

NEWS

Dublin Biodiversity Audio Tour

As part of the Dublin City of Science 2012 celebrations, the TCBR created The Dublin Biodiversity Audio Tour (DBAT). The DBAT brings together stories on 11 sites of interest around Dublin City, from community gardens and city parks to collections in museums and botanic gardens. The tour comprises a series of short, free-to-download pod-cast audio clips available from <http://www.tcd.ie/tcbr/news/biodiver-audio.php>.



Dublin Biodiversity Audio Tour



Discover the diversity of nature in Dublin, how it is researched, managed and enjoyed by Dubliners and visitors

www.tcd.ie/tcbr



Scripts were written by TCBR's Dr Caoimhe Muldoon in consultation with stakeholders at the sites, and read by TCBR's Aoife O'Rourke. Sound recordings and podcasts were done by Sharon Phelan and Aidan Delaney from the Arts Technology Research Lab, in TCD's School of Drama, Film and Music. Whether you decide to visit all the sites, or whether you listen to them from the comfort of your arm chair, we hope you visit the DBAT page and enjoy finding out more about Dublin's Biodiversity!

TCBR Summer Seminars

Two special biodiversity events were hosted by the TCBR this summer. First Professor Gretchen Daily, from Stanford University, spoke to a packed Botany Lecture Theatre during the Dublin City of Science 2012 ESOF meeting week in July. Her talk focused on the challenges faced by conservation scientists to mainstream nature into political and economic decision-making. She described tools for valuing nature, such as InVEST, an open source software system for Integrated Valuation of Ecosystem Services and Tradeoffs. She also discussed how new policies and finance mechanisms are being implemented worldwide and about engaging leaders to make long lasting transformations on how nature is

viewed. Following Prof Daily's lecture, Thomas O'Neil described Combined Habitat Assessment Protocols (CHAP) that he has developed at the North West Habitat Institute, which employ a spatially based multi-purpose field inventory accounting tool that, when applied to a site or area, will generate an accurate appraised habitat value.

Secondly, Edmund Barrow, former graduate from TCD Zoology (1973), currently Head of the Ecosystem Management Programme at the IUCN, gave a stimulating talk on his ongoing work on the IUCN Red List of Ecosystems. This ambitious project aims to assess all the world's ecosystems by 2025 and to link threat classifications with ecosystem values for appropriate land use planning on local and national scales. Ed highlighted in his lecture how the ecological theory he learned as an undergraduate in Trinity has helped define the conceptual basis of ecosystems in the process of creating Red Lists of Ecosystems.



Jane Stout (TCBR Director) with Prof Gretchen Daily (left) and Tom O'Neill, Director, North West Habitat Institute (right).



SIMBIOSYS Final Meeting

The EPA-funded SIMBIOSYS (Sectoral IMpacts on BIOdiversity and ecoSYSTEM services) project held its end-of-project conference entitled "Integrating Biodiversity Research, Policy and Practice" on 28th June 2012 in Trinity. The project, led by Jane Stout, has been a four and a half year effort by a team of researchers from TCD, UCD, UCC and NUIG. Overall the study has confirmed the positive relationship between species richness and the delivery of ecosystem services, and found this is maintained across land use types. For example, if the diversity of predatory ground beetles and pollinating insects in farmland increases, so does potential for natural pest control and pollination services.

NEWS

In addition, different anthropogenic pressures and management approaches benefit different aspects of biodiversity and, thus, the services that are delivered. The team demonstrated that Pacific oysters have now formed some well established feral populations on the Irish coast and documented a range of impacts on native ecosystems, including negative effects on a protected habitat-forming species, the honeycomb worm *Sabellaria alveolata*, and modifications to a number of ecosystem processes. The project has also identified some 'win-win' situations where both ecosystem health and socio-economic outputs can be maximised. For example, in general, road landscaping treatments that result in the greatest flowering plant species richness also require the lowest inputs and are, therefore, more sustainable in the long-term; using triploid oysters in aquaculture can reduce the risk of invasion and thus impacts on coastal ecosystems, and they also grow more quickly; and improving *miscanthus* crop yields has both an economic benefit but also increases rates of Carbon sequestration. These findings are crucial for a sustainable future.

The conference was opened by Micheál Ó Cinnéide, Director of the Environmental Protection Agency, who praised the work of the project team and specifically the TCBR. Then Professor Kathy Willis, from the University of Oxford, gave a keynote address on innovative tools, technologies and datasets to sustain biodiversity in the face of multiple threats, including climate change. The SIMBIOSYS team then outlined the main findings from the project and the audience, comprising academic researchers as well as key stakeholders, participated in an open debate. Finally, the PhD students and post-doctoral researchers who had actually done the day-to-day hard work on the project outlined their key results.



From left to right: Mark Emmerson (QUB, PI), David Bourke (TCD, Project Manager), Michael Usher (Stirling – external steering group), Jane Stout (TCD, Project co-ordinator), Tasman Crowe (UCD, PI), Padraig Whelan (UCC, PI).

Launch of the Biodiversity Beermats

A series of "Biodiversity beermats" were officially launched by Éanna Ní Lamhna in O'Neills pub in August, and are now in use in ten pubs around Trinity. The beermats are the first project of Biodiversity in our Lives, a group set up last year by some PhD researchers associated with the TCBR. The aim of the group is to make people aware of how important biodiversity is, and how it is linked to everyday life - including the things we would commonly drink in a pub! Their popularity has brought them to the Irish Times (see the following link for the full article: <http://www.irishtimes.com/newspaper/features/2012/0823/1224322752206.html>). For more information see the website www.biodiversityinourlives.com or the facebook page /BiodiversityInOurLives....and watch for future projects!



Biodiversity beermat.

Appropriate Assessment Workshop

The third international workshop on Appropriate Assessment was held in Dublin on the 6-7th of September 2012. The workshop was supported by TCBR and officially launched at the Botany Lecture Theatre by the Minister for Arts, Heritage and the Gaeltacht, Jimmy Deenihan.

The workshop was attended by AA practitioners and governmental representatives from across the EU, with insightful presentations from Portugal, Estonia and Croatia on current issues in AA practice. The NPWS presented the recently published Habitats Regulations and Board Gáis discussed the implications of renewable energy developments for the conservation of Natura 2000 sites. The debate focused on the effectiveness of the implementation of the Habitats Directive, and on the need to identify ecological solutions, so as not to freeze natural environments while ensuring sustainable development in designated sites.

The workshops conclusions highlighted the need to address the current inadequacy of accounting for cumulative and in-combination effects of developments in European sites, as well as the need to improve practice through data sharing, and enhanced communication between the proponent, the assessment teams and the NPWS.

RESEARCH FOCUS

Cusuco Epiphyte Project

With the development of modern rope access methods during the late 70's, biologists started to explore for the first time the world's forest canopies. Rope access allowed a 3-dimensional investigation of the forest strata and consequently enabled in-situ investigations into the ecology and biology of canopy dwelling organisms. Particular attention has been devoted to the exploration of canopy epiphytes. These plants live in the canopy for structural support and include species from the families *Orchidaceae* (orchids), *Bromeliaceae* (pineapple family), *Ericaceae* (heather family), *Melastomataceae*, *Polypodiaceae* (ferns) and *Araceae* (Arum family). Moreover, epiphytes are important foraging sites and food sources for other organisms and are important in the forest's mineral and nutrient cycling. Most research on epiphytes in America has been undertaken in South and North America, with only little focus on the Central American canopy flora.

In an attempt to increase our knowledge of the canopy flora of Central America, Sven P. Batke, a PhD student in Botany under the supervision of Dr. Daniel L. Kelly, set out to Cusuco National Park in Honduras in June 2012. His specific project aims are to assess the epiphyte diversity within the park, to investigate epiphyte abundance, biomass and distributions within trees and along altitudinal gradients and to assess the response of epiphytes to hurricane damage along a newly developed hurricane index gradient. The investigators are using rope access techniques that allow a 3-dimensional investigation of the large (>60 m) canopy trees. Within each tree every branch will be assessed for epiphytes and climbers. New species will be collected and subsequently dried in the field for later identification.



Assistant climber Nickolas Hill (right) and Sven Batke (left) sampling epiphytes on a 48.6 m *Pinus* sp. tree, using arboreal rope access methods.

The data from the first field season are currently being processed but preliminary results and observations indicate that epiphytes and climbers in Cusuco are very diverse (>120 vascular plant species) and that individual branches can in some instances support more than 15 species of vascular epiphytes at any given time. Initial results also suggest that past hurricane events, as well as current microclimatic variations, have major impacts on the epiphyte community composition within individual trees.

Payment for Ecosystem Services for Development and Conservation

Melaine Kermarc, BSc graduate in ecology, has just completed the Masters in Development Practices which is run jointly between UCD and Trinity College. The programme offers a holistic view of developmental issues by providing multi-disciplinary teaching, and two field placements. Through a partnership with the National University of Rwanda (NUR), students get the chance to spend 3 months in Rwanda, and carry out research with a local organisation.



Melaine and the rest of the team at Nyungwe National Park.

In collaboration with a research NGO financed by the EU, Melaine carried research on the potential of direct Payment for Ecosystem Services (PES) to support development and conservation on the outskirts of Nyungwe National Park. In addition to being one of the few practical experiments using PES in a Sub-Saharan African context, the project was set up as a Randomized Control Trial (RCT) to assess the success of the project. Two and a half years later, the PES programme has not shown any statistically significant changes, despite having a positive impact according to the project team members and the local authorities. As Melaine argues in his dissertation, this experiment does not invalidate the potential of PES. Rather, it raises issues on a practical level on the potential of those schemes to target the poor and individuals practicing illegal activities, such as poaching.

RESEARCH FOCUS

The RTC might be unable to capture the long-term impact of education and sensitisation to the environment. Ultimately, this Rwandese attempt, while providing many new aspects for future research, questions the potential of PES and other market-based solutions supported by the UN member states at the Rio+20 conference. This micro-level experiment highlights the lack of practical and institutional knowledge on PES, as well as the necessity for broader environmental policy to support market-based solutions in order to stop environmental degradation and alleviate poverty.

Gorillas and/or potatoes?

If you were given a resource that could guarantee revenue of \$30 million every year, with almost triple that amount additionally coming through ancillary spending, would you ignore it? If this resource then had the power to lift some of the most marginalised people on the planet out of poverty, you would even think twice? Gorilla tourism in Rwanda is this valuable and the people living around Volcanoes National Park (one of the few remaining islands for this species) are some of the poorest in Africa.



Shane Mc Guinness with some members of the Volcanoes National Park, Rwanda.

PhD student Shane Mc Guinness' research into interactions between the national park and local farmers has revealed that control of land is one of the key factors in creating conflict between the ideals of national park management and those of subsistence farmers. When people have little control over what they grow in this highly fertile region, either through government land use consolidation initiatives or private agro-industry, the impact of buffalos raiding potato fields or gorillas decimating eucalyptus plantations is exacerbated. The catch is cultural values and hierarchies in Rwanda mean that leadership will be followed, as changes are effected unquestioningly. One solution is to increase the proportion of tourism revenue shared with local

communities, instilling a feeling of ownership, and responsibility for, their forest. But this can only come with livelihood autonomy.



Farming at the Volcanoes National Park, Rwanda.

Research on Ecological Stability

Research is being carried out by PhD student Deirdre McClean under the supervision of TCBR's Dr. Ian Donohue to investigate the consequences of perturbations, both natural and anthropogenic, on ecological stability. Ecological stability is a multifaceted concept defined broadly as the ability of an ecosystem system to maintain or recover its structure (e.g. community composition) and functioning (e.g. nutrient cycling) after perturbations. This area of research is of vital importance for understanding not only how ecosystems respond to human disturbance but also to optimize the management of important ecosystem functions and services such as food production. This knowledge is particularly relevant in the face of an ever increasing demand for natural resources from a growing human population, as well as fears about declining biodiversity in regions around the world.

Deirdre's project investigates the effects of globally important perturbations, such as nutrient enrichment and water level fluctuations, on multiple aspects of ecological stability, such as resilience and temporal variability, in aquatic communities. The project uses a combination of manipulative experiments, both in the field and in outdoor mesocosms, to examine the interaction between food web structure, environmental variability and the temporal pattern of perturbations on stability. It is hoped that the results will contribute towards a greater understanding of the long-term impacts of both human and natural perturbations on ecological communities.

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