

The Bulletin

YOUR MAGAZINE FROM THE BRITISH ECOLOGICAL SOCIETY



British Ecological Society



inFOCUS

The pulling power of nature. In May the Freshwater Biological Association held an Open Day at the Windermere laboratory. Attendees included academics, practitioners, and local residents; on offer was an impressive array of talks, workshops, and guided tours of the facilities, but what really fired everyone's imagination was the simple process of sweeping a pond net along the lake margins and examining the catch in a tray. A window on a whole new world.

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June 2016

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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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WELCOME

Looking into the future and learning from the past



Ecological science is able to thrive by looking backwards as well as forwards, and there are several good examples in this issue. Sue Hartley's Presidential Piece focuses on the future development of international cooperation, but as part of a research trip to Melbourne she also notes how a painting commissioned in 1855 helped ecologists devise a planting scheme to restore a wildlife reserve to its pre-European agriculture state.

Very much a modern day phenomenon is the awarding of prizes for the best paper by a young investigator published in each of the five BES journals in the last year, and we celebrate the winners for 2015 on p8. While encouraging the current and future generation of ecologists the Society builds long term ecological understanding, and now is a good time to celebrate the Biological Flora of the British Isles, which has now been underway for 75 years. Tony Davy provides a brief history on p11. Tony and his associate editors, their predecessors, and all the authors of accounts, have done a wonderful job in providing a resource of immense value.

One of the tasks that the Biological Flora has begun is that of revisiting some of the earlier accounts in the light of current knowledge. The BES has done the same from time to time in the annual symposium series, where conservation has featured a number of times. The University of East Anglia hosted 'The Scientific Management of Animal and Plant Communities for Conservation' in 1970, followed by 'The Scientific Management of Temperate Communities for Conservation', which attracted 455 delegates to the University of Southampton in 1989, possibly the largest ever attendance at a BES symposium. I recall that meeting as being marked by a succession of superlative talks by leading ecologists of the time. But I also remember that a common theme of coffee-time talk among the practitioners was "So what does this actually mean for my patch of woodland/grassland/pond?" The 2014 joint BES-DICE (Durrell Institute of Conservation and Ecology) meeting 'Considering the Future of Conservation' took a big step forward in trying to bring a wider range of natural and social scientists together to understand the role of both ecological and human systems on conservation efforts, and the organisers of this year's symposium, 'Making a Difference in Conservation' clearly wanted to build on that to take the discussion beyond 'scientific management' to recognise the role of the media, economics and politics in delivering conservation objectives (or not). Our coverage beginning on p13 is mostly about what selected attendees thought of the meeting and what messages they took away

from their time in Cambridge. I'm very grateful to all those who contributed their thoughts to a very short deadline.

After updates from the External Affairs team (p19) and the Special Interest Groups (p22) there's a report on another conservation meeting, a workshop for student members of our Conservation Ecology SIG (p23). I was reading the Post-it notes summarising ideas for a better world put forward at the workshop but was brought to a halt by the one suggesting '...don't upgrade to the latest Apple product'. Oh Dear, I thought, typing contentedly on my new laptop, it's hard to be a consistently good citizen of Earth.

We have the usual crop of feature articles which we hope will inform, entertain and sometimes provoke. John Goss-Custard's thoughts on 'Mud, Birds and Poppycock' will probably do all three, in proportions determined by your point of view (p26). John has very nice images of some of his study animals in the article, and if that is not enough to convince you of the value of photography to ecologists, then read Kate Marshall's piece that follows (p30). *Bulletin* Associate Editor Lauren Ratcliffe attention was gripped by a display on art and science at the BES annual meeting last December and she talks to two members of *The Arty Scientists* collective on p34.

'Field Notes' make a welcome return to the *Bulletin* on p36, with Francis Brearley's thoughts on the appeal of the 'Heart of Borneo'. We really enjoy the warmth and pleasure that shines through when ecologists write about their favourite outdoor places, so please, if you'd like to write about a field site or any other sort of treasured location of interest, please get in touch so we can encourage you!

John Wiens has been giving a huge amount of thought to water issues in California, which provides the background to his latest essay (p38), and Sally Hayns of the CIEEM addresses (p40) an issue that will be exercising the minds of many UK voters at about the time this *Bulletin* is mailed out: Brexit, Yes or No? We live in interesting times.



Alan Crowden / Editor

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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

International collaboration to solve international problems



Sue Hartley / Sue.Hartley@York.ac.uk

In my first President's piece on the BES, I wrote about the importance of internationalisation in the BES Strategic Plan, and, fresh from a 3-week research visit to Australia, I thought it was a good time to reflect on why global interactions are so valuable to ecologists.

It is also a time when Britain as a whole is considering its position in the world (a vote that will be happening at around the time this issue is being mailed out!). A discussion of "Brexit" would be inappropriate (and take a lot more than my allotted words!) but perhaps it is appropriate to ask: do we have a stronger voice on environmental issues inside or outside organisations like the EU?

The BES recently gave evidence to the House of Commons Environmental Audit Committee as it examined the role of the EU in environmental protection in the UK and I think it was essential the Societies' opinion was voiced in that context. You can read our contribution at <http://data.parliament.uk/WrittenEvidence/CommitteeEvidence.svc/EvidenceDocument/Environmental%20Audit/Assessment%20of%20EUUK%20Environmental%20Policy/written/24781.html>. The conclusion from the cross-party EAC was that EU membership has improved the UK's approach to the environment and ensured that it has been better protected. Some may disagree, but I think most of us could sign up to another of the EAC Chair's conclusions: "Environmental problems don't respect borders".

Nowhere is that more true in than in the issue of climate change – that's an environmental problem that could even be said to have contempt for borders, given that the countries paying the highest price in terms of its impacts are not, by and large, the countries responsible for the problem. I'm writing this on the day that over 170 international leaders came to the UN to sign the Paris agreement on climate change – the largest number of leaders ever to sign a UN document. That is a very promising start and as ecologists we will be hoping that all these signatures turn into decisive and timely action! The EAC report suggested that "our voice at the Paris climate change conference was louder as part of a club of 28 countries". Again some may disagree, but it may be a good time to ask how we make ecology a leading voice on climate change, and indeed on other environmental issues. Can teaming up with other ecologists in a more international approach help us have more impact? Environmental problems don't respect borders, so maybe we shouldn't either, and we should look outwards for interesting and innovative ways to address these global challenges.

In Australia I encountered some interesting examples of how international collaboration is helping to address key current environmental problems. Wandering around Melbourne Botanic Gardens I passed the herbarium – the information boards outside highlighted their conservation efforts and the value of their collections, but one board particularly caught my eye. It explained their role as a partner collector for Kew's Millennium Seed Bank at Wakehurst Place in Sussex. Having just joined the Board of Trustees at the Royal Botanic Gardens Kew, I was particularly pleased to see this sort of international collaboration! It is vital work, and although we often focus on biodiversity and conservation higher up the food chain, the state of the world's plants is a major concern. Under the excellent guidance of their Director of Science, Professor Kathy Willis, Kew have just produced a comprehensive report on how the world's plants are faring, showcased at the recent first annual State of the World's Plants Symposium – a quick glance at the report and the speaker list at the conference is enough to confirm it truly is an international effort.

David Attenborough recently commented that “institutions like Kew are at the forefront of the battle to save the planet” but it is Kew’s global reach and international collaborations that underpin its role in helping to conserve the world’s biodiversity through initiatives like the MSB and its other collections.

The Kew symposium brought together international researchers to consider a range of major threats to plants, including climate change, habitat loss and emerging pests and diseases. The global movement of new pests and pathogens is a real challenge – they certainly don’t respect borders! My reason for being in Australia (other than visiting botanic gardens – 3 of them!) was to take part in the 9th Australasian conference on grassland invertebrate ecology. A focus of the conference was the impact of invasive pests on Australasian grassland ecosystems, both agricultural and natural. Again international collaboration is one of the most effective ways to try and counter this sort of increasing global threat. One such collaborative approach is the International Plant Sentinel Network, set up to facilitate interactions amongst plant institutes around the world, with a focus on linking botanic gardens and arboreta, national plant protection organisations, and plant health scientists to provide an early warning system for new and emerging plant pests and pathogen risks. The network aims are to share best practise, develop standardised methodologies, provide training and diagnostic support and share and communicate scientific evidence, all with the ultimate objective of safeguarding susceptible plant species worldwide.

For things like early warning systems, working together brings obvious benefits – many eyes spotting danger more quickly is a good ecological principle – and these sorts of international networks, whether for pest outbreaks or for seed collections, are a vital way to make a real difference. They also help us learn from one another. The UK is a world leader in conservation research, but we can still benefit from

an international outlook and lively discussion, of the sort very much in evidence at the recent BES Annual symposium in Cambridge on Making a Difference in Conservation. Check out the article in this issue for an account of this very successful event (p13).

We can also benefit from unexpected approaches to familiar problems which may have been tried by our international colleagues. I’m going back to Australia again for another example. I had the chance to visit Tower Hill Wildlife Reserve which became the State of Victoria’s first national park in 1892, one of the earliest designations of environmental protection in Australia (the first being the Royal National Park near Sydney in 1879). But that didn’t protect it from deforestation, over-grazing and quarrying. By the time it was designated a State reserve in 1961, the vegetation had been almost completely destroyed and only bare hillsides were left. What to do? Some might have given up at that point, but instead a fascinating approach was adopted. Botanists were called in to study a painting of Tower Hill by a Viennese artist Eugene von Guerard, known for his attention to detail. The painting had been commissioned in 1855 by James Dawson, who owned a cattle farm nearby, and amazingly it was still in the Dawson family. In 1966 James’ granddaughter gave the painting to the Victorian Wildlife Department for botanists to use as a reference for identifying plants present at the time (though looking at the painting myself I think this looks pretty challenging – see what you think!!). This novel approach was supplemented by information on species known to be indigenous to the area, and later confirmed by pollen analysis. A planting scheme was drawn up and by 1981 25,000 trees and shrubs had been planted with the help of hundreds of school children and volunteers (citizen science in action!); now over 300,000 trees have been re-planted. Some native animals were also reintroduced and more returned naturally – the reserve now has 164 species of birds, and the Australian “classics” of koalas, emus, kangaroos, wombats and echidnas are all present.

I’m not suggesting conservation ecologists should be hunting out historical pictures as an aide to restoration routinely, but unconventional approaches and interesting new ideas can emerge from interactions with people from across the globe who have solved the same problems as we all face. The BES provides a range of opportunities for you to participate and benefit from these sorts of interactions: you can contribute to our evidence on policy debates; attend meetings with an international agenda like our Cambridge symposium; and participate in our collaborative meetings with other ecological societies. You’ve missed the 2015 meeting in Lille with the French Ecological Society, SfE, but the 2017 annual meeting is in Ghent, jointly with the German and Netherlands ecological societies, GfO and Necov, and the European Ecological Federation, whilst the new Irish Ecological Association, partnered with the BES, are holding their first meeting in in Sligo in November this year. So it’s easy to get involved and to link up with your international colleagues. And there are plenty of those within our Society – the BES has members from 88 different countries and almost a quarter of the membership lives outside the UK.

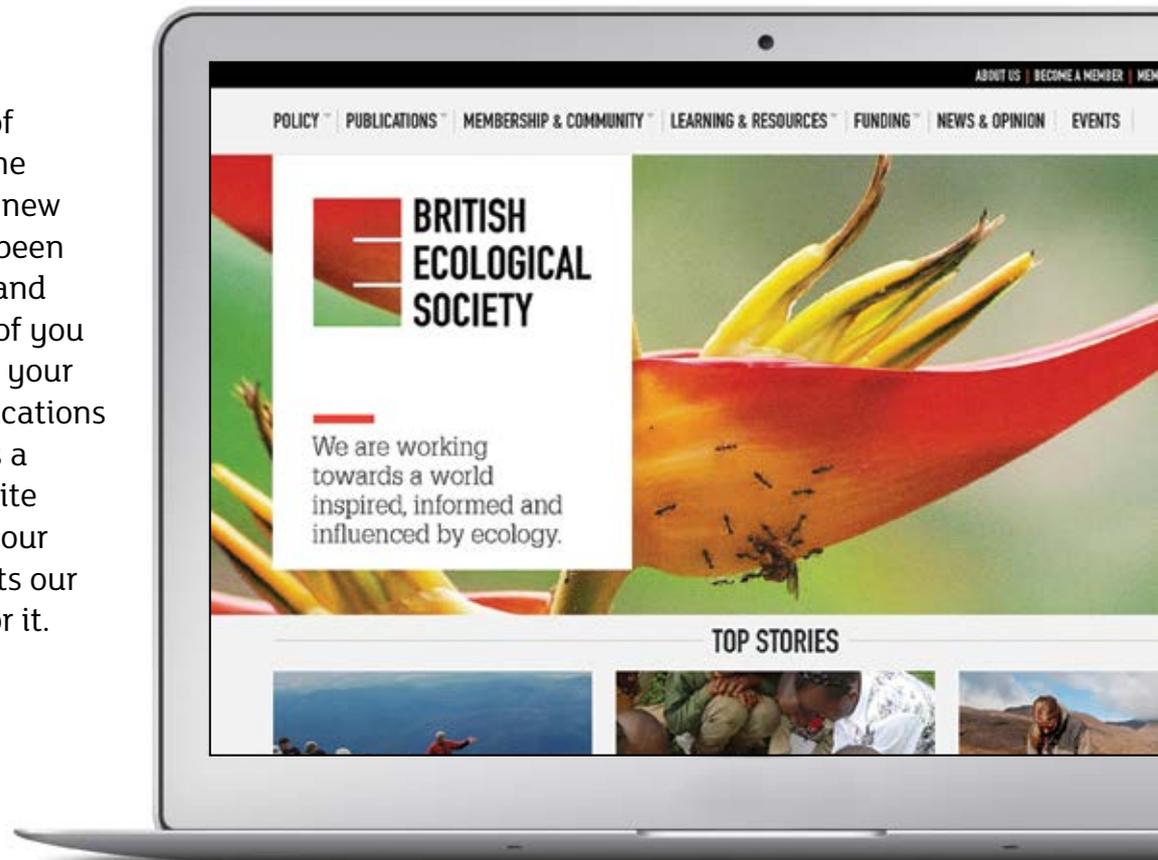
Last but not least, you could always visit a botanical garden for inspiration and ideas... and maybe drop in to some art galleries too! I’m certainly viewing landscape paintings in a different light these days! In my next President’s piece (if the editor hasn’t decided he’s had enough by then!), I’ll be thinking more about the benefits of links to other disciplines, including the arts and humanities – interdisciplinarity is the next i-word!

Editor’s note: *we had hoped to include a copy of the painting of Tower Hill we have been unable to get a response from the Museum’s copyright department. You can find the image at www.ngv.vic.gov.au/essay/eugene-von-guerard-nature-revealed/3/*

SAY HELLO TO YOUR NEW LOOK BES



June sees the launch of our new website and the first chance to see our new identity in action. It's been an 18-month journey and one that's seen many of you get involved and share your views on our communications and more. The result is a new identity and website that's been shaped by our community and reflects our collective ambitions for it.



You can see how our new identity is taking shape on the website as well as at various events across the summer (come and say hello if you're at Evolution or ESA!). We'll also be rolling it out across all of our printed materials and merchandise and on social media too, so keep an eye out for those.

We want you to stay involved. In fact, an interesting feature of our new logo is that everyone can create their own take on it. You can submit your own images to be used in the logo or, if you're part of a Special Interest Group, create your own bespoke logo. Talk to your SIG or send us an email or tweet to find out how you can get involved and to share your thoughts on our new identity.



AWARDS

EARLY CAREER RESEARCHER AWARDS 2015

The BES Early Career Researcher Awards are presented annually to the best paper by an author at the start of their research career, in each of the Society's five journals. Each 2015 prize winner has received £250, a year's membership of the BES, a year's subscription to the relevant journal and the opportunity to present their research at the Annual Meeting in Liverpool.

First authors who are in the early stages of their research career can nominate themselves when their paper is accepted for publication. The winners are then selected by the journal Editors at the end of each year.

The winning papers and two highly commended papers from each journal have been compiled into a freely available Virtual Issue which you can access from the journal websites. The Editors and the BES would like to congratulate the winners and highly commended authors on their outstanding papers!

WINNER OF THE HARPER PRIZE 2015

Yuuya Tachiki

A spatially explicit model for flowering time in bamboos: long rhizomes drive the evolution of delayed flowering



Yuuya Tachiki, Akifumi Makita, Yoshihisa Suyama and Akiko Satake (*Journal of Ecology*, 103:3, pp 585–593)

Yuuya's paper has been selected for this year's Harper prize as an excellent example of a mathematical modelling approach to the exploration of a perplexing phenomenon, namely that the vegetative growth period (flowering interval) in bamboos shows a geographic cline from tropical (short-interval) to

temperate (long-interval) regions. With his colleagues, Yuuya examined the evolutionary stable flowering interval using a spatially explicit mathematical model to investigate how rhizome length, seed and pollen dispersal and inbreeding influence the evolution of the flowering interval. They found that rhizome length increased flowering interval, seed dispersal range decreased it, but less so at large range sizes, and inbreeding depression led to a longer flowering interval within aggregated genets. Their explanation for these findings proposed a balance between intragenet competition and kin competition among seeds. The Editors were impressed with the rigour of the study and the value of the findings that provide novel evolutionary insights into the reproductive strategy of clonal plants.

Yuuya Tachiki became interested in diverse reproductive behaviours in terrestrial plants while at graduate school. He studied mathematical models of the evolution of synchronized and highly variable reproduction (i.e. masting) at Kyushu University under the supervision of Professor Yoh Iwasa. After completing his PhD, Yuuya became a post-doctoral fellow with Dr Akiko Satake at Hokkaido University. He explored the role of plant-pathogen feedback in maintaining biodiversity and resistance to the invasion of alien plants. He also studied the evolution of monocarpic clonal plants (e.g., bamboo), which

resulted in his receipt of the Harper Prize 2015. Currently Yuuya is based at Kyushu University as a post-doctoral research fellow and is continuing these projects.

WINNER OF THE ELTON PRIZE 2015

Jonathan Pruitt

Animal personality in a foundation species drives community divergence and collapse in the wild



Jonathan N. Pruitt and Andreas P. Modlmeier (*Journal of Animal Ecology*, 84:6, pp 1461–1468)

Charles Elton once quipped that "Ecology consists of saying what everyone knows in language that nobody can understand." Maybe that is true for much of ecology, but it is certainly not the case with the paper by Jonathan Pruitt and Andreas Modlmeier "Animal personality in a foundation species drives community divergence and collapse in the wild." Does everyone know that spiders have personality? And the prose in Pruitt and Modlmeier's paper is both clear and vigorous, so readers can definitely understand it. The editorial board was impressed by the creativity of Dr Pruitt's work, its rigour, and the conceptual ties it made among the sometimes disparate fields of behavioural ecology and community ecology.

Indeed, this paper stood out among many excellent papers in the *Journal of Animal Ecology* in 2015. Therefore, the editorial board is happy to award the 2015 Elton Prize to Dr Jonathan Pruitt.

Pruitt and Modlmeier examined how personality in the spider *Anelosimus studiosus* influenced a suite of other spider species over 7 years in the field. Either aspect of the study – examining the extended consequences of personality in *A. studiosus* or tracking spider community dynamics for 7 years – would be interesting enough. But what Pruitt and Modlmeier showed was that the spider communities associated with webs of docile *A. studiosus* individuals differed from those associated with webs occupied by aggressive *A. studiosus* individuals, at least initially. Numerous other studies, mostly in plants, have shown how variation among individuals can lead to cascading community- and ecosystem-level consequences, but much of that work has failed to examine the temporal dynamics of communities associated with particular phenotypes. Here, Pruitt and Modlmeier, because they tracked these communities for seven years, are able to examine early succession, convergence, and ultimately the collapse of spider communities. They conclude that it is possible to use the traits of these initial spider species to predict the rate and path of succession, divergence, convergence, and collapse among the rest of the spider community. In sum, these clever experiments and persistent sampling yield novel insights into how the behaviour of individuals scales up to influence the dynamics of communities. We now know that such links are common in nature, but few studies have characterized the links so explicitly. This kind of study is the kind of ecology that more people should know about, and they will, because it's written in a language they can understand.

Jonathan Pruitt performed his graduate studies at the University of Tennessee, Knoxville under the direction of Susan Riechert. He then conducted postdoctoral studies at the University of California, Davis with Andy Sih and Jay Stachowicz. He is presently an assistant professor in the Department of Ecology, Evolution and Marine Biology at University of California, Santa Barbara.

The Pruitt Lab's research explores the ecological consequences of individual variation in behaviour for individuals, populations, and communities. His lab uses a variety of invertebrate models, especially social spiders, to address these topics. More deeply, the research considers the role of individual variation in structuring patterns of task allocation within societies and how these patterns impact the long-term performance of groups in contrasting environments. In non-social systems, Pruitt and his lab consider how variation in behaviour impacts species interactions within and across multiple trophic levels. These studies have been conducted in a variety of both terrestrial and marine systems.

WINNER OF THE HALDANE PRIZE 2015

Brian Steidinger

Variability in potential to exploit different soil organic phosphorus compounds among tropical montane tree species



Brian S. Steidinger, Benjamin L. Turner, Adriana Corrales and James W. Dalling (*Functional Ecology*, 29:1, pp 121–130)

Soil phosphorus is as essential as water for plant growth, but its low availability in some areas forces plants to develop different strategies to acquire it. Mycorrhizal associations, symbiotic

associations between a fungus and a vascular plant, represent the most common strategy for access to the different pools of soil P by plants and it therefore seems reasonable to assume that different symbiotic fungal species will be differently able to exploit this non-renewable resource and that non-mycorrhizal species could have a competitive disadvantage.

Brian Steidinger and his co-authors tested this hypothesis by comparing phosphatase enzyme activity and performance of five tropical tree species belonging to different functional groups: arbuscular mycorrhizal angiosperms, arbuscular mycorrhizal conifers, ectomycorrhizal angiosperms and non-mycorrhizal proteoid plants. Their findings brought up the surprising result that the non-mycorrhizal Proteaceae trees exhibit a greater potential for exploiting recalcitrant organic P directly relative to mycorrhizal tree species and thus, could facilitate the coexistence of these functional groups.

This paper makes a significant contribution not only by revealing that P partitioning applies primarily at a coarser level among functional groups (non-mycorrhizal *versus* mycorrhizal), but also that another large pool of soil P exists for mobilization.

Brian received his Master's Degree at the University of Illinois Urbana-Champaign, in the lab of Jim Dalling. Brian's thesis work brought him to the montane tropical forests along the Panama's Central Cordillera, which contain plants belonging to different functional groups with respect to phosphorus (P)-acquisition. Specifically, he determined whether these plants have the potential to exploit different organic P compounds, a process that can facilitate coexistence by reducing how much neighbouring plants compete for the same soil P pools.

As a PhD candidate at the Indiana University, he investigated how horizontal mutualisms – like those between plants and mycorrhizal fungi – can be stabilized against exploitation by cheaters. To do this, he created general models that can be applied to broad classes of symbiotic interactions that share similar properties, such as how cheaters are punished (via sanctions) or mutualists rewarded (via preferential allocation of resources). These models demonstrate how conflict of interest within mutually beneficial interactions can give rise to coexistence among functionally diverse communities of hosts and their symbionts.

WINNER OF THE SOUTHWOOD PRIZE 2015

Dustin Ranglack

Competition on the range: science vs. perception in a bison–cattle conflict in the western USA



Dustin H. Ranglack, Susan Durham and Johan T. du Toit (*Journal of Applied Ecology*, 52:2, pp 467–474)

The paper by Dustin Ranglack and co-authors provides an excellent example of the type of work *Journal of Applied Ecology* aims to publish and the Senior Editorial team was unanimous in its decision to award the Southwood Prize to Dustin. This interdisciplinary study tackles a clear management issue using adequately designed experimental approaches, contributing to improving our understanding of human–wildlife conflicts in rangelands. Importantly, this case study illustrates the need for science-based management of social–ecological systems in which even long-term resource users might underestimate the complexities of trophic interactions. This paper represents a substantial amount of work and is likely to be very well received by the community. The Editors would like to congratulate Dustin on an excellent piece of work by an early career author and wish him every success in his future career.

Dustin earned his Bachelor of Science degree in Wildlife Science from Utah State University in 2008. He then spent several years working as a research technician in Montana and Colorado before returning to Utah State University for his PhD studies in Ecology, focusing on American bison ecology and bison–cattle interactions in the Henry Mountains of southern Utah, which he completed in 2014. He has since worked as a post-doctoral researcher at Montana State University using spatial ecology to evaluate and inform elk and elk habitat management in western Montana. His research focuses on applied large mammal ecology and conservation, spatial ecology and human–wildlife conflict.

WINNER OF THE ROBERT MAY PRIZE 2015

Kim Calders

Nondestructive estimates of above-ground biomass using terrestrial laser scanning



Kim Calders, Glenn Newnham, Andrew Burt, Simon Murphy, Pasi Raunonen, Martin Herold, Darius Culvenor, Valerio Avitabile, Mathias Disney, John Armston and Mikko Kaasalainen (*Methods in Ecology and Evolution*, 6:2, pp 198–208)

The winner of this year's Robert May Early Career Researcher Award is Kim Calders. Kim led the work on the paper, "Nondestructive estimates of above-ground biomass using terrestrial laser scanning" with an international team of co-authors. They have developed a way to harness laser technology for use in measurements of vegetation structure of forests. The study is an important development in the monitoring of carbon stocks for worldwide climate policy-making.

Both carbon stocks and above-ground biomass are important details for the United Nations initiative on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD) – a programme striving to reduce the destruction of forests and preserve the uptake of carbon

by trees. Previously, weighing trees in forests was time-consuming, expensive and destructive – particularly in tropical forests where trees can be over 50m tall and weigh over 100 tonnes. As a result, all current estimates of tropical forest carbon stocks are based on a small number of weighed trees. Terrestrial laser scanning is an active remote sensing technique that can measure precise distances by sending out laser energy and then analysing the reflected energy. Also known as terrestrial LiDAR, the method allows us to measure biomass with far more certainty than before. While traditional methods yielded results that may have been off by as much as 37%, the LiDAR method developed by Calders *et al.* delivers over 90% accuracy. Essentially, we can now 'weigh' trees far more precisely and then determine their biomass.

This paper – which brings together ecologists, remote sensing scientists and mathematicians – is a great example of how international and interdisciplinary collaboration can be a catalyst for significant scientific progress in ecology and forestry. In one recent demonstration of the method, researchers collected laser scan measurements of over 1000 trees in just 10 days. The method will now be tested in forests that are potentially more important for worldwide carbon stocks than Australian forests, including tropical forests in Gabon, Peru, Indonesia and Guyana.

Kim undertook a BSc and MSc in Bioscience Engineering at the Katholieke Universiteit Leuven in Belgium. He then commenced a MSc in Remote Sensing at University College London, followed by a PhD in LiDAR Remote Sensing at Wageningen University in the Netherlands. Over the course of his PhD, he has built up expertise in 3D measurements in both a research and operational context for the monitoring of vegetation dynamics. Kim is currently employed as a postdoctoral researcher with the National Physical Laboratory and UCL, where he explores the use of 3D data for end-to-end traceability of in-situ measurements and satellite-derived essential climate variables.

The Biological Flora of the British Isles: 75 years and blooming



Tony Davy / University of East Anglia / Editor of the Biological Flora
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Did you know that *The Biological Flora of the British Isles* celebrates its 75th anniversary this year?

Readers of the *Journal of Ecology* will be familiar with the single-species accounts of British plant species that can be found tucked away at the back of most issues. However, after the *Journal of Ecology* itself (1913) and the *Journal of Animal Ecology* (1932), the 'BFBI' is the British Ecological Society's longest-running project. It was in 1941 at the bleak height of the Second World War that Council revived a prescient proposal, made by E.J. (later Sir Edward) Salisbury back in 1928, to publish a series of autecological accounts of British plants (Salisbury 1928). As it had become so difficult to do new research, they decided that the energies of such ecologists as were still available could be deployed usefully thus: '*It is felt that the present wartime circumstances, which are unfavourable to long-term investigation and to much field work, may not be so unfavourable to the sorting out of data which have, for the most part, already been collected.*' (Foreword 1941). Council resolved that the accounts should be published in the *Journal of Ecology* and gave responsibility for them to a small committee, including the editors, Arthur (Roy) Clapham and Paul Richards, assisted by a zoologist, O.W Richards, to oversee the anticipated lists of animal feeders. War may have been the practical trigger but the BFBI was also an idea whose time had come. Although a focus on describing vegetation had continued to prevail for much of the first half of the 20th century (Anker 2001), there was now a growing perception of the need for a more experimental approach that would integrate with the findings of plant physiology and animal ecology to explain

the distributions of plants, as Clapham recalled later in his Presidential Address (Clapham 1956).

The original aims have changed little over the years. We still strive to provide a largely self-contained summary of all that is known about the ecology of a species, within a standard structure of headings ('the schedule') that facilitates comparisons between species. The headings are perhaps not as we might design them now, but with small changes have proved flexible enough to accommodate the new kinds of information that have become available, without sacrificing continuity within the more than 280 published accounts (covering rather more species). Sometimes it is not possible to provide information under all of the headings, desirable as this would be. In any case, we celebrate diversity, seeking to highlight what is perceived as particularly interesting and distinctive about any species, whether that be rarity, an unusual life history, genetic or taxonomic diversity, world-wide economic importance as a weed, invasiveness, sensitivity to climate change, exceptional environmental tolerances, or threat from introduced diseases and pests, amongst other possibilities. Some recent accounts exemplify this diversity. They include Britain's rarest plant (Ghost Orchid, *Epipogium aphyllum*), whose ghostly flowering spikes recently re-appeared in the woodland gloom shortly after it was declared extirpated in Britain (Taylor & Roberts 2011). There have been so many recent accounts of orchids that 12 of them could be featured in a virtual

issue of the journal last year. Accounts of the weedy, cosmopolitan fern Bracken (*Pteridium aquilinum*) by Marrs & Watt (2006) and of Creeping Thistle (*Cirsium arvense*), a scourge of agriculture (Tiley 2010), are already well cited. Perennial Glasswort (*Sarcocornia perennis*) is a succulent halophyte with a distinctive distribution in world salt marshes (Davy *et al.* 2006). Recent additions to the British flora are represented by the North-American invader Ragweed (*Ambrosia artemisiifolia*), a hyper-allergenic hazard for hay-fever sufferers (Essl *et al.* 2015), and Giant Rhubarb (*Gunnera tinctoria*) – displaying a unique, intracellular symbiosis with cyanobacteria that fix di-nitrogen, collected by Darwin on *The Beagle* and now widely naturalized in the west of the British Isles (Gioria & Osborne 2013). The most recent account, of Ash (*Fraxinus excelsior*), is the largest ever and features the landscape-changing double threat from ash-dieback disease and the emerald ash borer beetle (Thomas 2016).

Perforce the accounts have become much bigger, more detailed and more critical with the information explosion. The information available in the 1940s represented truly meagre pickings compared with the present day – to the extent that the schedule provided a list of 'standard works' to be searched, each with a 'standard abbreviation', internal to the BFBI. In fact, we abandoned these hallowed features only relatively recently: the former became redundant with the great diversity of electronic resources and the latter because of the desirability of crediting cited authors appropriately in these times of bibliometrics.

For many years before the advent of internet publication, the series was the vehicle for the publication of updated distribution maps. Maps from the pioneer Botanical Society of the British Isles Distribution Maps Scheme illustrated the accounts from 1957 onwards, well before the publication of the Atlas of the British Flora in 1962, and after its publication many of the maps were updated by the Biological Records Centre with additional records collected by BSBI.

The philosophy and *modus operandi* of the Biological Flora have also stood the test of time. It was always intended as a broadly collaborative project: 'The Council therefore invite all members of the Society to an active cooperation in gathering together this material, and they would welcome also assistance from all botanists and field naturalists who... may be willing to help. Assistance can be given either by sending information to the authors who have accounts in preparation, or by offering, singly or in collaboration, to prepare accounts of species themselves.' (Foreword 1941). As then, accounts are not published in any regular order, but as the necessary information and authors become available. The Biological Flora is perhaps unusual these days in that the editors work with authors to achieve the best outcome, rather than making summary decisions about manuscripts. David Gibson, the current Executive Editor of the journal, recalls his BFBI accounts as amongst the most enjoyable and satisfying of his writing experiences. We depend on volunteer authors with particular knowledge of species and, these days, they may not be members of the Society or even be based in the British Isles. If you have the expertise to write, or contribute to, an account of a species not yet covered so far, please contact Tony Davy, the current Editor (a.davy@uea.ac.uk).

There have been surprisingly few editors over the years, although history is vague about some details. Since the founding 'fathers', a senior or receiving editor has been hugely assisted by a small group of expert associate editors, selected for their accumulated knowledge of aspects of the British flora and generosity of spirit to share it: I am specially indebted to Chris Preston, Michael Proctor, David Streeter, Peter Thomas and Michael Usher. It is no secret that some of them, having served long terms, are anxious to retire, so ecologists with appropriate experience are urged to contact Tony Davy! The original editors were joined by David Coombe and Donald Pigott, who is the longest-serving senior editor (1954-1978); in turn, they were first joined and then succeeded by Trevor Elkington, Franklyn Perring, Arthur Willis, Peter Grubb and Andrew Malloch; Peter was senior editor 1978-1987, to be followed by another long and distinguished reign (1987-2005) from Arthur, before I took over the reins.

Who uses the Biological Flora? Originally it was available by subscription as reprints from the journal (at 1s 6d each [7.5p]); latterly the Society has forgone this handsome income stream and made accounts available free online. Judged by citations, some accounts are remarkably influential – not surprisingly those of species with wide distributions or economic importance. The overall influence of the BFBI is undoubtedly more pervasive, often in the background when research, restoration or conservation projects are planned. Indeed, its role in 'recognising and defining the relevant problems' was stressed by Clapham (1956). So while accounts may feel like the 'last word' for their authors, in truth they are only ever interim, working documents. In this spirit, we have recently allowed ourselves the luxury of publishing replacement accounts for a few of the earlier ones. Although representing a

restricted geographical area itself, the Biological Flora idea has spread much more widely, spawning similar journal series (or books) that cover other areas or particular biotopes e.g.: the Canadian Prairie Provinces, Central Europe, Dunes and coastal wetlands, Malaysia, New Zealand, Israel and Japan. In the words of Clapham himself (1956) 'Our Biological Flora is something of which we have reason to be proud. ... At present it describes lamentably few cases. I appeal to all of you to add to their number'. Amen and Happy Birthday.

REFERENCES

- Anker, P. (2001) *Imperial Ecology: Environmental Order in the British Empire, 1895-1945*. Harvard University Press, Cambridge MA, USA.
- Clapham, A. R. (1956) Autecological Studies and the 'Biological Flora of the British Isles'. *Journal of Ecology*, 44, 1–11.
- Davy, A.J., Bishop, G.F., Mossman, H., Redondo-Gómez, S., Castillo, J.M., Castellanos, E.M., Luque, T. & Figueroa M.E. (2006) Biological Flora of the British Isles: *Sarcocornia perennis* (Miller) A. J. Scott. *Journal of Ecology*, 94, 1035-1048
- Essl, F., Biro, K., Brandes, D., Broennimann, O. *et al.* (2015) Biological Flora of the British Isles: *Artemisiifolia*. *Journal of Ecology*, 103, 1069-1098.
- Foreword (1941) *Foreword*. *Journal of Ecology*, 29, 356–357.
- Gioria, M. & Osborne, B.A. (2013) Biological Flora of the British Isles: *Gunnera tinctoria*. *Journal of Ecology*, 101, 243-264.
- Marrs, R.H. & Watt, A.S. (2006) Biological Flora of the British Isles: *Pteridium aquilinum* (L.) Kuhn. *Journal of Ecology*, 94, 1272-1321.
- Salisbury, E. J. (1928) A Proposed Biological Flora of Britain. *Journal of Ecology*, 16, 161
- Taylor, L. & Roberts, D.L. (2011) Biological Flora of the British Isles: *Epipogium aphyllum* Sw. *Journal of Ecology*, 99, 878-890.
- Thomas, P.A. (2016) Biological Flora of the British Isles: *Fraxinus excelsior*. *Journal of Ecology*, 104, DOI: 10.1111/1365-2745.12566.
- Tiley, G.E.D. (2011) Biological Flora of the British Isles: *Cirsium arvense* (L.) Scop. *Journal of Ecology*, 98, 938-983.

Making a Difference in Conservation: Improving the Links Between Ecological Research, Policy and Practice.

A joint BES and Cambridge Conservation Initiative (CCI) symposium

Alan Crowden / *Bulletin* Editor

A full and fascinating report on the BES-CCI symposium by Clive Mitchell and Juliette Young has been posted on the BES website at: www.britishecologicalsociety.org/wp-content/uploads/BES-final-paper-conference-report_C.Mitchell-J.Young_.pdf

Here's some brief and superficial comments to read while laboriously typing the web address for the full report...

A joint meeting of the British Ecological Society and the Cambridge Conservation Initiative (CCI) took place at the new centre for conservation science in the centre of Cambridge, from April 11-13, 2016, in front of a capacity audience of over 250 participants. Cambridge is currently supporting one of the largest populations of building cranes in the whole of the UK, and one or more of them must have been involved in the construction of a structure that

was built on and around the original Museum of Zoology building. The David Attenborough Building was opened by our eponymous hero the week before the symposium, but I wasn't invited, so my photograph of the green wall that graces the central atrium lacks the excitement of the press coverage, which had images of the nonagenarian conservationist abseiling alongside the wall with a mildly concerned expression on his face.

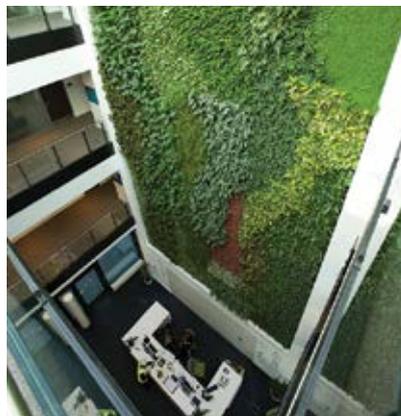
The new building houses an unprecedented accumulation of conservation organisations and this conservation campus provides working habitat for about 500

individuals, of whom about 150 are university academics and 350 from the conservation organisation partners.

By means of panel discussions, plenary lectures, workshops and networking opportunities in the breaks, the meeting provided stimulating discussion among an unusually diverse group of delegates. There were thought-provoking presentations from natural and social scientists, politicians and political advisers, and stimulating workshops covering a whole range of issues from engaging with policymakers to exploring linkages between social and environmental outcomes.



The David Attenborough Building



Green wall



Sir John Beddington's enjoyable lecture on Emergencies, Evidence and Policy was open to the public



John Beddington's in tray.

The first day was topped and tailed (if I can call it that) by talks from Ian Boyd, current Chief Scientific Adviser to the UK Government on Food and Environment, and by Sir John Beddington, former Government Chief Scientific Adviser. John gave us a glimpse of the key issues in his in tray, and could not conceal his glee that the in tray now belongs to Ian Boyd.

The fact that we were addressed by Chief Scientific advisers past and present gives some idea of the pull of the new conservation hub (and the BES, of course), but the meeting also drew on the expertise of excellent speakers both local and from far away. Hugh Possingham spoke shortly after news broke that he will be taking up the role of Chief Scientist at the Nature Conservancy in Washington D.C. in November, though Hugh being Hugh, he will combine the role with continuing to work at the University of Queensland.

The last major presentation of the meeting was from Mark Burgman of the University of Melbourne, who offered a strikingly honest account of the difficulties of establishing the credibility of a multimillion dollar unit set up to provide advice to the Australian government. Written down on paper the technique of asking government officials to tell them which issues to address doesn't seem terribly ground-breaking, but it transformed the relationship to one of trust and collaboration.

The conference ended with a panel; six people, not quick enough to run when they saw Bill Sutherland approaching, were given two minutes each to reflect on key lessons from the conference and how they might apply these in future. Never one to try to have a good idea when I can pinch someone else's, I adopted this approach to our coverage of the meeting. Five accounts follow from delegates from a variety of backgrounds who were asked to offer their thoughts on the key messages they took from the meeting. I asked for personal, informal and immediate reactions and I am extremely grateful to these contributors for working to a very short deadline. We hope their thoughts give you a flavour of the reactions that can be provoked by a successful conference.

While I'm not an active conservation scientist I can tell when conference delegates are having a good time (they attend all the sessions; they stay to the end; more questions are asked than there is time to answer; there is a buzz at the coffee breaks; the conversations are continuing as people are leaving the building at the end of the day).

The success of a meeting depends on all the right elements coming together, which doesn't happen by chance. The symposium organisers were William Sutherland, Nancy Ockendon, Stuart Butchart, Zoe Davies, Nathalie Pettorelli, Peter Brotherton and Juliet Vickery; and from the BES Amelia Simpson, Amy Everard, Ben Connor and Hazel Norman made sure that all the behind the scenes stuff worked. Brilliant, just brilliant.



Mark Burgman of the University of Melbourne

CONFERENCE NOTEBOOKS

We asked a number of delegates for their impressions of the conference, and the key take home messages that might influence their thinking and approach in the months and years ahead.

Clive Mitchell, Juliette Young and Des Thompson (*Scottish Natural Heritage, CEH Penicuik, and SNH*)

This excellent conference explored relationships between evidence, policy and practice for conservation. Whilst conservationists can rightly claim many successes, the ongoing loss of biodiversity testifies to the lack of room for complacency. For some this includes a need to be curious and a willingness to challenge current approaches, as illustrated by Bill Sutherland in his opening remarks, and by Lucy Bastin in references to 'open policy making'.

There was a strong suggestion that policy is well-defined and 'knowable', and that by uncovering its processes scientists might better understand the science-policy interface, present its 'truths' at the right place and time, to the right people, and thereby be effective.

But, and it is a huge but, the policy-evidence relationship is complex. Bias is rife in science e.g. in data, method, publications (Charles Godfray). Policy is not easy to define, nor does it operate as a tried-and-tested replicable process. Instead, it is often event-responsive, ministerially impulsive, and hungry for supportive evidence. It is unhelpful to think of science as being entirely independent of, or distinct from, policy (Susan Owens). Policy is a values-based activity and all values including 'nature's intrinsic value' are human values (Ian Bateman). Choices about allocating resources involve value judgements, whether for conservation action (Ian Bateman) or to acquire more knowledge (Hugh Possingham). People filter these choices, including the evidence to support these, through their worldviews.



A panel discussion of Future directions closed the meeting. From left, Rosie Woodroffe (Zoological Society of London), Peter Brotherton (Natural England), Jonathan Spencer (Forestry Commission), Victoria Robb (HM Treasury), Kathryn Monk (Natural Resources Wales) and Andrew Slade (Welsh Government)

Science can help define problems, but effective framings involve a broad-based range of different perspectives including the social sciences (e.g. EJ Milner Gulland and Lynn Frewer) and non-scientific knowledge (Pernilla Malmer). Participatory approaches could considerably shorten the time from implementation to influencing decisions from 3-27 to 0-1 years (Pernilla Malmer). Social sciences are more concerned with revealing context and situational viewpoints, which may be relevant to nature that is local and highly dependent on context.

There is an alarming lack of knowledge about what works in conservation, coupled with a disturbing capacity to continue with practices that have been shown not to work (John Altringham). Reserve managers, for instance, rely on a wide range of sources but especially their own and colleagues' experiences to juggle a range of local factors to inform site-specific actions (Malcom Ausden). How do we break out of this? Why does intuition seem to trump the evidence?

Uncertainty is pervasive in ecology. In responding to 'does it matter?' Rob Freckleton suggested that the answer lies in an assessment of the consequences of acting or not acting. Science tends to focus on the measurable components of 'quantitative risk' which can lead to a misguided sense of control or even the language to deal with 'qualitative uncertainty' (Andy Stirling).

Several contributors argued that relationships and trust are the cornerstones of building bridges across the science-policy interface, but power was not discussed openly in plenary until the final day (Andy Stirling). When trust and relationships break down, conflict erupts (Serah Munguti and Juliette Young).

Exploring what was not said can be as instructive as what was said. Clive Mitchell and Juliette Young have written more about this in their impressions (http://www.britishecologicalsociety.org/wp-content/uploads/BES-final-paper-conference-report_C.Mitchell-J.Young_.pdf) of the conference. Arguably, we could weave more strands of the

social and life sciences to tease out our understanding of nature, naturalness, health, quality, resilience. Nature conservation, after all, can be argued to be a social construct.

The independence of science and scientists was highlighted, but not how this could be established and maintained. Much science is a social activity, with scientists embedded in both scientific and non-scientific communities. These social biases are as important as the methodological biases discussed at the conference. Policy is usually administered through institutions, bringing yet more social complexity and power relations to the landscape. These affect both the development and implementation of policy.

These three themes (worldviews, independence and institutions) affect the framing of conservation (e.g. people as a part of nature, or apart from it). The scope of ecology, and the range and diversity of collaborations and creative insights likely to inform policy, and define the wider impacts in society.

Olly Watts (RSPB)

A sub-title for this conference could have been 'Helping people to make better choices – for nature and for people'. What a great mission!

A theme explored from the start, that policy is shaped by consideration of evidence and values, grew and developed through a variety of talks and discussions throughout the conference. Policy of course is also a culmination of politics and public views, as well as the practical constraints of deliverability. Seen in this constantly tail-chasing mix, confused further in some instances by beliefs and dogma, the need for ecological evidence to shape what actually gets done is ever more apparent.

So if we want nature and ecological considerations to shape our society's values, politics and what actually gets done, it is surely incumbent on us all to tell the stories our science gives us, as best we can, to as many people as we can. We heard some terrific insights towards doing this, from conservation success in Kenya, to making our own infographics for conservation, and with intriguing insights into politics today. Seeing the role the media is playing may have been a rude awakening for some, but highly pertinent!

Nature seems to be falling down both the political agenda and public awareness – at a time when it nature seems to be in more trouble than ever. If the public is largely ambivalent about ecological science and the role it can play in society, then that's something we must address. If ecological science is not getting through to policy advisors, opinion formers and politicians, that too is something we need to tackle. Quite how this should be achieved needs further thought, but perhaps we need to embrace, more widely, communication as the culmination or milestones in science, rather than publication.

'We are the intermediaries to nature', someone eloquently said in a workshop. This gives us a great opportunity, and also responsibility: if we fail grasping our role as intermediaries, additional to being scientists, we fail not only nature, but also science and society.

It was such a good conference that I rejoined the BES, after a 30 year absence, and I hope I can contribute to developing the BES's role in pervading ecology across society.

Rob Yorke FRICS (A rural land surveyor and interested outsider)



I don't want to overwork this piece: these are off the cuff thoughts gleaned from scribbled note and muffled recorder. Most unscientific you mutter. Perhaps so, but like most of us, I've little time and so I was delighted to allocate three days to attend the BES/CCI event in Cambridge.

But things are never that straight forward.

My rural surveying work took me away for one day and another was spent realising that the single-subject symposium (*'Improving the links between ecological research, policy and practice'*) was anything but single issue. Nor it seems was there enough time to absorb and then question the content. I'm all for stimulating lectures from the word go – the Defra's Chief Scientist Adviser set the scene: "the scientific community has not built trust with the policy community". However, having sparked debate, he left the building before we could ask any questions. Such is the woe of high office policy makers.

But what a fine venue the David Attenborough building is. Standing for all that's great about science today. Lots of conservation NGOs (Birdlife, BTO, RSPB, Fauna and Flora International, Cambridge Conservation Forum) – all an office floor away from each other. It could really do with sharing the space with *Population Matters*, an organisation of which Attenborough is Patron. The venue is a 'loaded' building of influence, power, values and science; the perfect conduit to commission ecological science to fill the huge gaps in our knowledge and explore how *matters* interact with human *population* interests.

There's plenty to do.

Do you remember those media outlets in 2013 that declared 60% of all UK wildlife in the State of Nature report was in decline? (www.mirror.co.uk/news/uk-news/state-nature-report-uk-wildlife-1929885). They didn't read the small print. It's 60% of the mere 5% of species on which we have reliable data. Pedant I hear you cry. But without robust measurable data, how can we improve links between research and policy that influences conservation practice on the ground?

"I wonder if we recognise the tens of thousands of farmers in our own country as indigenous experts"

Peter Brotherton from Natural England via Blue Sci, the Cambridge University science magazine. (<http://www.srcf.ucam.org/bluesci/2016/04/conservation-conferencing-cambridge>)

Many of the subjects, including the poster presentations, at this wide ranging fascinating event involved matters that farmers, gamekeepers, wildlife wardens, foresters and land managers deal with on a daily basis. Practitioners at grass root level, thirsty for guidance at the front line of conservation.

Were any here?

No, because they were too busy working. Fighting flea beetles without neonicotinoids (Prof Godfray's restatement), scratching heads on badgers (Prof Beddington's throwaway remark), managing vegetation (winning poster for bird nests in hedges), dealing with heather burning (Juliette Young on resolving conflict [<http://www.thefield.co.uk/country-house/conservation-conflict-ending-conflict-32001>]), debating with rewilders (Andy Stirling on democratic science), delving into GM farming practices (Fiona Fox's media angle), with no time, unfortunately, to enjoy social marketing of crabs affected by fertiliser runoff (Bob Smith's amusing ad).

I loved all of it. I wanted to call, write about, tweet to as many as possible outside the building. Was there a firewall preventing me or is some of this about ownership and values? Sticking to our tribal social media scientific community rather defeated the BES President's call to use the Twitter hashtag to extend the impact of the meeting beyond the building. (see Storify, www.twitter.com/BESPolicy/status/723080388034347008)

If evidence from ecological scientists can help inform gamekeepers and wildlife wardens to save the curlew (<http://onlinelibrary.wiley.com/doi/10.1111/1365-2664.12167/abstract>) let's get on with working directly with them rather than waste too much time improving links with short term politically office-bound gatekeeper-guarded policy makers.

For me, lack of the social element – I don't mean the excellent coffee breaks as which we buttonholed, networked or chatted with various attendees – was the less fashionable social science. (<http://www.nature.com/news/major-biodiversity-panel-desperately-seeks-social-scientists-1.19778>) . Sticking my hand up anyway when they asked how many social scientists were in the room, I counted myself in because I'm a conservation-science-loving conservationist utilising 'skills' (including use of psychology) to communicate tradeoffs and synergies between farmers, engineers, land users and ecologists.

I wonder if we can get away from the idea of ecological science evidence-led policy as the panacea for conservation. Is social science perceived as an inconvenience that muddies ecological science? So then, let us be braver in seeking to be evidence-informed by science and then us roll up our sleeves (<http://www.sciencedirect.com/science/article/pii/S0006320710001849>) to help interpret how scientific – both negative and positive results – are framed within moral, political, socioeconomic and ethical parameters.

There was shy shuffling in the room when we were told to get on telly, shout about it, generate debate – but then be ready to engage as robustly as the evidence supports your science.

It can get rough. 'Offence is not a defence' when you are under John Humphry-style scrutiny – especially when critical peer review is a keystone to ecological science research.

I don't know what other BES events have been like, but this vibrant symposium was stuffed full of vital information, topical talks, piercing questions (more time for questions, less slides please) and presentations laden with provocation – I'm not sure how many of the audience twigged this significance – whereas to me they were an obvious wake-up call to start adapting to future change.

It's time to find ways to work closer with non-academic local knowledge experts, build on collaborative ownership of research to enable science, in an era of tension, to be used more as a tool, not a weapon. Let's open up the social aspect of the complex intrinsic interaction between 'trust, values and relationships' within science today.

Rob Yorke is an independent commentator on rural affairs.

Take him to task at www.robyorke.co.uk

Camilla Morrison-Bell (British Ecological Society)



Hi, I'm Camilla Morrison-Bell and I joined the BES in April as the new Senior Policy Officer having worked previously at Plantlife as Policy Officer and An Taisce (in Ireland) in the Natural Environment department. I have a degree in Environmental Science and a Masters in Rural Environmental Conservation and Management from Trinity College Dublin and University College Dublin respectively. I've been asked to give you some initial impressions of the BES-CCI symposium.

Having posted a blog about my take home messages from the symposium I've summarise just a few bullet points here that I feel have the most resonance for me and are key for us to remember within our policy work at the Society.

1. Scientific evidence is one strand of information used within the decision-making process and it needs to be packaged and communicated in an accessible, organised and neutral way.
2. Those working in the policy arena, such as myself, need to ensure not to bombard decision makers with information but to distil the key facts into an engaging format that is then supported by the more complex and comprehensive evidence.
3. When packaging up evidence there is the need for transparency and therefore, we must always ensure we clearly reference the evidence source. Similarly, we need to encourage decision makers to communicate the rationale for their policy decisions.
4. Communicate the evidence clearly, effectively and as often as is possible.

We in the BES policy team are working hard to take some of these key messages forward. As it is vital evidence is fed into the decision making framework, BES provides an important platform to ensure policy makers have access to the best available ecological science to inform decision making. For example, we aim to highlight to our members when there are opportunities to submit ecological evidence into relevant public consultations or select committee inquiries. We do this through our Special Interest Groups (SIGs) and by looking at our expertise database. Therefore, if you are thinking about ways to communicate your evidence into policy forums it is worth starting by filling in your expertise in our database and to join one of our SIGs.

We also run a number of schemes to show how the policy-making world works. These are aimed more at early career scientists and include some schemes such as BES Parliamentary Shadowing Scheme, the POST Fellowship scheme and six month paid internships with us in the BES office.

If you participate in any of these schemes you can then join the BES Policy Alumni Network. Finally, we are looking for BES members to contribute to our new Policy Guides project, which will create guides to help scientists understand how to engage with policy to ensure the best scientific evidence is made accessible to decision makers. Please get in touch if you want to be involved in any of these schemes or projects.

Becky Robertson
(Research Assistant at the University of Cambridge, and currently a Policy Intern with the BES)



I'm the new policy intern. I'm a recent graduate from the University of East Anglia, where I completed an integrated Masters in Environmental Sciences specializing in conservation science.

After my degree, I volunteered for the RSPB East of England Regional Office Communications Team. I worked to encourage responses to the public consultation on the Nature directives. I was lucky to stay at Minsmere during Springwatch 2015 and run my own photo-led blog, Humans of Springwatch, exploring the benefits people receive from nature.

I also currently work as a research assistant at the University of Cambridge, creating summaries for Conservation Evidence.

I felt fortunate to attend the joint BES and CCI Annual Symposium. I really appreciated the diversity of speakers and attendees. The talks were thought-provoking and extremely informative. William Sutherland opened with 'conservation works', reminding us that we all make a difference, but that we can do better.

Here are a few key ideas and themes that I took away:

Getting involved in policy is easier than you think.

We can individually engage with policy makers. Or if this seems daunting we can support the work of 'skilled intermediaries' like the British Ecological Society.

Understanding the process is necessary to progress conservation further.

There are many opportunities to increase understanding such as; accessing online resources, open events, placements and shadowing schemes.

Suggestions for improving evidence:

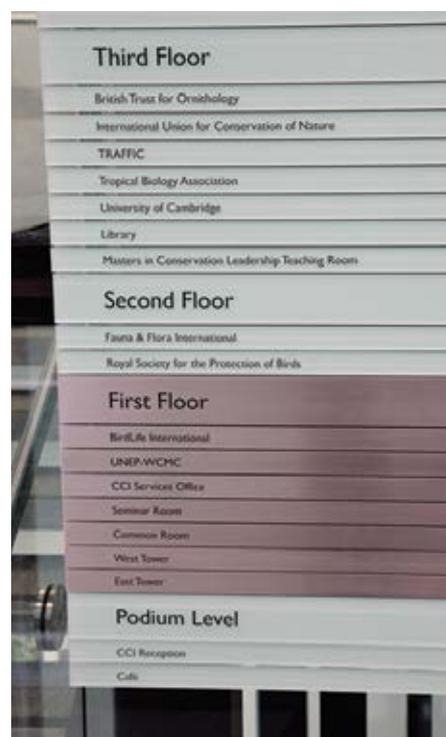
- Use a multiple evidence base – Pernilla Malmer
- Peer-review study design – Charles Godfrey
- Co-production of knowledge has merits but it is not panacea – Juliette Young
- Discovering what doesn't work is important so that resources can be redirected to interventions that do. – The Behavioural Insights Team and John Altringham

Communication of evidence could be improved

- Don't oversell the science
- Try various methods of communication, such as info-graphics.
- Generalisations aren't helpful. The public are many audiences. Policy makers are diverse in values, roles and power. Social sciences, like natural sciences, have differentiated to answer a variety of questions.
- Campaigns should be evidence based and also integrate local stakeholders – Serah Munguti

Pernilla Malmer said, "that knowledge is not an outcome but a process". The symposium encouraged me to be part of the process and seek opportunities to engage with policy makers.

My first week at BES has been an incredibly positive experience already. I'm excited by the upcoming events and new resources. Watch this space!



How many conservation organisations does it take to fill a building? The floor directory at the David Attenborough Building.



Hugh Possingham

The future of environmental policy in the UK: the EU referendum and beyond



Ben Connor / Policy Manager, British Ecological Society
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In the Government's own words: "It's a big decision. One that will affect you, your family and your children for decades to come." Should the UK remain a member of the European Union or leave to go its own way?

That's the question that's been on everyone's lips since February, when the referendum date was confirmed as 23rd June. Since then, we've seen high political drama, with Cabinet Members and long-time party colleagues taking opposing sides, and everyone from the National Farmers' Union to the Confederation of British Industry adding their voice to the debate.

While the arguments raging in the media have at times relied on shaky evidence and unverified claims, what is certain is that the outcome of the referendum will have a profound impact on science and environmental policy in the UK. Environmental legislation in the UK is closely entwined with EU Directives: the Common Agricultural Policy – shaping the management of much of our countryside – represents 40% of the EU budget; and the EU has a significant impact on the funding and organisation of British science.

In the lead up to the referendum, we have not taken a position on whether the UK would be better off in or out of the European Union. Instead we have focused on informing members about the role the EU plays in shaping environmental and science policy in the UK, and the possible impacts of a decision to leave the EU. We've also aimed to communicate what the EU means for ecology and ecologists to policymakers.

INFORMING THE DEBATE ON THE ROLE OF THE EU

One way we have done this is by responding to two parliamentary select committee inquiries: the House of Lords Science and Technology Committee inquiry on "EU membership and UK Science", and the House of Commons Environmental Audit Committee inquiry on the "EU and UK Environmental Policy". Our responses were shaped by contributions from our members, highlighting their experiences of how the EU has influenced their work.

For the House of Lords inquiry, we contributed to the Royal Society of Biology's collaborative response, which brought together views from across the biosciences. The submission highlighted the benefits that EU science and innovation funding streams have brought to UK bioscientists and bioscience infrastructure – with examples including the development of the Centre for Ecology and Conservation at the University of Exeter's Penryn Campus – whilst also emphasising the opportunities for international collaboration facilitated by the EU through free movement of staff and students, and structures for sharing knowledge, infrastructure and resources.

In their final report, published in April, the Committee echoed many of these sentiments, finding that membership of the EU is "highly valued" by the UK research community, and that science is a "major component" of the UK's membership of the EU. They further highlighted the UK's lead role in developing EU science and research policies. However, they also emphasised that there were mixed views on the impact of EU regulations on UK science, with some scientists seeing them as disadvantageous, while UK business engagement with EU research and development programmes was seen to be lagging behind that of academic researchers.

In our letter to the Environmental Audit Committee inquiry, we reiterated the major role that EU funding and infrastructure plays in facilitating ecological research in the UK, and stressed the importance of the ecological evidence base for informing environmental policies. Similarly, we highlighted the role of multinational EU legislation in providing a framework for applied ecological research, a point picked up by the Committee in their final report.

People, Politics and the Planet - Any Questions?

A pre-election debate on the environmental policies of the UK's major political parties, chaired by Jonathan Dimbleby

 #EnvAnyQs

(WiFi network: FH Conferencing Password: @BritishQuakers)



The People, politics and the planet event 2015. Photograph by Jason Reeves

The Committee concluded that the UK's membership of the EU has been a crucial factor in shaping its environmental policy, with EU interventions leading to improved standards in many areas, which would face an uncertain future in the case of a vote to leave. However, the report also highlighted the key leadership role of the UK in influencing the strategic direction of EU policies, and driving quicker action. It is also important to note that the scope of the inquiry did not cover the Common Agricultural Policy or Common Fisheries Policy, the source of much criticism for their environmental impacts.

The responses submitted to the two inquiries provide an excellent range of evidence and views from all sides of the debate. You can find links to the inquiries, and other information on the environment and science aspects of the referendum on our dedicated webpage at www.britishecologicalsociety.org/public-policy/policy-priorities/eu-referendum.

LOOKING BEYOND THE REFERENDUM

Without doubt, the EU referendum presents a crossroads in the course of environmental policy in the UK.

Vote leave, and we enter a period of great uncertainty. Vote remain, and the challenges of tackling climate change and biodiversity loss lose none of their urgency. Even beyond the EU question, one year on from the general election, UK environmental policy is being shaped by many forces of change, from the potential historic climate agreement last year in Paris, to the Government's promise of a 25-year plan for the environment in England. How will our policymakers tackle these issues?

That's the question we'll be asking on 21 July 2016, when we bring together a panel of leading politicians for one of the first opportunities to discuss the future of environmental policy in the UK in the aftermath of the EU referendum. Hosted in partnership with the Sibthorp Trust and the Royal Geographical Society (with IBG), our second *People, Politics and the Planet: Any Questions* event will this year tackle the theme of "Britain in a Changing Europe". Chaired by leading broadcaster Jonathan Dimbleby, confirmed panellists include Labour's Shadow Environment Secretary Kerry McCarthy MP, Liberal Democrat Environment Spokesperson Baroness Kate Parminter, and Green Party Leader Natalie Bennett.

Tickets are now on sale at www.peoplepoliticsplanet.eventbrite.com, and you can watch last year's pre-election debate on our website at www.britishecologicalsociety.org/public-policy/policy-events/2015-events/environmental-question-time. What will you ask the panel? Let us know on Twitter using the hashtag #PPPAnyQs.

FOOTNOTES

For more details on the potential implications of the UK leaving the EU, see our 2016 Legislation Scan in the April *Bulletin*: Sutherland, W.J., Burke, E., Clements, A., Connor, B., Martin, J., McNamee, P., Mitchell, C., Monk, K.A., von Bieberstein, K.R., & Thompson, D.B.A. (2016) What are the forthcoming legislative issues of interest to ecologists and conservationists in 2016? *Bulletin* British Ecological Society 47 (1) 45-54.

<http://www.parliament.uk/business/committees/committees-a-z/lords-select/science-and-technology-committee/news-parliament-2015/eu-membership-report-published/>

<http://www.parliament.uk/business/committees/committees-a-z/commons-select/environmental-audit-committee/news-parliament-2015/eu-uk-environmental-policy-report-published-15-16/>

https://www.rsb.org.uk/images/pdf/RSB_response_to_HoL_consultation_on_science_and_the_EU_FINAL_-_Copy.pdf

<http://www.publications.parliament.uk/pa/ld201516/ldselect/ldscitech/127/127.pdf>

http://www.britishecologicalsociety.org/wp-content/uploads/Assessment-of-EU-UK-Environmental-Policy_-BES-Letter_20.11.15.pdf

<http://www.publications.parliament.uk/pa/cm201516/cmselect/cmenvaud/537/537.pdf>

OUTREACH GRANTS

Speakezee



Karen Devine / External Affairs Manager, British Ecological Society
Karen@britishecologicalsociety.org

Each year we award up to £24,000 to help promote ecological sciences to a wider audience through our Outreach Grants.

In 2015 we awarded a grant to Professor Bruce Hood, founder of Speakezee. Speakezee is a website bringing together academic speakers and event organisers. Its core aim is to engage more academics with the public and make it easier for organisers to find experts to talk at events.

Launched in 2015, it is already the largest academic speakers' website. Our funding will be used to increase the representation from ecologists like you!

February this year saw the launch of *Speakezee Presents*. This is a national campaign for coordinated quality talks around the country. Judith Lock from the University of Southampton is a BES member who presented at a *Speakezee* event, she shares her impressions.



Judith Lock at a *Speakezee* event, photograph by Bruce Hood

"The Southampton Speakezee events were organised by PhD student Jessica Spurrell, with Bruce Hood attending the afternoon event at which I spoke. I talked about nature versus nurture because I realised that in a world of genome sequencing, the effects of the environment are largely overlooked and don't feature much in public science. It was really enjoyable to speak to such a varied audience, which included primary school children (who were very excited to tell me the names of the twins in their class!) through to colleagues from other departments. I hadn't spoken to such a broad audience before, so was a little anxious but really I shouldn't have been, it was a great experience."

One of the evening's speakers was a 1st year Zoology student from my academic unit, Georgia Harper. She says;

"I really enjoyed the evening event; the talks by all the scientists were brilliant. The panel was good, and my favourite part of the evening was the questions and answer time after the panel, I'm sure we could've debated for hours! It opened up a lot of opportunities for discussion and left you with a lot to think about."

I enjoyed being on the panel and the people I spoke to really liked seeing both established and new scientists working together."

Jess did a wonderful job of choosing a varied panel for both events. She also introduced the audience to women scientists and engineers who history doesn't always remember as clearly as their male colleagues.



Natt Day is researching the common cold. Photograph by Mengyang Zhu

To top it off, our events were part of the University of Southampton Science & Engineering Festival and the team won an award for Collaboration.

It was a great event and I would recommend anyone who is interested in public engagement to find out more about Speakezee.'

You can find more details about *Speakezee* via: www.Speakezee.org

If you are involved in an event, do let us know and we'll do our best to spread the message for you: Info@BritishEcologicalSociety.org

SPECIAL INTEREST GROUP NEWS

MICROBIAL ECOLOGY

Rachael Antwis and Xavier Harrison

The British Ecological Society launched their new Special Interest Group in Microbial Ecology at the Annual Meeting in 2015. Since then, we have been busy organising a two day event at the University of Salford in June on the topic of "Microbial Ecology: From Individuals to Ecosystems". This will consist a number of talks that cover the diverse ways that microbes influence the ecology of organisms and ecosystems, including a plenary lecture from Prof. Alan McArthur from the University of Liverpool. During the second day we will run a "Horizon Scanning Workshop" – the aim of which is to identify the next big questions in microbial ecology (similar to previous events run by Professor Bill Sutherland). This will require delegates to submit 10-20 questions relating to their field before the event, which will then be discussed at Salford and reduced to a number of leading and specific research questions. The process and results of this workshop will then be submitted to a peer-reviewed journal for publication, with all contributors listed as authors. We are greatly looking forward to this event, and to reporting the outcomes to the BES membership in the second half of next year.

In addition to this event, we have advertised to fill the SIG roles of communications rep, early career rep and student rep, as well as filling the role of events rep (Sarah Griffiths, University of Manchester). The communications rep will be responsible for getting our online presence off the ground, including our Twitter handle (@BES_Microbial) and our external website (www.besmicrobialecolology.wordpress.com). We aim to have a different guest blogger each month to write about their research, and are particularly interested in hearing from early career researchers and PhD students if you would like to contribute a post about your work. To learn more about us please visit <http://www.britishecologicalsociety.org/getting-involved/special-interest-groups/microbial-ecology/>, and if you would

like to join the Microbial Ecology SIG, please email Rachael Antwis (University of Salford) and Xavier Harrison (Institute of Zoology) at microbial@britishecologicalsociety.org. We will distribute news, job vacancies, PhD studentships and event information via this mailing list, so if you have anything that may be of interest, please feel free to send it over!

PARASITE ECOLOGY AND EVOLUTION

Jo Lello (Lelloj@cardiff.ac.uk)

Early Career Researcher Workshop

In November last year, the SIG hosted a two-day workshop for early career researchers. A group of around 35 PhDs and post docs met at ZSL London Zoo, from a range of disease ecology research groups at institutions across the UK. The workshop focussed on helping ECRs develop skills towards being independent scientists, prompted on the first day by discussions led by two experts in the field, Prof Sarah Reece and Dr Kayla King, on their own careers and thoughts for the future of the field. With their inspiration and guidance, participants worked together to develop novel research ideas and communicate them to the group. On the second day participants had a chance to hone their project management skills, to help take away their ideas and turn them into reality.

The SIG will be running a similar event for ECRs this year, keep an eye on the @ParasiteSIG feed, our mailing list and the BES website and *bulletin* for information!

Outreach plans for 2016

This year the SIG are planning to host an outreach event, sharing the real parasites and pathogens that have inspired some of cinema's most famous monsters. Look out for more details coming soon!

A Conservation Ecology Workshop: Imagining a Better Future



Cat Stokowska and Stuart Patterson / Student Reps for the Conservation Ecology Special Interest Group
clstokowska1@sheffield.ac.uk / spatterson@rvc.ac.uk

At the BES Annual Meeting back in December, the Conservation Ecology SIG held its first student event since the SIG's reboot in 2014. Student reps Cat Stokowska and Stuart Patterson reflect on some of the insights and discussion generated in the workshop...

FROM VISIONARY THINKING...

Close your eyes. Think of a place you go to when you need quiet. It doesn't matter if it is outside or indoors provided you can see the outside world. Picture the sights, notice the surface you are sitting on and recall the sounds of those surroundings...

Something has changed.

You can't quite put your finger on it, but it actually feels different. The sound of people drifts into your field of awareness. As the group comes closer, one person comes over to you. They're smiling.

You ask about that strange feeling. And they tell you. Fifty years ago, it was 2015...

Breathe. Listen. Think and imagine. What happened?

Things are better fifty years into the future. But in which specific ways? Your acquaintance tells you the story of the steps our generation took to get there. Listen it through. And when they're done, take another breath. In your own time, with that changing scene flashing in reverse before you, come back to the present...

A wise scout leader once took my peers and I through this exercise as part of an environment-themed residential. Paper instructions in hand, we each wandered off into the woodland around the hut in varying states of bemusement, too-cool-for-school cynicism, and open-minded enthusiasm.

That sharp step back away from all the issues we'd been debating was a really profound experience for me. It prompted me to actually consider what my world would look like if I could imagine my way to any ideal. To then work out the tangible steps that would be needed to get from there to here made it seem achievable, exciting and hope-worthy rather than just some vague utopia. This is exactly why we decided to use it to open our first Conservation Ecology SIG (re-booted) student workshop at December's BES Annual Meeting.

I don't know how our participants felt about being asked to close their eyes in a room full of strangers – or what they thought when I then asked them to imagine time travel to a New Earth where Wonderful Things Have Happened. To their credit, they came up with roughly 75 post-its and some sincere discussion afterwards. So thank you to everyone for not creeping out when eyes were shut and, more importantly, for genuinely engaging with the experience! The responses ranged from provocative step-changes in current thinking (Greater London National Park anyone?) to the simple and, in my opinion, rather poignant 'dark at night'.

As I sorted through the post-it notes back at home I could see several themes starting to emerge. We've included a collage of some of the originals but, for now, allow me to paraphrase and open a window for you onto our SIG student members' visionary futures:

In 2055, the major political and economic shift we were crying out for really happened. Not only that but there has been a significant and solid change in the mindsets of the majority of people. I'm talking about the average person on the street knowing the names of birds other than those that grace our Christmas cards, access to wild places practically being a human right and everyday people being proud of our natural heritage. The innovation that sprung from this revolution in thinking transformed our cityscapes into a thing of beauty. Nowadays, cities mean coexistence and beautifully ingenious urban design (think the Capitol without the Hunger Games. Or the crazy people). Beyond them, our landscapes have also returned to a state closer to their wilder selves and, wherever management is necessary for us to use resources, this is evidence-based and considers the whole system. Last but not least... being a human in this day and age? It's a lot simpler...

(Words by Cat Stokowska)

OF INTEREST TO MEMBERS

MULTIVARIATE ANALYSIS OF ECOLOGICAL DATA USING CANOCO 5

Course tutors: Jan Lepš & Petr Šmilauer

Applications are now being accepted for this course, to be held at the Faculty of Science in Ceske Budejovice, Czech Republic, from 24 January – 4 February 2017. This popular course, offered regularly since 1997, focuses on major modern approaches to the analysis of multivariate data, and is specially designed for researchers and students in all fields of ecology and conservation. Jan Lepš and Petr Šmilauer have been regular attendees at BES meetings over the years and their course attracts very positive feedback from participants.

In-depth lectures and practical sessions cover the following topics:

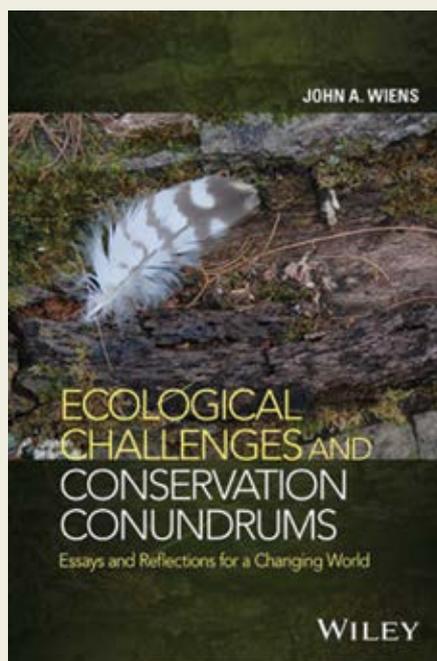
- Classical ordination methods (PCA, DCA, PCO, NMDS)
- Constrained ordination methods (CCA, RDA), including partial analyses, variation partitioning, principal response curves, and permutation tests of multivariate hypotheses
- Tuition on the interpretation of ordination diagrams and the efficient use of Canoco software; all practicals are run with Canoco 5
- Course participants are expected to bring data from their own projects and will be given time to apply methods mastered during the course to their own datasets. The course lecturers will provide individual assistance.

The course follows the structure of our book Šmilauer & Lepš (2014): *Multivariate Analysis of Ecological Data using Canoco 5*, second edition, Cambridge University Press.

Further information about the course can be found at <http://regent.jcu.cz> and you are also welcome to address any enquiries to the course manager, Petr Šmilauer, at his e-mail address: petrsm@jcu.cz

ECOLOGICAL CHALLENGES AND CONSERVATION CONUNDRUMS: ESSAYS AND REFLECTIONS FOR A CHANGING WORLD

Regular readers of John Wiens' superb essays in the *Bulletin* will be delighted to know that many of these have been brought together with completely new commentaries as well as other short pieces published elsewhere in a new book *Ecological Challenges and Conservation Conundrums: Essays and Reflections for a Changing World*, published by Wiley in April 2016. The hardback is priced at £54.95 but BES members receive a 20% discount. Full details by logging on to the member pages of the BES website.



MUD, BIRDS AND POPPYCOCK

John Goss-Custard

Visiting Professor, Bournemouth University
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Shorebird conservationists insist correctly that our coastal flats are vital to the survival of hundreds of thousands of shorebirds and the UK, again quite rightly, is committed to their protection by EU Directives.

Unfortunately, the Directives are sometimes applied in a way that suggests that many shorebird conservationists have come to believe that any human activity on the coast is bound to be detrimental. Although anthropogenic activities can indeed degrade shorebird feeding grounds, this does not mean that all human activities necessarily do so, every time and everywhere!

Most shorebirds occur in the UK from August to April when on migration or over-wintering. When exposed by the receding tide, intertidal flats provide food: most eat invertebrates but some wildfowl are herbivorous. The best environmental management issue with which to illustrate the culture that underpins the approach of many shorebird conservationists is disturbance from people due to dog-walking, kite-surfing, bait-digging etc. These activities are often viewed as self-evidently damaging to shorebirds. As a result, Environmental Impact Assessments (EIAs) seem more often designed to collect enough information to support

a preconceived concern than rigorously to test the hypothesis that disturbance actually harms shorebirds, which is what good ecological science should do.

This is the biology of the issue. Shorebirds must survive until spring with sufficient body reserves to migrate to often distant breeding grounds. Birds that fail to do so may not even survive the journey let alone breed successfully when they arrive. Disturbance could reduce survival and body condition on the wintering grounds in these ways. Flying uses lots of energy, so being disturbed into flight increases birds' daily demand for food. As a shorebird cannot feed while flying, disturbance reduces the time available for feeding. Disturbance concentrates birds in disturbance-free areas – often of poorer quality than the ones vacated – where the increased density may intensify competition. Disturbance therefore increases the birds' energy requirements while making it harder for birds to meet them.

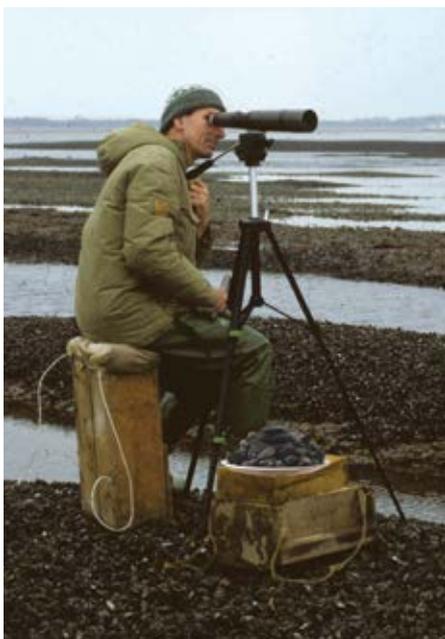
Acknowledging that disturbance *affects* the birds does not mean, however, that it necessarily has a significant impact, defined as follows. The Directives aim to maintain shorebird numbers. Disturbance could impact on numbers by reducing the birds' chances of surviving the winter and/or preventing them from achieving good enough body condition to migrate and breed successfully in spring. But all depends on the severity of the disturbance. One occasional dog-walk lasting five minutes may momentarily affect the behaviour of nearby birds but it would be too trivial to have a significant *impact* on their survival and body condition, and thus on population size. But if dogs (improbably!) occurred continuously in all areas, night and day, it almost certainly would. Whether there is an impact will depend on the amount of disturbance, its frequency, intensity and duration, as indeed the Directives themselves make clear. And if there is no impact, the ill-defined notion of the 'integrity' of the site will not be affected either.





The Oystercatcher on the right has a mussel in its beak. The one on the left wants it.

The main challenge for the objective shorebird ecologist is to identify the threshold at which increasing disturbance (or other environmental change, for that matter) begins to have an impact rather than merely an insignificant effect. This approach is by no means always adopted in EIAs. Often, only eye-catching behavioural effects are measured, like the distance birds take flight as people approach and how far they then fly.



Frequently disturbed patches of mud are shown to have fewer birds than undisturbed ones without any attempt being made to assess whether this re-distribution has a significant impact on the birds. Maps show that one kite-surfer may range over a large area, the untested implication being that much foraging space is thereby denied the birds for significant amounts of time. Observations show that flocks of shorebirds may make a major disturbance flight about once every daylight hour without testing whether this causes the average bird to lose significant amounts of time and energy. The inference from all these observations is that the natural activities of the birds are so badly affected by disturbance that there simply *must* be an impact.

This approach can give a badly distorted impression of the magnitude of the disturbance experienced by shorebirds. It focuses research attention on the places and times where people and birds do occur together while overlooking the sometimes many other circumstances where they do not. In fact, most shorebirds feed for most of the time in places and at times where the risk of being disturbed is low. Most people occur on estuaries during the warmer months whereas shorebirds are most vulnerable, and usually most numerous, during the

coldest. Most shorebirds feed in the muddy areas that most people avoid. Over high tide when most water sports are carried out, most shorebirds are feeding or roosting elsewhere because the tide covers the flats. Very few people visit intertidal flats at night when most shorebirds also feed – some by preference. Disturbance often makes a bird bring forward a flight it would have done later anyway – to reach, for example, better feeding areas downshore as these low-lying places become exposed on the receding tide. Once birds have been disturbed from an area by the first few people to arrive, there are few, if any, left to be disturbed subsequently, however many more people arrive. A false impression is often given that shorebirds and people are not as segregated in time and space as actually they often are.

How has such questionable research come to be accepted as sufficient for devising policies to ‘manage’ recreation disturbance in coastal areas? I believe that there are three reasons: (i) the beliefs held by many conservationists and their supporting ecologists, (ii) the ecological and scientific naivety of some decision-makers and (iii) the over-enthusiastic and un-balanced application of the Directives’ precautionary principle.

(I) CULTURE

Perhaps exacerbated by the assertions of powerful, single-issue pressure groups, the constant repetition of the mantra that shorebirds are 'sensitive' and live in 'fragile' habitats fosters the belief that anything people do simply *must* harm the birds. The evidence shows that this is by no means always the case: indeed, human activities on estuaries can sometimes benefit shorebirds and can even be managed to do so! Yet many shorebird ecologists seem to feel that their research should support the preconceived and widely-held concerns of shorebird conservationists. Conservation is the good cause that provides a shared *raison d'être* for many shorebird ecologists and conservationists.

An anecdote illustrates the expectation some conservationists seem to have of their scientific colleagues. I advised that the removal of Cardiff Bay mudflats under a fresh-water lake created by a barrage across the mouth of the River Taff would put at risk the shorebirds that fed there, even though they could feed on the adjacent Severn estuary. I was asked whether anything could be done to mitigate this impact. I presented my solution at a public meeting. The idea was to puncture a nearby seawall alongside the main Severn estuary to convert the adjacent field into a mudflat. This 'lagoon' would have remained accessible to the birds for some 30-40 minutes after the estuary itself had been covered at high water on Spring tides because the narrow entrance culvert would have delayed the ingress of the tide. This would have extended the birds' intertidal feeding time, probably to their great benefit. After the meeting, I was berated long, hard and very publically by three enraged conservationists. According to them, I should never have proposed anything that might have undermined their case against the barrage. Such arrogance! Surely, as a scientist, I had no right to attempt to distort public decision-making by selective use of knowledge that had been largely acquired at public expense!

(II) DECISION-MAKERS

The second reason that this doctrine has taken hold is the naivety of some of those charged with making decisions on matters that actually demand a good grasp of the science. It is not difficult to raise doubts in their minds that the 'science' is uncertain when some of them seem to know rather little about the scientific method in general and shorebird ecology and population dynamics in particular. See, for instance, some case histories in Jones, G. (ed.) 2012. *The Habitats Directive: A Developer's Obstacle Course?* Hart Publishing.

(III) PRECAUTIONARY PRINCIPLE

The last and, I suspect, over-riding reason lies with the EU Directives themselves, and in particular, the precautionary principle. This loads the dice heavily in favour of those who view human activities on estuaries as inevitably damaging to shorebirds. In scientific research, of course, conclusions are presented in probabilistic terms. Scientists know that new ideas or new data may at any time challenge their current understanding. In such an open, self-critical and self-effacing intellectual climate, it really is not difficult to raise enough doubt for the precautionary principle to be invoked.

This is the fundamental contradiction: the Directives require that science be used to evaluate an impact but don't encourage the use of a fundamental concept of scientific judgement – probability. A very strong scientific case that there is minimal risk of significant damage to the birds can be ignored simply because someone says: 'We hear what you say but we have to be precautionary. Sorry!'

The precautionary principle is all well and good when there is uncertainty about impacts, when the risk, though low, is not negligible and the potential cost to conservation is high. But to apply the principle without a careful balancing of the magnitude of the risk against the magnitude of the consequences is an abuse of the principle – and it is not what

it is meant to achieve. Its use is supposed to be 'proportionate' whereas, in practice, its use can seem absolutist instead. To demand, in effect, zero risk simply demands impossible science.

In fact, it sometimes feels as if just enough research is done to raise sufficient doubt to enable the precautionary principle to be invoked! On these occasions, contrary scientific evidence appears to be something to get round rather than to be used to assess risk! The approach of the objective scientist, however, should be rigorously to test the hypothesis that bird survival and body condition are likely to be decreased by disturbance and, importantly, to evaluate the risk that this will happen. But too often, discussion descends into a legalistic concocting of just believable scenarios rather than an objective appraisal of the evidence. This is made possible by the exaggerated implementation of the precautionary principle. The process seems often to be more of an exercise in absolutism than an objective assessment of the magnitude of the risk.

An example: On the Exe estuary, a levy is being charged on every new dwelling built near the estuary to provide 'mitigation' – of questionable and (to a scientist, disgracefully) untested effectiveness – for the impact that additional disturbance from the new householders may have on shorebirds. This has caused increased costs, yet more delays in planning and in the construction of much-needed dwellings. Equally sadly, it also increases the frustration with shorebird conservation.

My own independent and self-funded research has thrown overwhelming doubt on whether any mitigation is necessary because so little shorebird feeding is done in places and at times when there is a risk of disturbance. Additionally, Bournemouth University's (rightly cautious) model of shorebird disturbance in Southampton Water – in terms of shorebirds, very similar to the Exe – showed that it would require huge numbers of people



An oystercatcher piping

for there to be a significant impact on Exe shorebirds. It would take 15,000-30,000 people to visit the estuary regularly to reduce shorebird survival, or approximately 10-20% of the entire population of the region! Needless to say, nothing like this number has, or ever will, occur there. Instead of employing an over-precautionary approach, the risk to shorebirds should have been assessed as being so minute as to be, for all practical purposes, non-existent.

There should be no room for this culture of eco-pessimism! It infringes the civil rights of people if they are prevented without good reason from carrying out otherwise perfectly legitimate activities. Objective, hypothesis-testing, ecological science should always be done to make intelligent risk-assessments of where mitigations really are both necessary and effective. Members of the public are becoming increasingly sceptical

that mitigation funded by an enforced levy and restrictions on their activities are justified by the evidence: 'Why are birds more important than people' I often hear said. Such mounting anger threatens long-term support for a good cause. Shorebird conservation needs to be protected from the effect that the Directives have had on the culture of many shorebird conservationists!

I would like to thank Mike Begon for excellent advice on how to improve the wording. Also, my grateful thanks to the 20 or more very experienced colleagues who read various drafts, with especial thanks to those (about half) who replied, all of whom said that their experiences coincided with mine. Thanks also to the other half who did not reply and so did not retort that I must have been unlucky and my experiences singular.

John Goss-Custard BSc PhD DSc was a professional shorebird scientist for 40 years, for most of that time being employed by the Natural Environment Research Council, latterly as senior Individual Merit scientist. Over thirty years, he and his colleagues developed and tested individual-based models of shorebird populations that predict the impact of a whole range of human activities – ranging from shellfishing through barrage construction to recreational disturbance – on the birds' survival and body condition over the non-breeding season. He has described this approach in a non-technical account 'Birds and people: resolving the conflict on estuaries' which can be downloaded to an iPad, Kindle etc. at: <http://www.amazon.co.uk/dp/B00JMCBBQ0/> After his retirement, he became Visiting Professor in the School of Applied Sciences at Bournemouth University, where the models are continuing to be developed and applied to a much wider range of animals and issues by the research team led by Professor R A Stillman.

FOOTNOTES

¹ Acknowledgement: the title was inspired by MUD, BLOOD AND POPPYCOCK by Gordon Corrigan, with permission from The Orion Publishing Group.

CAPTURED ON CAMERA: THE ART AND SCIENCE OF ECOLOGY

Kate Marshall

Every year the BES photographic competition attracts hundreds of entries from around the world. But how does ecological understanding help capture memorable images of the natural world, and how are ecologists using photography as a research tool? *Kate Marshall* speaks to five previous winners to find out.



Put a camera in the hands of an ecologist and what do you get? Stunning photographs of places and animals you may never see in real life; insightful pictures that make you reflect on how fragile our planet is and our impact on it; inspiring images revealing delicate ecosystems and the remarkable work of the ecologists that study them.

Ecologists travel to the ends of the Earth in their quest for discovery; from the unique animals of the Galápagos Islands and the vast deserts of Namibia to the remote Scottish Highlands, few natural wonders have escaped their gaze. Luckily for us, many ecologists capture these amazing sights on camera and share them with the world.

Often braving gruelling research sites, the clicks of ecologists' cameras bring to life animals and places we may otherwise never see, or even know about. With their deep knowledge and curiosity about the organisms and environments that they study, ecologists are poised to succeed not only as researchers and conservationists but also as nature photographers.

Photography and ecology: perfect partners

Dr Adam Seward, a freelance ecologist as well as a professional photographer, explains why ecologists can compete with the world's best nature photographers.

"After a lot of time in the field with my study animal, I would get to know their behaviour and ecology. This understanding helps to create photographs that tell the animal's story, while the time with them increases the chances of observing something unusual," he says.

While working as an ecologist, he has tracked gibbons through the Cambodian rainforest, observed wild meerkats in the Kalahari Desert, and for his PhD at Cardiff University he studied the effects of climate change on wheatears (see image).

His photographs have won awards in the Wildlife Photographer of the Year and British Wildlife Photography Awards, as well as the BES photographic competition, and he thinks that being an ecologist has been crucial to his success.

According to Adam: "I find photography and ecology perfect partners to understand the natural world and to share its wonders with a wider audience."

Dr Ute Bradter, a postdoc at the University of Leeds, reveals that for her, being an ecologist and a photographer are two sides of the same coin.

"On the one hand, the photos and films of the natural world I saw early on in my life are largely why I became an ecologist. On the other hand, as an ecologist I can better anticipate animal behaviour and know where the best places are for photography," she says.

Ute's research is more desk-based these days, but her ecologist's instinct for how to find the best photographs does not appear to have deserted her. Last year her holiday snaps from Namibia – including one of a great white pelican fishing on a mirror calm pond in Walvis Bay (see image) – scooped three prizes in the BES photographic competition.

If you're inspired to pick up your camera, our award-winning snappers share their top tips.

"Take the time to think about what you want to convey with your photographs. Try to suggest emotions or deliver a message to bring the subject to life"

Adam Seward

"Look at other people's pictures to identify what you like and try to reflect this in your own photography. Read photography books to learn about the basics, which I really think is important"

Ute Bradter

"Start with what you are interested in and build up your skills. You don't need the best camera; it's what and how you take your photos that matter"

Lara Bates-Prior

"Get a light, manual-setting and full metal-case compact camera, and learn how to use it properly – not in auto mode. Don't stress out animals for your photography. Use smaller memory cards – taking fewer pictures will require you to concentrate"

Silviu Petrovan

"Enter competitions, share your images on Flickr and Tumblr and find out which ones generate the most buzz. Join a wildlife photography group. Always have your camera with you"

Peter Steward

Creative vision

But great photos are about more than being in the right place at the right time. Creativity counts, and Lara Bates-Prior, an undergraduate at Oxford Brookes University studying Animal Biology and Conservation, aims to capture special moments in time.

“Many of my photos are close ups on one animal. The details are sharp; you get a real feel for what you are seeing. That’s where the connections are made. Getting an emotive response is very important to me,” she says.

In last year’s BES photographic competition, Lara was the Student Winner in the *Ecology in Action* category for her photograph of a beetle in UV powder (see image). She took the photograph while taking part in the BES Undergraduate Summer School at Malham Tarn Field Studies Centre in Yorkshire.

There, she discovered how to use UV powder to track beetles in the dark using a black-light torch, so that she could observe their behaviour without harming them or altering their natural rhythms.

“The UV tracking method I learned is everything I think science is: fascinating, vivid, and enables us to see nature in a different way. It was pioneered to discover things about insects we had previously never even thought about,” she explains.



Ecology and Society category, winner 2014:

Moths to an electric flame by Peter Steward, University of Leeds
Clouds of moths are attracted to a bright flood lamp illuminating the Ngulia hilltop in Tsavo West National Park, Kenya. Thousands of passage migrant birds, disorientated by fog and attracted to the lights, are ringed here each year.

Lara went the extra mile to achieve her vision. To preserve the fluorescent glow of the powder, she had to be careful not to let any light inside the specimen jar by ensuring her camera lens completely covered the lid.

“The resulting colourful and vibrant effect was as if the beetle was clinging to the side of a tiny red-hot sun. I wanted to preserve the image forever as a memory of the experience I had at Malham Tarn,” says Lara.

Dr Silviu Petrovan, a vet-turned-ecologist at the University of Hull, Conservation Coordinator at Froglife and long-time nature photographer, also loves to capture a joyful and intense moment in time.



Student Winner 2010: *Wheatears in the snow* by Adam Seward, freelance ecologist and professional photographer
This pair of wheatears was in my PhD study population, shortly before I captured and fitted them with colour rings. As I approached their territory, it began to snow (in May!), and they helpfully posed together for this photograph.

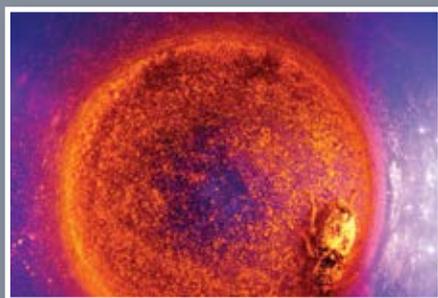
“My pictures are a chance to revisit a and relive some of the excitement of that moment. I’m a wildlife addict and seeing my photos gives me the ‘kick’ I need, even many years after I’ve taken an image,” he says.

Photography as an ecological research tool

Silviu has also found that photography can be a useful research tool. When digital photography first arrived some 30 years ago, he was in the field taking photographs of Europe’s largest venomous snake the long-nosed viper, and realized the potential of digital imaging for recording pictures of his study species.



Whole Organisms and Populations category, winner 2015: Great White Pelican by Ute Bradter, University of Leeds. Great White Pelican (*Pelecanus onocrotalus*) fishing on a mirror calm tidal pond in Walvis Bay, Namibia.



Ecology in Action category, student winner 2015: Beetle in UV powder by Lara Bates-Prior, Oxford Brookes University This carnivorous Ground beetle has been dusted with UV powder. It is a new tracking technique, and it does have some beautiful results.



Whole Organisms and Populations category, winner 2014: Dice snake by Silviu Petrovan, Froglife / University of Hull Dice snake (*Natrix tessellata*) tasting the air from a pond, Iron Gates Natural Park, Romania.

"The first Canon digital camera I used only had a 2MB memory, but I still got very useful images," he recalls. "I could take eye-level images on my belly while making sure the venomous snakes did not come too close for comfort."

Since then, he's used digital photography as a research tool in a variety of ways. Not only do new imaging technologies, such as infrared imaging and motion detectors, help him to monitor amphibians passively, but pictures on his regular camera help him spot details that he missed in the field, such as the way his field sites change over time.

According to Silviu: "I have a series of images of the same ponds I monitored in south-west Romania. In just two years the water levels in early spring noticeably decreased due to climate change. This could have huge consequences for the amphibians and invertebrates that live there," he says.

And when working in the Tropics, photography helped him identify animals that would previously have required him to take away a dead specimen.

"I found a previously undescribed species of snake by checking scalation details in photographs so that I knew what to look out for," he explains.

Photography as a research tool is also what fascinates Dr Peter Steward, an ecologist at the University of Leeds. Peter visits farms in Malawi to study how to preserve soil and the organisms that live in it under climate change, and first started taking photographs in the field to document features of animals and plants that he later needed to identify.

"Having pictures quickly brings memories to mind and adds clarity to our otherwise vague human visual memory," he says.

In his current fieldwork, Peter is using macrophotography (extreme close-up photography) so he can easily share images of insects with experts at remote field sites. He also takes pictures of his experimental crops growing from seed to maturity.

"Next year I hope to set up remote trail cameras to take time-lapse photographs of my crops growing. I would also like to explore 3D imaging of insect specimens for identification," he says.

But what he loves most is taking pictures of birds and sharing these with others, which allows him to find like-minded people anywhere in the world. "It is always handy to have a photo when dealing with a contrary birder who won't believe you have seen a certain bird in a certain place," he says.

Whether to support scientific research or to fulfill an artistic vision, the art of photography and the science of ecology are inevitably and increasingly intertwined, especially as new technologies emerge. It's a partnership that is valuable both to ecologists and the wider world. Illuminated by their expertise and creative vision, ecologists' photographs give us a different perspective of the world. They celebrate the precious beauty of our planet as well as encouraging us to preserve it.

Kate Marshall did her PhD in Zoology at the University of Cambridge, was the BES press officer intern at last year's annual meeting, and now works for Cambridge University Press.

The Photographic Competition is open to all BES members and will open for entries in July, so get those cameras at the ready!

Full details: www.BritishEcologicalSociety.org/Photocomp

ADVICE ON EQUIPMENT & SOFTWARE

"I use Canon DSLRs, Canon and Sigma lens, Manfrotto tripods, Canon and Nissin Speedlites, ThinkTank bags and Sandisk Extreme memory cards. I would never risk using cheap memory cards. I always shoot in RAW with flat settings (faithful picture style on Canon cameras) and process the images in Adobe Lightroom, occasionally also using OnOne Perfect Layers and Perfect Effects"

Adam Seward

"When I first started I had a little point and shoot Canon digital camera. It's the one I used to take my prize-winning beetle picture. My father loves photography so when he found out that I was getting really into it he bought me a beautiful camera: the Olympus E-M10. I am also now the proud owner of a macro lens, a zoom lens as well as a detachable flash. I don't edit my photos, but I will tidy up any excess lighting or increase the colour saturation. I find that iPhoto works really well for this. I also use Flickr to store my photos"

Lara Bates-Prior

"For a long time I used a Sony DSC-V3, which I bought some ten years ago. I now only have one camera body, a Canon 7D and 3 lenses, a 100mm macro which I love, a 17-40mm wide angle and a 100-400mm telephoto, all from Canon. I use free software called FastStone for rapid editing. Even today, I keep photographic equipment fairly minimal in the field to focus on data collection. But I sometimes miss having more equipment with me. I keep it all wrapped in a t-shirt in my rucksack"

Silviu Petrovan

"I use a Nikon D7000, a 28-135mm zoom, a 300mm f4 lens, a 1.4 converter and a 10-20 mm zoom. Very occasionally, I use a polarizing filter, a neutral density or a neutral density graduated filter and very frequently a tripod. Most of the time I photograph in RAW and apply settings like white balance retrospectively with Nikon's own software (Capture NX2)"

Ute Bradter

"I use a Canon EOS80D, some not particularly expensive telephoto (150-600 mm) and macro lenses (50, 150 mm), tripod, flash, GPS logger and light room to catalog and process images"

Peter Steward

www.BritishEcologicalSociety.org/2016

Liverpool 2016



British Ecological Society



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The Arty Scientists



Lauren Ratcliffe

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I had the pleasure of interviewing Amy Munro-Faure and Becky Watson from Edinburgh University, who are two representatives of a larger collective called *The Arty Scientists*. They talked me through their journey establishing a group that puts together events helping researchers in their University to explore different ways of perceiving and communicating their work.



"It all started when we were organizing a conference for PhD students and were looking for something to do – an event or workshop – that wasn't a traditional science talk," Amy explains. "We then thought it would be interesting to do something around SciArt (Science and Art) and with some help from ASCUS we developed workshops for a PhD conference."

ASCUS is an organization, set up in Edinburgh, fantastically named after a type of cell in lichen that is formed through the symbiosis of two organisms from two different kingdoms – fungi and plants. In effect, this encompasses what ASCUS strives to achieve – a symbiosis between two disciplines – science and art. "A representative from ASCUS helped us at the conference by running a poetry workshop. We then put together a drawing workshop and had some showings and films running alongside," describes Amy.

It can be difficult to encourage people to network at conferences, especially at ones where you're getting people together who don't know each other, or are from different countries. What *The Arty Scientists* did with these workshops was to do something that wasn't explicitly networking but still got people working together and getting to know each other.

"A lot of the stuff that was in the drawing workshop was getting people to draw and talk about their own work very quickly," Amy elucidates. "We had exercises, such as 'draw your PhD in two minutes', where people in the group had two minutes to draw their PhD and then use the drawing to explain their research to everyone else in the group. Then a second person within the group would be set the task of drawing the research just explained to them in two minutes, similar to Chinese whispers."

Breaking down barriers

After the success of this workshop at the PhD conference, *The Arty Scientists* ran the workshop again as part of a fortnightly Friday seminar series to get people together from all different levels within the University department. "It was a big success, and fantastic to see professors, postdocs and international students all getting together in a big room and drawing their research on large pieces of paper," Becky explains.

"I wouldn't say I have much of an art background," describes Becky. "I have always liked crafts and knitting but have never really taken this interest into raw drawing. If I was given a pen, some paper and asked to draw, I would have no idea what to do. These workshops break down this fear and give you a structure that gets you going."





“If you express an idea or concept in a way that is not written down, such as visually or orally, this can potentially spark new connections and make you think about things in a different way.”

Diverse interpretations

To get everyone on the same page at the beginning of these events, *The Arty Scientists* often give people the task of representing a well-known scientific theory on paper, but without using classic imagery. “We once asked people to draw the theory of evolution, but without using trees or arrows that are normally used to represent evolution,” Becky describes.

“One person tore up the paper and made it into a 3D spiral to represent evolution!”

“My favourite out of that exercise was when this one person drew dark grey and white clouds on white paper. They then drew them independently mating with each other, to produce a colour range of ‘baby’ clouds – from dark grey through to light grey and white. To portray the process of evolution, there ended up being more pure white clouds

on the page, as they could camouflage themselves against the white paper backdrop and were ultimately more successful by being better adapted to their environment,” Amy explains.

“What was most fascinating was people’s interpretation of the science, and how they chose to represent this”

At another workshop run by The Arty Scientists as part of their fortnightly series, they got people into groups, presented them with a short science article or news story and challenged them to capture the story of this research in a collaborative drawing. “We would have a few rules to go with this workshop – everyone in the group had to make a mark on the paper, and groups weren’t allowed to communicate what their article was about. Once the drawings were done, they would then be held up to show the other groups, who would try and guess what the original article was about,” Amy explains.

Sparking new connections

So, where do they see their project heading in the future?

“So far the project has been driven by its own energy, depending on who we meet and what they are interested in doing. We are all most excited about developing the workshops and the ideas behind them, tailoring them to different audiences and perhaps even doing some public engagement work,” Amy explains.

SciArt can mean lots of different things to different people – many see it as a way to communicate work in more visual way and collaborating with artists can be one way to achieve this. *The Arty Scientists* also see it as a mechanism to challenge your perception: as Amy says, “If you express an idea or concept in a way that is not written down, such as visually or orally, this can potentially spark new connections and make you think about things in a different way.”

If you’re interested in finding out more about *The Arty Scientists*, you can find out more on their website at: <http://theartyscientists.weebly.com>. Or you can engage with them on Twitter @ArtyScientists

FIELD NOTES



Francis Q. Brearley / Manchester Metropolitan University
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In 1994, when I was examining university prospectuses and deciding where I should commit myself to do my degree in ecology, I came across the name of an academic who was studying tropical forests on the island of Borneo.

The previous year, I'd been lucky enough to go to Borneo as a member of a Cambridgeshire schools expedition and was raring to return. 'Wouldn't it be great to go with him and help out' I thought as I applied to the University of Stirling. In the middle of my third year I found out John Proctor was indeed going to Indonesian Borneo next summer and was looking for assistants. With a group of friends, we formed an expedition and were on our way to Barito Ulu. The paperwork and bureaucracy was an eye-opener but was part of the expedition experience. We spent five weeks there and the experience was, quite literally, life changing: I'm sure I wouldn't be researching and teaching if I hadn't. The tropical bug had metaphorically bitten; I returned the next summer as well and then started a tropical PhD working in Malaysian Borneo. Barito Ulu was close in some ways but when I wasn't busy examining mycorrhizas for my PhD work, I spent some time writing up my undergraduate project conducted at Barito Ulu that was subsequently published and is now one of my most highly cited papers! It wasn't until 2005 that I was able to return and was welcomed back as the only student to have gone there on the numerous undergraduate expeditions returning with their own research programme. For some years, I have been the main botanical investigator with Project Barito Ulu, along with David Chivers in Cambridge who has led the zoological work: much of which is focused on systematics and behaviour of gibbons in this area where two species meet forming a hybridization zone.

What is the attraction of this research site, quite literally in the 'Heart of Borneo' and only a few miles from the equator? The forest here is wonderful – there are towering giants of trees, the understorey is dynamic and I feel privileged to be able to witness the splendor of the forest. But there is not just a flat monotony of forest.

The research area is on the edge of the Müller Mountain range, which separates the island of Borneo in two, and the landscape becomes quite hilly further away from the rivers – occasional glimpses of rain forest stretching to the horizon can be caught from the higher vantage points. The diversity of forest types is fascinating, with tall lowland forest grading all the way through to stunted heath forest (also known as *kerangas*). Some of my work involves understanding how soil variation may create this mosaic of forest types.

In addition, along the riverbanks, the local population conducts shifting cultivation and the recovery from this small-scale form of disturbance is another topic of study. With John Proctor's death in 2006, I inherited a number of the permanent plots that he and his students had set up and these are now very valuable to us as some of them have been monitored for twenty years with five or more tree censuses conducted over this period.

This site is not a fragment of a forest surrounded by oil palm plantations or roads but neither is it an undisturbed wilderness, as local villagers use it for a variety of purposes. I have been interested to see how the area has changed over the years that I have been working there. On my first visit in 1998 there were frequent speed-boats heading up- and down-stream with many people going to



collect the lucrative birds' nests for their eponymous soup. Gold mining rafts have moved slowly upstream over time although their activities depend upon international gold prices as well as discoveries of locally rich areas for mining. Timber companies have pulled out of the area with the consequence that the majority of a village has relocated, however transport to this headwater area is now faster (and probably safer) using the old logging roads than it was by boat through dangerous rapids.

The forests of Borneo are changing fast with less than half of the island remaining forested but what will be the fate of the forests in the headwaters of the Barito River? Shifting cultivation pressure will probably remain low as the area is remote, population densities are not high and travel is difficult. There is currently some illegal logging and there may be a return of the timber companies as the forest recovers from the first cut and new trees reach the minimum diameter for harvesting. Currently there are no major plans for oil palm plantations here in contrast to much of the rest of lowland Borneo. The real hot potato is coal mining: both international and Indonesian companies are interested in the high grade coal found throughout much of east and central Kalimantan and there are already numerous mines found further east towards to coast and well-established methods of transportation. This may be a real threat in the future...

With the retirement of the expatriate who was instrumental in setting up and maintain the research camp, its fate is in flux and my research plans are less clear but we have particularly valuable long-term data-sets on forest growth rates, secondary succession following shifting cultivation, and forest phenology. In the last few years, Borneo Orangutan Survival Foundation have used the area to release some of the orang-utans from their rehabilitation centres (as seen on TV), so the continued support for conservation of these forests is imperative. We are hoping to publish a book highlighting research from Project Barito Ulu in the not-too-distant future that will hopefully catalyse future research and certainly welcome new interested scientists.



The Value of Nature and the Fate of a “Stupid Little Fish”¹



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What is Nature worth? Philosophers have pondered this question over the ages, as, more recently, have ecologists, resource managers, policy makers, and the public at large. The question has come to bedevil conservation, pitting those who believe that nature has value in and of itself against others who see the value of nature only in how it benefits people. It's what philosophers recognize in the distinction between intrinsic and instrumental values.

This schism, and the complexity of the tradeoffs between intrinsic and instrumental values, is perhaps best illustrated by an example. So let me tell you a story about smelt.

Once upon a time, the California Delta, where the Sacramento and San Joaquin rivers meet before emptying into San Francisco Bay and the Pacific Ocean, was a vast wetland, teeming with wildlife. There lived the delta smelt (*Hypomesus transpacificus*, see photograph). It was one of the most common fish in the Delta. It occurred nowhere else. But the wetlands were drained and the tidal channels were straightened and diked. Water was diverted to massive pumps and shunted into networks of canals and aqueducts to supply cities and farms elsewhere in the state. The Delta was transformed into one of the most altered estuaries on earth.²



The Delta smelt, a “stupid little fish” in the eyes of one U.S. Congressman. Photo: U.S. Fish & Wildlife Service.

The smelt's habitat shrank and new threats emerged. Predation and competition from introduced species such as Mississippi silverside (*Menidia audens*) and overbite clam (*Corbula amurensis*) increased. The brackish-water areas favored by most smelt became more restricted as the balance between fresh-water inflow from the rivers and tidal intrusions from the Bay shifted. The pumps reversed flows in the Delta, sucking in fish along with the water. Although smelt remained common into the 1970s, numbers subsequently declined and then crashed (Figure 1). Surveys in 2015 and early 2016 found fewer than 10 individuals. Delta smelt appear to be on a fast track toward extinction in the wild,³ perhaps within the next few years.

It's an all-too-familiar story. But the story isn't just about the smelt; it's also about the water. The smelt's life cycle is driven by water – of the right salinity, the right temperature, and the right turbidity, with the right food, in the right places at the right times. But people also want the water. More than a quarter of the water entering the Delta is diverted to the pumps, supporting more than 25 million people and 3 million acres (1.2 million ha) of productive farmland in central and southern California. The seeds of controversy and conflict are sown and well-watered.

The plight of the smelt is not new news – it was listed as threatened under the U.S. Endangered Species Act (ESA) in 1993.⁴ Among other things, the Act prohibits actions that would jeopardize the continued persistence of a species or result in “take” (i.e., mortality) – actions such as diverting too much water or sucking too many fish into the pumps. In 2008 the U.S. Fish & Wildlife Service determined that pump operations and water diversions should be restricted when too many fish were drawn into the pumps and flows were insufficient to support the smelt and its habitat. Less water would then be available for human uses.

Water became increasingly scarce during the severe drought of 2012-2016⁵ and the conflict intensified. Following the legal mandates of the ESA, some water was released for smelt and other species, reducing allocations to people. This prompted protests (see opposite page) and claims that water that could support people was allowed to run out to sea in the interests of what one U.S. Congressman called a “stupid little fish.” Political pressure to amend or overturn the ESA was intense; another Congressman called for removing protection from the smelt and allowing it to vanish so people could get the water. In early 2015, however, the U.S. Supreme Court weighed in, letting stand a lower court decision that limits on pumping and water exports were justified, despite the economic costs.

FIGURE 2

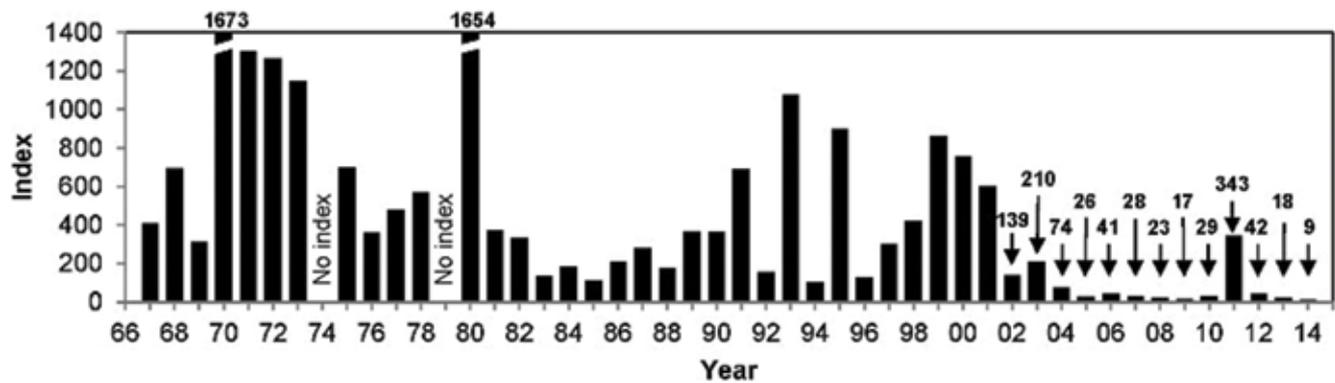


Figure 1. Delta smelt annual abundance indices, 1967-2014, as recorded by fall-midwinter trawls. Source: California Department of Fish & Wildlife.



Latino Water Collation protest, Fresno, California, July 1, 2009. Photo: San Francisco Bay Area Indymedia.

The delta smelt has become the flash point for conflicts over water and the Endangered Species Act. But it isn't the only imperiled species dependent on the water – populations of longfin smelt (*Spirinchus thaleichthys*), green sturgeon (*Acipenser medirostris*), Chinook salmon (*Oncorhynchus tshawytscha*), and other native species also have declined to perilously low levels, for many of the same reasons. As water has become more precious and legal protections for the smelt and other species have become more restrictive, polarized positions have hardened.

Which brings me back to my starting point about values and the worth of nature. The Endangered Species Act is founded on a philosophy of intrinsic values. It derives from the socially idealistic environmental movement that developed during the 1960s and 1970s, when it generated broad political support. There was little concern then about the costs and controversies that would later emerge as the impacts of the Act on people and their instrumental values

became apparent. But now some people see water that could support livelihoods and farms being wasted on a fish of no economic importance that is probably doomed anyway. Yet those who embrace the intrinsic value of nature believe that the smelt has value simply because it exists. This justifies providing it with the water and habitat it needs.

Such conflicts are not unique to California's Delta, or to the United States and the Endangered Species Act. Similar beliefs and values are deeply embedded in many cultures, and they underlie all sorts of environmental controversies throughout the world. Instrumental and intrinsic values are not incompatible ideals, however. Rather, they are complementary perspectives, somewhat like the yin and yang of Daoist philosophy, which, while opposites, are balanced parts of a harmonious whole.

"Instrumental" and "intrinsic" are philosophical labels. They are not inherent properties of nature itself. Instead, they express how people view nature – our values. They may be deeply held and resistant to change, but that does not mean that they cannot be blended, each embedded in the other to create a more balanced, encompassing philosophy.

Balancing instrumental and intrinsic values in this and other conflicts is not easy. It will not happen without willingness to compromise. The reality is that people cannot get all the water they demand from the Delta without further altering the environment, and conservationists cannot get all the water they need to save every species without creating economic hardship and resentment among people. Conflicts will only escalate as demands for water increase and droughts and climate change make less water available.

There are, however, encouraging signs of compromise. Prompted by the drought, attitudes and policies are changing to foster more efficient water use at scales from individual households to large irrigation districts. Resource managers are beginning to expand their focus from single listed species ("smelt myopia") to encompass food webs, landscapes, and ecosystem processes, although restrictions of the Endangered Species Act make this difficult. This will lead to better management of the entire Delta, not just a few species. And this, in turn, will provide a platform for enhancing the economic and ecological sustainability of the Delta.

Clearly, there is no single answer to the question, "What is Nature worth?" Different people answer the question in different ways. Finding solutions that honor nature and enhance human well-being, however, requires that the differences in philosophies be bridged, that the values be blended and balanced.

FOOTNOTES

- ¹ Parts of this essay are drawn from my book, *Ecological Challenges and Conservation Conundrums. Essays and Reflections for a Changing World*, forthcoming from Wiley. Thanks to Jay Lund and Peter Moyle for comments on this essay.
- ² Lund, J.R., et al. 2010. *Comparing Futures for the Sacramento-San Joaquin Delta*. University of California Press, Berkeley, CA.; San Francisco Estuary Institute-Aquatic Science Center. 2015. *A Delta Transformed*. Publication #729, San Francisco Estuary Institute-Aquatic Science Center, Richmond, CA. (available at www.sfei.org/projects/delta-landscapes-project).
- ³ Captive-breeding facilities maintain thousands of smelt, but releasing them into the wild is problematic given the lack of suitable habitat and the persistence of other threats.
- ⁴ A proposal to elevate the status of the smelt to "endangered" was precluded by "other higher priority listing actions" (Federal Register 75: 17667; April 7, 2010).
- ⁵ The drought is ongoing, despite El Niño-generated winter storms in 2016.

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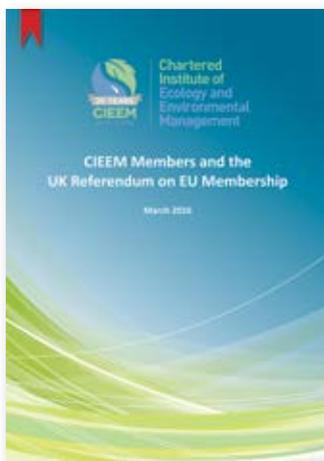
UNCERTAIN TIMES

Just a year ago I was writing about the uncertainty associated with the General Election and how we are failing to make environmental protection a political issue. Well here we are again with the EU Referendum upon us. Whilst environmental issues have not been a primary topic of debate amongst political commentators, I do detect more awareness and interest in the impact of being in the EU on natural resource management and protection. High profile politicians on both sides of the debate have referenced the environment more frequently than during the run-up to the General Election (ok, in passing but at least it was a mention).

This is due, in part, to the excellent work undertaken by the policy teams at some of our leading NGOs. For example, the Institute of European Environmental Policy's (IEEP) report, *The EU. The environmental and potential consequences of a UK departure from the Union* was commissioned by The Wildlife Trusts, RSPB and WWF-UK and published in March this year. It is a comprehensive analysis of the EU's track record on the environment – what has been done well and what has been done less well – and the implications for environmental protection if the UK leaves the EU. It concludes that, overall, being part of the EU has been good for the environment and (thus good for us humans) although some concerns remain, principally in relation to the impact of the Common Agricultural Policy (CAP) on biodiversity. Leaving the EU will require considerable investment in legislative and policy instruments to maintain or improve the current level of protection and there must be some doubt as to the political will to do so unless the economic driver

of compliance with EU environmental standards in order to access EU markets is in place.

Such views endorse our own analysis. At the beginning of the year we undertook a comprehensive survey of our membership, representing professionals working in the private, public, NGO and academic sectors, to find out what they thought the implications of Brexit would be. The summary report (available at www.cieem.net/*news)



Our report concludes that EU nature legislation – including the Habitats, Wild Birds, Water Framework and Marine Strategy Framework Directives – has contributed significantly to harmonised and consistent approaches to European nature conservation. Without the EU there would be a complex picture of national mechanisms and disjointed approaches that would have left species and habitats vulnerable and provided potential distortions for the Single Market by using national environmental and nature regulations as non-tariff trade barriers. The issues addressed by EU nature

legislation are complex and continue, we believe, to require action at the EU level.

Over 93% of our survey respondents believed that EU environmental legislation has been beneficial to the UK's natural environment. The same number said that EU environmental directives have had positive additional benefits on UK habitats and species. If the UK were to leave the EU, 90% of respondents felt that there would be significant negative impacts on wildlife protection.

Over 85% of respondents did not believe that current UK environmental policies would have been delivered to the standard that they are now if we had remained outside the EU. Nearly 84% of respondents thought that the UK had achieved more for nature conservation as an EU member than it would have done if it had relied only on international nature conservation agreements (e.g. Convention on Biological Diversity). For example, the reintroduction stocks of both red kites and great bustards came from Spain, which was considerably helped by both being EU members. Over 84% of respondents also stated that the UK would achieve more in the future for nature conservation as an EU member than as a non-member.

Of course the environment is just one of very many societal issues impacted by the UK's membership of the EU. CIEEM as an organisation is also concerned about the impact on research, tertiary education, employment and economic stability for example. But it is gratifying to see those organisations engaged in management and protection of the environment making sure that their voice is heard as part of the debates. Surely something we should all be doing more of.

JOURNALS NEWS



Maximising the policy impact of scientific research

In April, *Journal of Applied Ecology* Executive Editor, Marc Cadotte, and Associate Editor and Policy Direction author Sarah Durant coordinated a workshop on maximising the policy impact of scientific research at the joint BES and CCI Symposium 'Making a Difference in Conservation: Improving the Links Between Ecological Research, Policy and Practice'. The workshop was well attended with attendees ranging from academics to practitioners to those who work somewhere in between. The key discussions in the workshop focused on how to achieve and communicate policy relevant research and how to maximise policy impact when working overseas.

In recent years there has been an evolution of the types of papers journals publish and as funders increasingly require impact it is becoming more important to provide the policy and applied recommendations that can be taken from research. It was agreed that scientists themselves should bear some of the responsibility to communicate the policy implications of their research because they are best placed to communicate it, they have unique insights into the topic, they can best represent their research, and they may be funded by public money.



You can read the key take-home messages from the workshop for maximising the policy impact of scientific research on the Applied Ecologist's blog (<http://bit.ly/JPEBESCCI>). Here you can also read a post from Marc Cadotte 'Who should communicate the policy implications of ecological research?'

For the Symposium we also published a Virtual Issue on conservation ecology with *Methods in Ecology and Evolution*. The research from *Journal of Applied Ecology* includes three Policy Directions – the article type launched in 2015 to inform and improve policy by providing a broader policy context and relating it to the wider issues around constrained decision making. The articles in this Virtual Issue cover topics that include the policy challenges for managing invasive species, fire management policies in Brazil, and wildlife fencing policies in dryland ecosystems. The selection also includes a Practitioner's Perspective on evidence-based conservation, a Forum article on biodiversity offsetting and an Editor's Choice on the costs for monitoring European farmland biodiversity. You can read the Virtual Issue online here <http://bit.ly/consecol>.

Science for Environmental Policy

Over the last few months several of our articles have been summarised by Science for Environment Policy, a free news and information service published by Directorate-General Environment, European Commission. This portal is designed to provide accessible summaries of the latest environmental research findings to policymakers. Michał Mihorski *et al.*'s paper 'Effects of water level and grassland management on alpha and beta diversity of birds in restored wetlands' is summarised in one piece 'Wetland biodiversity is supported by temporary flooding and sustainable grazing'. A paper from Katherine Orford and colleagues 'Modest enhancements to conventional grassland diversity improve the provision of pollination services' is discussed in a digest 'Increasing grassland species improves pollination and may impact on crop yields'.

Special Feature: Quantifying Resilience

In the June issue we published a Special Feature on 'Quantifying Resilience' edited by David Angeler and Craig Allen. As well as providing in the Editorial a much needed list of definitions of terms commonly used in resilience science and theory, the other papers complement and expand on current quantitative approaches in resilience research, covering mainly the ecological but also the social sciences and combined social-ecological systems. The Special Feature is arranged to cover aspects of quantifying ecological resilience in a variety of systems, and includes assessing leading indicators of regime shifts, linkages between ecological scaling, complexity theory, management and conservation. The systems covered are broad and include coral reefs, streams, lakes, coastal habitats, forests, and a combined social-ecological system dealing with ostrich farming. The feature begins with papers that focus on assessing the resilience of particular contexts and systems, and broadens from there.



Fire is an example of a spatially contagious process that reinforces existing ecological structures on landscapes; positive feedbacks between fire and vegetation help create resilient ecosystems. Photograph: Craig Allen.

On the blog

We continue to publish a number of blogs from authors and Associate Editors about the research we publish and how it could impact management, with a range of posts from a video outlining the strategies to enhance seagrass resilience, to a post describing how pollination by wild insects is an underestimated and underappreciated agricultural input. In March, we posted a series of well-received blogs for International Women's Day.

Some of our female authors and Associate Editors wrote about their careers and the challenges and improvements they are seeing in STEM as well as their latest research. You can read all of these posts here <http://bit.ly/JPEIWD16>. If you are interested in contributing to the blog please e-mail Nathalie.Pettorelli@ioz.ac.uk or admin@journalofappliedecology.org to discuss your ideas.

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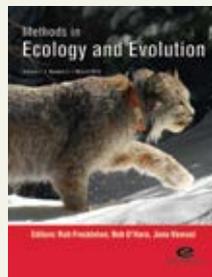
www.methodsinecologyandevolution.org
@MethodsEcolEvol

Cross Journal Special Feature

In April *Methods in Ecology and Evolution* and the *Journal of Applied Ecology* released a Virtual Issue on Conservation Ecology (<http://bit.ly/1YrcixB>). It was produced for the joint BES and Cambridge Conservation Initiative (CCI) Symposium 'Making a difference in conservation: improving the links between ecological research policy and practice'.

The methods showcased in *Methods in Ecology and Evolution* include a meta-analysis of spatial conservation models and a systematic review of the Delphi technique in conservation. The latter article was one of this year's highly commended papers for Methods' annual Robert May Early Career Researcher Award (<http://bit.ly/1RlaKO3>). The collection also highlights an Application article describing rSPACE (<http://bit.ly/1rfe9eJ>), an open source R package for implementing a spatially based power analysis for designing monitoring programs. Our Application papers describe new software, equipment, or other practical tools, with the intention of promoting and maximising the uptake of these new approaches.

The Virtual Issue also includes articles on value of information, assessing consequences of disturbance, monitoring wild bee diversity, species range shifts and much more.



New Associate Editors

Over the past couple of months, we have added five new Associate Editors to our Board. Nick Golding (University of Melbourne, Australia) and Sarah Goslee (USDA, USA) will both be working on our Applications articles (<http://bit.ly/OxS9bc>). Nick develops statistical models and software for mapping the distributions of species and diseases and is particularly interested in tools that make it easy for researchers to add more mechanistic structure into their correlative models (and vice versa). Sarah's research tackles the question of why plants grow where they do. She has used everything from traits all the way up to satellite imagery to answer this question and is currently working on agricultural decision support tools.

Our other three new Associate Editors are Rachel McCrea (University of Kent, UK), Francesca Parrini (University of the Witwatersrand, South Africa) and Will Pearse (McGill University, Canada). Rachel's areas of expertise include capture-recapture modelling, multistate models, modelling population dynamics and methods of model assessment. She strives to find innovative, practical statistical solutions to ecological questions. Francesca studies the ecology and behaviour of mammalian herbivores, their interaction with biotic and abiotic factors and the integration of factors governing their decisions. Recently, she has begun working with graph theory and network analysis to study the spatio-temporal structure of animal movement patterns. And finally, Will – a former winner of the Robert May Early Career Researcher Award – uses information on species' evolutionary history and functional traits to understand what structures ecological communities.

Methods in the News

The biggest library of bat sounds has been compiled to detect bats in Mexico – a country which harbours many of the Earth's species and has one of the highest rates of species extinction and habitat loss. An international team developed the reference call library and a new way of classifying calls to accurately and quickly identify and differentiate between bat species which is described in the *Methods* article by Zamora-Gutierrez *et al.* (<http://bit.ly/23HoBtc>). It is the first time automatic classification for bat calls has been attempted for a large variety of species, most of them previously noted as hard to identify acoustically.

A growing number of studies on the behaviour of aquatic animals are revealing the importance of underwater sound, yet these studies typically overlook the component of sound sensed by most species: particle motion. In response, researchers from the Universities of Bristol, Exeter and Leiden and CEFAS have developed a user-friendly introduction to particle motion. In their *Methods* article (<http://bit.ly/21Cw6nN>) Nedelec *et al.*, explain how and when particle motion ought to be measured, and provide open-access analytical tools to maximise its uptake.

An Alternative Guide to Writing Manuscripts

Getting research funded and published depends to a very large extent on the ability to get a given point across. Although scientific texts appear to differ wildly from other forms of writing, a good research paper actually follows the same basic principles of effective communication as a newspaper article or advertising text. In a post on the *Methods* blog (<http://bit.ly/1S1CE7m>), Emma Sayer provides some simple guidelines on presenting and structuring written information to get the point across and highlight the key messages that are very useful for manuscripts, thesis chapters, proposals, basically any kind of academic writing. A full version of these guidelines can be found on the *Functional Ecology* website (<http://bit.ly/1YVamhl>).

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Demography Behind the Population

Last year a BES symposium was organised to “highlight the emerging role of demographic tools as bridges across ecological, spatial, and temporal scales”. All five of the BES journals and our partner OA journal *Ecology and Evolution* published our first cross-journal special feature, *Demography Beyond the Population*, in all of the journals’ issue 2s, this year, based on this 2015 symposium.

Since the publication of the special feature lots of additional material has gone online. Some of the special feature authors discussed their research in a webinar, which is available to access via the BES website: it is still available to watch now.

All of the journals also published a cross-journal virtual issue, which was edited by the different editorial teams entitled *Demography behind the Population*. The purpose of the virtual issue is to further highlight the breadth of demography research published across our journals. The virtual issue is available to access via the *Journal of Ecology* homepage <http://www.journalofecology.org/view/0/crossjournalvirtualissue.html>.

And finally two of the guest editors of the special feature, Rob Salguero-Gómez and Alden Griffith, wrote a post for the *Journal of Ecology* blog (<https://jecologyblog.wordpress.com/>) that places the virtual issue within the context of the publication of the special feature.

The *Journal of Ecology* team really enjoyed working on this hugely ambitious project and we hope that you enjoy all of the material that is available in conjunction with the special feature emphasising the interdisciplinary nature of the field of demography.

Plant Ecogenomics Virtual Issue

In April we published a virtual issue on plant ecogenomics, which is available on the *Journal's* homepage <http://www.journalofecology.org/view/0/PlantEcogenomics.html>. The virtual

issue was edited by one of our Associate Editors Nate Swenson.

Nate on why the *Journal* decided to publish an –omics virtual issue:

“The integration of ‘omics into ecology has generally been limited to a small set of model species or their close relatives and meta-genomics approaches. Presently, and certainly going forward, this will no longer be the case and much more emphasis will be placed on testing mechanistic ecological hypotheses using multiple non-model species. What we aim for in this virtual issue is to generate discussions and to provide a sample of research published in this field. We hope the issue encourages future submissions to the *Journal* that use the most up to date methodology and leverage large ‘omic data from model and non-model organisms to address questions of broad interest to ecology.”

New Associate Editors

We are really pleased to welcome to the editorial board Duncan Cameron, Randall Hughes, Etienne Laliberté, Natalia Norden, and Gail Wilson.

As always for the latest *Journal* news, and to keep up to date with all of the research published in *Journal* follow us on Twitter @JEcology and on Facebook.

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Peer Review in Ecology

Following on from the two papers published in the January 2016 issue of *Functional Ecology* (*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*), Charles Fox *et al* have published a third, referenced below, looking at the effect of using author-suggested reviewers. Suggesting preferred reviewers clearly benefits authors. Preferred reviewers rate papers significantly more positively (on average) than the editor-selected reviewers on a paper, improving

the chances that a paper will be published. There has been a high level of community interest in these papers, which are directly relevant for both authors and editors, with discussion on social media and blogposts on the topic.

(Fox, C. W., Sean Burns, C., Muncy, A. D. and Meyer, J. A. (2016), Author-suggested reviewers: Gender differences and influences on the peer review process at an ecology journal. *Funct Ecol*. Accepted Author Manuscript. doi:10.1111/1365-2435.12665)

FE Spotlights

In order to highlight papers of exceptional quality and significant novelty, *Functional Ecology* occasionally commissions FE Spotlights, short invited commentaries that place the research in context and highlight how the paper advances ecology. Our most recent FE Spotlight, *Ecological significance of thermal tolerance and performance in fishes: new insights from integrating field and laboratory approaches* from Ben Speers-Roesch, highlights Payne *et al.'s* *Temperature-dependence of fish performance in the wild: links with species biogeography and physiological thermal tolerance*. FE Spotlights are free to read and you can find this and others at <http://www.functionalecology.org/view/0/FESpotlights.html>

Podcasts

In our latest podcasts, Alan Knapp talks to Brian Steidinger, winner of the 2015 Haldane Prize for Early Career Research, Emma Sayer and Ken Thompson discuss *Making the Most of Microbes* and Jason Kolbe discusses his recent paper *City slickers: poor performance does not deter Anolis lizards from using artificial substrates in human-modified habitats* with Duncan Irschick. All our podcasts are available to download and stream here: <http://www.functionalecology.org/view/0/podcasts.html>. If you are interested in recording a podcast for *Functional Ecology*, or any other BES journal, we have a short non-technical guide here: <http://www.functionalecology.org/view/0/videos/podcasts/podcastguide.html>

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Latest animal ecology research

Lethal genetic blindness found in the rare Scottish red-billed chough

The Scottish bird population of red-billed choughs, which currently totals less than 60 breeding pairs and is of major conservation concern, is being affected by lethal blindness that is passed on by non-blind individuals that carry a mutant gene.

Work by Amanda Trask and colleagues found that non-blind individuals carrying the mutant gene are likely to be widely distributed within the population, making eradication of the mutation difficult. Non-blind individuals carrying the mutation were also found to have more offspring per year than individuals that don't carry the mutation, so that the mutant gene is likely to persist in the population in the future.

"Despite being lethal, blindness only affects a few chough chicks each year and should probably not be the priority concern for Scottish chough conservation, compared with managing habitat for choughs," said Amanda Trask. "However, the blindness may be a symptom of the poor 'genetic health' of the population, so strategies to manage these genetic concerns will need to be considered in the future."



Red-billed chough. Photograph: Gordon Yate

Baby fish breathe easier around large predators

Research by Maria del Mar Palacios and colleagues found that physiological stress on juvenile fish can be reduced by more than a third if large predatory fish are around to scare off smaller, hungry predators, known as mesopredators.

"Previous studies have proven that the sight of large predators can reduce the activity of mesopredators," explains Maria del Mar Palacios. "But our study is the first to show that such behavioural control on mesopredators is strong enough to indirectly allow juvenile fish to reduce stress levels by more than 35 %."

To obtain these results, Palacios *et al.* exposed juvenile damselfish to combinations of sensory cues (including visual and scent cues) from small and large predators. Detailed measures of the behaviour and oxygen uptake (as proxy for "stress") of the juvenile fish enabled them to understand the cascading effects that predators throughout the food chain can have on newly settled baby fish on the Great Barrier Reef. The conservation implication of these results is that the current overexploitation of large marine carnivores might allow an explosion of smaller, active predators which would have an associated negative impact on smaller fish.

Climate change exacerbates the impacts of large mammal declines

In a review paper in the current issue, Josh Daskin and Rob Pringle show that the strength of the effects of large mammalian herbivores such as deer, antelope and elephants on the abundance of other animals is greatest in the least-productive ecosystems. Where climate change reduces primary productivity, the impacts of ongoing herbivore population declines and eruptions may be greatest. Read more about the paper on the Journal blog *Animal Ecology In Focus* (<https://journalofanimalecology.wordpress.com/2016/04/27/how-climate-change-could-exacerbate-the-impacts-of-large-mammal-declines/>).

New Associate Editors

We are pleased to welcome Sandra Bouwhuis (Institute of Avian Research, Germany), Anna Eklöf (Linköping University, Sweden) and Elisa Thebault (Université Pierre et Marie Curie, France) to the Associate Editor board. Sandra is an evolutionary ecologist with a specific interest in the causes and consequences of within-individual change in life-history traits and between-individual variation in life-history strategies. She mostly conducts analyses on long-term individual-based data sets collected in wild bird populations and is currently running the long-term life-history project on common terns (*Sterna hirundo*). Anna is an ecologist with a special interest in theoretical ecology. She is fascinated by the diversity of life we see around us and how the intricate network of species interactions and abiotic factors act together and form our ecosystems. Her research focus is on theory and modelling related to the structure dynamics of ecological networks. The goal with her research is to provide detailed understanding of the factors driving network structure and thereby increase our knowledge about ecosystem functioning and system-wide responses to different kinds of disturbances. She is also particularly interested in the coupling to ecosystem service delivery. Elisa is interested in the processes that determine the structure of networks of interactions between species, and in the consequences of these network structures on community dynamics and ecosystem functioning. She mainly uses dynamical models and empirical data analyses to investigate these questions in a variety of ecological networks and ecosystems (e.g. plant–pollinator networks, plant–herbivore webs, soil food webs).

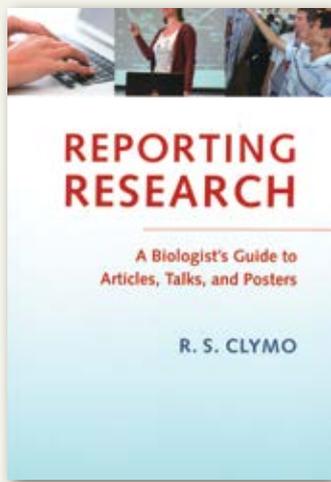
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BOOK REVIEWS

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.



Reporting Research: A Biologist's Guide to Articles, Talks, and Posters

Clymo, R.S. (2014)

Cambridge University Press,
Cambridge. 348pp, £69.99 (hbk)
£25.99 (pbk)

ISBN 978-1-107-05389-2 (hbk)

ISBN 978-1-107-64046-7 (pbk)

Dicky Clymo, an Honorary Member of the BES amongst his other honours, has a wealth of experience writing, reviewing and editing for journals, and has spent many days at conferences listening to talks and scrutinising posters. From his rich background comes this distillation of advice. It's easy to see that Dicky has been a journal editor since some of his advice is very painstaking, for example, reading proofs several times and on each occasion looking at just one aspect. Good advice but I wonder how many of us actually take the time to do this? But he does give sound advice on successful writing, such as putting a draft away for a few days before re-reading it, and giving a draft paper to a colleague and asking them to look at just the abstract, figures and tables to see if the message is clear. There is also practical advice; for example, what to take to a meeting when displaying a poster to make sure you're not caught out by organisational

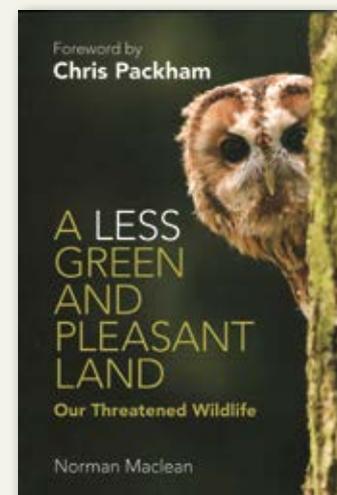
vagaries. Even for an old lag like me, he presents some very good ideas that I'd not thought of, such as changing the margin widths during the drafting process to alter line length: 'It may be a surprise to discover how many errors or infelicities this reveals.'

As well as advice on writing and preparing a talk or poster, he has in-depth chapters on knotty issues such as who qualifies as an author (but surprisingly little on sorting the order of authors), and how to deal with error and significance (which gets quite mathematical). There are other books that are more focussed on writing style and skills (e.g. Matthews & Matthews 2008) and others concentrating on getting that paper published (e.g. Benson & Silver 2013) but as an overview of rules and tips for successful communication of our science, Dicky's book takes a lot of beating. I'll be recommending it.

REFERENCES

Benson, P.J. & Silver, S.C. (2013) *What Editors Want*. Chicago University Press, Chicago.

Matthews, J.R. & Matthews, R.W. (2008) *Successful Scientific Writing* (3rd ed.) Cambridge University Press, Cambridge.



A Less Green and Pleasant Land. Our Threatened Wildlife

Norman Maclean (2015)

Cambridge University Press,
Cambridge. 424pp, £16.99 (pbk)

ISBN 978-1-107-67323-6 (pbk)

Building on his edited book *Silent Summer* (2010), this tome offers a comprehensive and engaging overview of the state of wildlife in Britain and Ireland. In the space of almost 400 pages, it is eclectically organised into 22 chapters, ranging in the first part from 'Living with change', 'A short dose of Earth history' to 'Wildlife conservation at home and overseas'. The second part ('So how is our wildlife faring? The details') has 13 chapters taking us through mammals, birds, amphibians and reptiles, freshwater fish, a wide range of invertebrates, plants, fungi, life in the open sea, the coast, and concluding with top wildlife sites, and finally 24 pages on 'What does the future hold?'

Chris Packham likes it, and in his Foreword asks the questions: 'If conservation in these islands were a single-company business, all the effort, endeavour, all the strategies, money and employees were under one roof, and that company had shares to purchase on the stock exchange, would you invest in them?'

Based on results? I wouldn't... because its results are not only poor – they are disastrous.' He goes on to refer to the 'palette of notable successes... It's not all totally bad news, but perhaps the occasional 'good' is exaggerated to cover the majority of bad.' This resonated with me as I read through the book – steeped in facts from a wide range of sources (with Wikipedia quoted liberally – which is fine, as so many of the entries are now very good), it is clear the author has given careful thought to marshalling the evidence.

Refreshingly uncluttered and clearly written, the book begins with five reasons for valuing and cherishing wildlife – moral imperative; wildlife contributions to agriculture, medicine and tourism; and wild species as 'art objects'. One theme running throughout is the substantially human driven 'sixth great extinction event', and nature's ability (or inability) to cope with change. Drawing on, and updating material in *Silent Spring*, we have a cornucopia of material on wildlife and habitats. Some of the chapters are excellent – I enjoyed that on plant and animal introductions and recent arrivals (including the 'true undesirables' such as Japanese knotweed, wild Turkish rhododendron and giant hogweed; and some 'welcome neophyte trees', notably Turkey oak, sycamore and horse-chestnut).

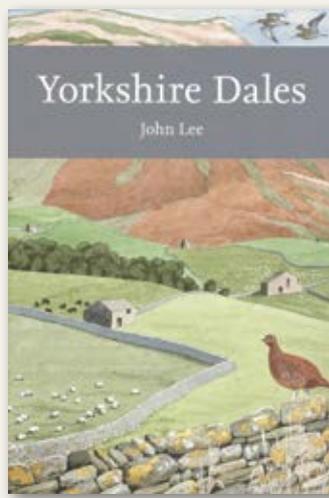
The chapter on hunting, shooting and fishing presents some vivid statistics – how many people participate in shooting animals in Britain and Northern Ireland? Possibly almost half a million people (with ten million gun days each year spent shooting) – in thousands, the figures are 86 for deer stalkers, 47 for driven and walked up grouse shooting, 71 for coastal wildfowling, 94 for inland wildfowling, and a massive 330 each for driven lowland game and pest control. Arguably these

figures are small in the context of other recreational activities. After all, the TV audience of English Premier League football is 4.7 billion – across 212 world territories! Hold on, in London in 2014 there were 22 million attendances at the theatre compared with a mere 13 million attendees at Premier League football matches!

The book ends with a look to the future – grounds for concern, and for optimism, and the interface between ecology, politics and people (focusing on ecosystem services, citizen science and evidence-based conservation science), and ending with what can be done to help – a list of 28 suggestions (with many taken from an action list produced by Mark Avery in *British Wildlife* 2014), including 'Support our local Wildlife Trust', 'Let parts of our gardens become wild' and 'Reduce litter on land and sea'.

Perhaps unusually, I'm ending this review with a suggestion. Frankly, this book, brimming with so much invaluable information, stuttered to a halt having run out of fuel. So, Professor Maclean, I have a mission for you – you should complete your trilogy by taking up from around page 351 in this book, just after your reference to Tony Juniper's *What has Nature Ever Done for Us?* (2013). Form a team, and between you weave ideas and proposals to get us out of the hole we are in. Don't dwell on the plethora of facts and figures on where we have got to – we now have these in buckets; instead, boldly set out what it takes to give us a more pleasant land, and how we influence the good and bad drivers of change. And can you ask Mr Packham to contribute to this, with his manifesto to, in his words, 'prompt thought, debate and creative change'. Now is the time for imaginative and fresh thinking – looking for solutions rather than indulging in hand wringing.

Des Thompson



Yorkshire Dales

John Lee (2015)

The New Naturalist Library,
William Collins, London. 384pp,
£60.00 (hbk) £35.00 (pbk)

ISBN 978-0-00-750369-8 (hbk)

ISBN 978-0-00-750370-4 (pbk)

By my reckoning this is the 30th title in the New Naturalist Library series on a country or region, with the north of England now represented by two volumes on Lakeland, and one each on Northumberland, and the Peak District. How welcome to have this addition, number 130 in the main series, and by a former President of the BES. The editors' Preface describes the setting as an 'iconic English landscape that is long overdue the literary attention and scientific attention of the New Naturalist series...' Well, we have a delightful book, on an area the author first encountered in 1958 on a coach journey from Keighley.

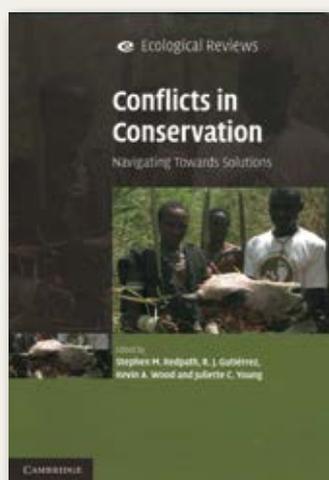
Arranged under 13 chapters, we are first introduced to the National Park, first designated in 1954. The formation of the landscapes (which the editors describe rather delightfully as 'formed of landforms in places well-upholstered') occupies two chapters, before we delve into the main habitats (woodlands; pavements, scars and screes; meadows and pastures; moorland; tarns and wetlands; rivers and caves). The three concluding chapters deal with

the changing Dales – birds, followed by other animals – with 'Into the future' closing the book. The chapter I have not mentioned is the first I went to, on the Lady's Slipper Orchid, once the holy grail for many botanists in the early part of last century, having been rendered near absent in Britain in the late 19th century due to collecting, and thought 'extinct in Britain' by the end of the First World War. The book takes us through the intrigue surrounding the re-finding, protection and attempts to propagate the orchid, with much of the work directed under a cloak of secrecy by the *Cypripedium* Committee (formed over 40 years ago, and now run by Natural England).

Beautifully illustrated throughout with many photos taken by the author, the book is at its best where the text is enlivened by direct reference to the work of researchers (such as at Malham Tarn FSC Field Centre, on birds, butterflies and moths, river ecology, limestone pavements and of course the meadows). The book closes with a detailed consideration of the National Park's management plan and prospects for extension, and long-term monitoring requirements. The role of agriculture is clearly critical to defining the landscape, and the author refers to the need for a long-term commitment to 'appropriate environmental stewardship' to sustain the landscapes and wildlife so revered in this special area. Looking ahead, pine martens, corncrakes and even hen harriers may make a comeback, though some non-native invasives will inevitably be more widespread and abundant. Curiously, the book ended with what might have been placed at the beginning: '...The National Park will remain as one of the most important 'laboratories' in Britain for the study of ecological and environmental processes – a laboratory where north meets south along the Pennine chain, attracting

students and researchers from across the country to solve both old and new questions, and to understand more about the natural world in all its many complexities.' If you substitute 'is' for 'will remain as' you herald the many ecological adventures and discoveries in the Dales, so admirably described here.

Des Thompson



Conflicts in Conservation. Navigating Towards Solutions

Edited by S.M. Redpath, R.J. Gutiérrez, K.A. Wood and J.C. Young (2015)

Cambridge University Press, Cambridge. 333pp, £69.99 (hbk) £34.99 (pbk)

ISBN 978-1-107-01769-6 (hbk)

ISBN 978-1-107-60346-2 (pbk)

In her Foreword to this excellent book, Georgina Mace remarks that 'Conservation will never work when it is either apparently or actually at odds with the needs and wishes of those who are nature's stewards.' Whilst that could be the subject of a final year undergraduate exam question along the lines of 'Discuss reasons for agreeing or disagreeing with this sentiment', it provocatively sets the scene for a book focused on human-wildlife conflicts. Drawing on more than 60 contributors, the book's 20 chapters fall under three parts, the first introducing the wide range of conflicts, the second and largest delving

into contrasting disciplinary approaches to studying conflicts, and the final one dealing with a diversity of approaches to managing conflicts.

Whilst the book is short on presenting actual solutions (hence the subtitled reference to 'navigating'), I was left with the impression that a line has been drawn in the sand rather than of a sandcastle about to succumb to the incoming tide. Why? Quite simply, because we now have a detailed understanding of the symptoms of conflict, and the underlying causes. Of course, moving beyond this to step aside from the legislative, power game, psychological, economic and political issues is immensely difficult, but it is key to finding solutions.

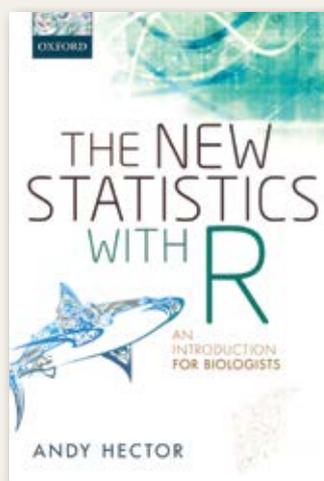
The introductory and closing chapters of the book neatly summarise the beginning and end of the journey. The types of conflict cover: competing interests (groups wanting different things); divergent beliefs and values; different approaches to decision-making and what is deemed to be fair, consensual or authoritarian; arguments over information (notably where 'scientific' and 'local stakeholder' knowledge differs, sometimes radically); structural conflicts predicated on legal, social or economic inequalities; and interpersonal issues founded on individual or group beliefs and perceptions.

Each chapter is complemented by a nicely illustrated boxed example of a wildlife conflict. Hence, Hanley's insightful chapter on the economic perspective on conflicts sits neatly with a case study of Leatherback turtle conservation in marine protected areas, and Trouwborst's essay on law conservation conflicts works well with Frank's outline on four themed conflicts involving wolves in Sweden. I particularly enjoyed Bill Adams's chapter on the political ecology of conservation conflicts (with its closing section headed

'conservation as anti-politics'), and Paul Rogers writing on 'Peace research and conservation conflicts'. Frankly, each chapter has nuggets and idiosyncrasies appealing to the reader.

This is a super book, and having participated in the conference in Aberdeen in August 2011 that partly gave rise to this, I am impressed with the outcome. As the editors conclude in the closing chapter, resolving conflicts will require 'leadership and boldness from all involved to move positions, be open to other world views and be prepared to argue, debate and negotiate towards solutions that are mutually beneficial and of long-term benefit to conservation.' The trouble is, this is one area of life where virtually each and every one of these aspirations can be untenable, if not impossibly out of reach. I hope I'm wrong.

Des Thompson



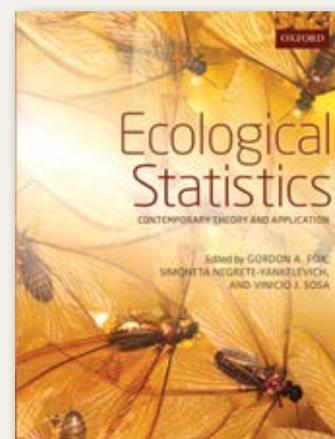
The New Statistics with R: An Introduction for Biologists

Andy Hector (2015)

Oxford University Press, Oxford. 224pp, £75.00 (hbk) £29.99 (pbk)

ISBN 978 0 19 872905 1 (hbk)

ISBN 978 0 19 872906 8 (pbk)



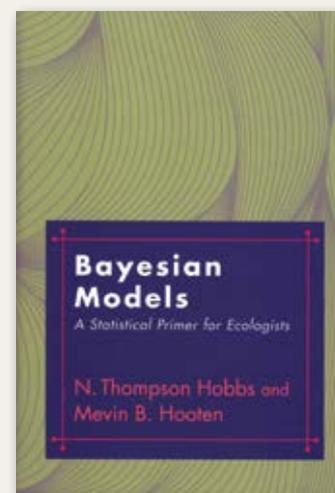
Ecological Statistics: Contemporary Theory and Application

Edited by Gordon Fox, Simoneta Negrete-Yankelevich & Vinicio Sosa (2015)

Oxford University Press, Oxford. 406pp, £75.00 (hbk) £39.99 (pbk)

ISBN 978 0 19 967254 7 (hbk)

ISBN 978 0 19 967255 4 (pbk)



Bayesian Models: A Statistical Primer for Ecologists

N. Thompson Hobbs & Mevin Hooten (2015)

Princeton University Press, Princeton. 322pp, £37.95 (hbk) ISBN 978 0 691 15928 7 (hbk)

The natural world is complex, often difficult to replicate at meaningful temporal and spatial scales, and characterised by high natural variability and

tangled webs of cause and effect. To study this complexity, ecologists have long leaned heavily on the science of statistics. For many years, most ecologists got by with a rather rudimentary understanding of statistics, usually with the help of one or two statistically-informed colleagues. Over the last two decades, however, that has changed: awareness of the limitations of traditional approaches to statistics has increased; the growing power of personal computers has given most of us access to computationally demanding techniques to solve complex ecological problems; and the development of an open source, freely-available programming language for statistical computing has enabled many scientists to take control of (and even enjoy!) the challenges of data analysis and presentation.

It is these changes – the reappraisal of standard approaches to statistics and the explosion of new techniques – that motivate Andy Hector's new book, *The New Statistics with R*. The book is very nicely produced, with plenty of white space, informative Boxes that avoid disrupting the flow of text, and simple, clear graphics. It proceeds at a very gentle pace, making very few assumptions regarding the reader's knowledge of statistics (for example, four pages are devoted to explaining what is meant by least squares – including a nice description of why we refer to 'degrees of freedom'). Recognising recent criticisms of Statistical Hypothesis Inference Testing (a phrase I borrow from Lewis Halsey, who emphasised the suitability of its acronym!), Hector stresses the importance of effect sizes throughout, encouraging the reader to "attempt the P-free challenge" for writing-up research. Hector moves all the way from basic statistical tests, like t-tests and regression, to dealing with discrete error distributions and fitting GLMMs. Brief mention is

made of information-theoretic model selection but this book provides limited insight into how that can be applied. The focus is on illustrating how basic methods can be applied in R, although the Appendix introducing R will need to be supplemented with other sources for most users to reach a level of confidence at which they can follow and adapt the code examples. This is a difficult challenge for an author: if they introduce R fully, the book could become unhelpfully large, but if they are too brief, readers will have to have learned R elsewhere (in which case, the chances are that they also have a reasonable background in statistics). In spite of this, Hector's book will be useful for many. It is aimed at undergrads and postgrads but, I suspect, will be of interest to many at more advanced career stages. Importantly, the patient explanations of basic concepts will improve the statistical understanding of most ecologists. Moreover, even with a working knowledge of R, readers will pick up many useful tips from this text (and the R scripts available online), including a good grasp of how to generate quality graphics quickly using the ggplot2 package.

Ecologists already conversant with the type of material covered in Hector's book might want to tackle a more challenging text. The edited book by Gordon Fox and colleagues is one possibility. *Ecological Statistics: Contemporary Theory and Application* is a significantly denser book, in several respects. In particular, the fonts used are smaller, white space is shorter-supply, and the material covered is often substantially more advanced. Like Hector, the editors of this book were motivated by the explosion of new techniques available to ecologists. They feel, however, that a book covering the diversity of these new techniques has so far been lacking. I am inclined to agree with them.

A key theme of Fox and Co's book is that off-the-shelf statistical approaches, of the type to which ecologists have been limited throughout much of the discipline's history, are often highly restrictive in terms of their assumptions and capabilities. Although they continue to dominate statistical teaching in ecology, they are seldom appropriate for analysing the kinds of data that ecologists collect – data that are often discrete, overdispersed, highly correlated or subject to complex causality. To author a book covering the range of techniques demanded by these data would be impossibly demanding, so the editors have very sensibly recruited an additional 13 authors, all of whom are practising ecologists.

The resultant book is not a gentle read in the manner of Hector's *New Statistics* but I suspect that few ecologists could fail to learn from it. Among the subjects covered, different chapters introduce likelihood and model selection, missing data and imputation, GLMs and structural equation models, meta-analyses, spatially and phylogenetically correlated data, dealing with overdispersed data, and GLMMs. This is a rich selection of the new canon of ecological statistics. Most examples are illustrated with the relevant R code, all of which is available online. As a result, this is not just an introduction to the theory underlying new approaches – it is a hands-on introduction to their use! The book requires some familiarity with R and with basic mathematics, and is aimed at postgrads and professionals. Importantly, the chapters – though cross-referenced – are self-contained. As such, many practising ecologists will be able to dip in to a chapter that covers a particular problem that they are facing. That is a real strength of this book and suggests that most ecological research groups will benefit from access to at least one copy.

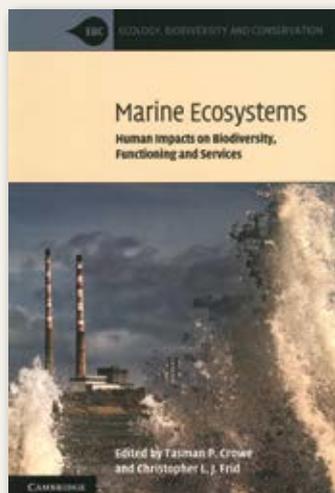
The rigid inflexibility of many traditional statistical approaches, together with concerns about their philosophical underpinning and interpretation, have prompted a variety of recommendations for how to move forward with statistics. Some emphasise effect size, as in Hector's new book. Others emphasise more bespoke approaches to statistical modelling, often based on likelihood, as in the volume edited by Fox and colleagues. A third solution, believed by many to represent the most flexible way to deal with the complexity of ecology, is to get to grips with Bayesian approaches to inference. This is the approach favoured by Hobbs and Hooten in their new book, *Bayesian Models: a Statistical Primer for Ecologists*.

Many books already deal with Bayesian analyses in ecology. The approach taken by Hobbs and Hooten is novel, however, in that this is not a book on how to conduct Bayesian analyses. Rather, this is a book about the conceptual underpinnings of Bayesian analysis, and the development of Bayesian models, intentionally written in a language that ecologists can understand. The authors believe that this is necessary because many ecologists who use Bayesian approaches have a good grasp of how to write code but, for example, lack the understanding to write out their models in formal mathematical notation. This limits the clarity with which they can express what they've done, and also constrains their own confidence in what they've found. Providing ecologists with the understanding and confidence to construct the models that encode their hypotheses will enhance the potential for collaboration between ecologists and statisticians, and will lead to a richer and more satisfying science of ecology.

At first glance, *Bayesian Models* is a rather intimidating prospect. Most pages are rich in mathematical formulae, some of which span many lines. However, this should not deter the reader. Hobbs and Hooten “err on the side of excessive explanation of notation and equations”. Although most ecologists will still struggle a little, the text will be accessible to all but those with significant mathematical phobias. Importantly, whether you are interested in applying Bayesian models or any other form of bespoke model design, the first section (on ‘Fundamentals’) will be a good introduction into how to think about and write down your model. The section on designing your model to ensure that your parameters have biological meaning is a good example. Later sections introduce MCMC and multi-model inference, and provide extensive examples of how models can be built from first principles.

Overall, these three books share common motivations but present very different responses to those motivations. To some degree, they encompass the full range of ‘the new statistics’. Each of them emphasises the importance of selecting approaches to suit the questions asked – not asking questions to suit the approaches available. They are aimed at readers with quite different aspirations and levels of expertise. Undergraduate audiences will probably gain most from Hector’s *New Statistics*, but postgrads and beyond will gain much from any of the texts, depending on their aims. More familiarity with the ideas presented in these books will undoubtedly lead to a more flexible, informed and informative science of ecology.

Phil Stephens



Marine Ecosystems – human impacts on biodiversity, functioning and services

Edited by Tasman P. Crowe and Christopher L. J. Frid (2015)

Cambridge University Press, Cambridge. 406pp, £69.99 (hbk) £34.99 (pbk)

ISBN 978-1-107-03767-0 (hbk)
ISBN 978 1 107 67508 7 (pbk)

The oceans contribute much more to human survival than is popularly appreciated, ranging from producing much of the oxygen we breathe and the fixed carbon essential to power economically significant food chains, to their importance in global transport, amenity and even waste disposal. Yet it is only relatively recently that concern over sustainability of marine resources and the fragility of many marine ecosystems has achieved the prominence it undoubtedly deserves. With competing pressures, however, it seems no longer enough to plead for the oceans on essentially aesthetic and moral grounds – cases have to be made with an underpinning of sound science. It is this developing field of ‘Ecosystem Services’, an emerging driver of conservation policy focussing on the contributions of ecosystems to human well-being, that is the theme of this book.

It is widely acknowledged that marine ecosystems are complex

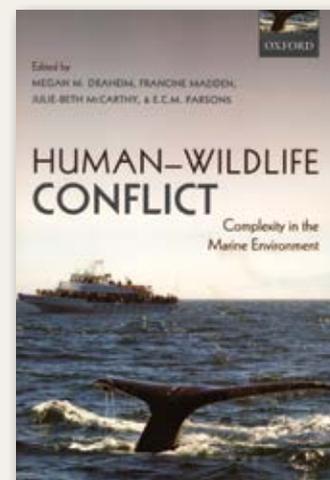
and human activities affect them in complex ways. To protect the oceans and to maintain their benefits to humanity, therefore, requires understanding of the long-term impact of human activities and the consequences of the different conservation decisions that may be made. The data to achieve this, however, is frequently unavailable since the majority of traditional ecosystem studies have not followed through from identifying the responses to change to considering the more wide-ranging effects of those changes on human society i.e. on ecosystem services. This work attempts to provide a resource for better understanding these problems.

The services seen to be important include: supply of materials which may be viewed as ‘provisions’ (wild and farmed animals/plants/microorganisms and their genetic resources sought for food, pharmaceuticals, cosmetics, biofuels etc., together with non-living materials e.g. salt, sediments/minerals, fossil fuels etc.); services which ‘regulate’ the functioning of the planet (by air purification, climate regulation, nutrient cycling, purification of organic waste, regulation of water flow by e.g. salt marshes, reefs, reedbeds, etc.); habitat services (maintaining breeding grounds and habitats for populations exploited elsewhere, and to maintain genetic diversity by separation of viable populations); and cultural services (for tourism, recreation and a general feeling of spiritual well-being). Also to be considered is the impact on marine systems of shipping, coastal construction, waste disposal, invasive species, and the generation of renewable energy. These services are, of course, frequently interlinked, not always mutually compatible, and may sometimes be poorly understood. They are also frequently subject to change (in effect, importance and perception) both spatially and

temporally. A demanding field of study!

There is, inevitably, much jargon in a work such as this, encompassing so many inter-related disciplines, and much repetition as many authors present their cases, but there is also much of interest. The text is generally well written, points are logically made, examples are clear and well chosen, and arguments are convincingly presented. There is detailed discussion on how human activities are influencing marine ecosystem functioning and, hence, ecosystem services (with many references to original work) and there is helpful advice for those involved in ecological surveys of the marine environment to encourage the gathering of data which will be useful for impact assessments. This would be an excellent guide for any marine ecologist with an interest in the broader well-being of the marine environment.

Ian Lancaster



Human-Wildlife Conflict – complexity in the marine environment.

Edited by Megan M. Draheim, Francine Madden, Julie-Beth McCarthy and E C M Parsons (2015)

Oxford University Press, Oxford. 224pp, £70.00 (hbk) £34.99 (pbk)

ISBN 978-0-19[968715-5 (hbk)
ISBN 978 0 19 968715 2 (pbk)

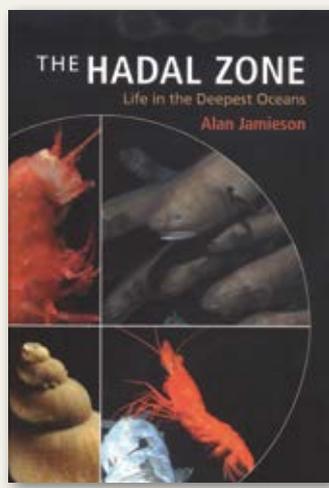
The key word in this work is 'conflict' and all of the associated negative connotations: in this case, situations where wildlife impacts negatively upon humans and where humans impact negatively on wildlife. The authors attempt to bring a fresh understanding to this field of conservation by adapting strategies used in conflict situations between people to try better to deal with conflict situations involving wildlife.

There are some chapters of interest with issues directly relevant to marine conservation. Case studies include tourism in the Bahamas (problems with sewage discharge from boats in a small and picturesque harbour – not resolved); over exploitation of lobster fisheries in the Abacos (Bahamas again) leading to too many undersized animals being brought to market (resolved by mutual agreement between fishermen and exporters); effects of anthropogenic noise on marine mammals in, mainly, US waters (unresolved, indeed thought to be intractable); and humpback whale management off the Dominican Republic (with application to the conservation of many 'common-pool resources'). The highly controversial issue of 'scientific whaling' is also considered, but little is offered other than details of the controversy itself. Even 'swimming with dolphins' is subjected to detailed discussion with little more than an eventual acknowledgement that some people see this as a problem.

As stated in the preface, this book does not offer solutions but rather insights and perspectives. As such, it might appeal more to the sociologists, psychologists, peace-builders and economists that are so frequently cited as authorities. It is jargon-heavy, leaving the reader reeling under a welter of variations of 'conservation conflict transformation approaches' to 'conflict analysis', used by the 'human-wildlife conflict community', viewed

through 'conservation conflict transformation lenses' found in 'conservation conflict transformation practitioners toolboxes'. Exhausting. It is a difficult read, often repetitive, and tends to labour points to such an extent that even the simple and obvious eventually seem complex and obscure. It is also, inevitably, acronym-heavy – but at least there is a summary list at the start. You have been warned.

Ian Lancaster



The Hadal Zone – life in the deepest oceans.

Alan Jamieson (2015)
Cambridge University Press,
Cambridge. 382pp, £50.00 (hbk)
ISBN 978 1 107 01674 3 (hbk)

This habitat occurs, technically, in those parts of the ocean where one tectonic plate subducts beneath another, but may be more conveniently defined as clusters of deep ocean trench ecosystems located at tectonic plate boundaries. Although traditionally little studied, for obvious reasons of their almost total inaccessibility, they none-the-less account for some 45% of the total ocean depth range and are, truly, one of the last great frontiers of ocean science. Summarising both historical studies with relatively primitive equipment, and more recent investigations with cutting-edge technology, the author sets out to demonstrate that the deepest

parts of the oceans are definitely not "deep, dark areas of little importance where nothing but the weirdest creatures eke out an existence".

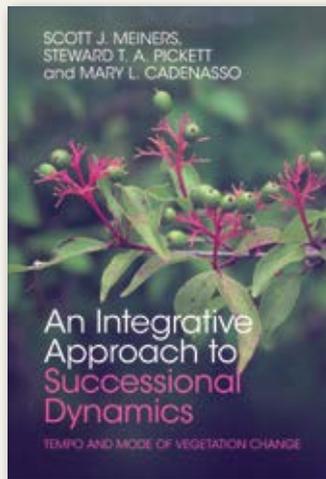
The study of hadal life began late, since nineteenth century marine biologists suffered for decades under the prejudices of such authorities as Edward Forbes who strongly maintained that life was impossible below depths of about 600m. Comprehensive oceanographic studies from the late nineteenth to mid-twentieth centuries began to disprove this idea, but detailed analysis depended upon technology that was extremely primitive by modern standards. The pioneering history of deep ocean exploration is covered in the first part of this work and summarises the contributions of many nations to our growing understanding of the deep sea.

The geography and geology of the hadal zone, relevant to a greater understanding of earthquakes and tsunamis as well as ecology, are discussed, and the methods (and challenges) of obtaining information from such depths are described in some detail. Remotely-operated vehicles (ROVs) and sounders, being the instruments of choice, feature frequently, as might be expected. One result of such wide-ranging studies has been the realisation of the surprisingly varied environmental conditions faced by hadal organisms. This contrasts with the previously held view that such regions were, essentially, homogenous and unchanging. Temperature, salinity, oxygen levels, current velocities and substrata have all been shown to vary (albeit slightly) both through time and over the very wide geographical ranges of the different trenches. How these changes affect the distributions of hadal organisms, if at all, is presently unclear. Although metabolic rates have been noted to be generally lower in such organisms, perhaps reflecting the generally lower

availability of food, it is notable that most major taxa and all feeding guilds are known to be represented. Adaptations to high pressures, of course, are the best studied aspects of deep-sea physiology (as the one parameter which has a predictable linearity from the surface to the floor of the deepest trench), and piezophiles (organisms adapted to high hydrostatic pressures) dominate the fauna, both macro- and microscopically. The hadal community is reviewed in the context of the organisms found by different sampling methods. Microbes, protists and worms are found predominantly in sediment cores and are, therefore, covered together; porifera, molluscs and echinoderms are recovered using trawls and sledges, while crustacea tend to be caught by baited traps and cnidaria and fish are known mainly from nets. Detailed species lists are given in an appendix. There is a particularly interesting section dealing with the ecology and evolution of hadal communities, while a more sobering section reviews the exploitation and conservation of deep ocean areas.

This is an excellent account of a remarkable habitat and will interest all marine biologists as well as ecologists interested in extreme environments. It is well-written, well-illustrated with many *in-situ* photographs, and well-referenced. Expensive but worth adding to a Christmas list.

Ian Lancaster



An integrative approach to successional dynamics: tempo and mode of vegetation change

Scott Meiners, Steward T.A. Pickett & Mary L. Cadenasso (2015)

Cambridge University Press, Cambridge. 312pp, £65.00 (hbk)

ISBN: 978-0-521-11642-8

The editor of the *Bulletin* knows how to acquire reviews, his email always starts with “Free books”; this is his attention-grabbing approach to bullying his chums into reading and then critiquing books to fill his column inches. I normally delete at this point but this time curiosity made me read further. When I read to the end of the email, I thought brilliant, a new book on Succession; this one looks really interesting so I must say yes.

This book by the authors’ own admission is part monograph and part conceptual treatise on succession theory; they argue that this dual approach is necessary to fully understand the complexities of plant communities and by inference their dynamics. I would add a third pillar, in that it is also an historical journey through the development of succession theory over the last half century or so as seen through the eyes of those involved in the long-term Buell-Small Succession Study Site (BSS) in the Hutcheson Memorial Forest in New Jersey. The BSS started in 1958 and

continues to the present day (diamond jubilee in two years – time for a party); its aims were “track the undergoing successional transitions from released agricultural fields to now young forests”. Essentially, it was a series of permanent plots in old fields where change has been recorded since the start by teams of graduate students, faculty and alumni from Rutgers University. I see this as very enlightened; I can imagine the benefits to being a graduate student helping to record the data alongside their teachers but more importantly the alumni, this must have been very uplifting.

After a chapter setting out the goals of the book, which also covers concepts and definitions, the book is divided into four sections. The first has three chapters and this covers the conceptual background to succession as well as a detailed history of the BSS. The meat of the book is in the second and third sections, each with 4 chapters, dealing with (a) successional patterns in the BSS data (4 chapters) and (b) integrative themes. There follows a final synthesis section with one chapter looking at implications for habitat management and restoration and a retrospective finale. Throughout there are also some great quotes.

The first section on the history of succession is great. In the introduction they ask the question “whether there is anything to learn in succession, After all, ecologists have been studying succession for over 100 years – have they been lazy?” I am pleased to say that they argue from that point onwards how relevant succession is in modern ecology, albeit it is extremely complex and we do not have all the answers yet. They develop a process model template which they use throughout to structure discussion on succession. I first picked up a forerunner of this approach in an early

paper (Pickett *et al.*, 1987) and I used this last week as an exemplar approach to explaining succession in a lecture to my first year undergraduates. The book then covers the history of ecological thinking, which I really enjoyed. Whilst working in this general area, it is always pleasurable to read other’s prejudices about the various generalized theories that have been put forward to explain succession.

The second section starts with an absolutely brilliant and honest one-liner – they admit that many of the analyses started with a simple exploration of the question “Can we find this pattern in our data?” They argue that whilst perhaps not the most scientific way to test hypotheses, this approach has been very successful! The chapters in this section are a tour of successional theories, tested using data from the BSS and they draw particular attention to the effects of founding communities and the importance of sporadic droughts and other disturbances in structuring communities. The third section starts to bring it all together looking at community assembly and convergence on the one hand and the development of heterogeneity within old-field systems on the other. The latter chapter includes links to life-forms and plant functional traits. Sandwiched between is a chapter comparing the successional equivalence of native and non-native species. The model template derived to explain this is clearly derived from their earlier template explaining succession (and is quite neat)!

The penultimate chapter looking at Succession and management is short but is to the point. They use a similar structure diagram to the one for succession, but here with a series of structure management interventions. Again this approach works in that it is really good for explaining ecological management to students and

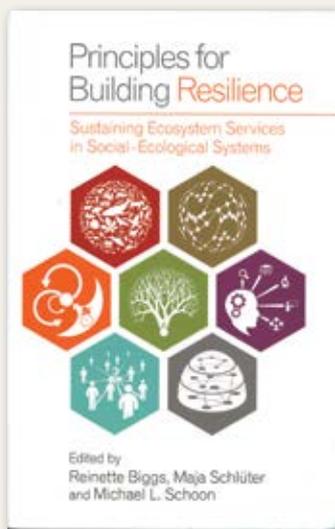
ends-users. One can argue over the exactitudes of where individual interventions should be. Fire and grazing for example (neither in their schema) could be included at any of the three levels (Site conditions/history, Species availability, Species performance). The finale is a useful clarion call for ecologists interested in successional theory. There are many lessons to be learned. First, that conceptual frameworks really help structure science and succession is no exception. Second that interdependencies between processes often control the way succession progresses. Lastly, they state that they have benefitted from having long-term datasets to explore. The last one is stating the “bleeding obvious”, you cannot understand long-term ecosystem change without some long-term studies, even if they are merely to act as check to models. The work described here indicates the value that such datasets provide. The BSS study monitors vegetation change on old-fields, as such it mirrors the “Wilderness study” at Rothamsted and a similar one set up at Monks Wood, both in the UK; the added value of the BSS has over these studies is that it has been sampled annually.

Overall, this is a great book. It is well written and for the most part is written in an easy to read style. The target audience is not defined but I would suspect it should be graduate students or academics that are working in some aspect of succession. For these readers this is a really superb read, great ideas put together in a cogent way. For others, with perhaps a lesser grasp of succession theory, may struggle to come to terms with some of the concepts and terminology. Nevertheless, I look forward to reading the next edition covering the next 60 years of the BSS!

Rob Marrs

REFERENCE

Pickett, S.T.A, Collins, S.L. & Armesto, J.J. (1987). *Models, mechanisms and pathways of succession. The Botanical Review*, 53, 335-372.



Principles for building resilience: sustaining ecosystem services in social-ecological systems

Edited by Reinette Biggs, Maja Schlüter & Michael L Schoon (2015)

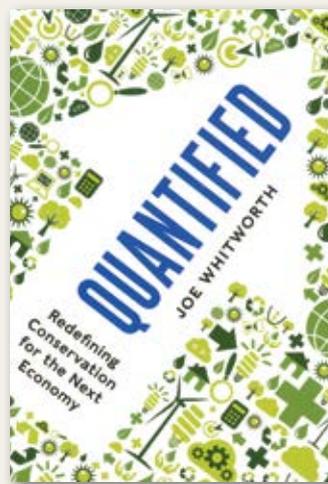
Cambridge University Press, Cambridge. 312pp £39.99 (hbk)

ISBN: 978-1-107-08265-6

For ecologists, resilience is an ecosystem concept introduced back in 1973 in a paper by Buzz Holling, whose work in this field and in ecological economics, with people like Robert Costanza and Tom Odum, has provided new thinking and new objectives for modern ecologists. Since that paper over 40 years ago there have been a number of important books developing the questions and some major steps forward, like the creation of the Stockholm Resilience Centre in 2007. This volume is evidence of further encouraging activities as it comes out of the work of the Resilience Alliance Young Scholars Network started in 2008. In this book the authors test fundamental questions about resilience where this is

taken to mean the inter-twined social-ecological systems that characterize the world today, a series of complex adaptive systems that are exemplified by non-linear and emergent behaviour and, of course, stretch across our traditional disciplines, falling within what we now call sustainability science. It assumes humans are fully embedded in the biosphere rather than external drivers of ecosystem dynamics as ecologists usually see them, and that the complex systems can both self-organize and continuously evolve. Using an innovative “trial” technique these young researchers tested the literature and refined it to seven key concepts that enhance the resilience of ecosystem services: maintain diversity and redundancy, manage connectivity, manage slow variables and feedbacks, foster complex adaptive system thinking, encourage learning and experimentation, broaden participation and promote polycentric governance systems. For those ecologists interested in the bigger picture this approach contains all the problems inherent in finding optimal approaches to complex problems where the “scientization” of politics and the “politicization” of science are both seriously detrimental. The authors have included some useful examples in each of the chapters on principles and they have tried to suggest how action can be taken to improve the operation of each principle and what research would help most in the future. The text is heavy with social sciences and management terms and quite light on ecological science making this quite hard work for the average ecologist. Nevertheless, this holistic approach in which no solution is acceptable unless it takes people into account has to be the only way forward in a world with 7.2 billion people.

David Walton



Quantified – redefining conservation for the next economy

Joe Whitworth (2015)

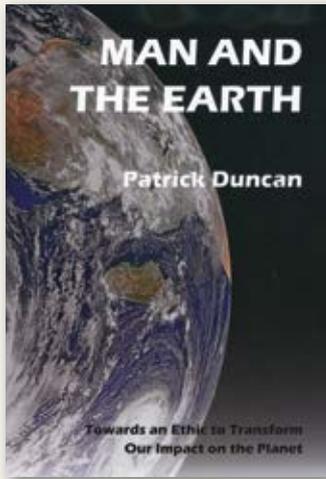
Island Press, Washington. 256pp, £20.99 (hbk)

ISBN: 978-1-61091-614-1

Conservation is an integral part of modern management of land and biodiversity, has spawned innumerable laws, attracted huge sums of money and many volunteers and yet to some seems to be losing the battle for hearts, minds and money. Whitworth asks just how innovative, successful and efficient modern conservation really is and concludes that it is worthwhile, well-meaning but largely ineffectual. His solution is to adopt the aggressive approaches of big business and look to see how the tactics that brought success to Amazon and Microsoft, Apple and Unilever, can be adapted for 21st century conservation. As President of the Freshwater Trust in the United States his interests are primarily aquatic but he maintains here that the principles can be used by anyone and he labels his approach “quantified conservation”. The book is written in simple, easily readable narrative and although largely American in its examples that does not detract from the message. His thesis is that we should give up trying to alarm the public with stories of disaster and malpractice by government

and corporations and instead use their own weaknesses to get them to co-operate. In this scenario conservationists should be teaming up with big companies to show them how “doing the right thing for the environment helps the bottom line”. Bridging this divide between economic and conservation interests needs new thinking and new tools and Whitworth gives some examples from the purchase of a watershed by New York City to guarantee its drinking water to precision agriculture to save irrigation water. He uses the example of the Gates Foundation approach to polio eradication as an example of how fresh thinking, innovation, determination and a lot of money can produce remarkable results. And he contrasts it with the non-strategic way billions of dollars are spent on environmental causes – a not entirely fair comparison to my mind but it does set you thinking. Where he does make important points is in the short term approach of many grant givers, the lack of evaluation to determine what is successful, and a general risk averse approach to new ideas. He uses the reform of the management of the Murray-Darling basin in Australia as an example of breaking historical rules and managing scientifically for a drier future. Many will recognise public-private partnerships dressed up in other terms in his suggestions but the objective is to increase the opportunities to harness funds and enthusiasms between unlikely groups so perhaps it does have a place. This is a challenging book for many traditional conservationists but since it is clear that accepted approaches to conservation are failing in a fast warming world perhaps these new approaches are worth considering – seriously and quickly!

David Walton



Man and The Earth

Patrick Duncan. (2015)

YouCaxton, Oxford. 270pp, £10.00 (pbk)

ISBN 978-1-909644-79-3

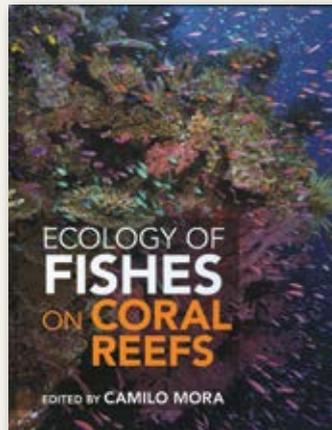
This is a reprint of a book first published in 1974 written by a white South African who worked with the African National Congress to replace apartheid. A diplomat, then a political activist, he documents what he sees as the emerging environmental disasters of around 50 years ago when we had only 3.8 billion people to contend with. His overall thesis is that Man destroys the biodiversity and the global environment, and since religion has declined in importance we need a new ethical framework to guide us to less contentious times with a greater degree of self-control. He proposes a new geo-centric ethic to replace the Man-centred one, that recognises the importance of what we now call ecosystem services and the rights of animals. I am really not clear why this book was reprinted since the information is dated, the illustrations are almost unusable and the arguments for change are for me too naïve and philosophical to be useful. Duncan was not a scientist and his prose is redolent with adjectives and opinions which might jar with some people. Whilst one cannot doubt his enthusiasm and commitment

the personal testament – for that is what it really is – is not really helpful in the 21st century.

David Walton

ALSO RECEIVED

Notes by Alan Crowden



Ecology of Fishes on Coral Reefs

Edited by Camilo Mora (2015)

Cambridge University Press, Cambridge. 388pp, £74.99 (hbk)

ISBN 978-1-107-08918-1

This is a book I wish I had read before committing myself to a PhD working on the fish of the chilly, murky waters of the River Thames. In his foreword to this excellent new book, the eminent fish biologist Peter Sale observes that “Bathing yourself in warm, relatively shallow water, while idly watching fish cavort is a great way to earn a living”. Sitting oneself in a comfy chair and browsing this colourful and information-packed volume is a pretty decent substitute for those of us who lack foresight in our choice of field site. Camilo Mora brings together nearly 60 leading scientists to provide a wide ranging review of many key topics in coral reef fish biology, ranging across basic ecology, evolutionary pattern and process, human impacts, conservation, and concluding with a set of essays on controversies and debates that have influenced the science in recent years.

Nicely laid out in a double column format with extensive use of colour illustrations, the book achieves the editor’s aim of providing the ‘go to’ reference for coral reef fish ecology. The price is substantial but less than the price of a family day ticket to the London Zoo, so if you have anything more than a passing interest in fish ecology, I suggest this nicely packaged work of reference is worth a closer look.

Landscape Ecology in Theory and Practice: Pattern and Process. 2nd edition

Monica G. Turner and Robert H. Gardner (2015)

Springer-Verlag, New York. 502pp, £67.99 (hbk)

ISBN 978-1-4939-2793-7 (hbk)

The field of landscape ecology enjoys a considerable following around the world, nowhere more so than in the United States where Turner and Gardner have long been key contributors to the development and expansion of knowledge. The first edition of their book was completed in 2000, and this much-revised second edition reflects the burgeoning literature and new ideas in the intervening years. Three introductory chapters set the scene, followed by detailed consideration of quantitative methods. A further three chapters focus on pattern-process relationships, and the final 60 pages bring together applications and synthesis. The book is primarily directed to students in ecology, but conservation biology, resource management, landscape architecture and land planning will also find topics of interest here. While the book is structured as a student text with clear summaries, discussion questions and further reading at the end of each chapter, the price probably dictates that most readers will consult a library copy. Which is a shame, because it undoubtedly a fine piece of work by two leading ecologists

that deserves to be read and savoured by anyone with an interest in the field of landscape ecology.

Climate Change Impacts on High-Altitude Ecosystems

Edited by Munir Ozturk, Khalid Rehman Hakeem, I. Faridah-Hanum and Recep Efe (2015)

Springer International Publishing Switzerland. 712pp, £153.00 (hbk)

ISBN 978-3-319-12858-0

A collection of case studies inspired by a workshop held in Pakistan in 2012, which collectively address issues arising from fragmentation, health and well-being of high-altitude areas in Turkey, Pakistan, Malaysia, Nepal Georgia and Indonesia (among others).

Combating Hunger and Achieving Food Security

M. S. Swaminathan (2015)

Cambridge University Press, Delhi. 182pp, £79.99 (hbk)

ISBN 978-1-107-12311-3

A collection of papers and transcripts of speeches from the author on the ways and means to achieve food security.

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

JUN 20

Council

OCT 11

Policy Committee

OCT 12

Meetings Committee

DEC 11

Council

OTHER MEETINGS 2016

JUN 2

Planning for Climate Change Conference. Westminster, UK. Details: <http://www.planforclimatechange.co.uk/>

JUN 6-7

18th International Conference on Biodiversity. New York, USA. Website: <http://www.waset.org/conference/2016/06/new-york/ICB>

JUN 12-16

Mathematical and Computational Evolutionary Biology. Montpellier, South of France. Details from: <https://www.ncsu.edu/mckimmon/cpe/opd/EPD/agenda.html>

JUN 13-16

14th International Symposium on Scale Insect Studies, Catania, Italy. Details: <http://www.issis2016.org.spazioweb.it/>

JUN 19-23

Annual Meeting of the Association for Tropical Biology and Conservation. Le Corum, Montpellier, France. Website: <http://www.atbc2016.org/>

JUN 26-30

Plant Biology Europe, EPSO/FESPB 2016. Prague, Czech Republic. Details from: <http://www.europlantbiology2016.org/>

JUN 20-24

Palaeoenvironments in permafrost (ICOP) 2016. Potsdam, Germany. Details from: <http://icop2016.org/index.php/program>

JUL 4-7

The Society of Experimental Biology Annual Meeting. Brighton, UK. Website: <http://www.sebiology.org/meetings/index.php>

JUL 6-8

Society for Conservation Biology – 4th Oceania Conference (OCCB). Brisbane, Australia. Details from: <http://brisbane2016.scboceania.org/>

JUL 17-20

Communicating Science for Conservation Action. North American Congress for Conservation Biology. Madison, Wisconsin. Details from: <http://www.scbnacongress.org/>

JUL 24-29

Unifying Ecology Across Scales. Gordon Research Conference, University of New England, Biddeford, Maine, USA. Website: www.grc.org/programs.aspx?id=13261

JUL 29-2 AUG

The 16th International Behavioural Ecology Conference. The University of Exeter, UK. Website: <http://www.behavecol.com/pages/society/meetings.html>

AUG 7-12

101st Ecological Society of America Annual Meeting. Fort Lauderdale, Florida. Website: <http://esa.org/ftlauderdale/>

AUG 8-11

6th European IUSSI Congress. Helsinki, Finland. Website: <http://www.iussi2016.com/>

AUG 15-19

15th International Peat Congress. Kuching, Sarawak, Malaysia. Website: <http://ipc2016.com>

SEP 1-10

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

SEP 4-7

ECSA 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>

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

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Looking **BACK**



Our photograph, kindly provided by Phil Smith, shows Palmer Newbould (left) with students on the UCL Conservation Course peat boring on the Moss of Cree, Galloway. It was taken on 6th September 1963.

Professor Newbould was lecturer in Plant Ecology at University College London from 1955 to 1967. Palmer was in charge of the UCL Diploma and MSc course in conservation, the first course of its kind in Europe. In 1967 he moved to the New University of Ulster in Coleraine, where he and Amyan Macfadyen were the founding professors of a new department of biology.



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