

# Symposium

ZOOLOGICAL SOCIETY OF LONDON  
REGENTS PARK, LONDON, NW1 4RY



16 April 2015

## THE CONSERVATION AND SCIENCE/POLICY INTERFACE: CHALLENGES AND OPPORTUNITIES

ABSTRACTS  
POSTERS



Organised by  
Nathalie Pettorelli, Zoological Society of London and  
Ceri Margerison, British Ecological Society



**8.30 REGISTRATION OPENS**

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**INTRODUCTION** – *Chair: Nathalie Pettorelli, Zoological Society of London*

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**09.00 Bill Sutherland, British Ecological Society****09.15 Jonathan Baillie, Zoological Society of London**

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**SESSION I: ENGAGING WITH POLICY MAKING – A SCIENTIST'S PERSPECTIVE***Chair: Sheila Wren, John Muir Trust*

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**09.30 Scientific evidence in the control of bovine TB: a black and white issue?***Rosie Woodroffe, Zoological Society of London**Email: [Rosie.Woodroffe@ioz.ac.uk](mailto:Rosie.Woodroffe@ioz.ac.uk)*

Bovine tuberculosis (TB) is the most challenging animal health problem facing UK farmers; in 2014 TB control efforts cost taxpayers nearly £100 million. Scientific evidence shows clearly that the pathogen which causes TB (*Mycobacterium bovis*) is present in many wild badger (*Meles meles*) populations, and that badgers can and do transmit this infection to cattle. Paradoxically, however, in Britain culling badgers consistently increases the proportion of badgers infected with *M. bovis*, undermining the reductions in cattle TB achievable by culling, and even risking increases. While there is broad consensus among scientists about the evidence base, advocates and policymakers have interpreted this evidence in a variety of different ways, leading to a ferocious public controversy about the best way to proceed. The issue has become highly politicised, potentially undermining efforts to achieve a sustainable evidence-based solution to the problem. For these reasons, this case study cannot be viewed as an example of successful engagement between scientists and policymakers. In this talk I will outline the evidence as perceived by the scientists who developed it, and review how different groups of stakeholders appear to perceive the same evidence. By considering decisive moments in the collection and communication of scientific evidence on this issue, I will explore whether lessons might be learned for the development of evidence-based policies on other potentially controversial issues.

**10.00 Scientists into policy: getting involved in the Environmental Audit Committee Inquiry on Invasive Species***Helen Bayliss, Centre for Evidence Based Conservation, Bangor University**Email: [h.r.bayliss@bangor.ac.uk](mailto:h.r.bayliss@bangor.ac.uk)*

Last year the Environmental Audit Committee undertook an inquiry to examine the Government's policy on invasive species and the implications of the European Commission's draft EU Directive on the 'prevention and management of the introduction and spread of invasive alien species'. A range of individuals, organisations and groups contributed evidence to this process. Here I describe my own experiences of giving oral evidence as a witness at the first public hearing in Westminster, from engaging with the inquiry to seeing how the submitted evidence was used to inform the final report. In this context, rather than aiming to communicate the outcomes of our own research, we seek to signpost the most relevant evidence from our field and draw on our expertise of the subject area to help inform the policy process. Parliamentary inquiries offer an interesting opportunity for scientists to contribute their expertise to the policy process through a range of mechanisms, regardless of career stage. I will finish with some suggestions that I hope may help others seeking to engage with similar participatory policy processes for the first time.

**10.30 POSTER SESSION (TEA/COFFEE)**

**11.00 When wording does matter: the Infrastructure Bill as a case study**

*Sarah Durant, Zoological Society of London*

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The UK government's Infrastructure Bill contains an important clause that increases powers for the authorities to address the problems of Invasive Non Native Species (INNS). This clause provides new powers for authorities to control and eradicate INNS, including rights of access without the landowner's permission. However, close inspection of the first draft of this clause showed something rather alarming: a number of species that were not INNS, but were, in fact, native species were included in the list subjected to increased powers of control and eradication. The story of this legislation and its revision provides a useful example of when wording really does matter, both in ecology and law. It also throws a spotlight on the difficulties ecologists face in defining native and non-native species, particularly in a changing environment, and the importance of developing definitions that are meaningful to policy makers. Finally, it also shows why, in a UK where biodiversity conservation faces a bewildering complexity of pressures and challenges, it is important for ecologists to engage fully with policy makers.

**11.30 The role of evidence in developing the England biodiversity strategy *Biodiversity 2020***

*Peter Brotherton, Natural England*

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*Biodiversity 2020* is the over-arching government strategy for the conservation of biodiversity in England. It has ambitious objectives, underpinned by specific quantitative outcomes, and is the main policy instrument through which the government aims to halt biodiversity loss and the degradation of ecosystem services, and meet its international and EU commitments on biodiversity. Specific aims of the strategy include: to increase the area of priority habitat by 200,000 ha; to achieve favourable condition for 50% of Sites of Special Scientific Interest; to have a network of marine protected areas covering in excess of 25% of English waters; and to prevent species extinctions. But where did these commitments come from, and how were these numbers derived?

In this talk, I explore the extent to which *Biodiversity 2020* is based on evidence, and consider what other factors influenced the development and adoption of this government policy. I describe the different events leading up to the publication of the strategy in 2011, including an assessment of the influence of the 'Making Space for Nature' report produced by the panel led by Professor Sir John Lawton. I discuss the types and sources of evidence used to inform the objectives of the strategy, and consider circumstances in which policy commitments may be made when strong evidence is not available. I also reflect on scientists' expectations, and the appropriate role of evidence in influencing policy.

**12.00 Science evidence in marine environments is not just another stakeholder input**

*Melanie Austen, Head of Science: Sea and Society, Plymouth Marine Laboratory*

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**12.30 LUNCH**

Prince Albert Suite

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## SESSION II: PERSPECTIVES FROM SCIENCE/POLICY INTERFACE PROFESSIONALS

Chair: James Wilsdon, University of Sussex

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### 13.30 How does a funding body support evidence-informed policy?

Sasha Leigh, Natural Environment Research Council

Email: [snbl@nerc.ac.uk](mailto:snbl@nerc.ac.uk)

Recognising that there are myriad routes to using scientific knowledge as an evidence-base for policy decisions, this talk will discuss the role a public-funding body (the Natural Environment Research Council) takes in facilitating links between the academic and policy communities. Traditional debates around the 'two communities' are being overtaken by an open policy innovation ecosystem with key roles played by knowledge integrator and brokers. NERC acts as an intermediary, both funding academics to translate and apply their research to policy and practice questions and also taking a coordinating role in linking government departments to the research evidence base. As a non-departmental government body, NERC also takes a role with the other Research Councils in informing and influencing science policy as a whole, with the aim to ensure continued support for the UK's research and innovation base to keep us at the leading edge of global scientific endeavour.

This talk will cover both the available mechanisms and funding available to support individual researchers and Research Organisations in working at the science-policy interface, and also NERC's current activities in developing strategic relationships with government departments and interactions with parliament. The discussion will also look to the future: where are the opportunities to utilise environmental science for decision-support? What should the vision be for government and parliamentary engagement? How can NERC best play our role in supporting evidence-informed policy?

### 14.00 Scientific evidence and the scrutiny of policy in the UK Parliament

Jonathan Wentworth, Parliamentary Office for Science and Technology (POST)

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The UK Parliament has the constitutional role of scrutinising government legislation and of policy, particularly through the Select Committee system. It draws upon a wide range of information to do this, including research evidence from Learned Societies, Research Institutes and individual academics. However, there is little evidence on how evidence is used in parliaments, if findings from academic studies could be better tailored suit parliamentary processes or even whether lack of knowledge is primary factor in decisions with poor outcomes. What is known is that factors such as how information is presented, the time available for processes and the values held by politicians play a role in how or if evidence is used. Politicians have to mitigate the possible risks of technological innovation while determining whether it drives economic growth and meets societal needs, but simplifying ill-structured problems can lead to elements relevant to some actors being overlooked or denied. Scientific evidence may be necessary to address complex environmental problems, but is unlikely to be sufficient. When an issue becomes 'hot', science itself can be drawn into controversies by Ministers referring to a 'sound scientific basis' for a policy decision. Individuals taking on the role of experts should be wary of adversarial political debates and set the terms of engagement (be clear as to whether acting as an issue advocate, science arbiter, honest knowledge broker or pure scientist). Despite a litany of examples, such as climate change and vaccination, there is poor understanding amongst scientists of the dimensions of social conflict (process/fairness/empowerment, values and uncertainty).

Politics is the process of managing interests, with science just one of those interests. Parliamentary technology assessment institutions, such as Parliamentary Office of Science and Technology (POST), are intended to provide a 'safe space' for managing different values in the science community, presenting the plurality of evidence and the limits of knowledge to politicians. This is not as a means of ensuring evidence-based policymaking, but to clarify different perspectives and provide analysis of the issues at stake (including ethical, legal and societal dimensions). By providing the 'safe space' for debate, the intention is to help improve the pragmatic basis of political narratives.

**14.30 Policy isn't made in a vacuum: incorporating natural science, social science and value judgements**

*Abigail Bunker, Royal Society for the Protection of Birds*

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**15.00 POSTER SESSION (TEA/COFFEE)**

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**CONCLUSIONS – Chair: Ceri Margerison, British Ecological Society**

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**15.30 The science of scientific advice: how evidence, argument and ideas shape public policy**

*James Wilsdon, University of Sussex*

*Email: [J.Wilsdon@sussex.ac.uk](mailto:J.Wilsdon@sussex.ac.uk)*

In October 1964, Sir Solly Zuckerman was appointed the first UK Government Chief Scientific Adviser (GCSA). Fifty years on, scientific advice has never been in greater demand; nor has it been more contested. From climate change to cyber-security, poverty to pandemics, food technologies to fracking, the questions being asked of scientists, social scientists and other experts continue to multiply. At the same time, the authority and legitimacy of these experts is increasingly scrutinized.

Taking the institution of the GCSA as a starting point, I will describe how cultures of scientific advice in the UK have changed, to become more open, accountable and multidisciplinary. I will then look at the international landscape; in particular, recent controversies over EU scientific advice and the outcomes of an inaugural global summit of scientific advisers in August 2014. I will ask whether the current enthusiasm for scientific advice and evidence-based policy is part of a broader shift towards more 'experimental' forms of government, and consider what this means for the relationship between experts, publics and democracy.

**16.00 Utilising ecosystem assessments to build effective science-policy interfaces**

*Claire Brown, UNEP World Conservation Monitoring Centre*

*Email: [Claire.Brown@unep-wcmc.org](mailto:Claire.Brown@unep-wcmc.org)*

We are currently faced with threats to our long-term human well-being from the loss of biodiversity and degradation of ecosystem services. To support and implement cost effective policies address these declines, decision-makers need scientifically credible, legitimate and relevant information on the often complex interactions between biodiversity and society that defines nature's benefits to people. They also need effective methods to interpret this scientific information in order to make informed decisions. However, the scientific community needs to be able to understand what decision-makers require information for, so that relevant information is provided in a useful format. Therefore strengthened science-policy interfaces are critical for



# POSTER PRESENTATIONS

## **Habitat loss of woody plants in the Brazilian savannahs: the role of protected areas and conservation policy**

*Jéssica Fonseca da Silva, University of Cambridge*

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Large-scale agriculture and cattle ranching are transforming the landscape across the Brazilian savannahs - the Cerrado. Scientists are concerned about the reduction in vegetation cover and its environmental consequences, especially due to the recent expansion of sugarcane fields to meet the demand for ethanol-based biofuels. The Cerrado has been used for land development for more than five decades and lacks strong government policies for conservation. To date, the environmental impact of the increasing extent of sugarcane fields remains unstudied. We calculate the extent of the species ranges affected by the expansion of sugarcane fields and by other anthropogenic land uses. We also assess the effectiveness of protected areas (PAs) in preserving suitable habitats. By modelling species distribution, we construct biodiversity maps, which we overlap with maps of land use and PAs. We find that, while sugarcane fields do not strongly occupy any of the individual species ranges, the combined anthropogenic land cover overlaps with up to 70% of species suitable habitats. Areas with high species richness compete with intense land use. The majority of the species-rich areas are outside PAs, implying that a re-think of the PAs policy is necessary. Even though sugarcane fields do not represent a direct risk to woody plants so far, other farms are currently occupying suitable habitats. A possible indirect link between sugarcane and the expansion of other anthropogenic activities must be further investigated. We suggest intensifying conservation efforts in the south-west and north of the Cerrado, since they are areas with rich biodiversity at a high risk of conversion.

Co-author: David A Coomes, University of Cambridge

## **Assessing the relative importance of local vs. landscape-level actions to develop ecological networks**

*Elisa Fuentes-Montemayor, University of Stirling*

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Current actions to reconnect fragmented landscapes include creating new habitat patches and restoring, expanding and connecting existing patches to develop functional 'ecological networks' (a suite of core habitat areas connected by buffer zones, corridors and 'stepping stones' that allow movement of species or their propagules). However, there is much uncertainty on the relative importance of alternative actions (e.g. increasing habitat area vs. connectivity) to develop ecological networks. As part of an ongoing collaborative research project (Woodland creation & Ecological Networks; WrEN) between academics, policy makers and conservation practitioners, we surveyed 100 secondary woodland patches in the UK to study how different taxa were influenced by local- and landscape-level woodland attributes related to the ecological network concept. Our surveys focused on a range of species with different life-history traits (e.g. habitat specificity and dispersal abilities), including vascular plants, lower plants (lichens and bryophytes), ground-dwelling invertebrates (beetles and spiders), small terrestrial mammals and bats. Preliminary analyses indicate that taxa differ in their response to local- and landscape-level woodland attributes, depending partly on their dispersal abilities. Our results suggest that local-level conservation activities are particularly important for lower-mobility species. For higher-mobility species, both local- and landscape-level actions are required.

Co-authors: K Watts<sup>2</sup>, N Macgregor<sup>3</sup> and K Park<sup>1</sup>.

(1) University of Stirling, (2) Forest Research, (3) Natural England.

## **Assessing the efficacy of riparian zone legislation for terrestrial species: a case study from oil palm plantations in Malaysia**

Claudia L Gray

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In many countries the vegetation next to rivers and lakes is protected. This reduces the flow of sediment and chemicals into waterways and lowers flood risk downstream. These protected areas of vegetation, called riparian reserves or riparian buffers, can also support species that would not otherwise persist in human-dominated landscapes. Regulations specifying the width and structure of riparian reserves therefore affect important ecosystem services and the conservation of many species. Unfortunately, in many countries management guidelines for riparian zones have been informed by few ecological studies. Here, we present an overview of riparian reserve legislation worldwide and a case-study from oil palm plantations in Sabah, Malaysian Borneo, in which we assess whether existing legislation is appropriate for conserving terrestrial riparian species. Currently, legislation in Sabah specifies that 20 m of vegetation on each side of a river must be protected. This is similar to many other tropical and temperate countries: 30 m of riparian vegetation is a common requirement. By surveying dung beetles, an informative indicator group, we found that increasing riparian reserve width to 50 – 80 m would conserve communities with a species richness equal to that in large areas of logged forest. We also found that proximity to other forest fragments increased species richness in the reserves, highlighting the importance of landscape-level planning for biodiversity conservation. Our results can inform policy for oil palm growing countries across the tropics, and have been incorporated into best management practices recommended by the Roundtable on Sustainable Palm Oil.

Co-authors: Eleanor M Slade, A Y C Chung, Darren J Mann and Owen T Lewis

## **Free-tailed bats in Africa contribute to agricultural pest control**

Faith A Jones

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Bats face many threats, including habitat loss, climate change, and disturbance. Despite often being seen in a negative light, bats provide many useful services exploited by humans. Insectivorous bats eat agricultural pests, contributing to pest control. Bats also pollinate and disperse seed of important angiosperm species. A quantification of the contribution of bats will support bat conservation advocates.

A deterministic model was developed using data available in the literature to quantify the value of bats predated on insects as a form of pest control. This model was applied to two case studies in sub-Saharan Africa: the lesser free-tailed bat (*Chaerephon pumilus*) feeding on the spotted stem borer (*Chillo partellus*) in maize fields, and the Angolan free-tailed bat (*Mops condrylurus*) feeding on the sugarcane stem borer (*Eldana saccharina*) in sugar cane fields. The lesser free-tailed bat contributed a saving of 12.1 million kg per maize crop through pest control, valued at 4.85 million USD. The Angolan free-tailed bat contributed a saving of 41.5 million kg per sugar crop through pest control, valued at 15.8 million USD. Countries such as Benin, Angola and South Africa gain particularly high values for pest control.

Estimates of the economic value of bat services will emphasise the positive impact of bats to humans. Tolerating and conserving free-tailed bats may contribute to economic savings in the agricultural industry. This is particularly relevant to the African food industry because Africa faces considerable threats to food security.

Co-authors: Sophie Williams and Alice C Hughes

## **British taxa shift their geographical range margins northwards in response to environmental change**

*Suzanna Mason, CEH*

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Many species are shifting their distributions to track recent climate change. However, studies have tended to focus on a few charismatic species groups (e.g., birds, butterflies and dragonflies), whilst little is known about range shifts in other groups, and how rates of range shift vary over time. Without an understanding of how current species distributions are changing, predicting future range shifts and building effective policies to protect species are very difficult. We investigated range margin shifts using monitoring data, collated by the UK Biological Records Centre. Northward range margin shifts were calculated for 21 lowland animal taxa using locally observed species richness to assess recording effort and account for variation in this over space and time. For seven selected groups with sufficient data, range shifts were calculated for two intervals between 1966 and 2010. Our results suggest that groups are showing different changes in rates of range shift. Some groups (e.g. butterflies) are expanding northwards at an increasing rate, other groups show a reversal in expansion towards range retraction (e.g. hoverflies). These results have implications for conservation policy because they show that the range shifts exhibited by charismatic animal groups may not be reflected by others. Future work is needed to explain the idiosyncratic responses of taxonomic groups to climate change.

Co-authors:

Georgina Palmer, Simon Gillings, Jane Hill, Chris Thomas, Richard Fox and Tom Oliver

## **A brave new world: integrating natural capital concepts into policy**

*Amy McDougall and Katy Thompson, Joint Nature Conservation Committee*

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The Joint Nature Conservation Committee (JNCC) sits at the heart of the science-policy interface within the UK and plays a key role in sparking and supporting discourse between the science community, government and civil society.

Nature conservation policy and practice is continuously evolving, an example being the current move towards integrating the Natural Capital concept into policy and practice. Natural Capital is the elements of the natural environment that provide valuable goods and services to people; such as clean air, clean water, food and recreation. Natural capital underpins all other types of capital- manufactured, human and social- and is the foundation on which our economy, society, health and wellbeing and prosperity is built.

This poster will present work developed by JNCC under the Natural Capital umbrella to explore this process of evolution and integration. The JNCC 'Spatial Framework for mapping and assessing ecosystem services' has been designed to help stakeholders i) identify ecosystem service provision within the environment, and, ii) explore how different decision scenarios affect ecosystem service delivery at the local, landscape and national level. The Spatial Framework has undergone two iterations to date, incorporating ideas and thoughts from a broad range of stakeholders. The next developmental phase is underway and JNCC is seeking further engagement with policy-makers, practitioners and the scientific community to further develop this tool in light of their experiences and changing needs with regards to Natural Capital.

## **Integrating conservation and climate change adaptation – a decision framework approach**

*Tom Oliver, CEH*

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General principles of climate change adaptation for biodiversity have been formulated, but do not help prioritise actions. This, along with uncertainty in climate change projections, is inhibiting integration of climate change adaptation into conservation planning. Our poster illustrates a published decision framework that addresses these issues by identifying and prioritising actions to increase the adaptive capacity of species, based on species and regional context and incorporating uncertainty in climate change projections. We hope the decision framework will be a useful tool for conservation and natural resource managers to integrate adaptation measures into conservation plans.

We demonstrate the application of the framework to identify and prioritise conservation actions to increase the adaptive capacity of 30 species threatened in the UK. We compare the actions identified for these threatened species by the decision framework with those included in existing conservation plans, as developed by the UK government's statutory adviser on nature conservation. We find that many existing conservation recommendations are also identified by the decision framework. However, there are large differences in the spatial prioritisation of actions when explicitly considering projected climate change impacts. Our results suggest conservation plans that do not take account of climate change projections may not maximise species persistence.

Co-authors: Richard Smithers, Clive Walmsley, Sallie Bailey, Colin Beale and Kevin Watts

## **Exploring drivers of agricultural policy knowledge: attitudes towards hedgerow cutting legislation**

*Siobhán Porter, Queen's University, Belfast*

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Hedgerows represent one of the most important semi-natural habitats in our agricultural landscapes, though their biodiversity value is greatly dependent on management. Under current legislation, Northern Irish landowners receiving Single Farm Payment are prohibited from cutting their hedgerows between 1st March and the 31st August. This 'closed cutting period' serves to minimize disruption to breeding farmland birds, a group that has suffered continued population declines over the past few decades.

We carried out a survey questionnaire at the largest agricultural show in Northern Ireland, to explore the relationship between hedgerow policy knowledge, farm demography and attitudes towards hedgerow management and related issues.

Less than 25% of respondents who lived or worked on a farm with hedgerows were able to give the correct dates within which hedgerows should not be cut. We found that those showing a positive attitude towards nature and wildlife conservation were more likely to be aware of the correct policy dates.

We explore how demography and attitudes towards policy and conservation issues relates to the challenge of ensuring cutting is not carried out during the bird breeding season; and how the targeted education of certain groups within the agricultural community could provide better opportunities for the continued safeguard of hedgerow nesting birds.

Co-authors: Moira Dean and Alison Cameron, Queen's University, Belfast

## **Nature in a changing climate: knowledge and policy for conservation in England, 1990–2011**

*David Christian Rose, University of Cambridge*

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The poster explores knowledge-policy interactions centred on the idea of landscape-scale conservation, an idea which took at least two decades to make an impact on government policy affecting England. Taking inspiration from previous work in policy analysis, combined with Science and Technology Studies (STS), the poster contends that 'knowledge matters in the policy process...but exactly when and how it matters is contingent' (Owens, 2010, 395) on the way in which it interacts with other factors. The poster presents some of the main findings of the PhD research (passed viva), namely: (1) that the certainty of evidence has a limited impact on government decision-making, (2) that conservation scientists should pay careful attention to the way in which evidence is framed and communicated (Rose, 2014; Rose, 2015), (3) that conservationists should recognise the significance of action on the ground for high-level policy-making, and not assume that implementation always follows a final decision (Rose, in review). In setting out these conclusions, the poster will create synergies between conservation biology, policy analysis, and STS, and present clear lessons for future research and action on the science-policy-practice interface in this area.

## **Building better models for environmental decision-making: how can modellers and practitioners collaborate?**

*Kevin A Wood, Wildfowl & Wetlands Trust*

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Effective environmental decision-making, in the form of evidence-based management and policy, is a key prerequisite to help balance nature conservation, natural resource management, and human socio-economic activities. To aid such decision-making, the need for predictive tools that are accurate, robust, and parsimonious has arguably never been greater. Our poster will highlight the use of individual-based models (IBMs) in environmental decision-making. Such models have emerged as powerful decision-support tools to aid practitioners, including statutory authorities with responsibilities in environmental and natural resource management, non-governmental organisations such as conservation charities, and those interested in the sustainable use of natural resources. Yet, such models have also become increasingly complex, and can be difficult to communicate clearly, and are thus frequently viewed as "black boxes" by practitioners.

Our poster will highlight the uses of IBMs in environmental decision-making, identify potential obstacles to their successful use, and discuss how such obstacles can be overcome. We will present a framework to allow practitioners and modellers to co-create IBMs to inform environmental decision-making. We aim to help practitioners understand the potential benefits of IBMs, and to help modellers to understand how to develop IBMs which will better aid practitioners and inform environmental management and policy.

Co-authors: Richard A Stillman and John D Goss-Custard, Bournemouth University

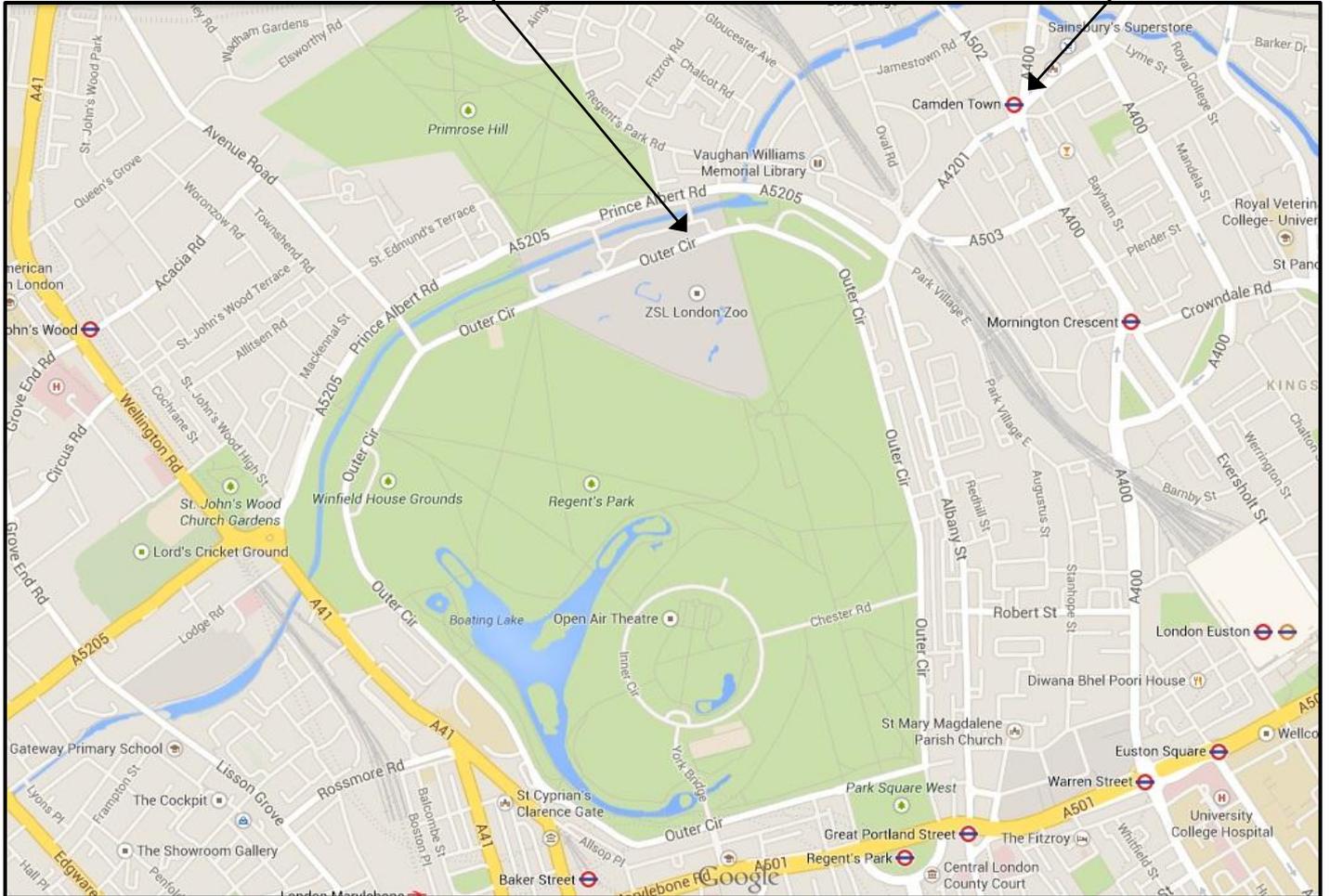
# The conservation and science/policy interface: challenges and opportunities

Location of lunch: Prince Albert Suite



**ZSL Meeting Rooms**

**Camden Town station  
(Northern Line)**



To walk between ZSL London Zoo and Camden Town underground station takes around ten minutes.

### Transport for London Travel information

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