Wild Thing??

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Issues of perceptions, history & science in severance & wilding

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Summary

Following seminal texts by Adams[1] (*Future Nature: a vision for conservation*), Peter Taylor[2] (*Beyond* Conservation), and Vera[3] (2000), there has been renewed interest in addressing conservation problems through radical new approaches. Indeed, there is a growing feeling that conservation has failed to deliver and in the age of politically enforced austerity, the situation will worsen. In this context, '*wilding*' and '*wilder*' landscapes, applied effectively and sensitively, offer huge, exciting benefits for biodiversity, heritage, and amenity. However, there are significant pitfalls if implementation lacks careful planning and design. The '*eco-cultural nature*'[5] of landscape, resulting from long-term, intimate interactions between people and ecologies is important, and across Europe particularly, twenty-first century depopulation means rural landscapes *abandoned*' not '*wilded*'. Ecology, communities, and economies are potentially devastated[4].

Alongside urbanisation of rural landscapes, these socio-economic and demographic changes cause '*cultural severance*'[6,7], with long-term, often rapid, declines in biodiversity and landscape quality. Furthermore, from urban to remote, rural areas, attitudes to, and perceptions of, '*alien*' invasive species challenge to attempts to '*wild*' the landscape. Feral species, exotic plants and animals, and invasive natives forming recombinant biodiversity[5,8], but '*re-wilding*' discussions rarely mention feral and exotic. Additionally, approaches are interventionist rather than '*wild*'. Interestingly, re-wilding discussions do sometimes advocate re-introduction of extinct, sometimes ecologically keystone species. A pertinent observation is that most discussions on ecological recombination consider invasive alien plants and animals, but not the implications of depauperate ecologies through species extinctions. Yet almost everywhere on the planet, this is a huge issue.

Central to '*futurescapes*' and '*re-wilding*' are ideas and perceptions of '*wild*', '*wildness*', '*wilderness*', '*nature*', and '*natural*'. This paper results from long-term observational studies, detailed historical research, scientific analysis of case studies, and international researcher collaborations. It presents ideas and paradigms relating to emerging concepts and visions.

Analysis of past landscape history enables predictions of likely impacts of '*abandonment*' concepts of wilding. In Britain for example, the changes which occurred after medieval Black Death de-populated the countryside, or when the Highland Clearances removed communities from the Scottish landscape, or more recently, when myxomatosis took out the rabbit population, where dramatic. With cultural severance and with modern rural de-population and abandonment, ecological pathways can be predicted from successional theory and species strategy models. In proposed concepts of futurescapes and wilder landscapes, these ideas need to be factored in to produce realistic and acceptable outcomes, or else our future nature may be less palatable that some predict.

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Biocultural diversity and rural landscape: case studies and policy implications

The historical development of the relationships between man and nature shows an important shift in Europe and especially the Mediterranean from a first phase starting around the fourteenth century, and dominated by appreciation of cultural landscapes shaped by man, to a different phase starting in the late nineteenth century and continuing today, where natural landscapes became more important. In the second half of the twentieth century, the attention to sustainable development and environmental conservation, favoured conservation of natural habitats and associated biodiversity, often criticizing the cultural landscapes previously appreciated. These views, originated mostly in North America and in central Europe, have profoundly affected the way landscape is managed and perceived today, with a shift in the attention from cultural landscapes towards natural landscapes. Nevertheless, Europe, as many other places in the world is basically a cultural landscape. The cultural origin of the European Union territory has already been recognized by the European Commission at least since 1999, when only 5% of the territory was classified as natural. In this respect the fact that NATURA 2000 covers 20% of the European territory poses the simple question of the real naturalness of the areas included, and the real nature of the biodiversity we have today, not only in the so called natural habitats, but in the entire EU territory and in many other parts of the world. The practical implementation of nature conservation strategies in rural territories affected by centuries of human influence without a redefinition of biodiversity targets, taking into consideration the historical relationships between traditional agricultural practices and animal and vegetal species has often resulted in conflicts with local populations.

The UNESCO – CBD Florence Declaration on the linkages between cultural and biological diversity has promoted the concept of Biocultural diversity. The declaration states that the European landscape is predominantly a biocultural multifunctional landscape. As such, it provides a crucial and effective space for integration of biological and cultural diversity for human wellbeing, including in the context of rural territories. The biocultural diversity concept suggests the opportunity to revise some of the current approaches to biodiversity, recognizing

the wider meaning of this term and the need for a revision of the current conservation strategies. Considering biocultural diversity and recognizing among the habitats to be preserved those resulting from the reciprocating influence between man and nature might also solve some contradictions between landscape and nature conservation. In view of the challenges the world is facing a model integrating nature and culture, rather than separating them is needed. In this respect biocultural diversity offers a useful perspective that could be included in sustainable development and in several conservation programs.

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The tale of two plantations - small scale rewilding

After reading an article in Tree News in 1992 entitled "Ancient Woodland: A re-creatable Resource?" by Keith Kirby, I have always had an interest in this line of thought. Over the last 10 years I took over the management of a plantation on the Brackenhurst Estate and experimented with the article in mind. My main goals were to "re-wild", increase biodiversity from local sources and provide a small area demonstrating coppicing, greenwood crafts and the management of worked trees.

This paper will showcase the "re-wilding" of Arnolds Plantation on the Brackenhurst Estate, near Southwell, Nottinghamshire and highlight the nature conservation work that can be used to change small scale landscapes.

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More, better and joined up – that is what saproxylic beetles have always wanted but few people have been paying attention

Saproxylic (wood-decay) beetles preserve very well in peat deposits alongside pollen and have been used by palaeo-ecologists to support the hypothesis that the wild natural vegetation of Britain was closed canopy woodland. However, objective examination of the same beetle data actually demonstrates that the vegetation combined much unshaded grassland and scrub, with trees, but very little shade for shade-demanding beetles. So the former wild Britain was actually more of an open wood-pasture landscape. But does this help us in deciding whether to continue the present conservation approach of maintaining the historic cultural landscape, or alternatively, venturing into the largely unknown country of wilder landscapes? In this presentation I will examine the poor condition of many of our most treasured saproxylic landscapes and contemplate a future of wilder landscapes.

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Rewilding the world for the future - using novel ecosystems as a key conservation tool

As we collectively shuffle into the Anthropocene there will be many surprises and unexpected situations to confront. Traditional conservationists (e.g. Lawton *et al*.) are arguing for 'More, Bigger, Better and Joined' conservation reserves, but at best this is myopia. On the other side, advocates for rewilding, de-extinction even replacement therapy are arguing strongly their cases – but not in a thematic way. Some ecologists from the restoration school have begun to discuss the reality of novel ecosystems and what we must do to recognise and manage them, as part of landscape management. Novel ecosystems are now everywhere, and in many parts of the world are providing better conservation opportunities than "natural" ecosystems. Yet another approach is that of landscape stewardship, which emphasises the important role of people in a new conservation. The language(s) being used by ecologists, green NGOs and government on 'where to next' for conservation only adds to the tower of babel. Combining these approaches, in ways appropriate to location, might best be

termed ‘neo-wilding’. We need a clearer discourse, a realistic acceptance of the rate and direction of change, and the recognition we live in a global garden. ‘Managed, Mended and Supported’, should be our catch-cry, understanding that for the best human future we need to embrace neowilding and become better gardeners.

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Dr Adam Broadhead, Arup, Adam.Broadhead@arup.com

Lost urban rivers buried beneath our feet – and what to do with them

Streams and rivers have been buried beneath towns and cities around the world, to make way for urban development, tame floodwaters, and sanitise what had become open sewers. This is a radical change in the water landscapes of our cities – streams and rivers lost in both a physical and socio-cultural sense.

Stream burial has had many negative environmental, social and economic consequences, and there is an increasing number of examples internationally and in the UK of “daylighting” – the reopening and restoration of once-buried streams and rivers to the surface.

This talk will touch on the latest research and international examples, including a case study of the Lost Rivers of Sheffield. It will explore how daylighting our lost rivers and streams can be done and what challenges need to be overcome to re-wild these most damaged of environments in towns and cities.

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New Wild Scenarios for the UK: returning natives, living with what we've got, or a mixture of the two?

A successful outcome of “rewilding” is the restoration of natural processes. Reintroduction of large carnivores, that kick start lost trophic cascades and regenerate landscapes of fear, fits well with the popular concept of wilding. Wolves, reintroduced to Yellowstone NP reportedly changed the behaviour of their prey (mainly large deer) such that woodland returned in the core of pack territories. In the UK opportunities for such a top down approach, through reestablishment of viable populations of wolves or lynx, are likely to be restricted to economically marginal wooded and open landscapes in northern Britain; wherever they were located, reintroduction of large carnivores would be controversial. This paper will suggest alternative scenarios for “new wild”. Rewilding could happen at the lowest trophic level through revitalising degraded soils, restoring their faunae, florae and fungi, and building on the presence of native or long-established burrowing and above-ground herbivores, omnivores and middle-sized predators. This bottom up approach, whilst much less controversial than a top down one, may seem less exciting but can nevertheless present new economic opportunities such as ecotourism. For example, some of the vertebrate species in the mix (such as beaver and pine marten) are highly attractive even if only seen in camera trap images. It could also accommodate non-native species that are better adapted to our climate-changed and hugely simplified present day landscapes than those in prehistoric ecological communities. Some of the non-native species could, controversially, be accepted as ecological analogues of extinct native species in the same way as naturalistic grazing schemes use domesticated animals instead of their wild ancestors. Native – non-native trophic cascades could develop. Research is underway to establish whether or not reintroduction of a native middle sized predator, the pine marten, causes reductions in densities in grey squirrel populations. Similarly, trophic cascades could develop for returned native lynxes and the small non-native deer within its range, and for reintroduced white–tailed eagles and non-native feral sheep/goats and deer where these are well established. A middle way involves rewilding offshore. In a European context Britain and Ireland are significant for their seabird islands, on many of which non-native mammalian “top” predators (such as rats) have depressed or extirpated native populations of birds. Rewilding of these islands involves removing the top predators, which reduces the number of trophic levels. This can allow the abundance and species richness of seabirds to increase and so increase the opportunities for people to experience the spectacle of their breeding colonies. When seabird populations recover, the increased nutrient import from guano etc. should lead to more of the biologically richer soils that are characteristic of

flourishing seabird colonies. Seabird islands thus offer opportunities for cost-effective and relatively non-controversial rewilding based on a bottom up kick start of natural processes by removing top predators.

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A Story of Rewilding – Pigs and Purple Emperors

… to be added

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"The thorn is the mother of the [open grown] oak": re-wilding parkland.

In his book, "*Forest history and grazing ecology*", Frans Vera writes about the park-like landscape of the wilderness. The ecology of ancient trees tells us that it must have been a landscape rich in all species of open grown trees and one where they could grow old gracefully without being killed by competition. A landscape where individual trees or groves of trees were continually establishing, maturing or declining in the protection of different species of scrub but also where grazing was maintained at levels that controlled scrub and allowed individual trees to live extraordinarily long lives. These systems were mimicked by the great landscaper designers such as Repton, Kent and Brown. The shifting baseline means that we now imitate the landscape designers through planting. Places, such as Knepp Re-wilding Project, where we can learn about the processes involved in wild, open-grown tree establishment are extremely rare. Scrub is generally cut or burnt, instead we need to better understand wild scrub and its grazing ecology. Britain with its remnant mediaeval Forests and deer parks or upland treed commons is well placed in Europe to champion and re-wild its parkland, trees and shrubs using the best suite of large wild herbivores or their analogues.

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Dr Steve Carver, Wildland Research Institute – University of Leeds, S.J.Carver@leeds.ac.uk

Rewilding Britain: moving from idea to reality

This paper provides an overview of the newly formed *Rewilding Britain* group, who we are, what are our aims, our proposed approach and ethos, together with a statement of need and our organisational structure.

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Alastair Driver, Environment Agency, alastair.driver@environment-agency.gov.uk

Achieving Multiple Benefits Throughout Sustainable Catchment Management In A Changing Climate

Working with natural processes is an essential element of sustainable catchment management in the face of climate change. This presentation summarises a wide range of practical solutions which the Environment Agency and its many partners have implemented on the ground throughout catchments in England in recent years, working from source to sea. It also reveals some of the early findings relating to the quantified benefits of these practical solutions, focussing on those which are transferable to other similar situations across the world.

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Mick Drury, Montane Scrub Action Group, mick@treesforlife.org.uk

Restoration of the mountain woodland of Scotland

Treeline woodlands are found throughout the world but are largely missing from Britain, and from the Scottish Highlands in particular. This situation is considered in relation to similar areas in Norway. Current and future restoration initiatives are described and the value of the habitat described. It is concluded that the widespread 'traditional' land management objectives in the Highlands, focussed on deer and grouse, are preventing the potential of the habitat being realised.

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Dr James Fenton, info@james-hc-fenton.eu

Is rewilding destroying the remaining naturalness of the Scottish Highlands?

In the Scottish Highlands most rewilders believe that the landscape should have significantly more trees so that 'rewilding' becomes synonymous with 'reforesting'. This paper argues that that the evidence suggests that open moorland would be expected to be the dominant natural vegetation type at this stage of the post-glacial era. Because rewilding is about maintaining or recreating the natural ecological characteristics of a locality, then adding trees to the landscape is in fact reducing the remaining wildness/naturalness of the Highlands.

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Ted Green MBE, Founder President of the Ancient Tree Forum, edwardgreen629@btinternet.com

Stating the obvious-- Vera circles--Patterns in Nature

Frans Vera explains how groves of trees often from a single tree, expand outwards from the centre. In time, the original tree or trees die to create an expanding glade and the process will eventually begin again. Examples are around where this process can be found throughout the Natural World from micro-organisms to trees.

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Joe Gray, Postgraduate Student, School of Environment, Natural Resources and Geography, Bangor University, Bangor, Wales, joe@ecoforestry.uk

Enabling a more critical attitude to assessing the benefits and costs for non-human nature of active woodland management: A systematic literature review to identify knowledge gaps (poster)

Background: Forest policy is a significant element in the potential for Britain to have a wilder landscape. In England and Wales, current forestry policy links active woodland management (and even timber production *per se*), as opposed to minimal-intervention approaches, to an overall benefit for biodiversity. The associated documentation, however, does not generally present supporting evidence for the purported link.
Aims: The aim of this piece of research was to examine the nature of the evidence base that exists for biodiversity differences between managed and minimally managed semi-natural woodland in Britain.
Methods: The Web of Science and Zoological Record databases were searched on 4 July 2015 for relevant comparative evidence, and other forestry research databases were also searched. Abstracts were screened for suitability and the identified evidence was qualitatively summarized.
Results: The search returned 1881 publications for screening, of which 14 full papers were retrieved for further examination. Of these, only five papers presented studies that met the inclusion criteria (one further relevant study sited in Britain was identified in the reference list of a pertinent meta-analysis). It appears, therefore, that the evidence base for biodiversity differences between actively managed and minimally managed British semi-natural woodland is very limited. Furthermore, no studies were identified in which management strategies were allocated by randomization. As such, causal inferences cannot be reliably made from the existing evidence.

Conclusion: The findings of this systematic review support recent calls from continental Europe for the creation of a coordinated network to compare biodiversity between actively managed and minimally managed forests. Such a network could supplement long-term reference findings from minimum-intervention reserves, as were identified for England back in 2000 as part of Habitat Action Plan policy. Within this, there is a particular need to better understand the potential for natural disturbances to create suitable conditions for light-demanding species across taxonomic groups.
Afterword: Additionally, there is a need to broaden the definition of biodiversity being considered – in this debate and others – from something focused on preserving particular species to one that fully acknowledges the importance of genetic diversity and dynamic processes. In doing so, though, it must be borne in mind that a conservation strategy based on allowing ecosystems to develop out of human control is a controversial one, at least in Europe.

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The possible incorporation of less-common and non-spiny shrubs in re-wilding projects

The extent and diversity of shrubs, both in open areas, and in woodland, has varied through the historic period. One insight is provided by the Doomsday Book. For three well-recorded English counties, many enclosed woods were described as *silva minuta* (interpreted as all the tree and shrub species being coppiced, with no standards).

Modern data on surviving zones of high shrub diversity, e.g. on woodland margins, will be presented; and the graphical representation of such data discussed.

Possible means of incorporating less-common, grazing-susceptible (e.g. non-spiny) shrubs within re-wilding projects will be reviewed.

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Jozef Hernik, University of Agriculture in Kraków, rmhernik@cyf-kr.edu.pl

The roles of domestic animals in protecting rural cultural landscapes - past, present & future

For millennia, first wild and then domestic animals dwelt in the open landscapes of rural areas. Indeed, balance in these areas and the appearance of the landscape, is preserved by their presence. However, recently major changes in European rural areas have led to regions with few or no large grazing animals. In particular, there are now large areas without any domestic animals; and this is a situation which did not occur before. In such situations, occur social, economic and cultural changes which are unparalleled until now. Furthermore, there are significant changes in biodiversity with dramatic declines in key species. This paper puts forward the results of the changes in the case study rural areas in Poland that is now without domestic grazing animals.

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Dr Della Hooke, University of Birmingham, d.hooke.1@bham.ac.uk

Rewilding – Scale, Expectation and Vulnerability

This paper will discuss three scales of 're-wilding' (or preserving a more 'natural' landscape) with three examples: (1) The Welsh Rhinogau (in part a NNR and SSSI and an area where I have carried out a lot of historical research but need to find out more about present-day management and environmental objectives - we have ourselves over the years noted the loss of glow-worms, hen harriers, barn owls etc but also recently have seen a pine marten and lots of different kind of bats); several areas of woods have also recently changed ownership as large-scale management became uneconomic and I have advised in this field. (2) The Malvern Hills, managed by the Conservators. 3) And, on the smallest scale, Moseley Bog in Birmingham, an area quite dramatically 're-wilded' from previous usage in recent years and now managed by the Wildlife Trust for

Birmingham and the Black Country with much local volunteer involvement. I shall discuss pressures and archaeological vulnerability as well as ecological aims in the broadest sense.

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Reading history in landscapes "naturally re-wilded": meanings for occupation and abandonment of drainage slopes, mills and fishing ponds in royal and ecclesiastical preserves in Portugal (1400s-1800s)

… to be added

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The impact of invasive species: a case study for the Galapagos Islands (poster)

The Galapagos Archipelago is one of the most preserved places in the world but all evidence suggests, if current trends and practices continue the Archipelago and its unique properties are under threat. Invasive species have been identified as the largest threat to endemic plants and wildlife and their spread remains one of the biggest challenges for both conservation, and land use management overall for the territory. We propose that the management of invasive species is a development issue, and can aid towards sustainable growth and food security objectives, as well as the long term resilience of the Archipelago. We provide new insights through a social –science perspective, to show how effective land use planning can deal with the invasive species problem, which in turn will have positive spill-over for other sectors including conservation and agriculture. The study aims to meet the following objectives: 1) Assess the current state of terrestrial invasive species 2) Identify the obstacles to managing invasive species 3) Frame invasive species as a development issue and 4) Identify land management opportunities which include invasive species under current policies and mechanisms such as payment of ecosystem services (PES). PES can offer a real opportunity, but challenges remain in the form of 'who' and 'how' these activities will be carried out and the likely success will depend on community inclusion and effective benefit sharing schemes. Governmental institutes need to have a co-ordinated and integrated approach, which focuses on connectivity, as well as provide support for organisations and actors that are currently tackling the invasive species issue.

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Legacies of traditional tree use in mountain agriculture and implications for nature protection (poster)

Usage of trees in agriculture was part of European agrarian history from its very beginning. Cultivating crops, hay-making or pasture under various types of trees was a traditional multifunctional local specific management which resulted on European level in development in many specific cultural ecosystems like dehesas, montados, Streuobst or wooded meadows and other. Agroforestry systems were diverse and common in Czechia just 150 years ago as well (Krčmářová and Jeleček, in prep.). However they were not considered as part of the supported modern agricultural form (Krčmářová and Arnold, in press.) and today they are theoretically and practically nearly forgotten.

As the poster will show, agroforestry relics can still be found in nowadays landscape. With the help of historical tax record, namely Franciscan cadastre, former fields, meadows and pastures with fruit and forest trees were identified in one mountainous region currently included in nature protection area CHKO Orlické hory. On former

agroforestry plots a geobotanical analysis was performed and relic trees mapped. The results indicate that many plots still bear legacies of the traditional management. Today these relics are partly protected yet only from the point of general biodiversity and relic tree protection view while the cultural aspects of these plots remain unrecognised. Finally thus also the current conservational potential of the agroforestry systems relics is discussed.

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Professor Jim McAdam, Agri Food and Biosciences Institute and Queens University Belfast, jim.mcadam@afbini.gov.uk

Silvopasture as a sustainable land use option in a partially "re-wilded" managed landscape.

In intensive and semi- intensive temperate grasslands, trees are often only found in field boundaries and in small scattered woodland pockets. Such landscapes often suffer from loss of biodiversity, homogeneous community and habitat structure, landscape aesthetic poverty, eutrophication of waterways, soil degradation and rural depopulation. This paper aims to show that the introduction of wide spaced trees in silvopastoral systems can make these landscapes much more sustainable and able to be partially re-wilded in a managed fashion for multifunctional outputs.

Silvopasture can make a positive impact on sustainable landscape and rural development, compared to conventional farm woodlands, because of the diversity of employment opportunities created by multi-functional systems. Silvopastoral systems can enhance biodiversity, improve the physical environment and are having a beneficial impact on animal welfare. Economic predictions are also encouraging. Favourable farmer surveys, policy inclusion and uptake on commercial farms in Ireland also indicate that farmers have started to consider silvopastoralism as a realistic land-use option which can meet a variety of objectives in future managed landscapes.

There are appropriate examples of silvopastoral systems in Ireland, UK and Chile.

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Professor Jim McAdam, Agri Food and Biosciences Institute and Queens University Belfast, jim.mcadam@afbini.gov.uk and Rodney Burton,

Human impacts and adaptation to landscape and environmental change in the Falkland Islands

The Falkland Islands are an archipelago of 782 islands situated in the South Atlantic Ocean between latitudes 51°S and 53°S and longitudes 57°W and 62°W. They cover an area of c. 12,200km^2 and are approximately 280 kilometres from the nearest point on mainland South America. Their remoteness, isolation, low population density and human impact on the environment make them a truly "wild" landscape. The climate is cool/temperate, oceanic and is characterised by its lack of extremes. Temperatures are maintained at a moderate level with a mean for January of 9.4°C and a mean for July of 2.2°C, and ground frosts can occur throughout the year. Rainfall is low with a mean annual precipitation at Stanley of 640 mm. Climatic variation across the Falkland Islands archipelago is poorly understood. The population density overall is 4.3 km^2 per person though as most (75%) of the population live in Stanley, the rural density is much lower. Sheep farming is the main land use and, following a period of intensification following farm subdivision in the 1980s, stock densities have decreased. The small, dispersed population has had relatively low impact on the environment. Peat cutting for fuel has all but ceased. The Falklands War in 1982 has had no long-lasting environmental impact other than the legacy of uncleared minefields. The biggest environmental threat is from potential climate change increasing the risk of evapotranspiration, soil erosion, flash flooding, alien species and carbon storage.
It is concluded that the people of the Falkland Islands have adapted well to a wild and remote landscape. Carefully controlling human impact from leisure activity, an awareness amongst the farming community of the need for sustainable land management, the desire to develop sustainable eco-tourism, increased awareness of wildlife conservation and of the potential impacts of climate change are all indicators of a willingness of the population to adapt to future challenges of landscape and environmental change in the Falkland Islands.

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Ecological networks, ecosystems and wilding

Ecological networks are a prominent theme in current conservation thinking. This talk will discuss some of the issues involved in putting the concept into practice. The first part of the talk will discuss some of the challenges of applying broad principles of ecological networks to management on the ground. We will outline how our understanding of requirements across taxonomic groups, though still patchy, is improving, focusing in particular on innovative research in England that is using areas of forest and grassland created by past restoration as 'natural experiments' to improve our understanding of the relative importance of different network attributes for different taxa, together with the findings of a number of other recent studies.

The second part of the talk will broaden the focus from thinking simply about the spatial arrangement of habitat networks to the importance of considering the ecological processes that create and support areas of habitat, and therefore the role of ecological structure and function – how a system works rather than just how it looks – in designing ecological networks. Seen from this angle, the ecological networks concept is quite closely aligned to two other growing ideas in conservation: the ecosystem approach and '(re)wilding' or minimum intervention conservation. We will briefly discuss these links, and will argue that our general approach to conservation in countries like England should be to try to shift conservation planning and management, where possible, further along the spectrum from highly managed individual sites to a greater focus on natural processes, dynamism and considering networks of sites as the unit of conservation.

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Human Impact on plant ecology changes in a protected area Case study: Maliau Basin Conservation Centre (MBCA) Sabah, Malaysia. (poster)

Maliau Basin Conservation Area is considered among the most susceptible habitats to recreational and other human use. The aim of this study was to assess human impact on plant ecology on long-established trails in MBCA, Sabah Malaysia. Five (5) trails with different visitation intensity were selected for comparison. Along trails, points of sampling were predetermined prior to data collection using convenient sampling method which 10 points for every trails. Transect line was established in every point selected which perpendicular to the trail. Along transect line, 5 plots established equally aside the trails. Thus, total of 250 plots were established. Plant ecology changes were indicated using biodiversity indexes particularly Plant individuals, species richness, family richness, Species richness index, species diversity index and species evenness index. The results showed differences in number of individual plants, number of species and number of family found in every trail. Agathis trail indicated highest number of plant with 27% and the lowest was Nepenthes trail with only 13% individual, however species richness was indicated highest in Nepenthes trail at 25%. The calculation of biodiversity indexes showed little differences among trails. However, comparison of biodiversity index among different plot location indicates differences particularly comparison with plot located on trail. Mean Jaccard index (Sj) comparison among trails showed that Ginseng trail indicated high similarity at 0.326 while Nepenthes show the opposite. ANOVA for plot location indicated that there was no significant different among plot located on trail and near trail compared to control at 5m beyond the trail edge.

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Upland Farming Systems and Wilding Landscapes: A Cumbrian example

Cultural landscapes in the United Kingdom are derived from mainly agricultural activity of the last five thousand years. Wilding projects are a recent phenomenon which have received attention in both the academic and public domains. As a result a tension is emerging between those that perceive these areas as ideal for wilding experimentation and the environmental, economic and social benefits already provided by upland farming systems. The purpose of this paper, therefore, is to explore some of the experiences of farmers involved a re-wilding project to emphasise the importance of fully appreciating, collaborating and recognising how upland farming systems operate and their wider socio-economic benefits.
It is evident that intrinsic characteristics of UK upland farming systems such as its relationship with the physical environment, indigenous livestock breeds, stratification, hefting, social capital and cultural heritage play important roles in wider political and social agendas which must not be brushed aside in our pursuit of wilding. Second, there are practicalities of wilding or part wilding landscapes that are currently managed for extensive livestock production, particularly with respect to grazing management which require a deeper appreciation of how hill farming operates. It is unlikely, due to broader agendas such as biodiversity production, food security, rural sustainable development, ecosystem services and cultural heritage, that wilding and upland farming will develop in mutual exclusivity; either they will share the same land or they will be geographically contiguous and thus one will affect the management of the other. By actively learning from pilot projects like Wild Ennerdale, we can develop fully collaborative multifunctional land use of which wilding is one facet.

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and Elena Cantarello, Sarah Douglas, Philip Martin, Paul Evans, Arjan Gosal.

Managing landscape resilience: the example of the New Forest

Are wild landscapes relatively resilient to environmental change? This question is examined in relation to the New Forest National Park, UK. As the most extensive area of semi-natural vegetation in lowland England, the New Forest offers a valuable opportunity for examining resilience at the landscape scale. Evidence is provided from historical profiling, species distribution modelling, long-term monitoring and landscape-scale modelling, supported by collection of empirical data. Results indicate that: (i) the New Forest has been remarkably resilient as a socio-ecological system, having withstood many internal and external shocks over the past nine centuries; (ii) the extent of woodland cover appears to be very resilient to multiple forms of disturbance, despite the high densities of large herbivores present; (iii) climate change will likely improve the availability and condition of habitat for some species, while adversely affecting others; (iii) some elements of this system are currently undergoing major changes in structure and composition as a result of multiple stressors, including climate change. While this research has highlighted the resilience of the New Forest, results also suggest that the value of this landscape to both wildlife and people could be vulnerable, particularly if climate change interacts with the other novel stressors now affecting the system.

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Using Place Based Wildife Habitat Assessment Tools to Guide Conservation and Land Management in Rapidly Growing Metropolitan Regions

Human population growth and development patterns have led to the accelerated loss of farmland and forest raising considerable concern over the loss of biodiversity and its impact on basic ecosystem functions that support ecological services needed by society for sustainability (EPA, 2004 and Conservation Fund, 2006). To address these concerns, a rapid wildlife habitat assessment tool was developed that uses an integrated series of

databases linking forest composition, vegetative development stage, forest and non – forest structure, and non-forest habitat features with maps of known vertebrate distribution. Supported by the U.S. Forest Service, the habitat assessment tool is being used by planners and land managers to evaluate habitat impacts associated with changes in land use and natural resource management, and to identify practical opportunites for habitat restoration in the rapidly urbanizing mid-Atlantic/Chesapeake Bay region of the United States. Discussion of the tool's design and a case study of its use in the City of Baltimore metropolitan region will be given.

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Why are sheep the bête noire of so many rewilders? The economy of nature, ecosystem services and the modern enclosure of the 'Lake District's' commons

This paper contends that present day arguments for the preservation of rewilded nature in enclosed reserves based on notions of ecosystem services can be traced back to the economic and spatial logic of Linnaeus' idea of the economy of nature coupled to the individualism of the economic liberals. The motivation to write this paper derives from a desire to understand and explain the pronounced anti-sheep, anti-commons attitudes encountered amongst public conservation officials and private managers of common lands while doing recent fieldwork in the English Lake District. The case study focuses on the Maredale valley of the Haweswater reservoir, under which several villages were drowned to make the lake, after which the water company built a hotel designed to look like an estate house, complete with scenic road and car park now used by visiting bird watchers, who have come to see England's sole Golden Eagle. Here the now privatized water company United Utilities, together with the Royal Society for the Protection of Birds (RSPB), with the apparent blessing of conservation officials, appears to be effectively preparing to enclose much the valley, and remove ancient breeds of sheep from the commons in accordance with the RSPB's slogan, "making a home for nature."

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Wood pasture: past present and future – a think piece about the relationship between the priority habitat and rewilding, using case studies to illustrate key points.

Rewilding is a process that involves reducing the intensity and changing the type of human intervention on a piece of land, and allowing natural processes greater freedom to operate. (from Rewilding Britain website, http://www.rewildingbritain.org.uk/ accessed 6th August 2015)

Wood pastures are a land use type where low intensity management allows trees and grazing animals to exist on the same piece of land. The activity of domestic grazing animals creates a distinct landscape with scattered trees and grassland or heathland, which Rackham has described as savannah-like. A key feature of the wood pastures which meet JNCC's priority habitat definition and description is the deadwood present in veteran trees which provides ecological continuity with past landscapes and habitats.

Wood-pasture and parkland occurs throughout the British Isles, but Natural England are leading a project to create an inventory for this priority habitat. Examples from this piece of work will be used to illustrate some of the points made in the presentation. Understanding how the past has influenced what is in our landscapes today is helping us identify some important sites.

In describing the past, present and future of wood-pastures, this paper will briefly describe their origins, key features affecting them today as well as consider their future.

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Re-wilding ancient woodland: some lessons from a 145 year-old experiment in Lady Park Wood

Long before the current interest in re-wilding emerged, Lady Park Wood was set aside as a non-intervention reserve where natural processes in native woodland could be studied indefinitely. Formally, this experiment started only in 1944, but in part of the wood one can, with only small exaggeration, date the start back to 1870, the year when this traditional coppice-with-standards wood was last coppiced. Detailed records of stand development have been maintained since 1944, so we can now quantify and demonstrate the 145-year outcome of 'rewilding' an ancient, semi-natural coppice.

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Anthropogenic factors shaping the historical landscapes of Białowieża Forest

The paper will summarise the current knowledge on the set of anthropogenic factors which shaped the landscapes of Białowieża Forest in the past, including traditional, non-timber utilization of forest resources, periods with timber extraction, forest fires, and combine it with most recent research on the history of livestock pasturing inside Białowieża Forest. The latter activity was one of the common privileges of locals since at least the 16th century. It was also one of the longest lasting types of traditional use of the forest resources, persisting until 1973 in the Polish part of the forest. I will summarize the first phase of the interdisciplinary study assessing the role of livestock grazing in shaping forest ecosystems in 19th-20th centuries, based on historical maps and accounts. The results of this study, conducted in the best preserved European lowland temperate forest, can contribute to the ongoing discussion on the role of grazing by both wild ungulates and livestock in shaping post-glacial woodland vegetation of Europe.

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Re-wilding lowland peatland sites

… to be added

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Changing approaches to forests and nature conservation management

Forest Enterprise manages some 258,000ha of land across England and its approach to management of both productive forest areas and areas primarily managed for nature conservation is changing rapidly and significantly. Fundamentally we are moving away from plantation forestry to more naturalistic forestry, with stands composed of more than one species and those species chosen or encouraged for compatible ecological performance across a range of ecosystem services. In conservation management we are moving towards business approaches that we hope will provide both a sustainable economic and ecological basis to create vegetation structures that accommodate guilds of species supported consistently over time. Climate Change is forcing us to rethink what is native, what is natural and what is wise. We are also exploring a range of interpretations of “Rewilding” … a very popular concept amongst many staff … across the range of locations under our stewardship. Not surprisingly this will vary from the vast extensive sitka forests of Keilder Forest to the smaller ancient woods and plantations of southern England. Changes are also afoot in the two Ancient Royal Forests of the New and the Dean and these too present interesting and idiosyncratic challenges. This paper presents some of the raft of approaches and challenges in taking ideas forward across the landscape under our management control.

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'Rewilding Rivers - a view from the north'

The problem with rewilding is that the surrounding world is no longer wild! Nowhere perhaps is this more true than with rivers, the form, function and flow of which are largely determined by anthropomorphic changes to the surrounding land, many of which are historic. So, can we truly 'rewild' a river?
When the RRC was set up in the mid 1990's, the first two restoration demonstrations on the Cole and Skerne, were small scale operations on relatively low energy streams that relied more on current reality and constraints than a vision of changing catchment landscapes. The development of restoration activities since then, as tracked in Scotland, shows a gradual move towards a greater emphasis on whole catchment and multiple benefits, but still relies on an individual project approach, and the enthused amateurs, rather than strategic alignment of activities, resources and opportunities at an institutional and catchment scale.
Detailed analysis of the impacts of restoration is lacking, even at the small scale and almost completely at the larger scale. Projects such as the Eddleston Water restoration, on Tweed, are few and far between, but it is these larger scale initiatives that attempt to quantify interventions and benefits that must be the way forward. Serious money is, at last being brought to bear on re-naturalising our rivers and the opportunities are opening up, with the introduction of beavers one such example of this new approach. We are still left though with a debate on how far we want to and how far we can go towards rewilding - in terms of both delivering alternative ecosystem services (the food-water-energy nexus challenge) and in process terms reflecting the dynamic nature of rivers, floods and flows.

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Cultural severance, ecological science and rewilding

Re-wilding can readily be seen as a reaction to a long-standing cultural severance – from the land, from the wild in wildlife, and perhaps also as a subliminal desire for wholeness. In this, the re-introduction of exterminated species plays an integral part – they are the ghosts in the landscape, provocateurs of an unconscious guilt that we, humanity, killed them off in acts of hubris. Re-wilding offers then a kind of redemption. But there is a problem. What has been lost is the wild in human experience, as well as the animal or plant allies to that experience. Former ecological managers and campaigners now suppose that science and its institutions, or government and its agencies, or voluntary sector activists, can reconstitute what has been lost – but that is the problematic, for none of these institutions is wild. This paper will argue that such institutions have been created by the same mentality that destroyed wildness in the first place. The modern human is now by nature or training, working with only half a brain – the tame half. Science itself and hence all ecological science is manipulative of nature, with motive and controlling agenda. And all media, most particular journalistic, and all campaign groups that rely upon media, also seek to control outcomes. The path to wildness is not tame, it carries risks of life and livelihood, disease and starvation, vulnerability to nature's cycles and to other humans – a path away from which has marked the apparent progress of civilisation. I will argue that humanity will have no choice but to come full circle and embrace its own wildness, but less of a circle, more of a spiral in time and consciousness such that we do not return to where we started.

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The Forest of Białowieża; last remnant of the European primeval lowland forest, or what?

Historical descriptions of areas are used to “prove” that the lowland of Europe naturally was covered by a closed canopy forest. An example is the description of the Forest of Białowieża from 1826 by Julius Brincken. The description was in in French and entitled: Mémoire sur la Forêt Descriptif Impériale the Białowieża and Luthanie.

Brincken was a German forester who was taken to the area by the Russian tsar in order to transform the area into the modern silviculture, developed at that time in Germany. The landmark book for modern sulviculture is the in 1816 published book by Heinrich von Cotta with the title: Anweisung zum Waldbau. The importance of the book in circles of forestry becomes evident form the fact that until 1864 it went through nine reprints. The description by Brincken is regarded as evidence that at that time the forest of Białowieża was a closed canopy forest, which has to be considered as the last remnant of primeval forest that covered the lowland of Europe since the end of the last ice age (Daszkiewicz *et al*., 2004).

The modern meaning of the word forêt is: vast forest with a closed canopy. This modern meaning is in the interpretation of the text from 1826 extrapolated to that period (Daszkiewicz et al., 2004). This interpretation ignores the historical and social context of the word forêt at that time. I will discuss the historical and social context of the word forêt, and the word forestis, from which it is believed the word forêt is derived. I will treat other areas in Europe which were indicated as forêt, such as the Forêt de Fontainebleau, as well areas indicated with related words such as the German Forst, the Dutch foreest and the English forest. With these data, with the text from de description of the Fôret Impériale the Białowieża from 1826, combined with the ecology of species of trees, shrubs and other plants and species of mammals such as European bison (Bison bonasus) mentioned in this description, as well with long series of observations of the succession of trees in the forest of Białowieża in the 20th century. I show that the interpretation of the word forêt as closed forest in the context of the description by Brincken (1826), has to be rejected. It shows that the language can be a major pitfall in interpreting historical texts. The pitfall is that the words remain the same, while the meaning changes over time as the result of social and technological developments. Uncritically the modern meaning of words to extrapolate the past thereby leads to a completely false picture of the past. Based on the historical description by Julius Brincken and ecology of plants and animals, I consider the Forest of Białowieża in conjunction with the map of Eichwald from 1830 (Eichwald, 1830), not as the last remaining pristine forest. It was a wood-pasture like landscape cf. Vera, 2000. Therefore it can be considered as the most near to pristine landscape from the Holocene.

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Site preferences of endangered species in a former coppice of high conservation value

Coppicing is a historical form of management that has been abandoned since the 19th century in the Czech Republic. Transformation of coppices to high forests brought fundamental changes in site conditions and retreat of many species. Our study focused on the best preserved remnant of formerly coppiced subcontinental oak forest in the country – Dúbrava Wood near Hodonín. To improve our understanding of ecology of endangered species and facilitate establishing effective conservation measures, we studied their site preferences here. Specifically, we mapped the occurrence of all critically and strongly endangered species. Then we compared vegetation composition and site conditions between plots with the largest populations of endangered species and plots randomly distributed across all major forest habitats in the wood. Our analyses show that the endangered species have highly uneven distribution along several environmental gradients. They are concentrated in well sunlit forest sites with soils of high pH and K content. The herbaceous vegetation in such sites is significantly richer in species and attains higher cover. Species characteristic for subcontinental oak forests are best indicators of sites with endangered species, while some broadly-distributed shade-tolerant and nutrient-demanding forest species avoid them. Such sites belong to most threatened by successional changes (particularly spread of *Tilia* and *Carpinus*), therefore we recommend conservation measures controlling these tree species such as selective cutting or grazing. As there are some endangered species that do not follow this general trend, a mosaic of different habitats should be maintained within the forest to protect different components of its unique biodiversity.

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Use of digitally altered photographs to determine stakeholder perceptions and preferences regarding managed and wilder landscapes

A photograph of the Borrowdale Valley in the Lake District National Park was digitally altered into a series of 6 images containing different levels of woodland cover. The images of trees used resembled the existing ancient semi-natural oak woods in the area. More than five hundred people completed an online survey to determine their views on the varying levels of woodland.

When asked to identify the current reality, 80% of the respondents chose a photograph showing considerably less woodland cover than exists at the moment. But when they were then asked to choose their most 'desirable' future view, 69% chose photos showing more woodland than the current situation.

The implications for future land management will be discussed and a different viewpoint will be shown to assess the conference audience's recognition of another Lake District landscape and their desire for greater, less or similar woodland cover within it compared to the current reality.

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Problems with 'Re-wilding'

There is currently much enthusiasm for 're-wilding' parts of the British landscape but the concept has not, perhaps, always been subjected to sufficient critical scrutiny. In this paper I will suggest that re-wilded landscapes would, because of the influx of new plant and animal species over the last thousand years, remain essential artificial constructs. In some ways they would be as remote from anything truly 'natural' as the farmed and managed landscapes which currently dominate Britain. I will also point out that the arrival of farming and the subsequent development of cultural landscapes served not to reduce but rather to raise levels of biodiversity in Britain, by massively increasing the range of different habitats – heaths, downs, coppiced woodland, meadows, arable and the like. These, and the particular wildlife they sustain, have a vital cultural importance: they are deeply embedded in our art, literature and much else, something which should not be lightly disregarded, given that our essential interactions with 'the natural' are structured by and mediated through our shared culture . None of this is to deny that some areas of Britain might be profitably 're-wilded'. But it is to argue that this concept should not be allowed to absorb too much of our attention, however fashionable and new it might appear. Most of Britain will always remain as farmed and settled land, and the better management of this for wildlife – and a better understanding of the social an economic developments which have, over thousands of years, shaped our complex and diverse environments – are also matters which deserve our urgent attention.

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Displays:

Ancient Tree Forum
BANC
British Wildlife Publishing
Bruichladdich Distillery
Gwent Wildlife Trust
Hagges Wood Trust
Hearts of Oak Project (White Rose Universities)
SYBRG
Tree Stories Project
Wildtrack