skills, certainly not early in their careers. The training of ecology PhD students is usually focussed quite narrowly, probably the best approach in a time-limited research programme

where early publications are an urgent requirement for the career progression of the researcher. Perhaps there is something here for the BES to think about – how can the Society support early career researchers who have completed their PhD and would now like to engage more widely with other disciplines to address current environmental challenges? A workshop on interdisciplinary working methods at the annual meeting might be a useful start. Do get in touch if you think this would be of interest, and send us your own ideas!

Genuine interdisciplinarity does not require ecologists to abandon their ecological expertise or somehow “water down” their scientific excellence. You need that disciplinary research excellence to bring something to the interdisciplinary table. But it does require respect for other ways of doing things, a recognition that research approaches may be unfamiliar, and perhaps less “quantitative” than is comfortable, but they are just as valuable and effective as those from our own discipline. One ecologist I spoke to recently, following their participation in a social science-led event was clearly struggling. “It’s all so vague – where are the numbers?” they wailed. My early forays into interdisciplinary research teams hit similar buffers – what, I wondered, was meant by “political ecology”? How did politics inform the study of species abundance and distribution? It takes time (and practise!) to move to an interdisciplinary way of thinking, and to develop the communication skills necessary to support it, but it’s essential to get the real benefits from collaborations.

Unsurprisingly many hard-pressed academics struggle to find the space to engage in this way. One of the reviewers of the rice project I mentioned above was enthusiastic about the molecular biology part of the proposal but commented “what is the point of all that useless social science” – someone not well-suited to interdisciplinary working I suspect! And, of course, many people are not suited to it – they have neither the interest nor the skills to get outside their “disciplinary comfort zone”. Nor, clearly, is interdisciplinarity the

solution to everything. Much research requires single disciplinary depth where interdisciplinarity would not add value; in fact, it would detract from the research effort.

So why make the effort, and why make it now? Well one very practical reason: research funders are recognising that addressing the key global environmental challenges that we face, whether it’s the impacts of climate change, the protection of biodiversity, securing our food supply, or dealing with the environmental consequences of rapid urbanisation, will require interdisciplinary research collaborations. This is why we are seeing increasing numbers of RCUK calls which span more than one research council, and many more funding calls specifically demanding a multi-disciplinary approach. One such example is the Government’s new Global Challenges Research Fund, a new 5-year £ 1.5 Billion (no that’s not a misprint!) funding stream with a focus on deploying the UK’s world-class research capability to address the challenges faced by the global south. This is the biggest thing to hit UK research funding in a long time and it’s vital that ecologists play a leading role – we have a lot to contribute to the environmental and human well-being that is a key part of the programme. Second in the list of objectives for GCRF is “promote multi-disciplinary approaches in addressing global challenges”. So I encourage BES members to think about how they can contribute, in terms of both their ecological research expertise and their input to challenged interdisciplinary teams. Go on – talk to a social scientist! They don’t bite (they are well-trained in human interactions!!) and you’ll need to if you are to successfully apply for funding, but, much more importantly, it will be a lot of fun and you’ll learn lots!

The UN secretary general, Ban Ki Moon, wrote in 2010 that “Now, more than ever, we need to connect the dots between climate, poverty, energy, food and water – these issues cannot be addressed in isolation”. That’s even more true today. Ecologists can help join those dots and be at heart of making a difference locally, regionally and globally. So gear up for impact – the next-i-word!

PEOPLE, POLITICS AND THE PLANET: ANY QUESTIONS?

What does ‘Brexit’ mean for the future of the UK’s environment?

Ed Maltby | Sibthorp Trust
Ben Connor | British Ecological Society
Chris Mahon | Sibthorp Trust
Ceri Margerison | Royal Geographical Society (with IBG)

The British Ecological Society and the Royal Geographical Society (with IBG) partnered with the Sibthorp Trust – a small charity aiming to keep the environment on the public agenda and question conventional thinking - to promote a lively public debate on 21 July 2016. Chaired by broadcaster Jonathan Dimbleby, the panel for *People, Politics and the Planet: Any Questions?* comprised George Eustice MP (Conservative, Minister of State for Agriculture, Fisheries and Food), Kerry McCarthy MP (Labour, former Shadow Secretary of State for the Environment), Baroness Kate Parminter (Liberal Democrats, Environment Spokesperson), Natalie Bennett (Green Party, Leader), Stuart Agnew MEP (UKIP, Agriculture Spokesperson) and Martin Nesbit (Senior Fellow, Institute for European Environmental Policy).

This was the second year of the *Any Questions* panel debate. While the 2015 event challenged politicians on their environmental priorities if elected, this year the focus was clearly on the implications of ‘Brexit’. An audience of over 400 included members of both Societies as well as the general public, and included a live link to the BES Undergraduate Summer School at Malham Tarn, ensuring strong student participation. Held in the Ondaatje Theatre at the RGS-IBG, where so many research expeditions were planned and reported on, it was perhaps fitting that no less a step into the unknown was being discussed.

Just 28 days after the EU Referendum this was the first opportunity to ask some of our politicians and an expert from the Institute for European Environmental Policy what ‘Brexit’



may actually mean for our natural environment. There is a growing recognition that the environment is not just a place for nature - its wildlife and habitats - but that it underpins the sustainability and health of our economy, contributes to all aspects of human wellbeing, and provides the resilience to combat global threats such as climate change and food insecurity.

There is still a long way to go if we are to better link the environment with other policy areas of government and some may feel that this holds back the prioritisation of the environment in decision-making. Our links to European Directives have been a strong driver of UK environmental policy and natural resource management in recent decades. How might this now change? Our management of the environment is necessarily determined by political decisions and priorities but government’s use of best available scientific evidence and other knowledge has sometimes been lacking.

A full recording of the event can be found at <https://youtu.be/P4HEWYQPoDw> but here we summarise some key aspects of the issues raised.

THE OPENING SALVO: GREENER IN OR MORE EFFECTIVE OUT?

The strength of support from a 28-strong European Union was the basis of the argument for ensuring that environmental matters were taken more seriously within member states and was what underpinned more effective and coherent international actions and representation. Natalie Bennett strongly endorsed that position, emphasising the importance of the environment in dealing with many of the current social and economic crises. Kerry McCarthy regretted that the environment had not been sufficiently discussed during the Brexit debate and was sceptical whether the government could deliver improved environmental policy. Baroness Parminter was concerned that the boundary between the UK and the rest of the EU would raise unanticipated problems and that as so many environmental questions are global they need the combined power of the EU to tackle them. The collaborative strength of the EU was cited as an exemplar for the rest of the world of how cooperation could work to implement climate policy. Martin Nesbit argued that the EU had been a positive force for environmental policy and that there were significant risks from an exit without very careful contingency planning. He gave the example of the designation of Marine Conservation Areas which might not have been implemented without the European push.

Contrary to these positions, George Eustice indicated that there was

genuine excitement in Defra about the new opportunities that Brexit would provide for policy innovation rather than simply following the Brussels lead. In particular it was argued that 'Brexit' would put the UK back on the world environment stage with its own voice as opposed to being buried in (and sometimes at odds with) the EU collective. Examples of animal welfare and fishing rules were cited in illustration. The Minister dismissed concerns over the future of important Directives such as the Birds and Habitats Directive, citing as an example our commitment to the Bern Convention which would allow government to adapt legislation more specifically suited to the UK. Stuart Agnew was particularly pleased at the prospects of the UK being able to take control of its fishing industry and management as well as farming and climate control measures. Of overriding significance was the difficulty in achieving coherent policy, especially in agriculture, among 28 member states with very different socio-cultural and economic conditions.

WHAT DO WE WANT FROM THE ENVIRONMENT?

In a future outside of the Common Agricultural Policy, which has shaped the management of much of our countryside, there is a pressing need for greater public debate on what we actually want from our land (together with its water and living resources). Implicitly reminiscent of the first principle of the Ecosystem Approach, as adopted by the Convention on Biological Diversity and underpinning much of Defra's stated policy objectives, the debate recognised fully the wider ecosystem services beyond food production. For example, Baroness Parminter suggested the need for a "common landscape policy", and Kerry McCarthy endorsed the idea of a holistic approach to land management. There are already examples of businesses and their customers, especially the water companies, contributing costs to environmental improvements resulting in public benefits, and the notion of paying farmers and landowners for the delivery of services such as floodwater

retention seems well established in the political mindset. The immense scientific effort that went into the UK National Ecosystem Assessment can play a vital role in reinforcing this policy development.

IMPORTANCE OF SCIENCE AND AN EVIDENCE-INFORMED APPROACH

Acknowledgement of the need for sound science and other appropriate evidence must be music to the ears of the membership of the BES and RGS-IBG. It was highlighted with specific reference to the debate on pesticides, with George Eustice stating that even outside of the EU "we'll follow the science as we always do". While the Minister quoted research from the NERC-funded Centre for Ecology and Hydrology, much scientific research and conservation action is supported by the EU, and concerns over loss of funding and access to networks of collaboration must be assuaged. George Eustice suggested that that new funding might proceed more efficiently without the complex bureaucracy often attached by the European Commission- avoiding what was described as some "dead-weight" costs associated with certain projects.

ACHIEVING GREATER COHERENCE AND IMPLEMENTATION OF DESIRED ENVIRONMENTAL POLICY OBJECTIVES AND ACTIONS

Much discussion revolved around the potential benefits of retrieving competence over the environment from Brussels and legal jeopardies preventing discretionary actions in exceptional cases of individual or community wellbeing. The importance of risk management tools to assist farmers and the incorporation of new support for ecosystem service provision were aspects of the desire for more coherence across sectoral policies. There was recognition of the value of the experiences from the CAP and Stuart Agnew expressed the view that the general support to farmers from the taxpayer in terms of single farm payments was a fair and effective way of reducing food prices. George Eustice felt that under the

EU there was too much emphasis on spatial designation of conservation areas particularly in the case of marine areas where highly mobile species were a key object of protection. He advocated more emphasis on process and management strategies supported for example by by-laws.

LOOKING AHEAD TO THE POST-BREXIT LANDSCAPE

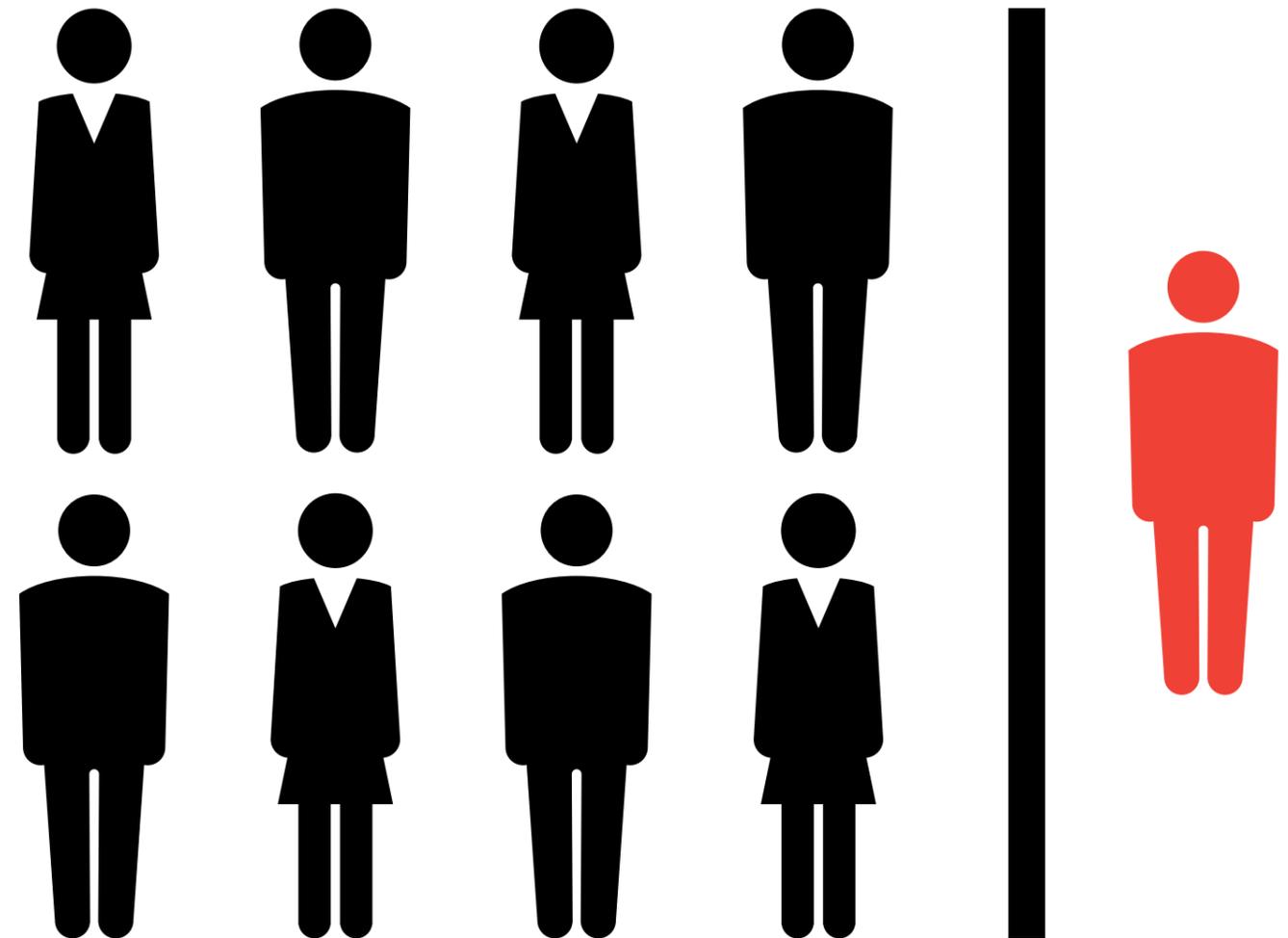
There is clearly still much uncertainty regarding how the environmental balance sheet might look after Article 50 is triggered and Brexit subsequently takes place. One of the positive themes emerging from the debate is that politicians across different persuasions appear increasingly aware of the artificiality of any separation between our policy for food and farming as against biodiversity and the need to see ecology and economics as part of the same coherent framework. Yet along with the opportunities for innovation and fresh thinking that Brexit may offer, it also poses a great number of environmental risks as established legislative frameworks are changed. It is essential that future environmental standards are at least as good, if not better, than those that currently exist within the European Union.

It is hoped that the partnership between the Sibthorp Trust, the BES and the RGS with IBG can continue to encourage informed debate that might just yield post-Brexit environmental benefits.



EQUALITY AND DIVERSITY IN THE BRITISH ECOLOGICAL SOCIETY

Hazel Norman and Sue Hartley | hazel@britishecologicalsociety.org



The BES strives to be an open and welcoming Society, where all ecologists feel comfortable as part of a diverse community. However, despite this aspiration and our commitment to these values, it is clear that parts of our community are disadvantaged and there are unconscious barriers to progression. For example, until 2012 the Society had never had a female President and only 4 BES Journal Editors out of a total of 24 are women. Of course we recognise that equality and diversity goes far beyond gender issues, but these basic facts illustrate the difficulties that certain groups experience in reaching senior positions in ecology.

The BES gave a commitment to increase the diversity of those doing ecology in our 2015-2019 Strategic Plan (available on our website) and this article explains some of the initiatives and activities we are undertaking to meet that commitment. As a first step, in 2015 a group of volunteers from the membership came together with BES staff to form the Equality and Diversity Task and Finish Group, to develop a set of recommendations to BES Council aimed at increasing inclusiveness within the Society. One of those recommendations was to set up an Equality and Diversity Working Group, chaired by the BES President, to drive this important work forward; you may have seen the call for volunteers via the eBulletin and social media. That Group is now up and running and has an action plan for delivery in 2016, as well as further work in development for 2017+.

We have developed an equality and diversity statement for our website (see box 1 for the statement) which clearly states our commitment to an inclusive and open ecological community, and we have instilled those principles in the way in which we recruit both volunteers and staff.

BARRIERS TO PROGRESSION IN ECOLOGY CAN BE COMPLEX, MULTIFACETED AND DEEP ROOTED. THE BES ALONE IS NOT ABLE TO TACKLE ALL OF THEM, BUT WE CAN MAKE A REAL DIFFERENCE IN OUR OWN COMMUNITY.

Celebrating and recognising those who have campaigned to highlight diversity, worked to make a difference in this area, or served as an inspiration to others within the ecological community is important, and we are delighted to announce the establishment of an annual award to do just that – the BES Equality and Diversity Champion (see box 2 for the award details). We strongly encourage the whole community to think about those people who are making a real impact on equality and diversity in ecology and to submit a nomination by the deadline of 7 October 2016.

The prizes that we give send a powerful message to our community about what we value and the people who win them are role models. We are committed to awarding prizes on merit alone, but it is important we take action to ensure that the people we consider for awards are drawn from the whole ecological community and good candidates are not overlooked because they are not the ones who come instantly to mind. To try and counter that sort of unconscious bias, we

BOX 1 DIVERSITY AND THE BES

The British Ecological Society (BES) values the diversity and wide range of perspectives that people from different backgrounds bring to their work and to ecology. It is the BES's policy to ensure that no member, volunteer, potential author, award or grant applicant or recipient, job applicant or employee, visitor or event participant is disadvantaged or receives less favourable treatment because of factors including but not limited to: age; physical & mental disability; physical appearance; gender identity; marriage or civil partnership; pregnancy, maternity or paternity; race, nationality, religion & belief; gender; sexual orientation or socio-economic background. Everyone at the BES has a role to play in ensuring that individuals are valued, treated with dignity and respect and that discrimination does not occur. Every member of staff and the Board of Trustees are responsible for implementing relevant policies, objectives and working practices linked to equality and diversity to ensure equal opportunity at all stages of engagement with the BES. The BES will identify, and invest in tackling, barriers to participation and create a culture in which equal opportunities and equal treatment are a priority for all members, staff, volunteers and others who engage with the BES.

We will proactively promote a culture of equality, diversity and inclusion within our discipline by:

- Using our Equality and Diversity Working Group (EDWG) to develop and oversee the delivery of the Society's equality and diversity work. Equality and diversity is something that should be embedded into every operation of the BES and the EDWG is responsible for ensuring that happens.
- Planning and implementing a SMART programme of work to embed the principles of equality, diversity and inclusion into our current organisational policies, practices and behaviours, and enhance the equality of opportunity in our activities as an employer and as a learned society.
- Assessing and reflecting on our progress annually and developing new programmes of activity to promote equality and diversity.

We will report on the work of the EDWG and these reports will be made available on the BES website.

If you have any queries or points you wish to raise about diversity and the BES please contact the Executive Director, Hazel Norman, hazel@BritishEcologicalSociety.org

have now introduced a rule that prize short lists must have an equal gender balance. This does not mean that the award winners must have that balance – we are aiming for equality of opportunity not outcome!

Last year we began systematically collecting equality and diversity data on our members and those who use our services. This data includes information on age, disability, ethnicity, gender and sexuality, and is now sufficient to become useful in understanding where bias is present and challenging it. For example, from next year people proposing thematic sessions at our Annual Meeting will be given equality and diversity data on our membership and asked to reflect that diversity within the invited speakers they propose.

Our meetings and conferences are a vital service for the ecological community and it is really important that everyone feels welcome and safe in that environment. We have introduced a code of conduct for all our symposia and Annual Meetings, to be printed in the programmes, which clearly articulates what we consider acceptable behaviour, as well as providing a secure way for people to raise concerns if they do have them.

Mentoring can be an empowering way of helping people find their own place within a community and the BES is working hard to extend our successful 'Women in Ecology' mentoring scheme so that it is more inclusive and can benefit anyone from the ecological community. You'll be hearing more about our new mentoring initiatives shortly.

One area of equality and diversity that receives less emphasis than gender, but is very important for us to address is the difficulties faced by ecologists from lower income backgrounds. The BES has been working with In2Science (in2scienceuk.org) over a number of years to support their work in helping school students from disadvantaged backgrounds become inspired about a career in ecology, and we are delighted that 10 of these students had the opportunity to spend a week with some of the UK's best ecology undergraduates at the BES Summer School in July 2016. We will be looking at how we can expand initiatives like this and help spread the message that an ecological career can be accessible to everyone.

We are also looking at how we ensure all of the BES's services and processes are accessible, open and transparent. Part of that is making sure the people involved in running the Society's activities are fully aware of any unconscious bias that they may have so we are going to provide training in this area to all our staff and volunteers in 2016.

Barriers to progression in ecology can be complex, multifaceted and deep rooted. The BES alone is not able to tackle all of them, but we can make a real difference in our own community. We see our current work in equality and diversity very much as a starting point on a long journey, but we are committed to having a real impact and making sure that anyone who shares our passion for ecology feels welcome, whatever their background or circumstance.

We would love to hear your views about how the BES can make a real difference to inclusiveness in ecology, so do get in touch with your ideas.

BOX 2 BES EQUALITY AND DIVERSITY CHAMPION

This annual award recognises an individual or group who have campaigned to highlight the importance of equality and diversity and worked to make a difference or served as an inspiration to others. It honours and celebrates those who have made significant, innovative and cumulatively outstanding contributions to enhancing the practice of equality and diversity in the ecological community. The Award is an honorarium of £1,000 and is open to ecologists from anywhere in the world.

The following criteria will be used when considering nominations:

- Acting as a role model in championing equality and diversity issues;
- Creating an inclusive culture by challenging inequalities, barriers and bias;
- Leading positive actions or interventions to enable talented people from all backgrounds to realise their full potential;
- Influencing the attitudes and behaviours of the ecological community;
- Evidence of the impact they have had in the support of equality and diversity in ecology both within their own organisation and in the wider ecological community.

The winners will be invited to give a presentation at the BES Annual Meeting, and write an article on equality and diversity for the *Bulletin* and a blog post for the BES website.

Closing date for applications 7 October. Please see the BES website (Membership & Community section) for the nomination form and further details.



POLICY

WHAT CHANGES ARE TAKING PLACE IN HIGHER EDUCATION POLICY?



Camilla Morrison-Bell | Senior Policy Officer, British Ecological Society
camilla@britishecologicalsociety.org

In November 2015, the Department for Business, Innovation and Skills (BIS) published a Higher Education Green Paper, setting out initial proposals for introducing a Teaching Excellence Framework and substantially changing the governance of higher education and research in England.

Despite receiving 618 responses to the Green Paper consultation, many questioning the details of the Government's plans, in May the proposals were brought forward in the Higher Education White Paper: "Success as a knowledge economy: teaching excellence, social mobility and student choice". On the same day, the "Teaching Excellence Framework: year 2 - technical consultation" was published, as well as a call for evidence on "Accelerated courses and switching university or degree". In addition, a few days after the publication the White Paper, on the 19th May, was the first reading in Parliament of the Higher Education and Research Bill.

In short: there are a lot of changes afoot in higher education. We have been working closely with the Royal Society of Biology (RSB) on responding to the Green Paper, the associated consultations and following the progression of the Bill through Parliament.

WHAT ARE THE IMPLICATIONS OF THE WHITE PAPER AND THE FORTHCOMING BILL FOR RESEARCH?

The White Paper and Higher Education and Research Bill will have substantial impacts on the structure and delivery of research funding across the UK. The White Paper implements the findings of Sir Paul Nurse's review of the structure and function of the Research Councils carried out last year. The recommendation was for a new overarching body to provide strategic direction and cross-sector co-ordination for research, into which the individual Research Councils report whilst retaining their autonomy.

UK Research and Innovation (UKRI) is this new overarching, non-departmental public body that will operate at arm's length from Government. It will bring together the seven disciplinary Research Councils, Innovate UK, and the research funding functions of the soon to be discontinued Higher Education Funding Council for England (HEFCE), into a single organisation (also being referred to as a nine-headed hydra depending on who you talk to!).

The dual support system, of separate budgets for UK-wide competitive project funding (currently provided by the Research Councils), and England-only block grant funding (currently provided by HEFCE), will be maintained within the single organisation, and enshrined in legislation for the first time. In the formation of the UKRI, it is intended that it will have a focus on providing strategic direction by co-ordinating cross-cutting issues such as multi- and inter-disciplinary research. These were areas identified as weaknesses in the current structure of the Research Councils by many submissions to the Nurse Review, including ours.

WHEN A MERGER IS NOT A MERGER...

While the Research Councils will be consolidated into a single legal organisation – and therefore have their royal charters revoked, this is not a complete merger. The names and brands of the individual Councils will be retained, and they will have responsibility "for the strategic leadership of their disciplines and on scientific, research and innovation matters." However, while the draft

Higher Education and Research Bill explicitly identifies the individual Councils to be retained, it also gives the Secretary of State power to change or remove these Councils (with the exception of Innovate UK and the newly created Research England) without the need for an Act of Parliament.

Key to the new system will be the relationship between the new board of UKRI and the Executive Chairs and Councils for each research discipline. Each Research Council will continue to set strategic delivery plans, prioritise their assigned budget and liaise with their community. However, each Council's strategic plan must be approved by the UKRI board, which will include research and business representation, and will provide advice to the Secretary of State on the balance of funding across research disciplines.

This has led to concerns of blurred lines of responsibilities across the Secretary of State, UKRI chief executive, UKRI board and the Executive Chairs of the Research Councils. There are also fears that this 'merger' and reorganisation of the councils is unnecessary, that it will cause a disruption for unknown benefits and instead of creating a simplified system it will result in increased levels of bureaucracy.

The Bill will be subject to a significant parliamentary process before it becomes law, with a number of opportunities for MPs and peers to influence its final form, so the final product may change from the version published in May.

THE TEACHING EXCELLENCE FRAMEWORK (TEF) AND ITS METRICS

The Teaching Excellence Framework is being developed to monitor and assess the quality of teaching in England's universities. In the words of the Government, it aims to

- 'provide clear information to students about where the best provision can be found
- encourage providers to improve teaching quality to reduce variability

- provide a quality assurance system through a clear set of outcome-focused criteria and metrics
- drive UK productivity by ensuring a better match of graduate skills with the needs of employers and the economy
- ensure better outcomes for all students, including those from disadvantaged backgrounds'.

As mentioned above, the technical consultation for the TEF was published on the 16th May. The majority of this consultation focused on the contentious issue of what metrics will be used to measure teaching excellence as well as setting out the assessment process.

At the time of writing, the metrics will be measured against three core criteria: teaching quality; learning environment; and employment outcomes and learning gain. Sources of evidence to inform the metrics include the National Student Survey, proportion of graduates in employment/ further education from the Destinations of Leavers from Higher Education survey, and retention rates. We remain concerned that the core proposed metrics are not direct measures of teaching excellence as they do not actually assess teaching quality. Further metrics of weighted contact hours and teaching intensity, as well as a 'highly skilled' employment metric will be trialled in 2018/19.

Institutions will be able to submit further quantitative and qualitative evidence to a panel in an effort to be more flexible in recognising the importance of varying teaching methods across disciplines. The peer reviews will be carried out by an independent panel of academic experts, students and employer representatives who will judge applications. This does add a much needed human element into the process. Nonetheless, we are still concerned about the administrative impacts of submitting evidence on teaching academics, and their time left for preparing for and teaching students. In addition, any further evidence submitted (within the limit of 15 pages) will be for the whole institution and not at the disciplinary

level, which would be of most use and interest to students. There is still a lot about the metrics that needs to be worked out and improved. Through the RSB's consultation response we have called for the implementation of the TEF to be slowed while the details are trialled and adjusted.

Interestingly, higher education institutions are being encouraged to enter into the TEF before all the metrics have even been trialled, the incentive being that it will allow the institution to increase fees in line with inflation. The timeframe and details of how the fees will be aligned with the teaching awards of 'Meets Expectations', 'Excellent' or 'Outstanding' are set out in further detail on our blog. We raised our concerns, in the response to the Green Paper, that having a tiered fee system could have a detrimental impact on widening participation and associated social mobility, international competitiveness, teaching standards and sector diversity.

This has been a bit of a whistle-stop tour of the proposed changes within higher education policy and not all issues have been covered here; check our blog for more in-depth analysis and the latest updates. We are always interested in hearing what our members have to say, and will be continuing to engage with this issue over the coming months. What will the Teaching Excellence Framework mean for you? If you would like to share your views and experiences of the latest changes, please get in touch.

PUBLIC ENGAGEMENT

ANIMAL ATTRACTION AT THE RHS CHELSEA FLOWER SHOW 2016



Jessica Bays | Public Engagement Officer, British Ecological Society
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In May 2016 the Society took 'Animal Attraction: The Garden & Beyond' to RHS Chelsea to celebrate the diversity of pollinators. After delivering our best Discovery Zone Display yet, we were thrilled to be awarded a Silver Medal.



With scientific content developed by more than 25 ecologists and the planting scheme designed by horticulturalist Emily Darby, the display was a fantastic combination of beautiful plants and cutting edge ecology.

Plants that featured in the display were chosen as they were attractive to pollinators both in the UK and further afield, and ranged from those common to UK gardens, to rarer more exotic specimens.

Various interactive elements were incorporated into the display and we were incredibly lucky to have been given permission to show Louie Schwartzberg's wonderful short film 'The Beauty of Pollination – Moving Art'. This film perfectly captures the intricate world of flowers and the process of pollination and if you have not seen this I would urge you to

view it online, as it is beautiful piece of work.

Alongside the video we also had a terrarium of Painted Lady (*Vanessa cardui*) caterpillars. After initial concerns that the common nettle (*Urtica dioica*) was not a suitable food source, and a successful thistle foraging mission by Ken Thompson within the grounds of RHS Chelsea, we were relieved to find the caterpillars found both thistle and nettles amenable food sources! By bringing caterpillars to RHS Chelsea we wanted to communicate the importance of having wilder patches in gardens that provide food and cover, and that if we are to see beautiful butterflies in our gardens we need to cater for the larval stages too.

The highlight of the interactive elements of our display was provided by Dr Manpreet Dhani from Stanford University. Manpreet studies the community dynamics of *Mimulus aurantiacus* nectar microbes, and brought to our attention that some of these nectar yeasts emit volatile organic compounds (VOCs) with a floral smell. Investigations into the role of nectar yeasts in the pollination systems is in its infancy; however, it is thought that these VOCs may play a key role in attracting pollinators to flowers.

Manpreet kindly offered to plate up *Metschnikowia gruessii* and *Metschnikowia reukaufii* alongside the bakers' yeast *Saccharomyces cerevisiae*. Visitors were invited to sniff the plates to see if they could determine which contained the nectar yeast. We were delighted that Manpreet was also able to provide scanning electron microscope images of the yeasts, which aided our discussions with visitors. These fantastic images even identified 3-D prongs which were hypothesised back in 1918 by Johannes Grüss in 1918 as a means to attach to bee hairs, and have been visualised for the first time in these images. This activity was a fantastic hook for visitors.



Floral yeast *Metschnikowia gruessii* cells display complex multicellular "prong" shaped structures. Image courtesy: Manpreet Dhani & Tadashi Fukami, Department of Biology, Stanford University. Technical credits: Lydia-Marie Joubert, CSIF, Stanford University



To celebrate attending RHS Chelsea we also made some of the BES published research on gardening and horticulture free to access online. One paper from each of the BES journals was identified, with lay summaries drafted. As part of this process, each paper was summarised into a single teaser sentence, which is no mean feat! These papers address important questions such as, 'are native plants better for pollinators than exotics?', and 'how good are horticultural varieties at attracting pollinators?'. Go online to find out the answers to these teasers and to see which papers made the final cut.

Curated by ecologists at the forefront of pollination research, or members who had undertaken the Society's Public Engagement Training Programme, the display provided a fantastic platform for ecologists to engage visitors with the science of pollination. We were very lucky that President of the BES, Sue Hartley, could join us for Press Day. Sue took full advantage of this fantastic opportunity, chatting to many of our visitors, including the famous comedian Bill Bailey! Lured in by the tantalising offer to sniff some yeast, Bill stopped for a chat with Sue, and had a long conversation that touched on herbivory and the arms race between plants and their consumers!

The stall was buzzing throughout the duration of Chelsea, with thousands of visitors stopping by to chat to admire the display and chat to our researchers. A special thanks therefore goes to all those who helped with the development of our display, including Ken Thompson, Manpreet Dhani, Jeff Ollerton, Jane Memmott and Alice Hughes and also to those that staffed the stand throughout the event.

For information on the plants, papers and interactive science, or to watch Louie Schwartzberg's amazing video go online to www.BritishecologicalSociety.org/Chelsea



Press day at Chelsea draws the great and the good. Our President Sue Hartley and comedian Bill Bailey

GRANTS

THE ECOLOGICAL CONTINUITY TRUST



Rothamsted Park Grass Experiment: 160 years of experimentation. Image courtesy of Rothamsted Research

Jessica Bays | Public Engagement Officer, British Ecological Society
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**Do you work on long-term field experiments?
Are you looking for funding to support your
research? Look no further...**



The Ecological Continuity Trust works to promote and support long-term ecological experiments (LTEs) throughout the UK. We offer research and travel grants of up to £1000 to researchers to work on, or promote the findings from LTEs, visit www.EcologicalContinuityTrust.org/grants for more information.

WHAT ARE LTEs?

LTEs are ecological experiments, undertaken in the field. To be eligible for inclusion, these must be controlled, manipulative and replicated, with treatments having been applied for a minimum of six years. Examples of LTEs include Park Grass and Buxton Climate Change Impacts Laboratory; at last count there were 26 active UK field experiments at 19 separate sites, so plenty to choose from.

WHY ARE LTEs IMPORTANT?

Ecosystem level experiments are vital to help us understand the changes we see in the landscape around us. Environmental changes can take decades to be identified and even longer to be understood. LTEs therefore provide us with the opportunity to

study real-world systems on time scales appropriate to environmental change. By manipulating ecosystems experimentally, simulating different management regimes or adjusting climatic variables, we can begin to identify and isolate these key drivers of change.

Long term responses to treatments can differ markedly from short-term responses; initial system responses can be dominated by the disturbance associated with initiating an experiment, or can be due the legacy of pre-treatment conditions. In other cases, responses may only be detected after many years of treatments. If treatments are ceased too soon, researchers may mistakenly conclude that treatments have no effect on, or conversely could overestimate, the true extent of the system's response.

Long-term field experiments are indispensable, and cannot be replaced by new analytical models or techniques. Indeed, the valuable data sets and known treatment history make LTEs fantastic sites to validate hypotheses and calibrate new techniques.

CHALLENGES OF LTEs

The inability to control ambient conditions can also be a challenge; however, variability in background conditions can also present fantastic opportunities. Data from the 160-year-old Park Grass Experiment at Rothamsted Research recently identified a biodiversity bounce back in response to reduced atmospheric nitrogen deposition. Species richness and diversity were found to both increase between 1991 and 2012, due to the introduction of cleaner technologies and consequently reduced levels of N deposition (Storkey *et al.* 2015). This research, published in *Nature*, is a fantastic example of how LTEs and the data they generate can serve as a basis for research that reaches well beyond the goals originally envisioned.

LTEs can be costly to manage, and with policy and funding decisions often directed by the rhetoric of the current issue of the time, LTEs can be a challenge to maintain. However, with the scope and rate of change in ecological systems at unprecedented levels throughout human history, we would argue there has never been a stronger case for maintaining these sites.



A storage bottle from Rothamsted

Rain shields at the drought experiment at Buxton



HOW YOU CAN GET INVOLVED?

We want to see an increased number of students and academics conducting research on LTEs, or communicating their findings from these fantastic sites. We provide grants to support these activities. Go online to find out more...

You can also join our newly initiated User Group. We have created a dedicated web space where individuals can access the latest news and updates from the LTE community. Individuals can promote their research, news and updates on our website for free.

Visit www.ecologicalcontinuitytrust.org/user-group/ to see how we can help you expand the reach of your research.

For further information about the Ecological Continuity Trust, visit www.EcologicalContinuityTrust.org or email jessica@britishecologicalsociety.org

PUBLIC ENGAGEMENT

PUBLIC ENGAGEMENT TRAINING & WYCHWOOD!

Jessica Bays | Public Engagement Officer, British Ecological Society
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Communicating ecology to the wider community requires more than simply making your results available in the scientific literature. Our members are taking ecology on the road, as Claudia and Rebecca explain...

PUBLIC ENGAGEMENT TRAINING

Claudia Harflett |
Rothamsted Research



I had read about the Sex Bugs and Rock & Roll in the *Bulletin* and thought it filled a great niche - bringing ecology to young adults & families enjoying the Great British Summer. So when I saw on the BES website that they were running a Public Engagement training programme for FREE(!) I jumped at the chance! I had previously helped with minibeast safaris, river dipping, and plant ID days with the general public, and I know how deceptively hard it can be to explain ecology off the cuff, in a manner that doesn't intimidate and invites individuals to explore nature and the world around them.

The initial workshop started with the amazing David Price from Science Made Simple - a man with the dream job of 'science busking'. Science busking helps academics put into words and actions the fantastic forces and interactions of the world around us. I was really keen to learn how to 'hook' the 'passing trade' and draw visitors back for more, an important skill in a festival when you are relying on word-of-mouth to get visitors to your stall!

Then came more fun; game development. We wanted to adapt existing well known games by adding a science education twist - I worked on a sexual selection version of snakes and ladders called the 'Power of Love', whereas others worked on 'Pin the Parasite' and 'Pollinator Picnic'. The challenge was to create a game that would rival 'Whose Poo?', a game loved by all!

I met loads of great people, keen to share their love of ecology with others. Yes it was hard to find the time for game and poster development, but seeing Idlewild and Bill Bailey made up for that! And if you want to find out 'Whose Poo?' it is, will you will just have to sign up as a roadie for next year - I will be!

Sexual selection meets snakes and ladders



WYCHWOOD

Rebecca Senior | PhD student at
Sheffield University



Given a very much non-misspent youth, I had never been to a festival before attending Wychwood 2016 as a BES Roadie. I like camping, music and talking about ecology, so why not? From the start it was something of an endurance test, with a delayed train and long trek from the bus stop to the campsite under the weight of my gargantuan, parasitic rucksack. Fatigue continued as an undercurrent throughout the weekend, but I rapidly forgot this as I rode the waves of science communication!



The Wychwood Roadies

Wychwood festival is held at Cheltenham racecourse, and is very family-oriented. The great thing about this is that it provides a really receptive and enthusiastic audience for getting initiated as a BES Roadie. Downsides include infuriatingly catchy children's entertainment (I'm looking at you, Mr Tumble!). Our team consisted of nine people, mostly PhD students, from institutions across the UK, and Nick Loughlin of the Open University as team leader. We shared a love of poo and bumblebees and colourful stickers, and our aim was simply to spread this fervour to all festival-goers visiting our tent.

Of course we experienced varying degrees of engagement, but the distribution was definitely skewed towards positivity and curiosity! My favourites included a dubious-looking couple who, after being coaxed into playing the poo game, confessed they had never thought about the information revealed by poo, and would look out for these nuggets on future walks. Then there were the youngsters who enthusiastically (and somewhat optimistically) brought me a spider to identify. Being completely clueless, I talked about the anatomy and ecology of spiders, which was excellent practice in saying 'I don't

know that, but I do know this'. My proudest moment was inventing an elaborate analogy about wanting to steal someone's ice cream, to explain how red deer stags weigh each other up before taking the risk of fighting.

I do despair when I hear researchers bemoan the burden of public engagement. Perhaps it's not for everybody; but not only are you fulfilling your obligation to communicate science to the people who ultimately pay for it, you're also inspiring them to think about the world around them and their place in it, demonstrating that scientists are real (albeit sometimes slightly strange) people, and you're engaging with the science yourself so that you can explain it, and its importance, to a lay audience. What better way to do that than standing in a field in the sunshine?



The Wychwood Festival
at Cheltenham Racecourse

FIND OUT MORE

Go online to find out how you can get involved:
www.britishecologicalsociety.org/learning-and-resources/public-engagement

@BESRoadies

ANNUAL MEETING 2016



BRITISH
ECOLOGICAL
SOCIETY

Registration is open at
britishecologicalsociety.org

11–14 DECEMBER
LIVERPOOL, UK
#BES2016

As always, our meeting has exceptional, international science. We will also have numerous career development workshops and a busy social programme - including our popular gala dinner, Special Interest Group events, Christmas Jumper Day and Fun Run!

Our Annual Meeting is the largest outside North America, and continues to deliver diverse, high quality ecological science through excellent speakers, varied sessions, networking and fun! Last year in Edinburgh we had 1,200 delegates from over 60 countries come together to share science and network. This year we're at the ACC, in the heart of Liverpool by the Albert Docks. We look forward to another packed programme of talks, workshops and socials!

We have a fantastic programme of plenary speakers, our thematic topics cover a wide range of disciplines, including celebrating our Functional Ecology Journal's 30th anniversary. This year we are delighted to see the return of our Early Careers Workshop on Sunday 11 December and excited to announce our new Coding Best Practice Workshop on the same day - places are limited, so sign up when you register. We also have our programmed free workshops on Monday and Tuesday lunchtimes, on a wide range of subjects from wellbeing to publishing.

Our social events are second to none - from our welcome mixer on Sunday (in our exhibition area), to our poster sessions with some great local treats to sample. Our gala dinner and awards return, post-dinner dance, plus our Special Interest Groups will be running various meets and events.

If that wasn't enough, we have the return of our hilarious Science slam, and other fringe events - not forgetting our Fun Run on Monday morning (at 6am!).

Our exhibition area will be our hub - this is where your posters will be, with games, our fantastic exhibitors and all lunches and refreshments. Our last day is our Christmas day, so don't forget to bring your festive outfits as our exhibitors deck their stands!

We're proud of the friendly, welcoming and exciting atmosphere at our meetings - bringing people together, creating new friendships and sharing experiences and knowledge.

All the latest information:
[www.britishecologicalsociety.org/
events/annual-event-2016](http://www.britishecologicalsociety.org/events/annual-event-2016)

SPECIAL INTEREST GROUP NEWS



CITIZEN SCIENCE GROUP

Co-Secretaries: Helen Roy and Michael Pocock
citizenscience@ceh.ac.uk

Student Representatives:
Gail Austen-Price and Gitte Kragh

Citizen Science in Africa: see special report p36

JOIN THE NEW JISMAIL MAILING LIST TO KEEP UP-TO-DATE WITH OUR NEWS

The BES Citizen Science special interest group has moved to JISmail to communicate about meetings, events and papers. Join the BES Citizen Science mailing list for more information on that and other events. Search <https://www.jiscmail.ac.uk/groups/> for "BES-CITIZENSCIENCE" or contact us at citizenscience@britishecologicalsociety.org

BRITISH ECOLOGY AT ECSA

The BES generously provided support for the recent European Citizen Science Association (ECSA) conference in Berlin (19-21 May). This was a gathering of about 300 people from across the world talking about citizen science – with lots of inspiration. The conference covered a wide breadth of subjects but, as befits the history of citizen science, ecological science was well-represented. There were examples of how citizen science in ecology and the environment has contributed to excellent science, public engagement with environmental issues, and wider participation in research. It was also great to see a good number of people from the UK at the conference and our projects represented in the talks, discussions, posters and marketplace. One of the themes of the conference was

impacts on policy: citizen science is a way of undertaking research that has profound policy impacts at local, national and international levels. Another theme was DIY science and hacking – what opportunities could there be for ecological science?

For more information on ECSA and the conference see <http://ecsa.citizen-science.net/> and the summary of each day on Muki Haklay's blog <https://povesham.wordpress.com/>

If you are interested in citizen science, ECSA's 10 principles for citizen science (drawn up by a group convened by Lucy Robinson from the Natural History Museum) are essential reading: <http://ecsa.citizen-science.net/node/94>

MAY CS-ZSL JOINT MEETING

Christopher Wheatley

The science of climate change impacts on species and ecosystems is well established both in terms of identifying and projecting broad patterns of change. However, different species, habitats and ecosystems are responding in widely different ways and it is important to target conservation action on those where climate change poses the greatest threat. A wide variety of approaches to vulnerability assessment have been developed to address the issue, but to date they have rarely been compared or evaluated and there is little consensus within the community as to what approach should be used. In May the Climate Change Ecology SIG and ZSL jointly hosted a one day meeting focussed on the latest developments in assessing vulnerability of biodiversity to climate change, aiming to bring together academic, practitioner and policy communities to explore this important topic.

The theme for the meeting was closely related to my own PhD research and one which I was looking forward to attending, even before I was asked to present some of my work during the day. It was the first time I've ever been invited to speak at a conference which

was both exciting and nerve-racking, having to follow talks from both of my academic supervisors on the day definitely added to my anxiety levels!

The day opened with a series of introductory talks covering the impacts of climate change across terrestrial, marine and freshwater ecosystems. These talks demonstrated the current and ongoing threats of climate change from individual species level to whole ecosystem scales, highlighting the importance of climate change vulnerability assessments in protecting biodiversity in the future.

I spoke in the second session focussing on the different methodologies used to assess climate change vulnerability. The session provided a detailed overview of what existing approaches are currently available and how well the different methods perform at identifying at-risk species. Some key areas where more research is needed to improve on currently available methods were also discussed, particularly to make the results more useable by a non-scientific audience.

The final set of speakers gave examples of the practical applications of climate change vulnerability assessments and how they are being implemented to identify species and landscapes most at risk. As someone working on developing and improving how we carry out vulnerability assessments it was fantastic to see how the results are being utilised by conservation organisations to protect biodiversity all over the world.

The meeting was well attended by PhD students, many presenting posters showcasing the excellent work being done to further develop and improve how we carry out climate change vulnerability assessments. Hopefully they all found the discussions and networking opportunities with practitioners and policy makers as interesting and informative as I did.

29 & 30 JUNE, NAIROBI, KENYA: CITIZEN SCIENCE IN EAST AFRICA

Much of the international discussion about citizen science is focussed on developed countries, but what is the potential for citizen science in other parts of the world? This workshop brought together practitioners and stakeholders from East Africa to discuss the future of citizen science in the region and highlight the good work that is already going on. A report on this hugely successful event is on p36. The workshop was supported by the BES and organised by the Tropical Biological Association and the Centre for Ecology & Hydrology.

UPCOMING EVENTS

In the autumn (date to be arranged) there will be a feedback event exploring opportunities for citizen science across the world. Look out for opportunities to join this workshop.

Friday 9 September, University of Reading: Enthusiasm for Citizen Science: Taking stock of motivations, costs and benefits.

It is often said that citizen science is growing as a field of practice, and with that comes a growing understanding of how citizen science can and should be used. At this event, we will be sharing best practice and current thinking on recent research surrounding motivations (of citizens, scientists, practitioners and policymakers) and the cost and benefits of citizen science. The event will introduce several research projects, including two recently funded by the UK Environmental Observation Framework (see <http://www.ukeof.org.uk/our-work/citizen-science>). Bringing together members of the BES Citizen Science SIG with representatives from monitoring agencies, this one-day event on 'enthusiasm for citizen science' will enable participants to take stock of recent research, share good practice and identify new directions and issues for citizen science research to consider. Email h.geoghegan@reading.ac.uk for more information.

September (date to be arranged; see website for information), London: Making London Smart

Monday 10th October, University of Cambridge: Analysis of Citizen Science Data

An event jointly organized with the Quantitative Ecology SIG (see their column for more information). Citizen science data can be excellent quality, but many citizen science projects produce data that are challenging to analyse – these data are often unstructured (depending on the project) and there are random and systematic biases that need to be accounted for. This event will facilitate dialogue between citizen science practitioners and statisticians, so that together we can make the best of data submitted by citizen science participants.



MICROBIAL ECOLOGY GROUP

Co-Secretaries: Rachael Antwis and Xavier Harrison
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[@BES_Microbial](https://twitter.com/BES_Microbial)

Since the last *Bulletin*, the Microbial Ecology SIG has been busy organising our first meeting; "Microbial Ecology: From Individuals to Ecosystems" at the University of Salford in June. At the time of writing the event hadn't yet taken place, although by the time of publication it will have done! So we will provide a full post-match analysis in the next *Bulletin*. However, we are expecting 40 people, with a plenary from Professor Alan McCarthy (University of Liverpool) on the history and future of molecular microbial ecology, and another 12 short talks on microbial ecology in many different guises, from soil to trees to amphibians to chicken farms! On the second day we will run a workshop to identify 50 research questions of importance to the field of microbial ecology, in collaboration with Professor Bill Sutherland, which will then be prepared for publication.

We have also filled up our committee, which comprises of the following:

Dr Rachael Antwis, Lecturer in Global Ecology and Conservation, University of Salford, Co-secretary

Dr Xavier Harrison, Research Fellow, Institute of Zoology, Co-secretary

Dr Kayla King, Associate Professor in Parasite Biology, University of Oxford, Deputy secretary and Committee Advisor

Sarah Griffiths, PhD Candidate, University of Manchester, Events Rep

Nim Kibbler, Undergraduate Student, Scotland's Rural College, Communications Rep

Chloé Orland, PhD Candidate, University of Cambridge, Student Rep

Andrew Devaynes, PhD Candidate, Edge Hill University, Student Rep

Dr. Kristian Forbes, Postdoctoral Researcher, University of Helsinki, Early Careers Rep

We now have an active Twitter feed (@BES_Microbial) so please follow us to keep up with all things microbial ecology!



ECOLOGICAL GENETICS GROUP

Paul Ashton
ashtonp@edgehill.ac.uk
[@BES_EGG](https://twitter.com/BES_EGG)

This year's Ecological Genetics Group meeting marked the 60th anniversary of the founding of the group and, as such, there was only one possible venue – Aberystwyth, where it all began in 1956. The event was hosted by John Warren, and the talks were held in the Old College on the seafront, the spectacular 1860s building originally built as a hotel but later to become the home of the first university in Wales in 1872. Despite (or possibly at least partly due to) Aber's relatively remote location, it has long been a popular venue for EGG, and this year was no exception with almost 50 delegates attending.

The meeting was preceded by a workshop on "Phenomics and

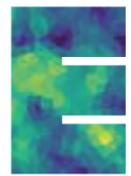
Genomics in Ecological Genetics” and was hosted by the National Phenomics Facilities on the Gogerddan campus, part of the Institute of Biological, Environmental and Rural Sciences (IBERS), Aberystwyth University. In an age of “Big Data”, new tools and approaches are required, and the presentations covered the use of such approaches in Ecology. Talks were followed by visits to and demonstrations of the Phenomics and Genomics Centres, as well as the Nutrient Flow Facility.

There was the usual breadth of talks, including a fascinating opening section on the evolution of languages and dialects. Other subjects ranged from morphometrics to next-generation sequencing, and encompassed organisms from all five of the original Kingdoms of Life – possibly a first for EGG. The Keynote Talk was given by award-winning writer and TV presenter Steve Jones, a native of Aber, and investigated the intriguing subject of “Snails in Art and the Art of Snails”. Needless to say, Steve also did quite a bit of book signing ... Tuesday ended with fish and chips on the windy Aber sea front, keeping a cautious eye out for opportunistic seagulls.

The traditional Wednesday afternoon field trip took delegates up into the hills surrounding Aber to the University’s upland research station at Pwllpeiran. The Experimental Husbandry Farm in the area is the only publicly owned farm in England and Wales, and the farm and the adjacent Elenydd Special Area of Conservation offer opportunities to carry out a wide range of research, particularly on agricultural land classified as Less Favoured Area. One such ambitious project is aimed at growing daffodils on the upland pasture. As well as being one of the national emblems of Wales, daffodils are the UK’s only feasible natural source of Galantamine, a compound that has been approved in the last twenty years as a treatment for Alzheimer’s disease. Following a trip to the abandoned metal mines at Cwmystwyth, the Brignant long-term extensification plots, where data have been collected for over ten years, and the beautiful Hafod estate, everybody returned to the Old

College for the Poster Session and wine reception. Then up the Penglais hill for the Conference Dinner and the traditionally competitive (and often chaotic) EGG-Heads quiz. Not to be outdone by the success of the “Spot The Real Dinosaur” round at last year’s EGG hosted by Paul Ashton (Edge Hill University), the highlight of the fourth EGG-Heads quiz was undoubtedly the “Spot The Real Welsh Place Name” round. Or maybe it was the birthday cake...

Next year, EGG will be going on tour. The 57th EGG meeting in 2013 was held at Queen’s University Belfast, the first time the meeting had left mainland UK, and was hailed as a great success. Consequently, the 61st EGG meeting will be the first to be held outside the UK, and will be hosted at the beautiful Irish National Botanic Gardens in Glasnevin, Dublin. Organization is already well under way, so watch this space.



QUANTITATIVE ECOLOGY GROUP

Nick Golding
quantitative@
britishecologicalsociety
@BES_QE_SIG

The SIG organised two successful training events earlier this year. The first was a two-day course on spatial data analysis using R, held at the University of York in April, and the second a one day course on data management in R, held at BES HQ in London in June. These were two of the most requested topics in the training needs survey Susan and Duncan carried out last year.

The SIG is organising two more events this year. First, we’re sponsoring a workshop on point process models after the International Statistical Ecology Conference in Seattle in July. The meeting will bring together statistical ecologists with interests in a range of applications to discuss how we can make the new models more useful to ecology. Second, we’re jointly (with the Citizen Science SIG) organising a meeting on analysis of

citizen science data. That meeting will take place on 10th October in Cambridge. As soon as registration opens, we’ll publicise it via our social media channels below, so keep an eye out for more information!

We’re always keen to hear suggestions for future meetings, or where we can sponsor meetings planned by other groups. If you have any requests of ideas of ecological topics with a quantitative bent, please get in touch! (contact details below)

The SIG committee had some fun playing with logo ideas as part of the society-wide rebranding (which should have taken place by the time this copy of the *Bulletin* goes to press). The brief was to come up with an engaging image that represents quantitative ecology and fits within the new logo template. We hope you like it!

After organising a cracking thematic session on prediction at the last Annual meeting, and contributing to the group’s social media strategy, Chris Clements has decided to stand down from the committee. Miriam Grace has made a switch within the SIG, from Social Media Rep to Policy Rep where she’s hoping to help increase the impact quantitative ecologists can have on various policy areas. After this reshuffle, we’re looking for two ecologists to join the SIG committee to fill the roles of Social Media Rep & Finance Officer. Being a committee member isn’t much of a time commitment, and is a great way to help support the quantitative ecology community. Drop us a line if you’re interested and would like to know more.

You can get information on upcoming events, news on all things quantitative, and get in contact with the SIG committee via twitter (@bes_qe_sig), facebook (facebook.com/besquantitativeecology), on our blog (besquantitativeecology.wordpress.com), or via email (quantitative@britishecologicalsociety.org). Please do get in touch!



AQUATIC ECOLOGY GROUP

Nessa O’Connor and Lee Brown
aquatic@britishecologicalsociety.org
@BES_aquaeco

The Group has been extremely active since its re-launch in 2014. Our goal is to foster a dynamic group of individuals able to address the broad range of challenges faced by the aquatic community, and to further knowledge in this research area. The BESAG recently hosted its Annual Science Meeting and Early-Career Researcher Workshop at Charles Darwin House, London. If you would like to suggest themes or topics for future activities and meetings, please contact us. The BESAG is an active network of aquatic ecologists whose interests tend to overlap with several other SIGs and we are keen to develop cross-cutting activities.

We would like to thank to everyone who submitted their photos with the topic of freshwater and marine ecology. The best images and our new logo will be posted on our new website, which is coming soon. Please watch this space:

<http://www.britishecologicalsociety.org/getting-involved/special-interest-groups/aquatic-ecology/>

FUTURE MEETINGS:

30th September 2016

Our **Aquatic Macroecology** meeting is now open for registration

The main focus of this meeting is to foster the integration of macroecological approaches into the study of aquatic ecosystems. Most predictions about how aquatic systems respond to environmental change require a deep understanding of patterns and processes at different scales. A great deal of what is known about the key processes operating in aquatic systems arises from small-scale empirical and/or experimental studies. The growing

AQUATIC MACROECOLOGY

Charles Darwin House, London 30/09/2016
Registration details coming soon



interest in integrating macroecological approaches to advance our knowledge about aquatic systems makes this an emerging and exciting topic. This is a joint meeting organized by the Aquatic and Macroecology SIGs and supported by the NERC/ DEFRA- Marine Ecosystem Research Programme.

More details coming soon - please watch this space:

<https://www.eventbrite.co.uk/e/aquatic-macroecology-tickets-22024592148?platform=hootsuite>

PAST MEETINGS:

Ecological resilience

Ian Donohue (Trinity College Dublin) and Guy Woodward (Imperial College London) organised a workshop on ecological resilience hosted by Imperial College London in March. The workshop, funded by the British Ecological Society Aquatic SIG, and attended by world-leading theoretical and empirical ecologists and representatives of both the IUCN (International Union for the Conservation of Nature) and IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) had the aim of developing operational measures of resilience that link with management and policy goals.

Contact person: Miguel Matias
(mmatias@ic.ac.uk).

TEMPORARY RIVERS WORKSHOP

47 researchers met in Nottingham Trent University for the Temporary Rivers Workshop. The aim of the workshop was for those within the UK working on the ecology of temporary rivers and ephemeral streams to come together to discuss their work and views and to seek collaboration. From a practical management point of view there is a lot of uncertainty associated with what we know and how we manage temporary and ephemeral streams. We highlighted the questions and issues we have, reviewed current scientific thinking, what research is being undertaken and where the research gaps are. The contacts made during the workshop will be used to input on behalf of the UK to a European COST action: http://www.cost.eu/COST_Actions/ca/CA15113

FOLLOW US!

Have access to the latest news, future meetings and job advertisements in freshwater and marine ecology!

Twitter: @BES_AquaEco -
#Thursdayjobday every Thursday at 11am

Facebook: BES-Aquatic Ecology Group

Mailing list: Send an email to v.r.edmonds-brown@herts.ac.uk

Website: You can also find us on the BES website in "Getting Involved", "Special Interest Group".



Some of the participants at the aquatic ecology workshop. From left to right, Sonia Kéfi (University of Montpellier), Edmund Barrow (IUCN), Jay Piggott (IPBES, University of Otago) and José Montoya (CNRS).

LOOKING FOR A JOB IN AQUATIC ECOLOGY

#Job, #Postdoc, #PHD, #Internship... we give you the freshest job offers in marine & freshwater ecology every Thursday at 11am.

@BES_AquaECO #Thursdayjobday

Tag us to share your job offers

PLANTS SOILS ECOSYSTEMS

Ellen Fry
plantsoileco@britishecologicalsociety.org

Plants-Soils-Ecosystems is a special interest group for people interested in plant-soil interactions, soil ecology and biogeochemistry. In this issue of the *BES Bulletin* we recapitulate on the April PSE meeting in London and highlight the soon-to-be most downloaded e-book: the Global Soil Biodiversity Atlas!

PSE MEETING RECAP

Relena Ribbons
@RelenaRibbons

The Plants-Soils-Ecosystems annual meeting in London was attended by a great mix of scientists. After lunch we started off with short-format talks ranging from large to small-scale research topics. The speakers covered a large array of topics from targeted experiments on fungal associated to global meta-analyses. The format really lent itself nicely to covering a lot of ground and required speakers to get their key messages across in a short time, which everyone did quite nicely.

The talks were followed by a careers session, where we heard from Roxanne Anderson (Research Fellow at the University of the Highlands and Islands), Georgina Key (Research and Knowledge Transfer Manager on the Agriculture & Horticulture Development Board), and Amy Zanne (Professor at George Washington University), who each shared their journeys in life and science. We followed their talks with a panel discussion where each speaker also shared their top tips for success with the audience. A common theme was to pursue your passion, enjoy the journey, and make the decisions that are the best for you and your interests (comparing with others generally doesn't lead to happiness). This was followed by the poster session, pub time, and dinner where much merriment ensued.

The second day of the meeting started off with Mike Whitfield extolling the wisdom of using R for improved data wrangling and manipulation techniques. We covered just the tip of the iceberg but did talk about dplyr, piping data, and github. An energetic talk, despite the early hour, meant that a few in the group even pulled out R to code before the morning coffee break. After coffee we returned with our policy session. We heard from Jonny Wentworth, an Environment adviser from the Parliamentary Office of Science and Technology (POST), who explained what role we scientists can play in policy decisions. We also heard from Ben Connor, Policy Manager within the BES, explaining the new special interest group policy representative's scheme; and Jessica Bays, Public Engagement Officer at the BES.

We wrapped up the meeting with several small group discussions of some of the big challenges our field is facing, or areas that research should be focusing on. Some of the key take home messages were that we should aim to standardize methods to make studies comparable, and to keep detailed meta-data on our research projects. Another key point that was raised was an interest in working collaboratively with policy-makers and translating science for a more general audience. There were several calls for increasing networks of research projects, following the model of the NutNet, for example. Lastly, it was brought up that a winter ecology symposium would be beneficial for PSE and the BES as a whole. Watch this space.

We thank everyone who attended the meeting for making it a successful event. See you at the next BES or PSE meeting!

GLOBAL SOIL BIODIVERSITY ATLAS

A great new resource is freely available for download: the highly anticipated global soil biodiversity atlas! Check out some of the press coverage here, and see if there is an event near you celebrating the launch of this tome by swinging by the global soil biodiversity webpage

at globalsoilbiodiversity.org. There is an event planned at the University of Manchester in July at the EuroScience Open Forum. Spread the word about the new atlas, integrate it into your teaching or send it to a friend who keeps asking you why you are studying soil.

PLANTS-SOILS-ECOSYSTEMS BULLETIN

Plants-Soils-Ecosystems not only sends interesting emails about job opportunities, studentships and meetings to those signed up to our mailing list. We also compile a bi-monthly *Bulletin*, which includes plenty of items of interest to ecologists interested in plant-soil interactions, and is compiled by committee members Relena Ribbons and Jessica Clayton. The success of Plants-Soils-Ecosystems depends on you, so keep sending us your jobs, studentships and interesting facts! You can find the archive of previous *Bulletins* on our website: besplantsoileco.wordpress.com.

GET INVOLVED!

We are looking for contributors to our online journal club, #psejclub. We're always looking out for enthusiastic people with ideas for organising meetings, training events, field trips, socials or other interesting activities within the spheres of plant-soil interactions and soil ecology. Email us at besplantsoileco@gmail.com if you are interested and have ideas about how to make your special interest group work for you!

JOIN US!

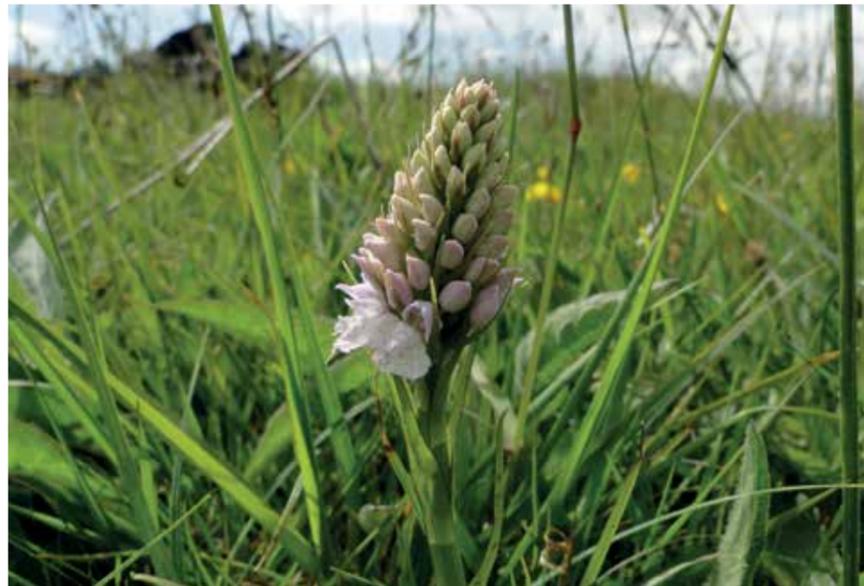
Sign up for our email list by sending an email to: listserv@jiscmail.ac.uk; Subject: BLANK; Message: SUBSCRIBE PLANT-SOIL-ECO Firstname Lastname. Follow us on Twitter @BESPlantSoilEco, and like us on Facebook: [fb.com/BESPlantsSoilsEcosystems](https://www.facebook.com/BESPlantsSoilsEcosystems). Finally, don't forget to check out the blog and journal club at besplantsoileco.wordpress.com.

ECOLOGY IN IRELAND AND THE IRISH ECOLOGICAL ASSOCIATION INITIATIVE

Ian Montgomery | Queens University Belfast



The history of ecology in Ireland mirrors that in Britain with its roots in natural history, particularly botany, and emergence from Victorian societies promoting natural philosophy and then natural sciences.



Dactyl fuschii, The Burren National Park, Co. Clare. Photograph by Alain Finn

Irish scientists, thus, have a long history of engagement in ecology. The British Ecological Society was founded in 1913 based around the British Vegetation Committee which involved the 'amateur' Irish botanist, Robert Lloyd Praeger, who became the third President of BES (1921-2). Irish representation at such an august level has been intermittent ever since with just two further 'Irish' presidents, Norman Alan Burges (1958-59) and Aryan Macfadyen (1987-88), both based in The New University of Ulster. Macfadyen and Palmer Newbould were founding professors in a new department of biology which had strong environmental credentials, and made a lasting impact on ecology and the governance of conservation in Northern Ireland. Both featured in recent issues of the *Bulletin*.

The development of ecology and ecologists in Ireland have not followed quite the same trajectory as in Britain. This may reflect differences in their landscape, climate and Quaternary history, but for much of the 20th century there was simply too little support in both northern and southern jurisdictions to address diverse ecological issues with limited, thinly spread expertise. Nevertheless, Irish ecology achieved a great deal during the last century because it focussed on the distinctive characteristics of Ireland's ecology with welcome inputs from British and other overseas colleagues. For example, we demonstrate a fascination for palaeoecology, peatland ecology, the limestone pavement flora of the Burren, relict populations of freshwater fish and the littoral and sublittoral ecology of Lough Ine. The continuing

good relationships and cooperation amongst ecologists north and south was, and still is, a factor facilitating ecological studies in Ireland. The final evenings of BES Winter Meetings were often when ecologists based in Northern Ireland and the Republic of Ireland met for the first time, especially during the difficult times of the 'Troubles'.

Times have changed. The rise of the Celtic Tiger, with more generous support for Irish science in general, and substantial European funding, led to an expansion of ecological research throughout the island. This was also aided by the expansion of RCUK funding in the first part of the new millennium. Although these sources of funding have been constrained in recent years there are signs of recovery as well as uncertainty following the result of the referendum on EU membership in the UK. Whatever happens in the immediate future regarding funding, there are now more active ecologists working in HE, Government, NGOs and industry than Praeger or Macfadyen could ever have envisaged. Whether we approve or not, Irish ecologists are better connected within the island by EU-funded motorways and served internationally by multiple flight connections.



The IT Sligo campus

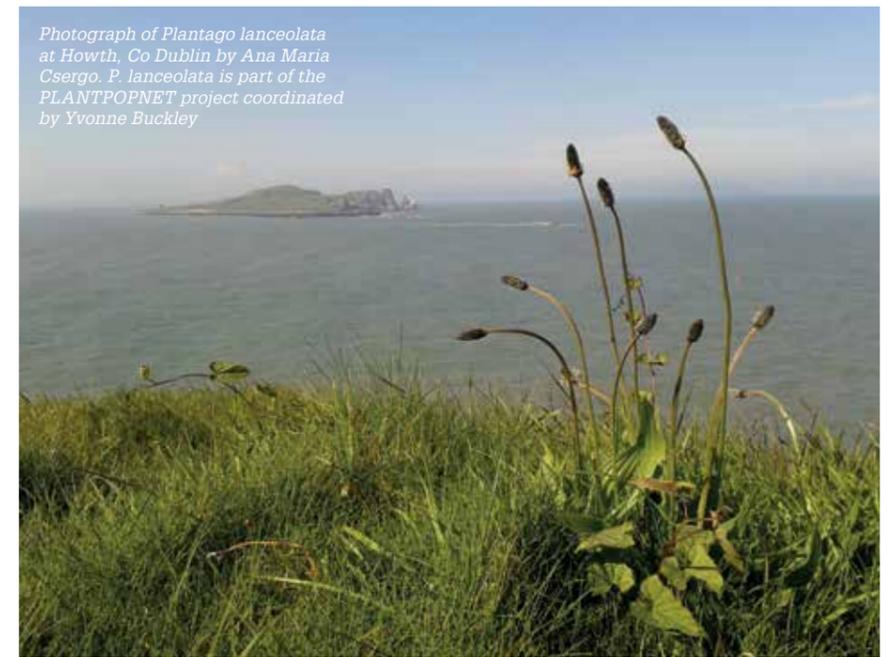
Productivity over the last twenty years has also increased both in terms of the number of papers and journal standing with approaching 1000 papers (128 in BES journals alone) featuring authors based in Ireland, listed on WoSci Science Citation Index.

The upsurge in ecological activity in Ireland in recent decades may also reflect recognition of the uniqueness of the Irish environment as well as the many challenges that we face. Unlike Britain, Ireland was covered entirely by ice during the last glacial maximum, remained isolated during the immediate stages of ice retreat and emerged as an island around 15,000 years ago much earlier than Britain. The arrival of people in successive waves from 12,500 years ago onwards brought about environmental change such that the natural tree cover has been lost and replaced by grass-based agriculture and, ultimately, reduced landscape heterogeneity. There is increasing phylogeographical evidence suggesting that although Ireland has fewer species than Britain and particularly continental Europe, they can include older, genetically more diverse and unique genotypes. Hence, Ireland has unique species assemblages and genetic diversity and does not simply support a subset of species present elsewhere.



The Burren National Park, Co. Clare. Photograph by Alain Finn

The position of Ireland on the western edge of Europe leads to a cooler, wetter climate which in turn affects vegetation cover in terms of production as well as species composition. As an island, climate change impacts are likely to be greater in Ireland than previously considered whilst alien invasive species arguably are having greater and more immediate impact. Ironically, a cool wet climate leads to a build-up of peat and lake



Photograph of *Plantago lanceolata* at Howth, Co Dublin by Ana Maria Csergo. *P. lanceolata* is part of the PLANTPOPNET project coordinated by Yvonne Buckley

sediments which have enabled detailed description of the changing Irish environment, an invaluable asset when considering anthropogenic climate change impacts and impacts of species that have been introduced recently as well as in the past.

Around 40 academics, professional ecologists and early career researchers from 12 institutions in Ireland met in Trinity College Dublin in June 2015, to discuss the timely proposition of establishing a new organisation, The Irish Ecological Association, within BES. IEA aims to foster cross-border links and collaboration between disparate groups (e.g. consultants and academia), increase the profile of ecology in Ireland and provide independent ecological advice on environmental issues. It is run on an entirely voluntary basis with free membership to BES and non-BES members alike (some 50% of the start-up meeting attendees were current/past BES members). IEA will also seek to: provide a portal for existing BES activities, resources, networks and training opportunities; promote ecology to students and early career ecologists; provide a forum for postgraduate students and early career researchers to network and identify career opportunities; and, stimulate collaboration as well as increase research funding for ecology in Ireland.

The inaugural meeting of IEA will be held in Sligo on 25th and 26th November 2016. It is aimed at ecologists working in Ireland, Irish ecologists working outside Ireland and all other ecologists with interests in the ecology of Ireland. The conference is broad-based in terms of topic and stage of career. The conference is titled Ecology and Evolution Conference 2016 and comprises two full 'working' days with plenary speakers, oral sessions and poster presentations. There will also be workshops on ethics in research, science communication and academic and alternative careers. Being Ireland, there will be plenty of time to talk informally.

FIND OUT MORE

For further information on the Sligo conference please contact Dr Caroline Sullivan: sullivan.caroline@itsligo.ie

If you are interested in IEA and wish to be added to our mailing list please contact: IrishEcologicalAssociation@gmail.com

**IRISH
ECOLOGICAL
ASSOCIATION**

A NEW UK CHARTER FOR TREES, WOODS AND PEOPLE

The Woodland Trust is heading a campaign to redefine the relationship between trees and people in the UK for the future. A proposed new Charter for trees, woods and people recognises the importance and value of woodlands in our society.

OF INTEREST TO MEMBERS

Valentine Seymour | University College London & Woodland Trust
valentine.seymour.12@ucl.ac.uk

Over the course of the year the Woodland Trust will lead, with the support of 51 other organisations¹, a new campaign to celebrate the value of our UK woodlands in an effort to secure their future by creating a new Charter for Trees, Woods and People. The new charter will be launched in November 2017, marking 800 years since Henry III signed the original Charter of the Forest which protected and restored people's rights of access to Royal Forests.

As part of this project local groups, clubs, councils and committees are being encouraged to take part by bringing people together to celebrate the woodlands at the heart of their communities. Since March, the 52 Charter Steering Group organisations have been recruiting volunteer 'Charter Champions' to help collect ideas and stories which will eventually feed into the building of the charter.

Beccy Speight, Woodland Trust CEO, has said: "Our collective ambition is for a charter that puts trees back at the heart of our lives, communities and decision making - where they belong. The charter will provide guidance and inspiration to allow us all to appreciate, preserve and celebrate our trees and woods for what they do for us in so many different ways. Inspired by something that happened 800 years ago, there is no better time than now to shine the spotlight again on the benefits that trees and woods bring to us all today and to future generations."

The new campaign has been built from similar pilot projects that have occurred over the years. One such venture was the 'Memories project' undertaken in 2012 which focused on Joyden's Wood in Kent (UK). As part of this, a team of volunteers collected one hundred years of untold memories shared by those whose lives have been inherently linked to the woodland. The memories each represented a point in the wood's history which had been shaped by people. Some of these included youthful memories living on the bomber flight path during the second world war, ongoing campaigns to save the woodland from development, as well as people's life long relationship with the woodland. At the end of the project, the stories were put up online for all to enjoy, with many more being shared.

When I spoke to Joyden's Wood Site Manager, Simon Bateman, who helped lead the Memories Project he said: "Joyden's Wood is full of stories and this was

a fantastic project that pulled these memories and tales of the woodland together into one place where everyone can see and enjoy them."

As I have found working within these projects, as well as being involved in various public engagement initiatives, our stories and connections with nature span the centuries. One example can be found at the Trust's Blackbush Shaw in the Cudham Valley (Kent, UK) where Charles Darwin spent time as he investigated the driving force behind his theory of evolution and natural selection. The surviving landscape, plants, insects, animals and buildings bear unique testimony both to his outstanding contribution to human understanding of natural life and to the scientific methods he developed, still used throughout the world.

Through this campaign, it is the coalition's ambition to set out principles in the 2017 charter that will articulate the relationship between people and trees in an effort to enhance people's future access to our woodlands. It is anticipated that sharing stories and memories will help create a lasting legacy in communities across the UK. It is also hoped that the project will bring a change to people's awareness and understanding as well as improved links to the natural world, which many of us can take for granted.

For further information about the campaign and to share your stories please go to <https://treecharter.uk>

REFERENCES

¹The organisations involved in the call for a Charter include: Ahmadiyya Muslim Youth Association UK, Ancient Tree Forum, Arboricultural Association (AA), Bat Conservation Trust, Black Environment Network, Borders Forest Trust, Butterfly Conservation, Campaign consultant, Coigach-Assynt Living Landscape Partnership, Common Ground, Community Woodlands Association, Confor, Country Land and Business Association (CLA), Campaign to Protect Rural England (CPRE), GreenBlue Urban, Grown in Britain, Institute of Chartered Foresters (ICF), Legal Sustainability Alliance LSA, Llais y Goedwig, Mersey Forest, National Association of Local Councils, National Trust, National Union of Students, Natural Resources Wales, Northern Ireland Environment Link, Plantlife, Red Rose Forest, Royal Forestry Society (RFS), Royal Horticultural Society (RHS), RSPB, Small Woods Association, Soil Association, Small Woodland Owners' Group (SWOG), Sylva Foundation, TDAG (Trees and design action group), The Centre For Sustainable Healthcare, The Conservation Foundation, The Land Trust, The National Forest, The Sherwood Forest Trust, The Tree Council, The Wildlife Trusts, The Windsor Estate, Trees for Cities, Wild Network, Woodlands.co.uk, and finally, Woodland Heritage.

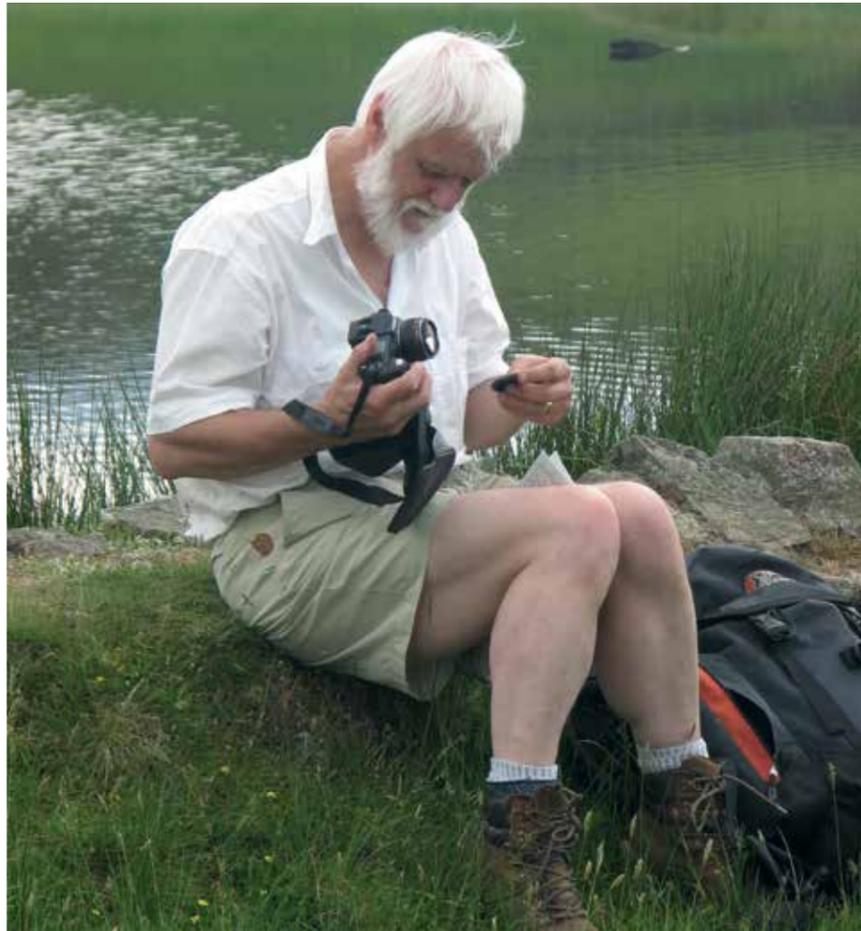
PROFESSOR BRIAN MOSS

1943–2016

It was with great sadness that we learned of the death of Emeritus Professor Brian Moss on Friday 27th May. He informed his close friends that he was terminally ill just after New Year and since then he has provided a very upbeat, indeed somewhat humorous, series of emails with respect to his condition.

Brian was a polymath, a true “Renaissance Man”, but was best known as perhaps the most influential freshwater ecologist in Europe over the past three decades, and without doubt the world’s leading scientist on shallow-lake ecology. Much of his research extended well beyond lakes – for example his identification of alternative stable states, studies on trophic dynamics, and his work on climatic effects on lake ecology. He was an inspirational teacher – not only to University students but to many fellow professionals in a wide range of disciplines.

Born in 1943 in Stockport, his school days were spent identifying plants in the Peak District before undergraduate studies and a PhD in Botany supervised by Frank Round at the University of Bristol. He then spent time abroad, studying tropical limnology at Lake Chilwa in Malawi, and thereafter the impacts of nutrients and fish predation on the structure of a deep, eutrophic lake in Michigan using large-scale experiments. His next move, to the University of East Anglia (UEA), saw him blossom further in the interdisciplinary School of Environmental Sciences, beginning his world-renowned work on the eutrophication of the Norfolk Broads. At this point, he also entered the field of restoration ecology, making a first attempt at restoring the conservation value of such systems through bio-manipulation – innovatively engineering fish communities and zooplankton grazers to affect algal stocks. He was involved in projects that led to removal of phosphate



from several Broadland wastewater treatment works. He has maintained an active research interest in the Broads ever since and his popular “New Naturalist” account (*The Broads*) summarised their history and ecology, all interwoven with Brian’s radical ecological thinking.

Some seventeen years after joining UEA, Brian succeeded Professor Tony Bradshaw FRS as Holbrook Gaskell Professor of Botany at the University of Liverpool. Here he continued his research on shallow lake systems in the North West of England. He also developed an extensive experimental pond system at Ness Botanic Gardens where he assessed ecological function

in relation to nutrient and climate manipulation – in other words pond-warming. This was yet another ground-breaking step with which others are still trying to keep pace.

Brian has published an impressive number of publications, and the fifth edition of his standard textbook on freshwater ecology is now at proof stage. Also at the proof stage is a guide (Ponds) in the *Naturalists’ handbooks* series. Brian was a superb communicator and a very popular plenary speaker. He has been President of the British Phycological Society, Vice-president of the British Ecological Society, and both Vice-president and President of the

International Society for Limnology, and for seven years (from 1981) edited the *Journal of Ecology* for the British Ecological Society. In 2007 he was awarded the August Thienemann–Einar Naumann Medal – the highest international honour for outstanding contributions to scientific limnology, in 2009 the Excellence in Ecology Prize awarded by the International Institute of Ecology, and in 2010 the Institute of Ecology and Environmental Management’s Medal. Part of the former prize was the freedom to write a book on “anything of his choosing”. The outcome was a *tour de force: Liberation Ecology*, a scientific textbook written for the general public, using parallels in religion, art, music, and his mother-in-law’s washing line to get over complex issues of ecology and environment. *Liberation Ecology* was, in turn, awarded a prize: the Marsh Christian Trust Ecology Book Award by the British Ecological Society. Brian’s eighth book *Lakes, Loughs and Lochs*, also in the “New Naturalist” series (he wanted to get the Welsh Llyn into the title also, but it didn’t scan), moved his radical ideas on environmentalism forward. Brian was awarded a DSc by the University of Bristol in 1981, and in 2014 an Honorary Degree (Fellowship) at the IHE, Delft. Also in that year he became Acting Director of the Ecology Institute (Kinne Foundation) in Germany.

Beyond this very impressive curriculum vitae, Brian had three important qualities that were altogether more human.

The first was an uncompromising approach to “doing the right thing” environmentally and in his relations with others. He was always prepared to argue his corner, quietly and effectively. He did this always with the politeness and elegance of a true gentleman, and without causing upset. However, he had no truck with bureaucracy for its own sake, seeing it as an unnecessary intrusion, preferring to trust students, staff and colleagues to take responsibility for their own actions. His poetic blasts at bureaucrats were legendary and extremely witty, particularly for anyone able to follow insults that issue sometimes in spontaneous Latin

prose. Lately, he has been a thorn in the flesh of Natural England over the management of a local nature reserve near his home. The discussion got as far as the Ombudsman, and Brian was very disappointed at the overall verdict (thought himself fobbed off). However, not to be outdone, he had recently complained to the Fraud Dep’t of the Rural Payments Agency. They, too, tried to fob him off (twice) and argued that ‘must’ in a legal document (e.g. X ‘must’ be done for the payments to be made) did not actually mean X had to be done: it was optional. A week before he died he mentioned that the only course of action was taking them to court.

Second, Brian was a superb, boundlessly enthusiastic and inspirational speaker. His taught courses often attracted an audience from those who were not enrolled, particularly for sessions in which he conducted second year students in Flanders and Swann’s immortal song, “The Hippopotamus”. Brian’s rendering is now so famous that it can be viewed on YouTube, where it has scored thousands of hits. He was a brilliant field teacher. Latterly, the honours field courses were smattered with substantive arguments between Brian and I; the students would often say, “they argue like a married couple”; we were told it was brilliant to watch in practice, even though well-rehearsed. We also were extremely effective at dealing with University bureaucracy when our “Mr Nice” and “Mr Nasty” (swapped between the two of us as appropriate) pincer strategy was as effective at getting the correct outcome as it was cynically implemented.

Third, Brian had an utterly compelling sense of humour. In the last ten years or so at Liverpool he took up playing the double bass, recording faithfully his progression through each musical grade on all annual reports to the University. Even his research grant applications were graced by knowledge of his current musical level. He eventually joined the Southport Orchestra, later becoming its chairman. Professionally, he was very keen that the University of Liverpool develop a School of Environmental Sciences; indeed, he believed every student should

be taught about the environment. This was a major difficulty in such a traditional establishment. Nevertheless, he relished the role of “Big X”, in the “Escape Committee” of applied ecologists plotting to move from Biological Sciences into Environmental Sciences at the University. He enjoyed the final email when the School of Environmental Sciences was formed and staff had transferred “RHM (the last committee member still active) has made a home run”. He was also a great impressionist. On mock public inquiries he convincingly played the parts of a Welsh biochemistry professor, an old man from Lancashire whose 11 siblings had died from dirty water, and a posh chairwoman of the local parish council complaining about the lack of public toilets “Excuse me I am a lady and I have a 48 inch bust to prove it!”

All of these idiosyncrasies made Brian an enigmatic but truly inspirational leader in environmental science. However, none of his quirks have ever diminished his influence as an individual moved by his unflinching commitment to the environment, and by the conservation ethos of one his great heroes, Aldo Leopold. It is impossible to capture Brian’s true scientific contribution, huge character and sense of fun in these few lines. Perhaps the most apposite distinction is to borrow from Brian’s great hero Leopold himself, to say that: “There are some who can live without wild things and some who cannot”. Brian Moss, clearly, was in the latter group. But hugely more important is that, through his work and actions, he has made it far more likely that so many of the rest of us sit there too, and for this all of us who knew him owe him a huge debt of gratitude. In his introductory lecture to incoming science students he always finished by advising them with the lines from Hamlet, “to thine own self be true”; Brian certainly lived up to this maxim.

He is survived by his wife Joyce and daughter Angharad. Our thoughts are with them.

R.H.Marrs | University of Liverpool

FEATURE



UNLOCKING AFRICA'S POTENTIAL FOR CITIZEN SCIENCE

Rosie Trevelyan, Anthony Kuria and Paul Mugo | Tropical Biological Association
Tom August, Michael Pocock and Helen Roy | Centre for Ecology & Hydrology
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From bird mapping, counting zebras and observing the behaviour of lions through to communities monitoring the habitats they depend upon, such as forests and mangroves, we heard about the many ways in which people - from school children to government officials - are involved in studying the wildlife and environment of East Africa. Though in the UK we don't usually hear much about citizen science in Africa it is clearly thriving in this region and we have much to learn from one another. At the same time there is enthusiasm for building the capacity among citizen science leaders to broaden the reach of this approach and to increase impact.

It was inspiring to hear of the ways in which decision-makers are invited to participate in citizen science - providing opportunities for communities, NGOs, scientists and others to convey important messages about the threats to biodiversity and the environment. Indeed, a number of case studies were presented that highlighted conservation actions that had resulted from involvement of people from across society in citizen science.

Emerging technologies will provide new opportunities across East Africa - the use of apps is already enhancing data collation and networking. However, there is a clear need to consider ways in which the flow of biodiversity data can be improved and how to enhance in-country capacity to do this.

The importance of citizen science in raising awareness of the threats to nature and calling for conservation action was widely appreciated. In East Africa, citizen science is seen as a way of connecting with nature, enhancing well-being and providing a sense of belonging. Discussions on priorities for citizen science revealed a need to raise awareness of how projects could connect with potential participants - a challenge when many are in remote localities.

Conservation is always challenging but the vitality and innovation of citizen scientists working in partnership across East Africa provide an inspiring way forward.

We have been delighted to work together with all the participants - we are extremely grateful to the British Ecological Society for providing funds through the Citizen Science Special Interest Group to make this possible. We will be preparing a workshop report and manuscript for submission to a peer-reviewed journal on priorities for citizen science in East Africa using the results from the collaborative prioritisation workshop.

While in Africa we used the opportunity to travel and teach on a Tropical Biological Association field course in Kibale Forest, Uganda. During our short visit we worked with the students to design and test pollinator monitoring schemes suitable for running as citizen science projects. The Tropical Biological Association organises field courses annually, teaching about ecology and research skills in amazing environments. There were about 20 nationalities represented on the course we joined, which often made for lively discussions about conservation priorities, as the students learnt from each other, and through practical field work.

The amazing diversity of citizen science in East Africa was revealed through a symposium in Nairobi. Co-organised by the Tropical Biological Association and the Centre for Ecology & Hydrology in association with the British Ecological Society, the meeting provided an opportunity to share the excitement and experiences of involving people in projects focused on ecology, conservation and the environment.



Colobus Monkeys were often seen around the Kibale field station



Helen Roy with artificial flowers designed by TBA students to attract pollinators for school children to then record

Tropical Biological Association students design resources for testing their citizen science projects



Citizen Science: unlocking Africa's potential



Tom August runs a session on presenting data in exciting ways



Moses, our forest ranger, uses an app to record wildlife observations



Michael Pocock works with TBA students as they design their citizen science projects



Chimpanzees were frequently seen in the forest surrounding the field station

CHARTERED INSTITUTE OF ECOLOGY AND ENVIRONMENTAL MANAGEMENT



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THE BREXIT CHALLENGE

Following the outcome of the UK referendum on the 23rd June there has been a period of intense activity as we try to assess what it means for nature conservation, environmental management, higher education, research and the careers of our members. Two things became clear very quickly. The first is that, although the outcome was not the one that CIEEM felt was the best one for the protection of the natural environment in the future, we must seize the opportunity to work towards improved domestic environmental legislation that delivers both biodiversity protection and sustainable development. Second, if we are to be successful then it is vital that organisations such as CIEEM, BES, NGOs and others work collaboratively and sensibly to help governments across the UK develop their thinking and find solutions.

That is our priority post-Brexit. The future is uncertain but change will not happen overnight. We must use this time to articulate a common vision and identify the most effective means to deliver it.

A TIME TO CELEBRATE

CIEEM's annual Awards Luncheon in June provided an excellent opportunity to acknowledge and celebrate some really high quality ecological and environmental management practice. The Birmingham Botanical Gardens was, once again, an excellent venue and over 120 guests enjoyed an excellent

presentation from Stephanie Hilborne OBE, Chief Executive of The Wildlife Trusts followed by a superb luncheon prior to the awards presentation.

The CIEEM Medal is the Chartered Institute's highest accolade and is awarded annually in recognition of an outstanding single or life-long contribution to the field of ecology and environmental management. This year the prestigious Medal went to Professor Roger Crofts CBE FCIEEM in recognition of his significant contribution to environmental conservation, governance and management in Scotland in particular but also globally. Roger has an exceptional record of leadership at both national and international levels.

Among his many achievements, Roger has been Chair of the IUCN UK Committee and of its World Commission on Protected Areas (WCPA) European Region and is now one of only six WCPA Emeriti globally. Roger led the development of the key outcome statements of the 5th World Parks Congress in Durban, South Africa. These provided the plan of action for the next decade for the Convention on Biological Diversity (CBD) Programme of Work on Protected Areas and the work of the IUCN World Commission on Protected Areas.

Roger's main legacy in Scotland is his leadership and vision on natural heritage. He was instrumental in the production of a highly regarded White Paper, *Scotland's Natural Heritage: The Way Ahead*. The ideas were accepted and Roger led the drafting of the Bill that became the Natural

Heritage (Scotland) Act 1991. Roger then founded, led and managed a new statutory body, Scottish Natural Heritage, over the next decade, putting in place governance structures and management schemes for nature protection and presiding over the implementation of Natura 2000 in Scotland which has given rise to extensive networks of Special Protection Areas (SPAs) and Special Areas for Conservation (SACs). Roger is a very popular recipient of the CIEEM Medal.

There were twelve other individual and organisational awards winners and full details can be found on our website (www.cieem.net) but special mention should be made of the Ecosystems Knowledge Network which not only won the Best Practice Award for Knowledge Sharing but was also awarded the Tony Bradshaw Award. This Award, given in recognition of CIEEM's former founding President and one of the most inspirational UK ecologists of the last 50 years, is only presented when a project or initiative had demonstrated an outstanding impact in its area of activity.

Our congratulations go to all of the winners and finalists and our thanks to the judges.

FORTHCOMING EVENTS

Autumn Conference, Nottingham, November 1-2 2016: 'Skills for the Future'

FROM OUR SOUTHERN CORRESPONDENT



Richard Hobbs | University of Western Australia

Most people have heard Benjamin Disraeli's famous quote:

"THERE ARE THREE KINDS OF LIES: LIES, DAMNED LIES, AND STATISTICS."

Particularly during election or referendum campaigns, it's often difficult to tell the difference.

We have a Federal election looming in Australia that doesn't quite match the US election for scariness and weirdness, but has its own special elements of comedy, tragedy and Disraeli's three kinds of lies. The election results will be long out by the time this article hits the press, as will the outcome of the Brexit poll. Here in Australia, climate change and the Great Barrier Reef have been hot topics in the election. Both have had important science back-stories that Disraeli would have been proud of.

Discussions relating to climate change have included: (a) debate over whether the extraordinary fires in Tasmania in February could be pinned at least partially on climate change (yes, they can, says Dave Bowman of the University of Tasmania: <http://www.abc.net.au/news/2016-02-24/study-links-tassie-fires-to-human-induced-climate-change/7193830>); (b) whether the massive storms knocking expensive houses into the ocean in Sydney are related to climate change (even current Prime Minister Malcolm Turnbull seems to think there must be something going on here, but not something that requires a change in government policy); and (c) whether

Australia should be rethinking its fixation on fossil fuel extraction and making use of the obvious potential for renewables (the jury's out on that one, depending on whose marginal electorate you are in).

And in the background is the national tragedy of the systematic disembowelment of climate research in CSIRO (<https://theconversation.com/csiro-cuts-as-redundancies-are-announced-the-real-cost-is-revealed-59895>). In line with the troubling trend towards mindless managerialism and political agendas taking precedence over common sense and good judgment, Larry Marshall, the head of CSIRO recently imported from Silicon Valley, has initiated cuts to public good research, particularly relating to climate change. While CSIRO is no stranger to cutbacks and reorganisations, this current round of cuts has left the scientific world dumbfounded. And you don't need to be too much of a conspiracy theorist to see that cutting climate change research is part of a tacit agenda from a government that doesn't really want to acknowledge that climate change is an issue.

Climate change is also a factor implicated in documented declines in the Great Barrier Reef. Already a political hot potato because of threats from international bodies to start labelling the reef as in danger, discussions of the future of the reef have become an election issue. And, as with most issues in the public domain these days, arguments have surfaced over how serious the threats to the reef are, and how credible reports of extensive coral bleaching are. This has even led to accusations that leading reef scientists are distorting figures in order to exaggerate the problems. According to Graham Lloyd, reporting in *The Australian* newspaper (4 June 2016), "Activist scientists and lobby groups have distorted surveys, maps and data to misrepresent the extent and impact of coral bleaching on the Great Barrier Reef"

(<http://www.theaustralian.com.au/news/nation/great-barrier-reef-scientists-exaggerated-coral-bleaching/news-story/99810c83f5a420727b12ab255256774b>). It turns out that it is probably the media distorting things, but the willingness to implicate scientists in a stitch-up is worrying.

The stoush over the reef arose through different interpretations of figures presented in reports – a media statement intimating that 93% of the reef shows some sign of bleaching (<https://www.coralcoe.org.au/media-releases/only-7-of-the-great-barrier-reef-has-avoided-coral-bleaching>) was suddenly translated into 93% of the reef being completely dead. This is a fairly blatant misappropriation of a relatively simple statistic, and it made me think about the increasing difficulty of communicating information about ecological topics. Ecology, as we all know, deals with complex interactions among organisms and their environment. The reef example was simply a case of someone attaching the wrong language to a simple figure. However, often in ecology, we rely on increasingly complex statistics to be able to both tease apart what's important in any situation and to communicate the findings, particularly for publication in scientific journals. What appears in the media rests on the interpretation of complex data through the filter of statistics.

The mention of statistics sends some people into paroxysms of despair. I think there is a fairly dichotomous split in ecology between people who never really “got” statistics but struggle through because they have to, and others who love to immerse themselves in the mysteries of statistical methods and models. I've experienced both camps, being completely flummoxed by poorly-taught undergraduate statistics classes and then becoming a complete stats nerd during my PhD. I think I now straddle the divide, finding it increasingly hard to keep up with new techniques and developments (not helped by my decision to leave R to younger, more agile minds in my group).

I've just been reading a recent paper that calls for moves to develop what the authors call statistical fluency for ecologists (Ellison & Dennis, 2016). They point to the undeniable fact that the types and complexity of data collected, and the types of question being asked, have developed rapidly and require an increasingly diverse and complex

array of statistical techniques. The authors lament, however, that “Many ecologists lack appropriate background in probability theory and calculus because there are serious disconnections between the quantitative nature of ecology, the quantitative skills we expect of ourselves and our students, and how we teach and learn quantitative methods.”

As a counterpoint to this statement, a comment included in Rory Putman's 1994 book on community ecology has stuck with me ever since I read it: “Undergraduates have simple on/off switches. This is a protective device for use when any dangerous mathematics enters the field of vision. Concentration will, on seeing anything remotely resembling an equation, switch off until all signs of mathematical notation have gone and normal text has been restored” (Putman, 1994). Added to this inbuilt protective device is the fact that statistics continues to be generally very poorly taught in undergraduate courses. Ecology units become *de facto* statistics refresher courses because students have not learned the basics beforehand. It was thus when I was an undergraduate and the evidence from teaching in Ecology units indicates that it remains the case. The editors of a recent Ecological Statistics text commented that “... despite considerable efforts, learning statistics continues to be boring for many ecologists and more often than not, it feels a bit like having dental work done: frightening and painful but necessary for survival” (Fox *et al.*, 2015). In addition, the plethora of new techniques available makes it very difficult for even the most statistically-savvy ecologist to be across all the nuances, vagaries and pitfalls involved.

Fortunately, there are ways through this, and some of the issues to be dealt with are common to all statistical methods, old and new (Steel *et al.*, 2013). Nevertheless, successfully applying and reporting statistical approaches remains a scary quagmire to many people. It's made even more scary and quagmire-ish by disagreements over which methods are appropriate, which

assumptions are inviolate, which transformations are allowed and so on. These disagreements can occur anywhere along the process from initial study design to publication, but perhaps are becoming most obvious at the stage of the journal review process. It seems that virtually every paper submitted by colleagues or students these days comes back with reviewer comments along the lines of “I question the use of statistical technique x, which I think is invalid in this case”, or “Why did you not use statistical technique y, transform your data this way, etc.?” Such comments are quick and easy to make but can imply weeks of extra work in reanalysis, redrawing figures and so on. They also include the implicit assumption that the authors must have been remiss in their original decisions on design and analysis. And the frustrating thing is that, nine times out of ten, the reanalysis does not substantially change the interpretation of the results!

A feature of becoming an old fart is the feeling that you've seen all this before. While I was doing my PhD in the 1980s, a mini Game of Thrones was raging over the most appropriate ordination techniques to use. In the 90s there was a period of existential angst over the use of non-parametrics in preference to normal statistics. Violating assumptions was a sin punishable by beheading (well, maybe I'm exaggerating a bit here). At that time, I was deeply encouraged (and relieved) to see some commentary that suggested that the supposed rules were not as sacrosanct as the stats police made out. In a 1995 paper, Allan Stewart-Oaten went as far as to comment that: “Statistical analyses are based on a mixture of mathematical theorems and judgments based on subject matter knowledge, intuition, and the goals of the investigator. A folklore can develop, where judgments based on opinions become laws of what ‘should’ be done. This can intimidate authors and readers, waste their time, and sometimes lead to analyses that obscure the information in the data rather than clarify it” (Stewart-Oaten, 1995). In other words, perhaps there's more than one way to statistically skin a

cat. And perhaps we should be less ready to assume that our favourite approach is always going to be the only – or right – way to proceed.

Of course, we could, instead, heed the advice of physicist Ernest Rutherford, who said: “If your experiment needs statistics, you ought to have done a better experiment.” However, Rutherford wasn't thinking about the complexities involved in even simple ecological experimentation. It is probably true, however, that statistics often simply confirm the obvious: significant treatment effects can often be visually discerned, but the numbers are needed for the publication. Perhaps more appropriate is the statement from the American statesman, Henry Clay, who said: “Statistics are no substitute for judgment.” Careful design, open recognition of underlying assumptions and limitations, and appropriate caution in interpretation are essential in the use of any statistics. Statistical elegance can still conceal ecological nonsense in the absence of insight into the system being analysed. And when reviewing how other people have tackled statistical problems, perhaps another Disraeli quote is relevant: “How much easier it is to be critical than to be correct.” We need statistical rigour – and, indeed, fluency – in ecology, but we also need to get on with the job of making sure that statistically-sound ecological stories influence management and policy, and maybe even the outcome of elections.

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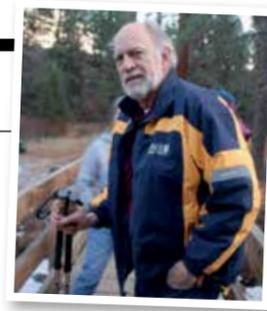
WELL DONE RICHARD

Regular readers of this column will be delighted to hear that Richard was awarded Honorary Membership of the Ecological Society of America at the recent ESA meeting in Florida. From the ESA website: “Honorary Membership is given to a distinguished ecologist who has made exceptional contributions to ecology and whose principal residence and site of ecological research are outside of North America. Richard Hobbs, a professor of restoration ecology at the University of Western Australia, is an innovative, collaborative scientist with proven capacity to bridge the fields of basic and applied ecology. He laid foundational work in the area of novel ecosystems, the theme of the forthcoming 2016 ESA Annual Meeting in Fort Lauderdale, Fl., and his research focuses on applying ecology in a rapidly changing world. He promotes ample, fruitful debate within our community and beyond.”



FEATURE

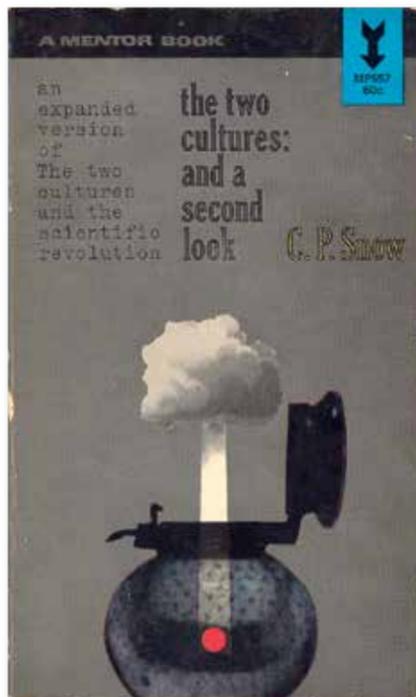
ECOLOGY AND THE TWO CULTURES



John Wiens | Oregon State University
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It was spring 1959, time for the annual Rede Lecture at Cambridge University. That year it was given by the British scientist and novelist C.P. Snow. Snow's lecture, "The Two Cultures and the Scientific Revolution,"¹ touched on many topics—the Cold War, failings of the British educational system, the disparity between the rich and the poor²—but most famously on the gap in understanding, communication, and respect between scientists and literary scholars. Science was separated from literature and the arts by a "gulf of mutual incomprehension"—scientists might be disinclined to plunge into the works of Dickens or Shakespeare, while those in the humanities were ignorant of the Second Law of Thermodynamics. Snow placed much of the blame for this cultural divide on "literary intellectuals" who distained science as a way of knowing. Scientists, on the other hand, "have the future in their bones," while "the traditional culture responds by wishing the future did not exist."³ Unless the cultural divide were breached, Snow argued, it would be difficult or impossible to address societal problems.

Snow's thesis generated immediate controversy and, among "literary intellectuals," outrage. In a vitriolic review, the critic F.R. Leavis suggested that Snow was "intellectually as undistinguished as it is possible to be" and that *The Two Cultures* exhibited "an embarrassing vulgarity of style."⁴ More recently, Steven Pinker and Leon Wieseltier rekindled the debate in the pages of the *New Republic*. Pinker proposed



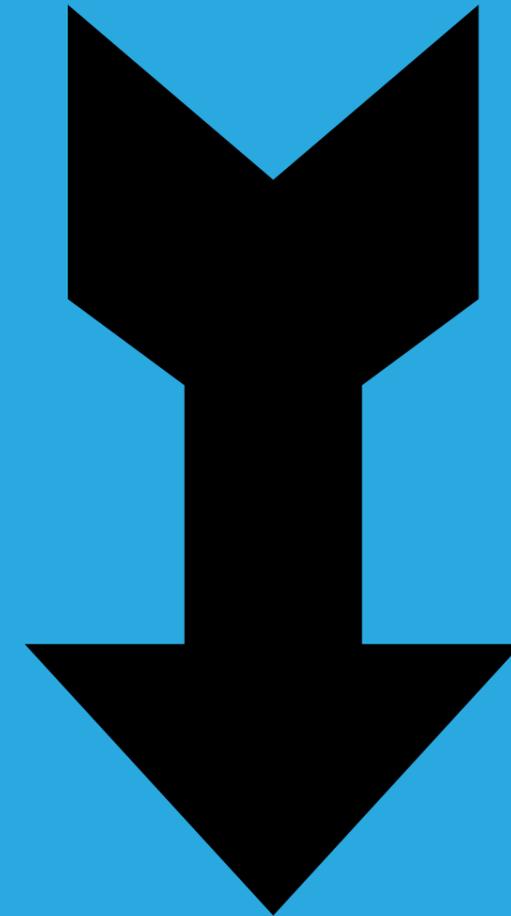
that the cultural divide is between knowledge based on evidence (science) and knowledge based on beliefs (humanities) and that "the worldview that guides the moral and spiritual values of an educated person today is the worldview given to us by science." Wieseltier defended the humanities, arguing that morality, politics, art, and beauty are philosophical matters, beyond scientific explanation.⁵

All of this debating may make for great entertainment.⁶ The critical issue, however, is not who was right or who won, but whether the cultural divide that Snow articulated is still with us. It is, but it has been joined by

cultural differences between science and policy, between research and management, between science and the public, or even within scientific disciplines.⁷ The divides are hardened by training and specialization. Scientists, writers, artists, managers, politicians, and people in general tend to talk and socialize primarily with others like themselves. They may share a language in common, but they use it in ways that may be incomprehensible to anyone outside their cultural clique.

To Snow, the force dividing the two cultures was a communication barrier.⁸ I've experienced this firsthand. Two of my daughters are artists. Their reviews and art criticisms are full of flowery descriptions and adjectives used in (to me) unfamiliar ways. While their writing may be clear and compelling to other artists, I sometimes struggle to understand their meaning. They probably have similar difficulties with some of my scientific writing, which may seem (to them) flat, sterile, and obtuse. My scientific colleagues have had no difficulty in understanding what I say (although not everyone has found it compelling).

The key to bridging cultural divides is not so much whether writers or artists are conversant with the Second Law of Thermodynamics or scientists delight in the nuances of *Hamlet* (to use Snow's example), but whether each has an appreciation for how the other thinks. What thinking is behind a work of art or poetry, or a scientific theory or mathematical equation? If communication is to foster mutual understanding among



WHAT WE'VE GOT HERE IS FAILURE TO COMMUNICATE

cultures, it must go deeper than words. Unfortunately, things seem to be going in the opposite direction. The growing use of social media may broaden the reach of communication, but at the expense of depth. Too often it encourages spontaneity or brevity (the 140 characters of a Twitter post) rather than contemplation. It may provide a glimpse of *what* people think, but offers little insight about *how* they think.

What does all of this have to do with ecology? The historical roots of ecology are as much in natural philosophy as they are in the sciences. Today's ecology, however, has all the trappings of a science culture: its own jargon, societies, and scientific journals. Ecologists communicate most easily and comfortably with one another. Yet ecology is increasingly being called upon to address societal problems that concern different intellectual cultures, the cultures of resource management, environmental policy, politics, conservation, and the like. Problems such as how to deal with invasive species, how to include economics in valuing nature, how to balance the needs of species and ecosystems with those of people, how to anticipate the ecological effects of climate change—the list goes on. In a broader sense, these problems have to do with how people relate to nature, which falls in the domain of humanities and the arts as much as it relies on science. Increasingly, ecologists aim for their message to be relevant to decisions about nature and the environment. This requires that the facts and insights of ecology be communicated to these other cultures.

Of course, many ecologists *are* reaching out to people in other intellectual cultures. Scientists in agencies are working to bridge divides with management and policy; more ecologists are writing and speaking to the general public; and some are even forsaking the sheltered academic life to enter the fray of politics, applied conservation, or research administration. Many of these people have mastered the art (and it is an art!) of communicating science in words their audiences can understand and appreciate. Yet the urgency of our messages about how natural systems function and the



state of the environment demands more. We must communicate with other people and intellectual cultures on their own terms. Science-talk may be appropriate in the scientific publications that lead to peer recognition and professional advancement, but it is a poor way to communicate across cultural divides.

Snow's thesis, old and controversial as it is, still resonates. It calls attention to the "gulf of mutual incomprehension" that often separates intellectual cultures. Bridging the cultural divides requires that all parties—not just scientists, artists, and writers, but resource managers, environmentalists, politicians, and the general public—understand how other people think and appreciate and respect their different priorities. This is the deeper understanding that builds mutual trust, which will be essential to dealing with the problems that the Anthropocene has thrust upon us.



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- ¹Subsequently published as *The Two Cultures and the Scientific Revolution* (1959, Cambridge University Press) and with additional reflections as *The Two Cultures: And a Second Look* (1963, Cambridge University Press).
- ²Which he predicted would disappear by 2000!
- ³Writers of science fiction may be an exception; some of the best science-fiction writers, such as Isaac Asimov or Arthur C. Clarke, were trained as scientists, although others, such as Ursula K. LeGuin, come from the humanities.
- ⁴Leavis, F.R. 2013. *The Two Cultures? The Significance of C.P. Snow*. Cambridge University Press (annotated re-issue); Ortolano, G. 2005. F. R. Leavis, science, and the abiding crisis of modern civilization. *History of Science* 43: 161-185.
- ⁵New Republic 2013 (<http://www.newrepublic.com/article/114127/science-not-enemy-humanities>; <http://www.newrepublic.com/article/114548/leon-weiseltier-responds-steven-pinkers-scientism>; <http://www.newrepublic.com/article/114754/steven-pinker-leon-wieseltier-debate-science-vs-humanities>).
- ⁶Snow observed that "debating gives most of us much more psychological satisfaction than thinking does; but it deprives us of whatever chance there is of getting closer to the truth" (1963: 56)
- ⁷In conservation, for instance, a divide exists between those who cherish nature's intrinsic values and those who emphasize nature's benefits to us (see my essay in the June 2016 issue of the Bulletin).
- ⁸I'm reminded here of the words of a prison Captain in the movie *Cool Hand Luke*: "What we've got here is failure to communicate."

JOURNALS NEWS

Functional Ecology

www.functionalecology.org
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Our latest issue includes a new Review, *Macrophysiology – progress and prospects*, by Steven Chown and Kevin Gaston. This Review gives an overview of macrophysiology's conceptual foundations, methodological approaches and insights and the challenges the field is facing currently, and is a useful introduction to anyone new to the topic.

We published our first Special Feature of 2016 in issue 1: *Mechanisms and Consequences of Facilitation in Plant Communities*. This Special Feature, edited by Richard Michalet and Francesco Pugnaire, goes back to the basics of facilitation, reviewing our knowledge on the main functional mechanisms of facilitation, their implications for community structure and ecosystem functions and services. This Special Feature also complements the Special Feature: *Mechanisms of Competition* (edited by David Robinson, Claire Trinder and Rob Brooker), published in the journal in 2013. We also contributed to the cross-journal Special Feature: *Demography beyond the population with two papers looking at leaf traits: Functional leaf traits of vascular epiphytes: vertical trends within the forest, intra- and interspecific trait variability and taxonomic signals and The underlying basis for the tradeoff between leaf size and leafing intensity*.

Issue 1 also included two papers on peer review in Functional ecology. These papers *Gender differences in patterns of authorship do not affect peer review outcomes at an ecology journal and Editor and reviewer gender influence the peer review process but not peer review outcomes at an ecology journal* are part of an ongoing project by Functional Ecology's Executive Editor, Chuck Fox, looking at bias in peer review. This project is going to be rolled out across the other BES journals in 2016.

EDITORIAL BOARD

We are joined on the board by Rafael Oliveira (University of Campinas, Brazil) [WAITING FOR BLURB], Anna Sala (University of Montana, USA), whose research looks at plant resource dynamics and its implications on plant life history strategies and responses to the environment, Sarah Diamond (Case Western Reserve University, USA), an evolutionary ecologist with specific interests in biological responses to climate and land-use change, Susana Clusella-Trullas (Stellenbosch University, South Africa), whose research focuses on the responses of ectotherms to changing environmental conditions and potential interactive effects of climate change and biological invasions, and David Costantini (University of Antwerp, Belgium). David's research interests include the role of oxidative stress and antioxidants as mediators of life-history variation, the impacts of environmental changes on animal populations and meta-analysis as a tool to develop a quantitative synthesis of research results. Our board continues to grow in response to our increasing submissions, which have grown by over 40% in the past five years.

Journal of Animal Ecology

www.journalofanimalecology.org
[@AnimalEcology](https://twitter.com/AnimalEcology)

NEW PRIZE FOR EARLY CAREER ECOLOGISTS

We are very happy to announce a new award for early career researchers. We hope to inspire early career researchers working on any aspect of animal ecology to submit reviews or synthesis papers that summarize their dissertation work, provide new insights into classic areas of animal ecology, or shed light on emerging fields in animal ecology. Proposals were accepted until August, so the Senior Editor team will be inviting the successful candidates to submit manuscripts later this year. More on this next time...

OPEN CALL FOR SUBMISSIONS: SPECIAL FEATURE ON "ANIMAL HOST–MICROBE INTERACTIONS"

The recent explosion of this field over the last decade is starting to facilitate a greater understanding of the functional role and consequences of variation in animal host microbiota, and the ecological and evolutionary interactions between the host, its resident microbiota and factors such as disease susceptibility, nutritional ecology, life-history strategies, social networks and animal behaviour.

We recently launched a call for new papers on animal host–microbe interactions for publication in a Special Feature in 2017. Manuscripts should be submitted in the usual way through the *Journal of Animal Ecology* website, clearly stating in the cover letter accompanying the submission that you wish to be considered for publication as part of this Special Feature. Submissions should be received by 20th December 2016.

SALMON SMOLTS FIND SAFETY IN NUMBERS

Using tags surgically implanted into thousands of juvenile salmon, University of British Columbia researchers have discovered that many fish die within the first few days of migration from their birthplace to the ocean.

Nathan Furey and colleagues (*J Anim Ecol*, 85: 948–959) followed the migration of one of British Columbia's largest sockeye populations from Chilko Lake, in B.C.'s Cariboo region, to the ocean. Each spring, juvenile salmon known as smolts leave this lake and migrate downstream through the Chilko, Chilcotin, and Fraser rivers and into the Salish Sea.

To follow the juvenile salmon, researchers implanted small electronic tags into the tiny 12-centimetre fish as they were leaving Chilko Lake. As the smolts made the 1,000-kilometre journey to the Pacific Ocean, acoustic receivers picked up the signals from

the tags to monitor how many fish survived the migration.

More than 2,000 salmon were tracked over four years and researchers found that survival was poor in the clear and slow-moving Chilko River, where predators were feeding intensely on the smolts. Once in the murky and fast-flowing Fraser River, the salmon travelled day and night, covering up to 220 km per day, and experienced nearly 100 per cent survival. The researchers believe that in these waters, predators have difficulty finding and getting to the fish.



NEW ASSOCIATE EDITORS

We are pleased to welcome Niels Dingemanse (*Ludwig Maximilians University of Munich, Germany*), Jenny Dunn (*Royal Society for the Protection of Birds, UK*), Lesley Lancaster (*University of Aberdeen, UK*) Becky Morris (*University of Oxford, UK*), and Mariano A. Rodriguez-Cabal (*Universidad del Comahue, Patagonia, Argentina*) to the Associate Editor board.

Niels is an evolutionary ecologist who works on the interface between behavioural ecology and quantitative genetics. His current research focusses on proximate and ultimate causes and consequences of individuality in average behaviour ('personality') and behavioural plasticity, for which he uses wild populations of birds (great tits) and insects (field crickets) as model systems

Jenny's research interests span a broad range of topics within ecology and conservation, but centre around factors influencing behaviour, and

the consequences of behavioural adaptation at both the individual and population levels. She is particularly interested in the sub-clinical impacts of parasitic infection, parasite transmission, the associations between parasitism and behaviour and the implications these may have for populations across generations through delayed life-history effects. Jenny is also fascinated by how multiple stress factors interact in free-living populations, especially those in decline, and the implications these interactions have for the conservation of populations.

Lesley is an empirical ecologist interested in understanding how biogeographic processes shape macroecological trait variation, population dynamics, life history evolution, and species interactions. She is also interested in the drivers of and constraints on niche evolution in ectotherms.

Becky is a community ecologist investigating the structure, dynamics and functioning of ecological networks in natural and human-modified ecosystems. She has a particular interest in empirical approaches to studying networks, especially large-scale manipulative field experiments; and in the role of density- and trait-mediated indirect interactions.

Mariano is a community ecologist with broad interests in the factors that generate, maintain and threaten biodiversity. He uses observational, experimental, meta-analytical and theoretical approaches to understand how the loss of some species and the gain of others influence plant-animal interactions, vertebrate and ant seed dispersers, the diversity and structure of communities, and ecosystem processes.

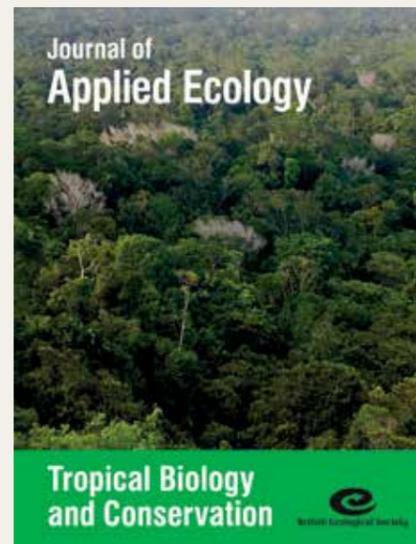
Simon Hoggart
Assistant Editor
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Journal of Applied Ecology

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VIRTUAL ISSUE: TROPICAL BIOLOGY AND CONSERVATION

For the Association for Tropical Biology and Conservation 2016 Annual Meeting we produced a Virtual Issue, edited by Susan M Cheyne 'Tropical Biology and Conservation' Virtual Issue (<http://bit.ly/tropbiol>). The papers gathered under this Virtual Issue represent a fraction of the work in a field which is rapidly expanding. Yet these papers exemplify the high quality of the science being produced by researchers and practitioners who are increasingly making use of new techniques and technologies, and successfully engaging and partnering with industry and stakeholders to lead the way in policy reform and best practice management. The papers are on the topics of forest recovery and restoration, anthropogenic disturbance and impacts on wildlife, and policy and management. In addition to Standard Papers the Virtual Issue contains a Practitioner's Perspective and a Policy Direction.



ON THE BLOG

We continue to publish a number of blog posts from the authors of articles we publish, Associate Editors and guest bloggers. 'Beyond the

Haze: Implications of the recent fires in Indonesia for tropical peatland research' is a post written by members of C-PEAT (Carbon in Peat on Earth through Time) to voice the group's concern over the consequences of the recent extensive burning of Indonesia's peatlands for science. C-PEAT is a thematic group of PAGES (Past Global Changes), and had its inaugural meeting at Columbia University in New York, in October 2015. Other recent posts include one from Nathalie Butt who took part in our Associate Editor mentoring scheme last year, writing about coastal mapping of wetlands for conservation and management, and an infographic from authors April Robin Martinig and Katrina Bélanger-Smith, entitled 'Why did the mammal cross the road?' To see this and our other blog posts go to <http://bit.ly/JPEblog>.

IN THE NEWS

Over the last few years it has become increasingly important for researchers to communicate and publicise their research, not only to help direct work to the relevant readers but also to raise their profile as a researcher. Public opinion can also influence policymakers so it is important that scientific stories make it into the media. One of the many ways research can be disseminated is by sending out a press release through organisation press offices. We have noticed a considerable increase in the number of these over the last year and you can find some tips and guidance here <http://bit.ly/JPEPR>.

A paper from Rhys Green and colleagues 'Potential threat to Eurasian griffon vultures in Spain from veterinary use of the drug diclofenac' has received media coverage on BirdLife International, Scientific American and Nature News. Many of our papers are featured on The Conversation, including 'How persistent are the impacts of logging roads on Central African forest vegetation?' by Fritz Kleinschroth and colleagues and 'Human-wildlife conflict, benefit sharing and the survival of lions in pastoralist community-based conservancies' by Sara Blackburn and colleagues.

NEW ASSOCIATE EDITOR

We are delighted to welcome Marie-Josée Fortin from the University of Toronto, Canada as a new Associate Editor. Marie-Josée has four main research areas – spatial ecology, disturbance ecology, conservation and spatial statistics. Her research programme studies the effects of global change (land use and climate) on species' spatial dynamics at the landscape and geographical range levels both in multi-use forested ecosystems and aquatic networks to maintain biodiversity and species conservation.

Alice Plane | Assistant Editor,
Journal of Applied Ecology
Alice@britishecologicalsociety.org

Methods in Ecology and Evolution

www.methodsinecologyandevolution.org
@methodsecolvol

METHODS IN ECOLOGY AND EVOLUTION'S 5TH ANNIVERSARY SPECIAL FEATURE

Methods in Ecology and Evolution was launched in 2010 with the ambition that we could transform the development and uptake of new methods. As the first journal in our field that specialized in publishing methodology papers, we aspired to give those researchers who develop new methods a place to publish and gain recognition for their work. We also aimed to improve the presentation of methodology to as wide an audience as possible by emphasizing the need for accessibility in published papers, as well as taking advantage of online support such as videos and podcasts.

To celebrate the 5th anniversary of the journal, we held a symposium in 2015, jointly hosted between London and Calgary. Streamed live, and with talks recorded and hosted here (<http://bit.ly/1dG4Bmz>), the symposium showcased the range of methods that we had published across our discipline and involved many of our authors and members of our editorial board. A selection of the authors who gave talks at the symposium have

contributed articles to the Special Feature in our June 2017 issue (<http://bit.ly/MEE5SF>).

The Special Feature highlights the breadth and depth of topics that the journal has covered over the past 5 years. It includes articles on data analysis, information criteria, remote sensing and more. We hope to continue to publish a wide range of papers on as diverse a range of topics as possible, exemplified by the diversity of the papers in this feature.

ENDANGERED SPECIES VIRTUAL ISSUE

To celebrate Endangered Species Day 2016 the BES journals compiled a Virtual Issue on the topic. The papers cover a broad range of plants, animals and insects as well as terrestrial and aquatic systems.

We showcased some excellent articles from *Methods in Ecology and Evolution*, which dealt with everything from methods for finding rare species via scat detection to Markov switching autoregressive models and from the Value of Information to investigating the risk of collisions between boats and marine mammals. As well as the seven articles that the journal contributed to the Virtual Issue, we had two new blog posts on Endangered Species. Till Czypionka et al. explained how ecological transcriptomics can provide a great way to study endangered species in a humane and conservation-friendly way (<http://bit.ly/1Vw65SN>). Following this, we had a post from Frank Breiner et al. They discussed the benefits of Ensembles of Small Models and why they can be so useful when data on a species is insufficient for most models (<http://bit.ly/1XggC6q>).

All of the articles in this Virtual Issue are free for a limited time. You can find them on our website here: <http://bit.ly/EndSpec>



METHODS IN THE NEWS

Animals caught on camera by amateur photographers and posted on the web could become an important new tool for studying evolution and other ecological questions, researchers from South Africa have found. To discover whether or not these photographs could accurately substitute for fieldwork, they used Google Images to find photographs of four species – black bears in western North America, barn owls worldwide, black sparrowhawks in South Africa, and hooded or carrion crows in Europe.

The new technique opens up a world wide web of possibilities for ecologists, from migration and diet to birds' moulting patterns and the age structures of animal populations in different areas. It works best for species that are of interest to photographers, so are very well photographed, as well as easy to recognise and categorise. You can find out more about this technique in 'Just Google it: assessing the use of Google Images to describe geographical variation in visible traits of organisms' by Leighton et al. (<http://bit.ly/1sLDD3U>).

Chris Grieves | Assistant Editor
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Journal of Ecology

www.journalofecology.org
@JEEcology

In June I started as the new Assistant Editor for *Journal of Ecology*. I would like to thank my predecessor, Lauren Sandhu, for her outstanding efforts on the journal for over 4 years and I am looking forward to carrying on her great work.

VOLUME 104, ISSUE 4

The Journal has published its July 2016 issue which included an interesting paper on the effect of latitude on herbivory by Zhang et al. as the Editor's Choice. Associate Editor Richard Shefferson wrote an entertaining commentary about the paper on our blog which has been very popular.

BIOLOGICAL FLORA OF THE BRITISH ISLES

This year *The Biological Flora of the British Isles* series celebrates its 75th anniversary and Editor Tony Davy wrote an excellent piece in the last *Bulletin* which is now also available on the journal blog. The series is one of the Society's longest running projects and contains over 300 accounts including a recent account on Ash which attracted a lot of attention and was picked up by several major news outlets including BBC News.

HARPER PRIZE 2015

As featured in the last *Bulletin*, congratulations again to Dr Yuuya Tachiki who has won the 2015 Harper Prize for the best paper published in *Journal of Ecology* by a young author. Dr Tachiki, a postdoctoral researcher at Kyushu University in Japan, won the award for his paper entitled "A spatially explicit model for flowering time in bamboos: long rhizomes drive the evolution of delayed flowering" which provides novel evolutionary insights into the reproductive strategy of clonal plants by using a spatially explicit mathematical model. The paper was also selected as the Editor's Choice for Issue 103:3, for which Richard Shefferson wrote another commentary which you can find on our blog, as well as a post written by Yuuya Tachiki himself.

Furthermore, two highly commended papers are also available online. The first paper is entitled "Impacts of geography, taxonomy and functional group on inorganic carbon use patterns in marine macrophytes" by Courtney Stepien who recently obtained her PhD from the University of Chicago. The second, "Historically browsed jewelweed populations exhibit greater tolerance to deer herbivory than historically protected populations" is by Laura Martin, Anurag Agrawal and Clifford Kraft. Courtney and Laura talk more about their findings in video podcasts which can be found on our blog and YouTube channel.

ECOLOGICAL SOCIETY OF AMERICA 2016 ANNUAL MEETING

Executive Editor David Gibson and Managing Editor Emilie Aimé were both in Florida for the ESA meeting this year where they enjoyed meeting and spending time with some of our authors and Editorial Board.

As always for the latest Journal news, and to keep up to date with all of the research published in the Journal, keep an eye on our blog and follow us on Twitter @JEEcology and on Facebook.

James Ross | Assistant Editor
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www.Britishecologicalsociety.org/2016
Liverpool 2016
British Ecological Society
save the date • 11 – 14 December • ACC, Liverpool

British Ecological Society
Ghent 2017
save the date
12 – 15 December
ICC, Ghent
www.Britishecologicalsociety.org/2017



ANNUAL MEETINGS

2017 | GHENT, BELGIUM | 11–14 DECEMBER

2018 | BIRMINGHAM, UK | 16–19 DECEMBER

2019 | BELFAST, UK | 10–13 DECEMBER

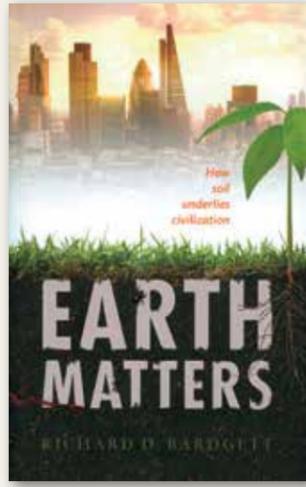
2020 | EDINBURGH, UK | 14–17 DECEMBER

BOOK REVIEWS

The book reviews editor is Sarah Taylor, who is currently on leave of absence. Reviews in this issue have been collected and edited by Alan Crowden.

ABOUT E-BOOKS

Publishers do not always provide us with information on the existence of electronic editions, and in any case often refer potential buyers to third party sellers for information on pricing. We have therefore decided not to attempt to provide comprehensive information on the availability or otherwise of eBook versions of the titles reviewed here. Most publishers now produce electronic versions of their books. Those interested in purchasing e-versions of any titles are recommended to check availability via the publishers' websites or through suppliers such as Amazon, Ebrary, NetLibrary and many more.



Earth Matters – How soil underlies civilization

Richard D Bardgett (2016)
Oxford University Press, Oxford. 224pp, £18.99 (hbk)
ISBN 978 0 19 966856 4

This highly readable account on soil by a former vice-president of the BES draws on 194 references, enabling the reader to dig deeper should they wish. There are seven chapters covering soil formation, biodiversity, how soil supports food and drink production, cities, the influence of war, and climate change. The author concludes with how attitudes to, and understanding of soil need to change if the human race is to survive.

In chapter one, we are introduced to soil horizons and how the parent material, topography, climate, vegetation and humans all interact to create different soils. We understand how the fertility of the Amazonian Terra Preta soils, which should be impoverished by the heat and humidity of the tropics, have instead been

maintained over thousands of years by the addition of charcoal, bone and dung. I have used modern equivalents (Biochar) on my allotment to good effect.

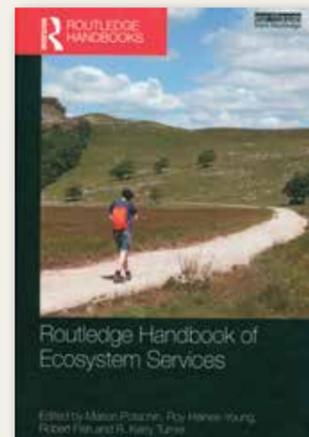
In chapter two, we learn that an increase in the density of mycorrhizal fungi can increase plant biomass by a staggering 42%, but that there is a plateau, suggesting some redundancy in the fungal biota. Thirty pages of essential reading for farmers is contained in chapter three, which is all about soil organic matter, structure, macro and micro nutrients, and the causes and consequences of degradation.

In 'soil and the city', the 'capping off' of soils under concrete, including the trend for converting front gardens into parking lots, is linked to flooding and the urban heat island effect. References to the historic use of 'night soil' in London and Manchester fascinate me. I know from my work in the Tamar Valley that the heyday of market gardening was founded on human waste brought up from Plymouth. The practice is still used in Japan, China and Korea and is one reason why their soils remain fertile despite huge population increases. I would have liked to have heard more about how this works in practice. For example, how is the waste treated and transported? The finite nature of phosphate is a challenge that ranks alongside oil depletion, in my opinion.

Prepare for some dark facts on soil contamination as a result of war, with one silver lining in the shape of post-WWII educational

policy, which saw children learning how to grow food and tend soil. This should be compulsory in all our schools. In 'soil and climate change', the practice of 'no till' is scrutinised, as well as the measurement of greenhouse gas fluxes across different soils, climates, seasons and management regimes. All in all, an enjoyable, accessible read.

Simon Bates



Routledge Handbook of Ecosystem Services

Edited by Marion Potschin, Roy Haines-Young, Robert Fish and R. Kerry Turner

Earthscan from Routledge, 630pp, £135 (hbk)
ISBN 978-1-138-02508-0

The concept of ecosystem services has exploded within the last decade, and has come to dominate our thinking about the natural environment and how best to communicate its benefits. Given the breadth of fields which are engaged in ecosystem service research, it can be a challenge for those of us coming from one field to get a grasp of some of the basic concepts from other fields, let alone to develop a clear picture

of the key current research challenges. This Handbook helps to address this challenge.

Writing a handbook of such a fast-moving field must raise concerns that by the time the book is produced things will have moved on. The editorial team of Potschin, Haines-Young, Fish, and Turner acknowledge this risk, and propose that rather than being seen as definitive text of a mature field it is best seen as a representation of the current state of play.

But as snapshots go, it's a good one. Perhaps a good test of a book spanning such a range of fields is its ability to communicate to non-specialists key concepts from other fields, and it does this well. For example, as an ecologist I found the sections on non-monetary valuation of services very accessible, including the associated description of neo-classical economics. The Handbook is also good at providing clarification concerning the sometimes confusing and complex use of terminology, for example the concept of ecosystem functions. I particularly liked the inclusion of what are called "Briefing Notes" – short, focussed essays on specific topics. The provision throughout of real-world examples also helps with the grounding of complex or unfamiliar ideas.

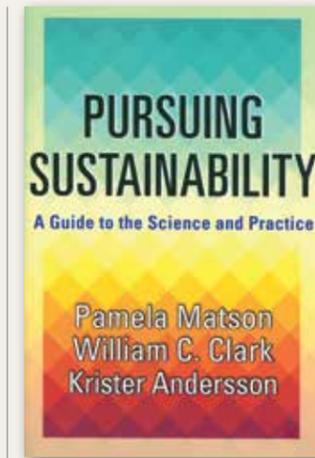
Given that the editorial team is entirely UK-based, I wondered whether the UK-NEA might dominate, but this isn't the case. The UK-NEA is mentioned, but placed within the wider context of international research, and the author list is truly international. And so the Handbook, as well as providing good topic coverage, also presents

a global picture of the state-of-play. The book also does not present an uncritical view of ecosystem services – for example Chapter 9 by Mark Sagoff explicitly presents a critical perspective.

In case you think this is turning into a puff piece, I do have a couple of niggles. First, it seemed to me that at times the application of concepts – for example the use of the ecosystem function concept – was not consistent between chapters. This is potentially confusing, although the Handbook itself discusses the variable usage of such terms and so it's possible to pick this apart. Secondly, some chapters seemed to have been more thoroughly worked up than others. For example, I was a bit disappointed by Chapter 4, which considers the links between biodiversity and ecosystem services, in that I was expecting more from the presumably large amount of recent research in this field.

But these points are small beer. Despite inevitably being a snapshot of a fast-moving research area, the fundamental concepts covered by this book, and the historical context within which the field is developing, will not change. The clearly written and presented chapters make this book highly accessible to a wide range of readers from students to specialists. I am sure this book will become a key text in this field and that I'll return to it frequently as a point of reference for future work on ecosystem services.

Rob Brooker



Pursuing Sustainability. A Guide to the Science and Practice.

Pamela Matson, William C. Clark and Krister Andersson, K. (2016)

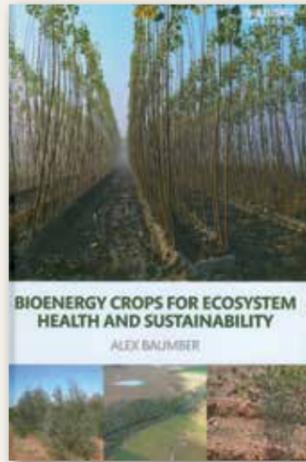
Princeton University Press, Princeton. 242pp. £24.95 (hbk)
ISBN 978-0-691-15761-0

Sustainability continues to maintain a high profile in environmental literature some three decades after the Brundtland Report of 1987 which introduced the precious concept of sustainable development. Its attainment, however, remains elusive as many environmental and social problems accelerate. An understanding of the issues and their resolutions is thus a vital element of environmental, and indeed political, education and is the primary objective of *Pursuing Sustainability*. The definition of sustainability, sustainable development and its history are outlined in Chapter 1 along with the role of science in sustainable development programmes. Four major case studies are cited to illustrate past and present progress and to highlight the dominant themes such as collaboration, complexity and challenge. This is followed by a

discussion on frameworks for the achievement of sustainability i.e. managing capital assets in tandem with well-being in its many senses including environment (natural capital, ecosystem services), community and individual health and advancement. Such social-environmental relationships are constantly changing as examined in Chapter 3; the maintenance of equilibrium in all such systems requires complex interplay i.e. feedback loops between components which may be social, environmental, economic and/or political. This makes prediction and planning difficult and requires an interdisciplinary approach. Governance, the subject of Chapter 4, is all important. It involves the concepts of collective action and common goals which are also subject to external forces and factors that may be positive or negative. Interestingly, there is no consideration of corruption which is globally widespread and which cannot nor should not be ignored in discourses about sustainability; indeed corruption lies at the heart of many development failures. However, Governance also involves the adequate funding and dissemination of knowledge linked with science and technology as well as education as examined in Chapter 5. Bringing all these factors together to achieve sustainability is complicated and requires leadership, creativity and persistence to achieve the common good, as reflected in Chapter 6. There are also two appendices; the first expands on the case studies examined in the opening chapter i.e. an historical perspective involving London's problems through the ages, contemporary

irrigation systems in Nepal, the agricultural systems of the Yaqui Valley of Mexico, and an example of a global issue, namely the protection of the ozone layer from destruction by CFCs through the Montreal protocol of 1987. Appendix B comprises a glossary of terms, acronyms and various resources which are useful for those wishing to pursue further investigation. Prior to the index there is a section containing notes which expand on points made in the earlier chapters, and which give details of literature quoted. Such additions might have been better placed at the end of each chapter. Overall, this is a clear and concise exposition on sustainability. It is an accessible text which includes authors' personal observations through their involvements with specific sustainability projects/issues. A primary message that each case/scenario, at whatever scale, must be judged and managed on its own integrity is well presented with appropriate diagrams where necessary. This book is a useful addition to the vast literature on sustainability. It merits inclusion in reading recommendations for undergraduate and postgraduate courses with an emphasis on the many aspects of environmental management.

Antoinette Mannion



Bioenergy Crops for Ecosystem Health and Sustainability.

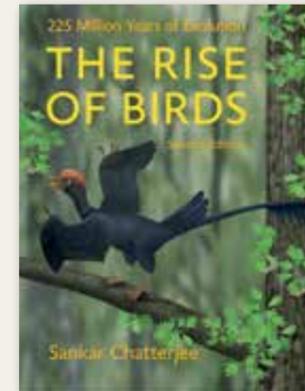
Alex Baumber (2016)
Routledge Earthscan
Abingdon and New York,
216pp, £85 (hbk)
ISBN 978-1-138-83883-3

Bioenergy crops are controversial. The debate centres on competing land uses, notably land for biomass energy *versus* land for food and their respective sustainability values. This issue is defined in chapter 1 which opens with a range of eye-catching quotes from recent literature focussing on the expansion of agrofuels, particularly oil palm. Such quotes reflect a commonly held view that these developments are environmentally detrimental and are reflected in deforestation data, especially in southeast Asia and increasingly in Africa and South America. Baumber does not dispute these facts but defines his objective as seeking improved and beneficial means of bioenergy production. The scene is set with a description of the many varieties of biofuels: maize, soy, woody perennials i.e. oil palm, eucalyptus and various perennial grasses. The management

of such crops can be rotational, polycultural and sustainable i.e. they can be multifunctional. Moreover, it must be recognized that bioenergy accounts for c. 10 per cent of the world's primary energy supply but that most (80 per cent) is used for traditional cooking and heating e.g. wood stoves charcoal production. The remaining 20 per cent is used for 'modern bioenergy' i.e. electricity production, biodiesel etc. which is the focus of Baumber's book. In Part 2 there is an appraisal of the relationship between energy cropping and the environment especially ecosystem health; this embraces climatic change, deforestation, land degradation and ecological restoration. There are numerous positive scenarios particularly in the context of perennial bioenergy crops as carbon sinks and in ecosystem protection. The three chapters of Part 3 are concerned with the interplay between energy cropping and socio-economic issues. These include possible competition with food production as well as questions of land rights and impacts on local communities whose *genres de vie* may be compromised through bioenergy cropping by outside commercial parties. An entire chapter is devoted to economic issues which are especially complex and relate to the type of bioenergy produced, notably ethanol and biodiesel plus woody crops, likely changes in future requirements and the indirect economic benefits of land protection. A further consideration is the issue of government intervention policies, which will vary between products and on a temporal basis,

in the form of subsidies for renewable fuel production. The final three chapters offer conclusions as to ways forward with an emphasis on sustainability, a survey of those government policies which have yielded the best results, and possible futures for two contrasting nations: Australia and Brazil. Overall, this is a valuable addition to the literature on bioenergy crops; it recognises problems, deals in the reality of ecological protection, and reflects the ever present interplay between politics, economics and environment. It presents an abundance of facts and figures, numerous case studies, useful diagrams (but no maps) and extensive chapter-by-chapter reference lists. In one sense this is a book on a specialist topic but in another sense its approach makes it relevant to a wide audience in environmental science/management at advanced undergraduate and postgraduate stages. However, at £85 it is expensive and will only be purchased by libraries.

Antoinette Mannion



The Rise of Birds; 225 Million years of Evolution 2nd edition

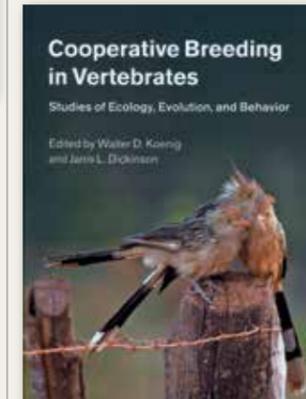
Sankar Chatterjee (2015)
John Hopkins University
Press
370 pages, £38.50 hardback
ISBN 978-1-4214-1590-1

The discovery, thirty years ago, of a set of fossil bones that clearly belonged to a primitive bird, Protoavis, that lived in the age of the dinosaurs led Sankar Chatterjee on a quest to understand their place in the history of life. He published his findings in the first edition of this book. Since then many more such fossils have come to light and this second edition brings all that information, and much more, together.

The sixteen chapters cover the development of the airframe, the origin of birds, Archaeopteryx and the continuing debate over its place in the evolution of flight, the Triassic Protoavis which predates Archaeopteryx by 75 million years, evolution of birds through the Cretaceous until the mass extinction and the subsequent development of the modern bird families. He then goes on to discuss the origin of flight, development of the egg and embryo, the development of the feather and the development of the

bill and associated feeding mechanisms. He concludes with a chapter on the negative effects of Man on birds.

This is a very detailed work and is more likely to be of interest to the specialist but it is an excellent summary of our current knowledge.



Cooperative Breeding in Vertebrates: Studies of Ecology, Evolution and Behavior

Edited by Walter D. Koenig
and Janis L. Dickinson
Cambridge University
Press, Cambridge. 390pp,
£89.99 (hbk)
ISBN 978—107-04343-5

This edited volume seeks to shed some light on the ecology, evolution, and behaviour of cooperative breeding. This fascinating phenomenon, whereby adults help rear offspring that are not their own, was described by naturalists as early as the 19th century and has since developed into a specific field of study.

Cooperative breeding occurs in multiple taxa, but is most studied in birds. This taxonomic bias is evident in this edited volume, with 15 of the 19 data chapters having a bird focus. Within this, there are chapters on some of the most well-known cooperative breeders,

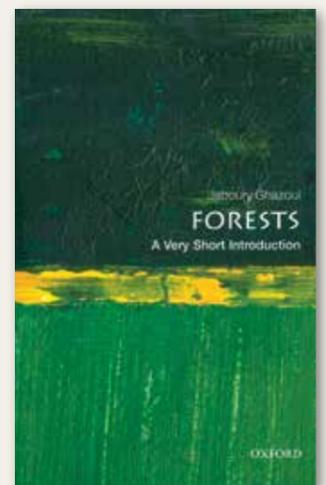
including long-tailed tits, Florida scrub-jays and Seychelles warblers, as well as some less well-known avian examples such as Taiwan yuhinas. The chapters cover the traditional "helper at the nest" scenario (e.g. western bluebirds in the US), helpers within social units at sub-colony level (e.g. bell miners in Australia) and joint-nesting whereby two or more breeding individuals of the same sex jointly care for their combined offspring (e.g. guira cuckoo in Brazil). Outside of the Aves, there is consideration of three species of mammal (meerkats, banded mongoose and naked mole rats) and cichlid fishes. There is a short scene-setting introduction at the start and a longer synthesis drawing the different strands of the disparate chapters together at the end.

For an edited work, the book is pleasingly coherent in terms of the number and style of graphs and tables throughout. Less standardized is the writing style, which varies between first and third person in different chapters, and the structure, which alternates between something very akin to a journal article with details of study sites and so-forth in some cases to a much more review-like style in others. This does make the book feel rather less unified in style and means it is not easy for a reader to make species-based comparisons on specific points. That said, all the chapters read very clearly and the regular use of sub-headings helps the reader navigate the text. Although the taxonomic bias is understandable (and, in many ways, representative of the field) personally I would have liked a little

more consideration of non-avian examples of this phenomenon, possibly considering primates and even branching out into insects, arachnids or crustaceans where alloparental care also occurs.

For me, the best single chapter was the final synthesis. This is a really clear summary of the complexities of cooperative breeding and the different reasons for its initial evolution and maintenance within different species. Tables and figures are used to very good effect here and the discussion of unanswered questions and where to go from here certainly should encourage the reader to reach for their trusty field notebook and walking boots...

Anne Goodenough



Forests: a very short introduction

Jaboury Ghazoul (2015)
Oxford University Press,
Oxford. 150pp, £7.99
ISBN 978-0-19-870617-5

The title says it all: this is not the book on which to base your forestry doctoral thesis, but it does fulfil the aim of the series, to provide a 'stimulating and

accessible way into a new subject'. It also contains a wide range of comments and insights, some of which are likely to be new even to the more experienced woodland ecologist.

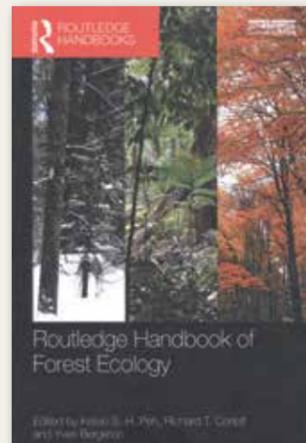
It refreshingly starts with a chapter on Forests in Human Culture (the sort of thing that usually gets left to the end in ecological textbooks), introducing modern day environmental activists, the Epic of Gilgamesh, Romanticism and the role (or not) of shifting cultivation in tropical deforestation. This is followed by exploration of the problems of defining what a forest actually is (bamboo in or out, what lower limit of tree cover is used) illustrating the potential issues that may arise when dealing with international forestry statistics. We then take a walk through different forest types from the tropics to boreal zones, in which the author has picked out the key differences in their physiognomy and composition, as well as the main causes.

The book has a walk through time as well, looking right back to forests of the Middle Devonian and through to the modern era. This brings in the role of humans in modifying even so-called pristine tropical forests, raising the question of what we really mean by a 'natural' forest. There is a chapter on natural disturbances (wind, fire, herbivores, disease) followed by one focussing on the provision of goods and services for human societies from forests – timber, medicinal plants, clean water, carbon storage – and the role of biodiversity in maintaining this supply.

The final chapter 'Past, Present and Future'

picks up the theme of past deforestation and what drives it, but also the potential for forest restoration. The uncertainties introduced by potential climate change for both present and future forests are highlighted. The book ends with a summary of why we need to take responsibility for what sort of forest cover we want to have in the future. The author is optimistic that forests will persist, just not necessarily the forests that we recognise today. Well worth a read.

Keith Kirby



Routledge Handbook of Forest Ecology

Edited by Kelvin S.-H. Peh, Richard T. Corlett and Yves Bergeron (2015).

Routledge, Abingdon and New York. 668pp, £125 (hbk)

ISBN978-0-415-73545-2 (hbk)

ISBN 978-1-315-81829-0 (ebk).

This is a weighty tome in every sense. It aims to provide 'a state of the art summary of our current knowledge of forest ecology' from a variety of perspectives, production, conservation recreation, and across a wide range of forest biomes with

over 80 contributors. The editors have however done a good job of producing a reasonably coherent volume. The diagrams, boxes and tables are clear and useful, but the black and white photographs in some of the chapters are not as sharp as they might be.

The book is divided into seven parts. The first has chapters on major forest biomes and a separate consideration of managed forests; the second section deals with forest dynamics, in particular the responses to disturbances driven by fire, storms and insect pests but also aspects of succession and the role of genetic diversity in affecting how the forest responds to disturbance. Section three has chapters on a range of different species groups – obvious ones such as birds and mammals, but also vascular epiphytes and lianes. Part four explores nutrient, water and energy movements in forest systems; part five various issues relating to forest conservation. Climate change gets its own section with six chapters including effects on fire regimes, droughts, carbon budget changes and modelling studies. The final part is a bit of a hotch-potch, but covers aspects of human interactions with forests such as non-timber forest products, recreation, hunting, urban forestry.

There are gaps, many of which the editors themselves acknowledge since it would be impossible to cover everything equally in even as large a book as this is: for example, the biome descriptions do not cover southern temperate forests; the main pests and pathogens chapter focusses just on North American

forests; the climate change drought chapter is limited to boreal forests.

My main concern was whether it really could be an 'authoritative text', appeal 'to the layperson interested in an introduction to forest ecology' and provide 'graduate students with a comprehensive collection of current research'. There are 2-3 pages of references per chapter so these are not comprehensive reviews of a topic, but they do provide a good starting point for further research. You would need to be really dedicated as a layperson to try to read this book cover to cover. However, the language is accessible enough and the chapters sufficiently self-contained for it to be a book that is dipped into. From the graduate student perspective, the cost of the hardback will limit how many will use it in this form unless purchased by their libraries. However, there is an ebook option at about a third the price, and increasingly that is the trend for books of this sort.

I think it succeeds surprisingly well, given the spread of its subject matter. It does provide a framework for understanding the different topics covered by the chapters, that you cannot get just from running a search for papers in Google Scholar or Web of Science.

Keith Kirby

ALSO RECEIVED

Notes by Alan Crowden

Ecological Mechanics: Principles of Life's Physical Interactions

Mark Denny (2016)

Princeton University Press, Princeton. 530pp, £55 (hbk)
ISBN 978-0-691-16315-4

One of the puffs on the back cover of this book aptly describes it as a "tour de forces", that is a tour of how diverse physical forces in the environment help govern the physiology, behaviour, ecology and evolution of organisms. There are hefty doses of physics, fluid dynamics, mechanics and more in this tome, but for those interested in the emerging field of ecomechanics, this is a 'must have' book.

Plant Life of the Dolomites: Vegetation Tables

Erika Pignatti and Sandro Punatti (2016)

Springer Heidelberg 568pp, £104.50 (hbk)
ISBN 978-3-48032-8

This is described as a supplement to the book Plant Life of the Dolomites: Vegetation Structure and Ecology, providing in-depth analysis of over 100 plant communities of the Dolomite vegetation.

Invasive Species in a Globalized World

Ecological, Social and Legal Perspectives on Policy

Edited by Reuben P. Keller, Marc W. Cadotte and Glenn Sandiford (2015)

The University of Chicago Press 418pp, £87.50 (hbk), £31.50 (pbk)

ISBN 978-0-22616604-9 (hbk)
ISBN 978-0-22616618-6 (pbk)

A multi-author book with the usual strengths and weaknesses of the genre. With seventeen chapters divided into four sections, the book draws on a much wider range of expertise in the ecological, social and legal aspects of invasive species than would be possible with a single or dual authorship. While the focus is on North American examples, there is input from other parts of the world. Overall, the book highlights the need for a multidisciplinary approach to an ecological problem that can never be addressed adequately without the right management, legal framework and social attitudes. Excellent introductory and summary chapters by the editors set the scene and draw some conclusions from this timely and useful book.

Green Exercise

Linking Nature, Health and Well-Being

Edited by Jo Barton, Rachel Bragg, Carly Wood and Jules Pretty (2016)

Routledge, Abingdon. 228pp, £29.99 (pbk)
ISBN 978-1-138-80765-5

The book brings together research on the synergistic health benefits of being physically active in green spaces; the green exercise of the book's title. The conclusion is that green exercise benefits individual health and wellbeing, increases knowledge and care for natural environments, and provides a policy link between health and the environment. What's not to like?



DIARY

THE SOCIETY'S MEETINGS

2016

DEC 11-14

2016 Annual Meeting. Liverpool, UK. Full details from: http://www.britishecologicalsociety.org/events/current_future_meetings/2016-annual-meeting/

THE SOCIETY'S COMMITTEE MEETINGS 2016

OCT 11

Policy Committee

OCT 12

Meetings Committee

DEC 11

Council

OTHER MEETINGS 2016

SEP 1-10

IUCN World Conservation Congress. Hawaii, USA. Details from: <http://www.iucnworldconservationcongress.org/>

SEP 4-7

ECSCA 56 Coastal systems in transition: From a 'natural' to an 'anthropogenically-modified' state. Bremen, Germany. Website: <http://www.estuarinecoastalconference.com/>

SEP 6-8

Ento' 16 Annual National Science Meeting. Harper Adams University College, Shropshire. Further details from: <http://www.royensoc.co.uk/content/ento-16-annual-national-science-meeting>

SEP 20-23

20th Evolutionary Biology Meeting. Marseilles, France. Further details: <http://sites.univ-provence.fr/evol-cgr/>

SEP 25-30

Entomological Society of America. Orlando, Florida. Website: <http://ice2016orlando.org/>

SEP 25-30

ICE 2016. International Congress of Entomology. Orlando, Florida, USA. Website: <http://ice2016orlando.org/>

NOV 7-9

New trends in evolutionary biology: biological, philosophical and social science perspectives. The Royal Society, UK. Website: <https://royalsociety.org/events/2016/11/evolutionary-biology/>

NOV 7-11

World Lake Conference 2016: Lake Ecosystem Health and its Resilience: Diversity and the Risks of Extinction. Bali, Indonesia. Details from: <http://www.ilec.or.jp/en/wlc/new/?p=2864>

NOV 28 – DEC 2

Ecological Society of Australia Annual Meeting. Fremantle, Western Australia. Details from: <http://www.esa2016.org.au/>

OTHER MEETINGS 2017

AUG 21-25 12th International Congress

of Ecology: Ecology and Civilization in a Changing World. Beijing, China. Details from: <http://www.intecol2017.org/>

TRAINING WORKSHOPS

The Chartered Institute for Ecology and Environmental Management runs a wide variety of workshops for professional development. For further information and availability see www.cieem.net or e-mail: workshops@cieem.net.

The Centre for Research into Ecological and Environmental Modelling runs a variety of workshops on a regular basis. For further information and availability see www.creem.st-and.ac.uk/conferences.php

ACCOUNTS

Accounts for the year ended
31 December 2015 together with
Council's and auditor's reports

Company number: **1522897**
Charity number: **281213**

BRITISH
ECOLOGICAL
SOCIETY



TRUSTEES AND ADVISORS

MEMBERS OF COUNCIL

| | |
|-----------------|-------------------------|
| A Beckerman | Resigned December 2015 |
| P Brotherton | Appointed December 2015 |
| Y Buckley | Appointed December 2015 |
| Z Davies | |
| M Eichhorn | |
| W Gosling | |
| Diana Gilbert | |
| A Gray | |
| R Hails | |
| S Hartley | |
| D Hodgson | Resigned December 2015 |
| Jane Hill | |
| Nina Hautekèete | Appointed December 2015 |
| G Hurst | Resigned December 2015 |
| O Lewis | |
| M O'Callaghan | |
| A Pullin | |
| D Purves | |
| P Raven | Resigned December 2015 |
| E Sayer | |
| Dawn Scott | Appointed December 2015 |
| I Stott | |
| W Sutherland | |
| L Turnbull | |
| A Vanbergen | Appointed December 2015 |
| J Vickery | |

EXECUTIVE DIRECTOR

H Norman

PRINCIPAL ADDRESS

Charles Darwin House
12 Roger Street
London WC1N 2JU

AUDITORS

Mazars LLP
Times House
Throwley Way
Sutton
Surrey SM1 4JQ

BANKERS

Barclays Bank plc
60 High Street
Putney
London SW11 1XB

SOLICITORS

Stone King Sewell LLP
16 St John's Lane
London EC1M 4BS

INVESTMENT ADVISORS

Barclays Wealth
Charity Investments Team
15th Floor
1 Churchill Place
London E14 5HP

OFFICE BEARERS

| | |
|----------------|---|
| President | S Hartley Appointed December 2015 |
| Past President | W Sutherland Appointed December 2015 |
| Vice President | R Hails |
| Vice President | A Pullin |
| Hon. Secretary | A Vanbergen Appointed December 2015 |
| Hon. Treasurer | D Purves |

CHAIRPERSONS OF STANDING COMMITTEES (AS AT DATE OF THIS REPORT)

| | |
|---|-------------|
| Finance Board | D Purves |
| Management Board | S Hartley |
| Education, Training & Careers Committee | W Gosling |
| Grants Committee | R Hails |
| Meetings Committee | Z Davies |
| Membership Committee | A Pullin |
| Personnel Committee | A Vanbergen |
| Public and Policy Committee | J Vickery |
| Publications Committee | A Gray |

COUNCIL'S REPORT

For the year ended 31 December 2015

1. FINANCIAL STATEMENTS

The Trustees present their report and financial statements for the year ended 31 December 2015.

2. COUNCIL'S RESPONSIBILITIES

The Council of the British Ecological Society (the Trustees and directors) are responsible for preparing the Annual Report and the financial statements in accordance with applicable law and regulations.

Company law requires the Council to prepare financial statements for each financial year. Under that law the Council have elected to prepare the financial statements in accordance with United Kingdom Generally Accepted Accounting Practice (United Kingdom Accounting Standards and applicable law). The financial statements are required by law to give a true and fair view of the state of affairs of the company and of the surplus or deficit of the company for that period. In preparing these financial statements, the Council are required to:

- select suitable accounting policies and then apply them consistently;
- observe the methods and principles in the Charities SORP¹;
- make judgements and estimates that are reasonable and prudent;
- state whether applicable UK Accounting Standards have been followed, subject to any material departures disclosed and explained in the financial statements;
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Company will continue in business.

The Council is responsible for keeping proper accounting records which disclose with reasonable accuracy at any time the financial position of the British Ecological Society (BES) and enable them to ensure that the accounts comply with the Companies Act 2006. They are also responsible for safeguarding the assets of the BES and hence for taking reasonable

steps for the prevention and detection of fraud and other irregularities.

Statement of disclosure to auditors:

- so far as the directors are aware, there is no relevant audit information of which the company's auditors are unaware; and
- they have taken all the steps that they ought to have taken as directors in order to make themselves aware of any relevant audit information and to establish that the company's auditors are aware of that information.

3. GOVERNANCE: CONSTITUTION, STRUCTURE AND MANAGEMENT OF THE SOCIETY

The BES is a company limited by guarantee (Registration no. 1522897) and has no share capital. As a registered charity (Registration no. 281213). It is governed by its Memorandum and Articles of Association.

Council is the supreme governing body of the BES. Council comprises the President, President-Elect or Past President, two Vice Presidents, Honorary Treasurer, Honorary Secretary, Chair of the Education, Training and Career Committee, Chair of the Meetings Committee, Chair of the Publications Committee, Chair of the Public and Policy Committee, and 12 Ordinary Members. Council is responsible for nominating officer and chair posts and members of the Society are able to put themselves forward for these roles. Nomination for Ordinary Members is open to the whole membership. All members of Council are elected by the membership at the AGM. All newly appointed Trustees go through a process of induction which fully briefs them about their roles, responsibilities and the BES.

There are nine committees that report to Council. These committees cover specific areas of work such as education, meetings, publications, finance etc., and comprise Council members and, in most cases, ordinary members drawn from the Society's members.

The Society has a governance document which details the structure, terms of reference and membership of Council and its committees. The work of each committee is supported by a member of staff.

The 2015 – 2019 strategic plan for the Society provides an exciting and challenging framework for the Society's activities as it moves into its second century.

Remuneration of all staff, including key management personnel, is considered on an annual basis by the Society's Personnel Committee.

4. STATEMENT OF GOALS AND PRINCIPAL ACTIVITIES

The objects for which the Society is established are to advance the education of the public in the subject of ecology as a branch of natural sciences and to advance and support research in that field, and to disseminate the results of such useful research.

The vision of the British Ecological Society is:

A world inspired, informed and influenced by ecology

and our mission is to:

Generate, communicate and promote ecological knowledge and solutions

In order to achieve this our major goals are to:

- ***Communicate world-leading ecological science***
- ***Generate, synthesise and exchange ecological knowledge***
- ***Share the excitement and relevance of ecology***
- ***Inspire, engage and recognise talent***
- ***Build a sustainable, resilient and efficient Society***

Ecology is the scientific study of the distribution, abundance and dynamics of organisms, their interactions with other organisms and with their physical environment. At a time when finite natural resources are being used at increasing rates, it has never been more important for human society to understand its impact on ecological systems (which includes systems intensively managed or impacted on by humans such as arable farms, pastures and marine fisheries) and their importance in maintaining human health. The BES's many activities include the publication of a range of scientific literature, including internationally renowned journals, the organisation and sponsorship of a wide variety of meetings, the funding of numerous grant schemes, public engagement, education work and policy work. The Society has approximately 5,000 members worldwide, and membership is open to all with an interest in ecology. There is a small membership fee, with discounts for students and those from low income countries.

5. REPORT ON PRINCIPAL ACTIVITIES

The Trustees confirm that they have complied with the duty in section 17 of the Charities Act 2011 to have due regard to the Charity Commission's general guidance on public benefit. All trustees give their time voluntarily and do not receive any private benefit. Details of trustees' expenses and remuneration are disclosed in notes 5 and 15 respectively.

The first four of the Society's strategic goals stated in section 4 provide clear public benefits, whilst the final one defines the ways in which the Society gains greater leverage from its finite resources and ensures its long-term sustainability.

The BES portfolio of grants covers all of the Society's aims. It can be divided into several broad categories; research, training & travel, outreach and support for ecologists in Africa. The BES funds grants with the aim of promoting ecology as widely as possible and hence individual awards are generally of relatively small value, although many awards are made.

5.1 Communicate world-leading ecological science, and generate, synthesise and exchange ecological knowledge

These major goals are primarily supported by our work in publishing, meetings and grants.

Publishing - Resources Expended = £1,4644,000 (48% of total)

During 2015, the BES continued to deliver high quality ecological research across our portfolio of academic journals, fulfilling one of its major goals of communicating world-leading ecological science. Publishing remains the BES's main source of income, and the surplus is reinvested in our other charitable activities, including grant-giving, subsidising meetings and providing education and policy expertise.

Access to ecological research is a priority for the BES so we make all content freely available to members and free to access to all 24 months after publication, as well as providing free or heavily discounted content immediately after publication to institutions in many developing countries. In addition, each of the journals have different paper types that are always free to access, including Journal of Applied Ecology's Policy Direction articles, the first three of which were published in 2015. The focus of Policy Directions is to inform and improve policy for a wide range of subjects and to provide a broad policy context for a topic and these three articles have already been downloaded over 3,000 times. Research from across the journals also featured in a large number of international news outlets during 2015, including The Telegraph, The Guardian, The Independent, BBC, Discovery News, The Huffington Post, Smithsonian.com and CBC.

Our open access partner journal, Ecology and Evolution, continues to grow both in direct submissions and transfers from its sixteen feeder journals, including the five BES titles. Since launch, more than 12,000 manuscripts have been referred to the journal, with over 1,500 of these authors requesting to transfer their manuscript for consideration by Ecology and Evolution. This means that 1,500 sets of reviews have been transferred from one journal to another within the discipline, a considerable saving of valuable reviewer and author time.

Our in-house publications team produced another informative guide for early career researchers to sit alongside our guides to peer review and data management. A *Guide to Getting Published in Ecology and Evolution* features top tips from a wide range of academics at all stages of their careers and, like all these early career researcher guides, can be downloaded free of charge at www.britishecologicalsociety.org/besguides. In conjunction with the BES External Affairs team, a webinar on this topic was also coordinated and run in early 2016, featuring presentations from many of those who contributed to the Guide.

In April, we celebrated the 5th anniversary of *Methods in Ecology and Evolution* with a 16-hour Anniversary Symposium, starting in the UK and continuing in Canada. The event was livestreamed for free around the world – a first for a BES meeting – and was watched by over 1,500 people across six continents.

The BES heavily relies on the excellent service offered by our anonymous peer reviewers and Chuck Fox, Executive Editor of *Functional Ecology*, has been investigating peer review quality and different types of bias in peer review using author, reviewer and editor data from *Functional Ecology* between 2004 and 2014. While he has found that the peer review process does differ in some aspects depending on editor and reviewer gender, reassuringly neither author, reviewer or editor gender affect the outcomes of peer review. This research has led to a number of papers published in *Ecology and Evolution* and *Functional Ecology* and the BES is supporting Chuck to extend this research to the other BES journals during 2016.

Our *Ecological Reviews* book series publishes on topics that have achieved a critical mass of knowledge in the past five years. Two new volumes were published in 2015 and both are already seeing excellent sales: *Trophic Ecology*, edited Hanley & La Pierre; and *Conflicts in Conservation*, edited by Redpath, Gutiérrez, Wood & Young. *Conflicts in Conservation* has been reviewed in *The Times* and on the BES Policy Blog and both volumes have been spotted on the shelves in Foyles' flagship store.

Finally, our Annual Meeting in December was a busy time for the publications team, with many Associate Editors and Editors travelling from overseas and within the UK to attend a variety of journal development meetings. The success of our journals is largely attributable to these individuals and it was a pleasure to welcome so many of them to Edinburgh and have the opportunity to discuss the journals and academic publishing more widely with them. The publications team also ran two events while in Edinburgh, a workshop on *Maximising the Exposure of Your Research* and a panel debate on *The Future of Data Archiving*, both of which led to lots of useful discussion between the participants and panellists.

Research - Resources Expended = £266,000 (9% of total)

In 2015 the Society received 395 applications for funding across its main grants portfolio (excluding Training & Travel), and funded 48 projects totalling £301,312. This continues to show a steady increase in applications submitted, compared to the 348 applications submitted in 2014. Going forward, it will be important for the Society to consider how to mitigate the impact of decreasing application success rates (see table below).

The majority of our awards went towards funding scientific ecological research projects. We supported small projects with new and innovative ideas, as well as larger projects that aim to help early career ecologists to establish an independent research career in ecology.

We supported ecologists in developing countries through the Ecologists in Africa grant scheme. This scheme recognises that ecologists in Africa face unique challenges in carrying out research and aims to provide them with support to develop their skills, experience, and knowledge base, as well as making connections with ecologists in the developed world.

Finally, funding has also contributed to Outreach grants, which support projects promoting the public engagement of ecology and/or improving skills in science communication.

Training & Travel Grants contributed £26,000 to enable 60 PhD students or postgraduate research assistants to present their research at meetings across the world or take part in specialist field training.

In 2013, Grants Committee recognised the importance of the Committee's activities being transparent and made the decision to make all grant success rates publicly available on the BES website. The 2015 success rates can be seen below. Comparing to the 2014 rates, there was a small increase in the rate for both Small and Large Research. There was a drop in Outreach from 13% - 9% and a drop in Ecologists in Africa from 10% - 6%.

2015 SUCCESS RATES

| GRANT TYPE | NUMBER OF APPLICATIONS | NUMBER OF AWARDS | SUCCESS RATE |
|----------------------|------------------------|------------------|--------------|
| Large research | 43 | 7 | 16% |
| Small Research | 104 | 22 | 21% |
| Outreach | 132 | 12 | 9% |
| Ecologists in Africa | 116 | 7 | 6% |

We have awarded a number of prizes to outstanding individuals in recognition of their contribution towards the science of ecology, including our annual Anne Keymer student talk prize and Best Poster Prize at the 2016 Annual Meeting in Edinburgh.

We continue to support the Gratis Book Scheme, the aim of which is to provide ecology and conservation books to those from outside Western Europe, North America, Japan, Australia, and New Zealand who would otherwise be unable to obtain them. The purpose of this scheme is to spread ecological knowledge as widely as possible. This scheme is a collaboration between the British Ecological Society (who pay for the postage), the NHBS online bookstore (who co-ordinate and organise the distribution), and the publishers and authors of the books (who provide the books for free). In 2015, the BES contributed £2,500 enabling 217 books to be dispatched to over 55 countries.

We provide an annual contribution to support scholarships for students from European institutions to attend Tropical Biology Association courses. In 2015 our contribution of £10,000 allowed 23 young biologists from 17 institutions, spanning 13 countries, to attend field courses in Tanzania, Borneo and Madagascar.

We are pleased to note that 2015 saw the development of a new grants database. All deadlines were met, which meant it was possible to use this system for the first round of applications in 2016. This online database will increase efficiency within the BES office and provide a much more user friendly system for all users. We have already received a substantial amount of positive comments from those that have used it and will take into account any feedback over the course of the next year. In 2016, the Grants & Events Officer will continue to develop bespoke areas of the system and migrate data from the previous database.

Meetings - Resources Expended = £592,000 (19% of total)

The exchange of ideas and networking that happens at scientific conferences and field trips are vital ways in which science advances and develops. Although we charge a registration fee to attend, the Society subsidises events to ensure fees are low for students and unemployed members – and always try to negotiate the best price when possible.

In 2015, our Annual Meeting was held at the EICC in Edinburgh. It ran from 13 - 16 December and attracted 1,200 delegates from over 45 countries. There were 430 talks spread over the daily 12 parallel sessions with 230 posters and two poster sessions. We were pleased to be able to draw renowned names to present our plenary lectures; Luigi Boitani gave the BES Lecture, Josephine Pemberton the Tansley Lecture, Pat Monaghan the '12 Months in Ecology' and Bill Sutherland, who gave the Presidential Address.

Workshops are now a staple of our meeting programme, so we retained the popular extended lunchtime slots for sixteen community-generated workshops over the two full days. Those who did not attend workshops were able to use the extra time to network.

We built on the successes of the previous year and paid special attention to the delegate experience – ensuring people felt welcomed, included and represented. It was the first year that we held an LGBT+ evening mixer and were asked to host a Christian morning mixer; both of which were attended by relatively small numbers (17 and c. 10 respectively), but the feedback was overwhelmingly positive and we have been encouraged to run them again in Liverpool.

We moved the AGM to run immediately after Josephine Pemberton's plenary lecture this year, which dramatically increased the numbers from a disappointing turn out in 2014 in Lille.

To build on the sense of community, we better promoted the Christmas Jumper day and awarded prizes for the best outfit; we also encouraged exhibitors to join us in decorating their stands for the final day. Although these are soft measures, they had a discernible impact on the goodwill our delegates felt towards us – helped by the array of communal games in the exhibition area, ceilidh and disco. The feedback paid tribute to this extra effort with a record number expressing high levels of satisfaction.

Twitter continued to be the main social media platform, again using it to accept questions for our plenary speakers. Its popularity at our Annual Meetings grows year on year, with the meeting hashtag #BES2015 trending for the whole three days – expanding the meeting's reach to those unable to join us onsite.

We are aware of our commitment to the wider society, which is why we keep registration process as low as possible – actively seeking extra revenue through sponsorship and the sale of exhibition space. We ensure the Annual Meeting is great value for everyone, but particularly students and our unemployed members, which is why we offer them reduced rates – and additional reductions for students who work as a 'student helper' for part of the meeting.

We continue to develop a raft of events within the Annual Meeting – ensuring we offer outstanding value and are competitively priced. These included practical workshops, career development, opportunities to network informally and events for the public; Edinburgh hosted our first public BES Science Slam (hosted by comedian Rob Newman), a high street

book signing at Blackwells and a policy debate on GM.

We also took the opportunity to publicly thank those who helped us make such a positive impact – our numerous assistant editors, Special Interest Groups leaders and grants Review College volunteers. We thank them for their commitment and enthusiasm in helping us to attain our shared goals.

In addition to the Annual Meeting, we delivered two symposia throughout the year. The first was **Demography Beyond the Population**, 24 – 26 March in Sheffield, hashtag #beyonddemog. It was organised by a truly international group: Alden Griffiths (Wellesley College, USA), Jessica Metcalf (Princeton University, USA), Rob Salguero-Gomez (Trinity College Dublin, Ireland), Sean McMahon (Smithsonian Environmental Research Center, USA), Cory Merow (University of Connecticut, USA) and Dylan Childs (University of Sheffield, UK). It drew in an equally international delegate number of 100. It was also the first time a special feature was produced that encompassed each BES journal.

Our second symposium, **The Ecology and Evolution of Emerging Plants and Pathogens: Challenges to Global Food Security and Ecosystem Resilience** was organised by Daniel Bebbler, Sarah Gurr and Britt Kosella, all of University of Exeter. It was held at the Penryn Campus, Cornwall and attracted 85 delegates. The hashtag was #pestsym

Our Special Interest Groups provide a valuable source of individual disciplinary accessibility to members and non-members, and deliver events for specific ecological areas. There are currently 16 groups, taking on the Behavioural and Microbial groups in the latter part of the year.

In 2015, there were over 35 events, ranging from a techniques workshop in Portugal to establishing collaborative partnerships in India. We subsidise these events and promote them through our various communication channels. However, in line with the desire to achieve cost neutrality, the SIGs have also been encouraged to be cost effective, or raise profit if possible. They have also been more encouraged to operate through social media, and their activity continues to increase.

5.2 Share the excitement and relevance of ecology

This major goal is primarily supported by our work in policy.

Resources Expended = £206,000 (7% of total)

The BES seeks to demonstrate the major contribution that ecological science can make to meeting national and global challenges. In our science policy work, we promote decision making informed by ecological science, and engage in policies that facilitates a robust, diverse, well-funded and broad based community of ecological scientists. In 2015 the BES's policy activities were reviewed and a refreshed strategy for policy engagement was finalised. The new policy strategy allows for a focus on targeted proactive ecological topics, makes more of the many training opportunities our members participate in, and improves connections both within the BES and with external networks.

We communicate the value of ecological knowledge to policy makers and promote evidence-informed solutions. In 2015, the Ecology Matters leaflet was published and given to key policy contacts, as well as informing follow-up publications in Science in Parliament, a magazine for MPs at Westminster, and In Practice, the members' magazine for CIEEM. In Scotland, MSPs were invited to the poster session at the Annual Meeting in Edinburgh and were met by the Scottish Policy Group who highlighted relevant emerging research.

The BES engaged with parliamentarians on specific ecological topics including natural capital through the launch of the Natural Capital Initiative 2014 summit report in Westminster, and two major consultations; the GM Insects inquiry where BES were invited to give oral evidence to the Lords Science and Technology Select Committee, and the Environmental Audit Select Committee inquiry on Soil Health. We have also brought together members' expertise on the Research Excellence Framework, Invasive Non-Native Species, the Higher Education Green Paper, EU regulation of the Life Sciences and more in joint responses with Wildlife & Countryside Link and the Royal Society of Biology.

The BES provides support for members to build their skills, develop their careers and enhance the policy impact of their work. Long running schemes such as the POST Fellowship and Parliamentary Shadowing Scheme continued in 2015 to provide members with direct access to policy makers. We also held a range of training days for PhD students and policy workshops, and successfully extended the policy internship from three to six months. The BES Women in Ecology Mentoring Scheme was also re-instated in 2015; this was an External Affairs Team project involving the Policy Manger and the Education Assistant.

Several events brought both BES members and non-members together to be informed by and ask questions of decision makers. The first People, Politics and the Planet debate, in partnership with CIEEM and the Sibthorp Trust, brought together over 300 people ahead of the General Election to question a panel of politicians, including Green Party Leader Natalie Bennet, Defra Minister Lord de Mauley, and Shadow Minister Barry Gardiner, on their environmental policies. A public debate on GM technologies in Edinburgh attracted press coverage by BBC Scotland. In the latter part of 2015, planning began for the 2016 People, Politics and the Planet debate, which will be held in July, and for the April BES symposium on the science-policy interface in conservation.

The Scottish Policy Group continued to grow its activities and carried out a range of events including a workshop and parliamentary tour at the annual meeting, 'Pie and a Pint' nights on policy and social media and conservation conflicts networks, a webinar on the future of the European Birds and Habitats Directives and participation in Scottish Environment Week. SPG also established a communications team, and presence on social media, as well as moving to a full committee structure with a new Chair. New relationships were established with MSPs through participation for the first time in Scottish Environment Link's Environment Week in the Scottish Parliament.

The Wales Policy Group was also established in late 2015, with over 100 members, many of which are working within Welsh Government. The WPG is developing activities for the coming year.

Finally, the Policy Officer extended BES's knowledge and participation in policies beyond the UK, forming networks with the Society for Conservation Biology, and contributing to Wildlife and Countryside Link's response to the European Commission's REFIT "Fitness Check" of the Birds and Habitats Directive as part of a coalition of 100 environmental organisations, ensuring that the latest ecological evidence was brought to the fore.

5.3 Inspire, engage and recognise talent

This major goal is primarily supported by our work in education.

Resources Expended = £256,000 (8% of total)

The Society supports the ecological education of people of all ages and aims to support ecologists at each stage of their career development through providing advice and opportunities for professional development. The BES supports our members in the development of education and public engagement activities related to their research.

In 2015, The Society extended the Ecological Ambassadors scheme by providing training for PhD students in developing schools engagement. PhD students reflected the breadth of ecological science and represented all four nations of the UK. Students were provided with funding to visit at least two schools ensuring where possible they engaged with harder to reach schools and promoting progression to Higher Education for all. Evaluations from students and schools have been very positive, at the time of writing 22 individual schools had been visited with further visits planned for spring onwards. The scheme will continue to grow in 2016.

The Society launched its first Summer School, a week-long residential school for 1st and 2nd year undergraduates. 48 students from 30 universities attended the school, the school was free to attend and travel bursaries were offered. The school continues in 2016 and is expanded.

The Society funded 10 A-level students to participate in In2Science, a scheme aimed at supporting young people from underrepresented groups to access higher education. The scheme will continue to grow over the next five years. The scheme successfully saw more students accepted to HE science courses for September 2015. All students were invited to attend a celebratory event to meet the Society and collect careers resources.

The Society provided free to attend training for 25 Early Career researchers delivered by Science Made Simple, these students were then supported to practice their public engagement skills at BES led events. The BES delivered public engagement events at RHS Chelsea, Wychwood, Glastonbury, Lambeth Country Fair, GreenMan. The approximate total number of conversations between scientists and the public is estimated to be 4,000.

The Society continued to deliver careers advice, mentoring for women in science and other groups across a range of free to attend events and conferences, heavily subsidised support for teachers and lecturers within Higher Education and provided paper based resources to schools.

5.4 Build a sustainable, resilient and efficient Society

We have a duty to ensure the long term viability of the Society. During 2009 BES Council co-invested in Charles Darwin House to provide new office space for the Society, shared with several other organisations with complimentary aims (i.e. the Society for Experimental Biology). The building has also generated income from office leases and hire of the conference facilities and this was expanded with the purchase of a second building in 2013.

In 2015 we continued to develop and support the BES Journals to further enhance their standing so that they remain a sustainable and significant income stream for the Society in the near future, despite uncertainties over the impact of open access and economic challenges across the world.

The 2015-19 Strategic Plan included an objective to diversify the Society's income as a way of increasing the resilience of the organisation. During the year a fundraising consultant was commissioned to produce a sustainable fundraising strategy for the BES and in December 2015 BES Council accepted most of the recommendations from the resulting report. In 2016 those recommendations will be implemented.

5.4.1 Financial Management and Control

During the year the BES Committees undertook a wide range of activities in pursuit of the Society's charitable objectives. It is therefore necessary to have budgets and clearly written policies about what activities will be funded and how, and to communicate these clearly to all involved.

The Finance Committee considers quarterly management accounts at its meetings through the year, with a narrative provided by the Honorary Treasurer and Executive Director, as appropriate. The narrative focuses on reasons for variation against budget. The quarterly management accounts are also circulated to budget holders.

Annual budgets for the following year are drawn up in the fourth quarter and are approved by Council at its meeting in December.

The BES has a set of Financial Regulations which must be followed. These Regulations are reviewed annually by the Finance Committee.

In 2015 £282,000 (9% of resources expended) was given away in grants. This substantive sum requires careful management by the Society. Applications are reviewed against specific, published criteria. The BES has established a Peer Review College to review grant applications. This ensures that the Society uses the most appropriately experienced reviewers for each grant application. The only exception to this are the Travel & Training Grants. These are reviewed by BES staff and awards are made if the applicant meets the published criteria and there are sufficient funds available.

5.4.2 Investment Policy and Performance

The listed investments held by the BES and managed by Barclays Wealth were worth £3.7M in 2015 and their performance is in-line with appropriate benchmarks. As returns from cash investments are very low and there is no immediate need to hold investments in cash, the trustees decided to move £1M from cash to the investment portfolio in 2015. The investment managers produce a quarterly summary of performance for the Honorary Treasurer and Executive Director. The investment managers attend one meeting of the Finance Board a year to discuss performance and general strategy. Day to day investment decisions are delegated to Barclays Wealth in accordance with the agreed mandate. The BES has spread its risk as far as practicable by part owning its headquarters building and holding some of its reserves in long-term deposit accounts as well as in equities, bonds and trust funds.

During 2015 we commissioned an independent review of the performance of Barclays Wealth. This demonstrated that their performance was good and their fees relatively low compared to their competitors. The Finance Board therefore decided not to take the contract for portfolio management out to tender.

We have continued to use the services of the Ethical Investment Research Service (EIRIS) to provide us with information, based on a long list of criteria and a scoring system, on the environmental performance of FTSE listed companies. This information is updated twice annually and is used to screen out companies with the worst environmental records and policies from our portfolio. This gives a more objective and consistent basis for excluding companies. Full details are available from the Honorary Treasurer or the BES Office. A policy of this sort is consistent with the ethos of the BES and is important to maintaining the support of members and the wider ecological research community.

5.4.3 Financial Performance

The accounts show a surplus of £550,000 (surplus of £483,000 in 2014) before net gains on investments of £20,000 (gains of £103,000 in 2014). Total funds of the Society were £8.6M at the end of 2015 (£8.0M at the end of 2014).

5.4.4 Reserves Policy

In 2015 the Society reviewed and revised its reserves policy.

The Society holds reserves for three purposes. The first is to act as a buffer against uncertainties over future journal publishing income and generate income for its operational needs (the Expendable Endowment Fund). This is held as a designated fund and stands at £5.0M (£5.0M in 2014). Continuing concern over the stability of academic publishing pricing models suggests that there is significant insecurity over this very significant source of income for the Society. On addition, the Society has a high level of commitment to its current expenditure levels in the short and medium term. Significant uncertainty over most of the income combined with a high commitment to expenditure represents a major risk to the organisation. The Society is using the expendable endowment fund to gradually accumulate reserves so as to provide greater long-term stability without affecting its day-to-day activities. It is the trustees' intention to build the fund to approximately £10,000,000. A Total Return on the Investment Portfolio of 4-6% is considered prudent for planning purposes. The income from this sum will help to mitigate the possible future decline in publishing income, allowing the Society to continue its work, and provide funds to invest in future income-generating projects. It also enables the Society to take a planned approach to reducing expenditure should income levels drop significantly.

The second is that funds can be set aside for specific major projects. The 2015 – 2019 Strategic Plan includes significant investment in activities across the Society including an expansion of the publishing portfolio. Returns on investments held by the Society will be required to part fund a number of the new activities contained in the Strategic Plan.

The third is to ensure that the BES can meet its operational needs and working capital requirements (the free reserve). The general funds are currently £888,000 and represent approximately 4-5 months operating costs, excluding third party operating costs and grants. The Society aims to hold between 3 and 6 months operating costs as free reserves.

The designated tangible fixed asset fund comprises the net book value of fixed assets held by the Society, principally the Society's office in London and as such it is not available to meet the general running costs of the Society.

The level of reserves and the Society's financial strategy is regularly reviewed and monitored by the Trustees. The reserves policy is reviewed annually at the Finance Board meeting in September and any recommended changes are considered by Council in December of that year.

5.4.5 Risk Management

The BES has a risk register. It is reviewed in detail each spring by the BES Committees and then approved by Council in June. The risk register identifies areas of risk, ranks them in priority ordered according to impact multiplied by probability, states who or which Committee is responsible for each risk, states how the risk is currently mitigated and what actions remain outstanding.

Some of the major risk areas are:
A major loss in income from journals resulting from a change in publication models or a decrease in impact factor: Income from journals is a very significant proportion of the Society's funds. There is continued uncertainty regarding publications models and the timeframe in which this might happen. This risk is being mitigated in a variety of ways. We have a reserves policy which would provide a sufficient buffer to allow a gradual scaling back of the Society's financial commitments if income dropped. The Society has a Head of Publications to deliver effective and efficient journal management and to ensure that the Society keeps abreast of the latest developments in journal publishing. We diversified our journals portfolio to include an Open Access journal in our portfolio, *Ecology and Evolution*, by partnering with Wiley. This brings very useful expertise and understanding into the BES on how to run an Open Access title. Each journal has a strategic plan identifying ways in which it can increase its reputation and standing. In addition, in 2014, we developed a detailed publications strategy closely aligned with the Society's overall strategic plan which provides a long term vision of growth and development for the journals portfolio. This strategy is reviewed annually.

A sustained decline in attendance at the Society's meetings: The difficult funding situation in Higher Education could have a significant impact on the ability of academics to participate in BES meetings. There is now a timetable for publicity for BES Symposia and Annual Meetings, for both the Bulletin and website, to ensure the ecological community is informed of meetings well in advance. The Annual Meeting will move back to its traditional December slot and the Annual Meeting in Edinburgh was very well attended. The new strategic plan for the Society provides an excellent framework for the continued development of our meetings, ensuring that they remain attractive to core audiences whilst attracting new ones.

A sustained decline in membership: The Society's Membership Committee receives regular reporting on membership numbers and trends. Council regularly discusses the role of learned societies such as the BES in the 21st century and reviews the activities of the organization to ensure we provide excellent services that are wanted and needed by the ecological community. The BES continues to work on the challenge of recruiting new members and turning them into long term supporters of the Society.

6. THE SOCIETY'S ENVIRONMENTAL IMPACT

The purchase a new office for the Society in 2009 offered an unprecedented opportunity for the Society to lead the way with regards to reducing our environmental impact. Discussions with the other learned organisations lead to agreement that we should aim for a BREEAM rating of Excellent, the second highest possible rating and a tough objective for a building designed and build in 1959. BREEAM is a method of calculating the environmental impact of a building. Progress has been excellent. The aim of achieving the BREEAM Excellent rating was made fundamental to the refurbishment project and had a major influence on decisions ranging from how to run recycling onsite during the demolition stage through to the choice of mechanical and engineering solutions, selection of the final fixtures and fittings, and the development of a staff transport plan. We were delighted to achieve a BREEAM Excellent rating

in 2010. The refurbishment of the second building represents the same opportunity and we are again aiming for a BREEAM Excellent rating.

The move to Charles Darwin House has created a new base line for resource consumption from 2010 onwards, although the increase in occupancy of the office floors to rent during 2010 and into 2011, the second phase of construction in 2010, the significant increase in the use of the conference suite over this time period and a significant increase in the number of staff working at CDH in have influenced electricity consumption. The drop in energy use in 2015 is most likely a result of a decrease in the number of people working in CDH1 as tenants moved to the new CDH2 building during the year.

| YEAR | ENERGY CONSUMPTION AT CDH1 |
|------|----------------------------|
| 2010 | 391,352 kWh |
| 2011 | 372,939 kWh |
| 2012 | 394,633 kWh |
| 2013 | 407,474 kWh |
| 2014 | 441,169 kWh |
| 2015 | 414,437 kWh |

7. FUTURE DEVELOPMENTS

Details of some of the wide range of activities planned for 2016 are given under the headings of the Society's principal aims. The 2015 – 2019 Strategic Plan has provided an exciting and challenging framework for our activities as the Society moves into its second century.

As part of that new strategy the Society conducted a major review of its policy work to ensure that we are as effective as possible in promoting ecological knowledge to policy makers. During 2016 we will be implementing the recommendations of that review. We are continuing to look at the potential to expand our publishing portfolio. Publishing ecological research has been at the heart of the BES since it was founded in 1913 and it remains so today. The BES wishes to build on its strengths in this area. To extend the international reach of our meetings and following on from the success of the joint Annual Meeting in Lille with the French Ecological Society in 2014, we are working with Necov and the Ecological Society of Germany, Austria and Switzerland to develop a joint annual meeting in 2017 in Ghent, Belgium. We will be building on the success of last year's inaugural BES Summer School, a new initiative to encourage talent into ecology, to develop and extend the programme offered to top undergraduates in the UK. During 2015 we engaged more with the general public at a wide range of events, again, as part of a longer term plan to increase investment in this important area and 2016 will see a continuation of that investment.

8. AUDITORS

In 2016 the BES auditors were Mazars LLP.

This report has been prepared in accordance with the provisions applicable to entities subject to the small companies' regime.

This report was approved by the Council on 20 June 2016.

Professor Susan Hartley
Member of the Council

INDEPENDENT AUDITOR'S REPORT

To the Members of the British Ecological Society

We have audited the financial statements of The British Ecological Society for the year ended 31 December 2015 which comprise the statement of financial activities, the balance sheets, the statement of cashflows and the related notes. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards (United Kingdom Generally Accepted Accounting Practice).

Respective responsibilities of trustees and auditors

As explained more fully in the Trustees' Responsibilities Statement set out on page 3, the trustees (who are also the directors of the charity for the purposes of company law) are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view.

Our responsibility is to audit and express an opinion on the financial statements in accordance with applicable law and International Standards on Auditing (UK and Ireland). Those standards require us to comply with the Auditing Practices Board's (APB's) Ethical Standards for Auditors. This report is made solely to the charity's members as a body in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the charity's members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the charity and the charity's members as a body for our audit work, for this report, or for the opinions we have formed.

Scope of the audit of the financial statements

A description of the scope of an audit of financial statements is provided on the Financial Reporting Council's website at www.frc.org.uk/auditscopeukprivate.

Opinion on the financial statements

In our opinion the financial statements:

- give a true and fair view of the state of the charity's affairs as at 31 December 2015 and of its income and expenditure, for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice; and
- have been prepared in accordance with the requirements of the Companies Act 2006.

Opinion on the other matter prescribed by the Companies Act 2006

In our opinion the information given in the Council's Report for the financial year for which the financial statements are prepared is consistent with the financial statements.

Matters on which we are required to report by exception

We have nothing to report in respect of the following matters where the Companies Act 2006 requires us to report to you if, in our opinion:

- adequate accounting records have not been kept, or returns adequate for our audit have not been received from branches not visited by us; or
- the financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of trustees' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit;
- the trustees were not entitled to prepare the financial statements in accordance with the small companies regime and take advantage of the small companies exemption in preparing the Councils Report.

Nicola Wakefield (Senior Statutory Auditor)

for and on behalf of Mazars LLP

Chartered Accountants and Statutory Auditor

Times House, Throwley Way, Sutton, Surrey, SM1 4JQ

Date: 28 July 2016

STATEMENT OF FINANCIAL ACTIVITIES

Incorporating the income and expenditure account

For the year ended 31 December 2015

| | Notes | Unrestricted £'000 | Restricted £'000 | 2015 £'000 | Restated 2014 £'000 |
|--|-----------|-----------------------|---------------------|---------------|---------------------------|
| Income from | | | | | |
| <i>Donations & Legacies</i> | | - | 10 | 10 | 10 |
| <i>Other Trading Activities</i> | | | | | |
| Investment income | 2 | 131 | - | 131 | 116 |
| Other income | | 10 | - | 10 | 1 |
| | | 141 | 10 | 151 | 127 |
| <i>Incoming resources from charitable activities</i> | | | | | |
| Publications | | 2,946 | - | 2,946 | 2,838 |
| Income from conferences | | 368 | - | 368 | 256 |
| Subscriptions | | 130 | - | 130 | 136 |
| Total income | | 3,585 | 10 | 3,595 | 3,357 |
| Expenditure | | | | | |
| Expenditure on raising funds | | | | | |
| Investment management fees | | 6 | - | 6 | 4 |
| <i>Expenditure on charitable activities</i> | | | | | |
| Publications | | 1,464 | - | 1,464 | 1,329 |
| Meetings | | 592 | - | 592 | 565 |
| Research | | 266 | - | 266 | 368 |
| Education | | 255 | - | 255 | 135 |
| Policy | | 196 | 10 | 206 | 214 |
| Bulletin and other services | | 256 | - | 256 | 260 |
| Total expenditure | 3 | 3,035 | 10 | 3,045 | 2,874 |
| Net income before gains on investment | | 550 | - | 550 | 483 |
| Net gains on investments | 9 | 20 | - | 20 | 103 |
| Net movement in funds in year | | 570 | - | 570 | 586 |
| Fund balance brought forward | | 8,022 | 2 | 8,024 | 7,438 |
| Fund balances carried forward | 13 | 8,592 | 2 | 8,594 | 8,024 |

All of the above results derive from continuing activities. There are no gains and losses other than those disclosed above. The accompanying notes form an integral part of these financial statements.

BALANCE SHEET

For the year ended 31 December 2015

| | Notes | £'000 | 2015 £'000 | £'000 | Restated 2014 £'000 |
|---|-----------|-------|---------------|-------|---------------------------|
| Fixed assets | | | | | |
| Tangible assets | 8 | 2,704 | | 2,462 | |
| Investments | 9 | 5,556 | | 4,890 | |
| | | | 8,260 | | 7,352 |
| Current assets | | | | | |
| Debtors | 11 | 665 | | 641 | |
| Cash on deposit and in hand | | 154 | | 521 | |
| | | | 819 | | 1,162 |
| Creditors: amounts falling due within one year | 12 | (485) | | (490) | |
| Net current assets | | | 334 | | 672 |
| Net assets | | | 8,594 | | 8,024 |
| Represented by | | | | | |
| Unrestricted funds | | | | | |
| General fund | | | 888 | | 560 |
| Tangible fixed assets fund | | | 2,704 | | 2,462 |
| Expendable Endowment fund | | | 5,000 | | 5,000 |
| Restricted fund | | | 2 | | 2 |
| | 13 | | 8,594 | | 8,024 |

These financial statements have been prepared in accordance with the provisions applicable to entities subject to the small companies' regime.

Included in the above reserves are unrealised gains of £333,326 (2014 gains £343,971).

The accompanying notes form an integral part of these financial statements.

The accounts on pages 21 to 36 were approved by the Council on 20 June 2016 and signed on its behalf by

Professor Susan Hartley
Member of the Council

STATEMENT OF CASHFLOWS

For the year ended 31 December 2015

| | £'000 | 2015 £'000 | £'000 | Restated 2014 £'000 |
|---|---------|---------------|-------|---------------------------|
| Cash flow from operating activities | | | | |
| Net (expenditure)/income | | | 570 | 586 |
| <i>Adjustments for:</i> | | | | |
| Interest income | (131) | | | (116) |
| Depreciation | 64 | | | 36 |
| (Increase)/Decrease in debtors | (24) | | | 130 |
| (Decrease)/Increase in creditors | (5) | | | 194 |
| Net cash provided by/(used in) operating activities | | 474 | | 830 |
| Cash flow from investing activities | | | | |
| Purchase of tangible fixed assets | (306) | | | (322) |
| Investment income – bank interest | 131 | | | 116 |
| Purchase of investments | (1,359) | | | (1,320) |
| Disposal of investments | 713 | | | 786 |
| (Losses) on investments | (20) | | | (103) |
| Net cash (used in) investing activities | | (841) | | (843) |
| Change in cash and cash equivalents in the year | | (367) | | (13) |
| Cash and cash equivalents at the beginning of the year | | 521 | | 534 |
| Cash and cash equivalents at the end of the year | | 154 | | 521 |

The accompanying notes form an integral part of these financial statements.

NOTES TO THE ACCOUNTS

For the year ended 31 December 2015

1 ACCOUNTING POLICIES

a) Basis of accounting

The financial statements have been prepared in accordance with Accounting and Reporting by Charities: Statement of Recommended Practice applicable to charities preparing their accounts in accordance with the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102) (effective 1 January 2015) - (Charities SORP (FRS 102)), the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102) and the Companies Act 2006. Assets and liabilities are initially recognised at historical cost or transaction value unless otherwise stated in the relevant accounting policy note(s).

The trustees have assessed whether the use of the going concern basis is appropriate and have considered possible events or conditions that might cast significant doubt on the ability of the charity to continue as a going concern. The trustees have made this assessment for a period of at least one year from the date of approval of the financial statements. In particular the trustees have considered the charities forecasts and projections and have taken account of pressures on donation and investment income. After making enquiries the trustees have concluded that there is a reasonable expectation that the charity has adequate resources to continue in operational existence for the foreseeable future. The charity therefore continues to adopt the going concern basis in preparing its financial statements.

FRS 102 has been adopted for the first time when preparing these financial statements. The transition date to FRS 102 was 1 January 2014 and the last financial statements prepared under the previous financial reporting framework were prepared for the year ended 31 December 2014.

The following adjustments have also been made in order to comply with the new SORP/ FRS 102. The effect on total funds or the net income and expenditure is shown in note 17. The main items were:

Governance costs are no longer presented as a separate category of expenditure in the Statement of Financial Activities as they are not regarded as part of support costs which are allocated to the cost of activities undertaken by the Charity.

At the date of transition in applying the requirement to recognise liabilities arising from employee benefits, a liability was recognised for short-term compensated absence arising from employee entitlement of the parent charity to paid annual leave. The initial liability recognised at the date of transition was for the holiday entitlement carried forward and for the entitlement arising in the year which was due but not taken. The initial liability was for £18,105.

b) Financial Instruments

Financial assets such as cash and debtors are measured at their present value of the amounts receivable, less an allowance for the expected level of doubtful receivables. Financial liabilities such as trade creditors, loans and finance leases are measured at the present value of the obligation. An equity instrument is any contract that evidences a residual interest in the assets of the BES after deducting all of its liabilities.

c) Income

i) Subscriptions income: All subscriptions income is accounted for in the period to which it relates. Subscriptions receipts in advance are recorded as deferred income.

ii) Other income: All other income has been accounted for on a receivable basis.

d) Expenditure (including grants)

Expenditure is classified under the principal categories of charitable and other expenditure rather than the type of expense, in order to provide more useful information to users of the accounts.

Charitable activities comprise direct expenditure including direct staff costs attributable to the activity. Support costs have been allocated to activities based on the average staff time spent. Governance costs are those incurred in connection with the management of the Society's assets, organisational administration and compliance with constitutional and statutory requirements. Support costs are allocated on the basis of time spent on each activity.

Grants payable are charged in the year when the offer is conveyed to the recipient except in those cases where the offer is conditional, such grants being recognised as expenditure when the conditions attaching are fulfilled. Grants offered subject to conditions which have not been met at the year-end are noted as a commitment, but not accrued as expenditure.

e) Depreciation

Depreciation has been calculated to write off the cost of assets over their expected useful lives as follows:

Freehold property - 2% per annum on cost

Furniture, fixtures and equipment – 33% per annum on a straight line basis.

The Society's policy is to capitalise assets purchased over £500.

f) Investments

Investments are stated at market value. It is the BES's policy to keep valuations up to date such that when investments are sold there is no gain or loss arising. As a result the Statement of Financial Activities only includes those unrealised gains and losses arising from the revaluation of the investment portfolio throughout the year. Disclosure is made in note 9 of the difference between the historical cost and the sale proceeds of the investments sold during the year.

g) Foreign currencies

Monetary assets and liabilities denominated in a foreign currency are translated into sterling at the exchange rate ruling on the Balance Sheet date.

Transactions in foreign currencies are recorded at the rate of exchange prevailing at the date of transaction.

All exchange differences are taken to the statement of financial activities.

2 INVESTMENT INCOME

| | 2015 £'000 | 2014 £'000 |
|--------------------------------|---------------|---------------|
| Income from listed investments | 110 | 83 |
| Interest receivable | 21 | 33 |
| | 131 | 116 |

h) Operating lease

Rentals payable under operating leases are charged against income on a straight line basis over the lease term.

i) Pensions

BES operates defined contribution pension arrangements, the assets of which are held separately from those of the BES in independently administered funds. Contributions are charged to the income and expenditure account as they become payable.

j) Fund accounting

General funds comprise the accumulated surplus or deficit and are available for use at the discretion of the Council in furtherance of the general objectives of the BES.

Restricted funds are funds subject to specific restrictive covenants imposed by donors or by the purpose of the appeal.

Designated funds comprise funds which have been set aside at the discretion of the Council for specific purposes.

All income and expenditure of the BES has been included in the Statement of Financial Activities.

3 ANALYSIS OF TOTAL RESOURCES EXPENDED

| | Direct Staff Costs £'000 | Other Direct Costs £'000 | Support Costs £'000 | TOTAL 2015 £'000 | Restated TOTAL 2014 £'000 |
|---------------------------|--------------------------------|--------------------------------|---------------------------|------------------------|------------------------------------|
| Cost of Generating Income | - | 6 | - | 6 | 4 |
| Bulletin & Other services | 92 | 30 | 134 | 256 | 260 |
| Publications | 368 | 903 | 193 | 1,464 | 1,329 |
| Meetings | 78 | 470 | 44 | 592 | 565 |
| Research | 16 | 241 | 9 | 266 | 368 |
| Education | 105 | 89 | 61 | 255 | 135 |
| Policy | 91 | 42 | 73 | 206 | 214 |
| | 750 | 1,781 | 514 | 3,045 | 2,874 |

| Support Costs | 2015 £'000 | Restated 2014 £'000 |
|-------------------------|---------------|---------------------------|
| Governance Costs | | |
| Governance staff costs | 54 | 34 |
| Audit Fee | 6 | 5 |
| | 60 | 39 |

| Other Support Costs | 2015 £'000 | Restated 2014 £'000 |
|------------------------------|---------------|---------------------------|
| Non salary staff costs | 36 | 22 |
| Property | 58 | 41 |
| IT costs | 25 | 23 |
| Venue Costs | 8 | 4 |
| Publicity | 15 | 14 |
| Fees / Affiliations | 48 | 71 |
| Office running costs | 41 | 47 |
| Depreciation | 64 | 37 |
| Bulletin | 78 | 77 |
| Outsourced finance & payroll | 29 | 29 |
| Legal & Consultancy | 14 | 4 |
| Website | 2 | 2 |
| Bank charges | 36 | 25 |
| | 514 | 435 |

Support costs are allocated on the basis of time spent on each activity.

4 GRANTS

Grant commitments are as follows:

| | 2015 £'000 | 2014 £'000 |
|---|---------------|---------------|
| Grant commitments at 1 January | 235 | 155 |
| Awards made during year | 282 | 405 |
| Payments made during the year | (392) | (325) |
| Grant commitments at 31 December | 125 | 235 |

Details of significant grant awards are detailed on the BES's website. The majority of grants awarded are to individuals. Grants to institutions are relatively few in number and low value.

5 NET INCOMING RESOURCES

is stated after charging:

| | 2015 £'000 | 2014 £'000 |
|-------------------------------|---------------|---------------|
| Depreciation | 65 | 37 |
| <i>Auditor's remuneration</i> | | |
| audit services | 6 | 5 |

Other than disclosed in note 15 members of Council did not receive any remuneration during the year. Expenses reimbursed to 15 (2014: 14) Members of Council in the year equalled £10,588 (2014: £8,885).

6 TAXATION

The BES is a registered charity and as such its income and gains are exempt from corporation tax to the extent that they are applied to its charitable objectives. There is no corporation tax charge for the year.

7 EMPLOYEES

The actual number of employees during the year was 20.4 (2014 20.2).

| | 2015 | 2014 |
|------------------------|--------------|--------------|
| Membership | 1.5 | 1.8 |
| Publishing | 9.6 | 9.1 |
| Conferences / Meetings | 2.0 | 1.9 |
| Research | 0.4 | 0.6 |
| Education | 2.5 | 2.2 |
| Policy | 3.5 | 3.9 |
| Governance | 0.9 | 0.7 |
| | 20.4 | 20.2 |
| | £'000 | £'000 |

Staff costs during the year amounted to:

| | | |
|----------------------------------|------------|------------|
| Wages and salaries | 684 | 646 |
| Social security costs | 72 | 66 |
| Employer's pension contributions | 42 | 40 |
| | 798 | 752 |

One (2014: one) employee earned £70,000-£79,999 during the year. The employer's pension contributions in respect of this employee during the year was £5,373.

The total employee benefits including pension contributions of the key management personnel were £224,188 (2014: £217,825).

8 TANGIBLE FIXED ASSETS

| | Freehold property £'000 | Furniture, fixtures and equipment £'000 | Total £'000 |
|-------------------------|-------------------------------|--|----------------|
| Charity | | | |
| Cost | | | |
| 1 January 2015 | 2,610 | 69 | 2,679 |
| Additions | 278 | 28 | 306 |
| 31 December 2015 | 2,888 | 97 | 2,985 |
| Depreciation | | | |
| 1 January 2015 | 158 | 59 | 217 |
| Charge for the year | 50 | 14 | 64 |
| 31 December 2015 | 208 | 73 | 281 |
| Net book value | | | |
| 31 December 2015 | 2,680 | 24 | 2,704 |
| 31 December 2014 | 2,452 | 10 | 2,462 |

During 2009 the charity purchased a part share (36.1%) in the freehold 12 Roger Street as its new headquarters. It shares the ownership of the building with other biological focused charities and the property is held by a nominee company on trust for the Co-owners as tenants in common.

During 2011 the charity had disposed of 6.1% of the freehold in 12 Roger Street to the Society of Biology in accordance with the original plan to share the ownership of the building with other biological focused charities. This transaction resulted in a gain on disposal of £69,498.

During 2013 the Charity completed the purchase of a part share (21.1%) in the freehold property of 107 Grays Inn Road. As part of this transaction the Charity disposed of a part share of its interest in 12 Roger Street, reducing its interest in that property from 30% to 21.1%. It shares the ownership of the buildings with other biological focused charities and the property is held by Charles Darwin House Limited on trust for the Co-owners. This transaction resulted in a gain on disposal of £95,963.

9 INVESTMENTS

| | 2015 £'000 | 2014 £'000 |
|--|---------------|---------------|
| Market value 1 January 2015 | 4,890 | 4,253 |
| Additions | 1,359 | 1,079 |
| Disposals proceeds | (507) | (786) |
| Net investment gain | 20 | 103 |
| Movement in deposits | (206) | 241 |
| Market value 31 December 2015 | 5,556 | 4,890 |
| Historical cost at 31 December 2015 | 5,223 | 4,546 |
| Accumulated unrealised gains based on historic cost at 31 December 2015 | 333 | 344 |
| Realised gain in year based on historic cost | 31 | 154 |
| Represented by: | | |
| UK equity shares | 1,448 | 1,067 |
| Overseas equities | 1,414 | 1,001 |
| UK fixed interest | 250 | 353 |
| Overseas fixed interest | 182 | 41 |
| UK Other | 272 | 191 |
| Overseas Other | 100 | 140 |
| Market value of listed investments | 3,666 | 2,793 |
| Investment in associated undertaking | - | - |
| Investment in subsidiary undertaking | - | - |
| Amounts held in cash | 1,890 | 2,096 |
| Total | 5,556 | 4,890 |

10 SUBSIDIARY UNDERTAKINGS

The BES holds 100% of the issued share capital of BES Trading Company Limited, a company registered in England and Wales. The sole activity of BES Trading Company Limited was to organise the 11th International Congress of Ecology in August 2013. At 31 December 2015 the Share Capital and net assets of BES Trading Company Limited amounted to £2 – (2014 £2).

During 2009 the BES acquired 36.1% of Charles Darwin House Limited, a company set up to manage the building. During 2011 shares representing 6.1% were disposed of leaving a remaining interest of 30.0%. During 2013 shares representing 8.9% were disposed of leaving a remaining interest of 21.1%.

At 30 June 2015 the net assets according to the audited financial statements were £1,000.

| | 2015 £'000 | 2014 £'000 |
|--------------------------------|---------------|---------------|
| Income and Expenditure: | | |
| Turnover | - | 3 |
| Cost of sales | - | (3) |
| Gross profit | - | - |
| Interest Received | - | - |
| Net result | - | - |
| Balance Sheet: | | |
| Net result | - | - |

11 DEBTORS

| | 2015 £'000 | 2014 £'000 |
|--------------------------------|---------------|---------------|
| Trade debtors | 475 | 460 |
| Other debtors | 49 | 46 |
| Prepayments and accrued income | 133 | 117 |
| VAT Refund | 8 | 18 |
| | 665 | 641 |

12 CREDITORS: AMOUNTS FALLING DUE WITHIN ONE YEAR

| | 2015 £'000 | Restated 2014 £'000 |
|-------------------------------|---------------|---------------------------|
| Trade creditors | 268 | 79 |
| Social security & other taxes | 21 | 10 |
| Other creditors | 6 | 19 |
| Accruals and deferred income | 65 | 147 |
| Grants payable (note 4) | 125 | 235 |
| | 485 | 490 |

13 MOVEMENT IN FUNDS 2015

| | Fund balances brought forward 1/1/2015 £'000 | Income £'000 | Expenditure £'000 | Net gains on Investment Assets £'000 | Transfers £'000 | Fund Balances Carried Forward 31/12/2015 £'000 |
|--------------------------------------|---|-----------------|----------------------|--|--------------------|---|
| Restricted | | | | | | |
| BEVC | - | - | - | - | - | - |
| Alex S Watt Breckland Research Trust | 2 | - | - | - | - | 2 |
| Policy Assistant Fund | - | 10 | (10) | - | - | - |
| Total restricted funds | 2 | 10 | (10) | - | - | 2 |
| Unrestricted funds | | | | | | |
| General | 560 | 3,585 | (3,035) | 20 | (242) | 888 |
| Expendable Endowment fund | 5,000 | - | - | - | - | 5,000 |
| Tangible fixed asset fund | 2,462 | - | - | - | 242 | 2,704 |
| Total unrestricted funds | 8,022 | 3,585 | (3,035) | 20 | - | 8,592 |

Designated

Tangible fixed asset fund

Represents the net book value of tangible fixed assets in use by the Society and therefore not available to the Council to meet future expenditure. A transfer is made each year to reflect the change in net book value.

Expendable Endowment fund

Represents the value of investments that the Trustees believe they need to hold, to protect income in the longer term, in order to ensure that the society can carry out its mission and thrive. The Trustees believe the fund should be £10,000,000 in order to provide sufficient long-term income. This is because most of the society's income is from academic publishing, the profitability of which is widely expected to begin to decline significantly within the next few years. The society has just begun formal long-term financial modelling to assess the balance of income expenditure against the risk of future income declines.

Restricted

Restricted funds of £1,985 at 31 December 2015 are represented by cash on deposit (2014 - £1,985).

British Empire Vegetation Committee (BEVC)

Represents amounts donated for the printing of colour plates in the BES's journals.

Alex S Watt Breckland Research Trust

Funds administered by the BES in the memory of Alex Watt to provide funding for small scale research projects aimed to enhance our understanding of the conservation of the Breckland Region.

Policy Assistant Fund

Restricted donation to support a staff member to work in the policy area. The staff member was appointed in February 2013.

The Society holds €36,996 (2014 €24,587) on behalf of the European Ecological Foundation. This balance does not form part of these accounts.

13 MOVEMENT IN FUNDS (CONTINUED)

| 2014 Restated | Fund balances brought forward 1/1/2014 £'000 | Income £'000 | Expenditure £'000 | Net gains on Investment Assets £'000 | Transfers £'000 | Fund Balances Carried Forward 31/12/2014 £'000 |
|--------------------------------------|---|-----------------|----------------------|---|--------------------|---|
| Restricted Charity | | | | | | |
| BEVC | - | - | - | - | - | - |
| Alex S Watt Breckland Research Trust | 2 | - | - | - | - | 2 |
| Policy Assistant Fund | - | 10 | (10) | - | - | - |
| Total restricted funds | 2 | 10 | (10) | - | - | 2 |
| Unrestricted funds – Charity | | | | | | |
| General | 759 | 3,347 | (2,864) | 103 | (785) | 560 |
| Expendable Endowment fund | 4,500 | - | - | - | 500 | 5,000 |
| Tangible fixed asset fund | 2,177 | - | - | - | 285 | 2,462 |
| Total unrestricted funds | 7,436 | 3,347 | (2,864) | 103 | - | 8,022 |

Prior year restricted income of £10,000 arising from donations and legacies was fully expended in the period & included within total policy expenditure.

14 ANALYSIS OF NET ASSETS BETWEEN FUNDS

| 2015 | General £'000 | Designated £'000 | Restricted £'000 | 2015 Total £'000 | 2014 Total £'000 |
|----------------------------------|------------------|---------------------|---------------------|------------------------|------------------------|
| Tangible assets | - | 2,704 | - | 2,704 | 2,462 |
| Investments | 556 | 5,000 | - | 5,556 | 4,890 |
| Net current assets / liabilities | 332 | - | 2 | 334 | 672 |
| Net assets | 888 | 7,704 | 2 | 8,594 | 8,024 |

15 RELATED PARTY TRANSACTIONS

No transactions have taken place with either Members or Senior Management Team. It is the policy of the BES that Committee members who have an interest in any grant awarding decisions must leave the room at the time the awarding decision is made.

Emma Sayer – the existing assistant editor of the Bulletin, was appointed as a trustee in the prior year. She continued to be paid at the fixed rate and has received £1,513 (2014 £1,497) in the year. She has received no remuneration in her capacity as a trustee.

Andrew Beckerman, a trustee of the BES was appointed in the prior year as an editor of the *Ecology & Evolution* journal, in which the Society has a minority interest.

16 THE GEORGE JACKSON ESTATE

As part of the George Jackson bequest the Society was left as residuary beneficiary of a revisionary bequest. The property passes to the Society upon the death of the life interest. Because of the uncertainty as to value and timing the value of the property is not included with these financial statements.

17 IMPACT OF TRANSITION TO FRS 102 AND SORP 2015

| | 31 December 2014 £'000 | 1 January 2014 £'000 |
|---|------------------------------|----------------------------|
| Reserves position | | |
| Funds previously reported | 8,042 | 7,456 |
| Adjustments on transition | | |
| Holiday pay provision | (18) | (18) |
| Funds restated on transition | 8,024 | 7,438 |
| Impact on income and expenditure | | |
| Net income / (expenditure) as previously reported | 586 | |
| Adjustments on transition | | |
| Holiday pay provision | - | |
| Net income / (expenditure) as restated | 586 | |

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LOOKING BACK

Oliver Rackham (left) and David Coombe at Scolt Head Island in Norfolk in the summer of 1965. Oliver took his shoes off and walked through the mud in his socks because he did not want to get his shoes wet! Scolt Head Island is a sand and shingle island composed largely of flint pebbles and the geophysical processes in the area have been studied extensively. The salt marshes here are developing rapidly, and no doubt will continue to provide paddling grounds for botanists for generations to come.

Photograph courtesy of John Birks



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