9th National Heathland Conference

CONFERENCE PROGRAMME

8 - 10 August 2006 at the University of Aberdeen

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9th NATIONAL HEATHLAND CONFERENCE

CHANGING LANDSCAPES

KING'S COLLEGE, UNIVERSITY OF ABERDEEN

Tuesday 8, Wednesday 9 and Thursday 10 August 2006

CONFERENCE PROGRAMME

TUESDAY 8 AUGUST		
From 09.30	*Registration*	
10.00–11.00	*Tea and coffee*	
Time	**Speaker**	**Theme**
SESSION 1 Chair	Lynne Farrell (Scottish Natural Heritage)	
11.30–11.40	Chairman's introduction	
11.40–12.30	Drennan Watson	The social geography of Scotland's heathlands
12.30–13.30	*Lunch*	
SESSION 2 Chair	DRIVERS OF CHANGE Lucy Sheppard (Centre for Ecology and Hydrology)	
13.30–13.40	Lucy Sheppard and Sally Johnson (Scottish Natural Heritage)	Drivers of change in upland and lowland heaths
13.40–14.10	Andrea Britton, Alison Hester, Javier Perez-Barberia (Macaulay Institute)	The only constant is change: using archive data to explore drivers of change in heathland communities over the last 30 years
14.10–14.40	Sally Power (Imperial College)	Nitrogen and heathlands: impacts and management decisions

14.40–15.10	Tony Waterhouse (Scottish Agricultural College)	Changes in support schemes for agriculture and land use – what will be the impacts upon heathlands?
15.10–15.25	Discussion	
15.25–15.55	*Tea and coffee*	
SESSION 3 Chair	MANAGING CULTURAL LANDSCAPES – PRACTICAL Steve Clarke (English Nature)	
16.00–16.05	Chairman's introduction	
16.05–16.25	Adrian Newton, Anita Diaz (University of Bournemouth) and Gavin Stewart (University of Birmingham)	Systematic review of heathland management
16.25–16.45	Andrew Tuddenham (National Trust)	Breaking down the boundaries – Tomorrow's Heathland Heritage in Pembrokeshire
16.45–17.05	Moira Greig (Aberdeenshire Council)	Zones of survival – the archaeology of heathlands in NE Scotland
17.05–17.25	Robin Pakeman and Nick A Littlewood (Macaulay Institute)	Managing moorlands for heather and the whole community
17.25–17.45	Jo Burgon (National Trust)	Recreation and access
17.45–18.00	*Discussion on talks*	
18.00–18.10	Lynne Farrell (Scottish Natural Heritage)	Briefing re Field Trips – Wednesday 9
19.00–20.00	*Dinner*	
20.00–22.00	Cultural event – guided evening walk around Old Aberdeen (numbers per group to be limited to 15)	

WEDNESDAY 9 AUGUST

08.00–08.45	*Breakfast*	
Time	Speaker	Theme
SESSION 4	FIELD TRIPS (packed lunches provided)	
09.00–15.00	Field Trip 1: Sands of Forvie	Management, access, grazing. Open areas of sand. Breeding of key protected species and the effects of the sea
	Field Trip 2: Red Moss of Netherley	Fragmentation, possible effects of Aberdeen Western Peripheral Route. SAC designation. Management
	Field Trip 3: Bennachie	People, access, erosion, archaeology, ownership, management, forestry, visitor centre
15.00–16.00	*Tea and coffee*	
SESSION 5 Chair	LOOKING TO THE FUTURE/FUTURE HEATHLAND LANDSCAPES Martin Auld (RSPB)	
16.00–16.05	Chairman's introduction	
16.05–16.25	James Bullock (Centre for Ecology and Hydrology)	The ecological context for large-scale habitat management and re-creation
16.25–16.45	Roger Catchpole (English Nature)	Landscape mapping of ecological networks
16.45–17.05	Gavin Bloomfield (RSPB)	Opportunity mapping in the planning system
17.05–17.25	Nigel Symes (RSPB)	Delivering large-scale heathland re-creation
17.25–17.40	*Discussion on talks*	
18.15–19.15	Poster Session and Reception	
20.00	*Conference dinner*	

THURSDAY 10 AUGUST

08.00–08.45	*Breakfast*	
Time	Speaker	Theme
SESSION 6 Chair	DISCUSSION GROUPS AND SUMMING-UP Lynne Farrell (Scottish Natural Heritage)	
09.00–09.10	Chairman's introduction	
09.10–10.10	Discussion Groups	
	Discussion Group 1 Chair / Facilitator: Jo Burgon Rapporteur: Andrew Tuddenham	Access and recreation
	Discussion Group 2 Chair / Facilitator: Anita Diaz Rapporteur: David Bullock	Restoration and re-creation of heathland – what works, when and how?
	Discussion Group 3 Chair / Facilitator: Adrian Newton Rapporteur:	Management techniques
	Discussion Group 4 Chair / Facilitator: Graham Sullivan Rapporteur: Fiona Hunter	How can the past inform the future?
10.10–10.40	*Tea and coffee*	
10.40–11.40	Reports from Discussion Groups	
11.40–12.00	Isabel Alonso (English Nature)	Conclusions / summing-up / thanks
12.00–12.30	Isabel Alonso	Business session – where do we go next? Shropshire 2008? (Invasive species)
12.30–13.30	*Lunch/Depart*	

ABSTRACTS

in programme order

TUESDAY 8, WEDNESDAY 9 and THURSDAY 10 AUGUST 2006

NOTES

DRIVERS OF CHANGE IN UPLAND AND LOWLAND HEATHS

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Heathlands are arguably a man made ecosystem. They owe their existence, in Scotland at least, to the wetter climate and mans farming activities – tree felling, grazing animals and burning. Scottish heaths are more usually known as moorlands and are often interspersed with bogs. The moorlands of Scotland, like their counterparts down south, provide an open landscape with scrub; juniper, birch and willow in the north; *cf* gorse in the drier south. Such landscapes provide a valuable resource for wildlife and are important in terms of conservation, recreation and the local economy.

This short introductory talk introduces some ways in which man's activities continue to impact on heathlands. Man's activities as a farmer, manager, polluter and now through effects on climate continue to shape our heathlands. The interaction between the activities that created these habitats is finely balanced and changes in these interactions are now resulting in the declining condition of these habitats. The EU and UK legislation now in place aims to ensure the future of these important ecosystems and restore their conservation value as a significant land use type.

Heathlands occur on soils with inherently low levels of available nutrients. As a result the indigenous plant communities tend to rely on mycorrhizas eg the ericoids and have relatively slow growth rates, commensurate with the low levels of available nutrients. Such communities often occur in repeating mosaics with accompanying lower plants such as mosses, liverworts and lichens. In days gone by muirburn (burning) and cutting with limited grazing and the absence of invasive species has preserved this non-climax ecosystem. However, in the last 30 years such management has become prohibitively expensive and many traditional management skills have been lost. To compound this, our heathlands are increasingly threatened from effects of eutrophication – N enrichment, arising from man's activities. N enrichment can change the competitive balance between species and leave ericoids vulnerable to attack from pests, pathogen or climatic stress.

This session will address:

1 the scale of threat presented by eutrophication, by examining what N does and how we may be able to reverse the changes;

2 the effect of climate change, with the potential for a warmer, drier / wetter environment that will speed up the biological clock of heathlands and will influence water status. Many knock on effects will occur if the biological activities of the soil microbes are accelerated: and

3 the role of laws passed by government and particularly the European Union which influence financial incentives for heathland management for conservation and oblige landowners to manage and restore heathlands.

NOTES

THE ONLY CONSTANT IS CHANGE: USING ARCHIVE DATA TO EXPLORE DRIVERS OF CHANGE IN HEATHLAND COMMUNITIES OVER THE LAST 30 YEARS

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Heathland communities in the UK span a wide altitudinal range, from maritime and lowland heaths at sea level, to alpine heaths which approach some of the highest UK mountain summits. The species composition of these communities is not static but reflects the past and present impacts of a number of 'drivers of change' including climate, management activities and pollution. The importance of individual drivers varies along the altitudinal continuum with climax communities such as alpine and maritime heaths being strongly influenced by climate, while lowland and upland heaths often rely on management for their continued existence. All types of heathland communities however, are exposed to multiple drivers and the likelihood of complex and difficult to predict interactions between them. While there is increasing concern about the future impacts of climate change and pollution on our natural heritage, effective conservation management requires an understanding of how these communities respond to such complex combinations of drivers to inform future management choices.

Experimental studies at a variety of scales can increase our understanding of processes and mechanisms in heathland ecosystems but are usually focussed on single drivers and their results may be site-specific and difficult to generalise. A variety of modelling approaches can also be used to provide more general predictions at larger scales, but how do we test the accuracy of such predictions? In this presentation we show how archive vegetation data sets, collected by colleagues from previous generations in the 1950's, 60's and 70's may provide a way of measuring change over the long term and evaluating the role of multiple drivers. This information can provide an important method of testing the hypotheses and predictions generated by modelling studies, and the generality of experimental studies. We describe recent work evaluating changes in alpine heathland communities and their links to climate, pollution and grazing impacts, and also a new project which is extending this approach to upland heaths and heathland / woodland ecotones.

KEY POINTS

- Heathland communities are not static but are continuously changing over a variety of timescales. Current species composition reflects responses to a variety of drivers both past and present.
- Heathland communities are exposed to multiple drivers of change but interactions between drivers may be complex and difficult to predict.
- Future management of heathlands, especially in the context of climate change, requires accurate predictions to be made but how do we test our models and hypotheses?
- Archive data sets collected during the 1950's–1970's provide a 'snapshot' of past vegetation composition and allow evaluation of change over the long term.
- Coupling archive data with information on climate, grazing and pollution changes can provide a method of testing hypotheses of driver impacts.

NOTES

NITROGEN AND HEATHLANDS: IMPACTS AND MANAGEMENT DECISIONS

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The dominance of heathland by dwarf shrubs is attributed largely to their tolerance of nutrient-poor conditions. However, over the past few decades, human disruption of the global N cycle has resulted in a substantial increase in the amount of N being deposited to terrestrial and aquatic ecosystems. Annual rates of N deposition have increased from levels in the region of 1–2kg ha^{-1} yr^{-1} in the late 1800's to a current mean value of 17kg ha^{-1} yr^{-1}; some parts of the UK experience deposition rates of even up to 50kg N ha^{-1} yr^{-1} (NEGTAP, 2001). This increase in available N has led to some fundamental changes in plant performance and ecosystem health.

Studies have shown that increasing N availability affects the growth and chemistry of *Calluna*, and increases its sensitivity to climatic stress and herbivory. Changes in litter quality and associated effects on the soil microbial community are responsible for faster nutrient cycling, with knock on effects on soil nutrient availability. The combination of accelerated growth and increased stress sensitivity has detrimental consequences for *Calluna* and associated species (eg lichens and bryophytes), providing opportunities for grass and scrub invasion.

Nutrient budgets for upland and lowland heathlands show that the majority (>60%) of the N which builds up in the system is stored in the litter and soil compartments (Power *et al.*, 1998) suggesting that management removal of above-ground biomass will have only a limited effect on nutrient accumulation. Results from field and modelling studies indicate that, at sites which have experienced high rates of N deposition, or where management has occurred infrequently in the past, targeted removal of litter and / or humus may be needed to restore the low nutrient environment which favours dwarf shrubs (Niemeyer *et al.*, 2005; Terry *et al.*, 2004). The potential for management to mitigate the effects of atmospheric N deposition will be discussed in relation to an ongoing field experiment, at Thursley Common NNR.

Although emissions of nitrogenous pollutants are predicted to decline over the next decade, the effects of post-industrial N loading will not disappear overnight. Heathland recovery from eutrophication is likely to be a slow process (Power *et al.*, 2006), but one which can be influenced by the type and / or frequency of management employed.

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NOTES

CHANGES IN SUPPORT SCHEMES FOR AGRICULTURE AND LAND USE – WHAT WILL BE THE IMPACTS UPON HEATHLANDS?

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Sheep Annual Premium, Suckler Cow Premium, arable and other production subsidies were discontinued and, in their place, entitlements for the new Single Farm Payment (SFP) began in 2005. The four home countries has adopted different means of calculating the new fully decoupled payments and implementing the details. The agri-environment packages associated with heathland also differ dramatically. Previously, upland farmers needed a quota for the livestock premia, and the requisite number of stock on their holdings. Now in the era of 'freedom to farm', land is the prime requirement and farmers must have adequate land available for SFP. Many other EU countries have opted to 're-couple' payments to headage, and 61% of suckler cows and 56% of sheep and goats in the EU-15 still receive coupled headage payments (Osterburg and van Horn, 2006). The Less Favoured Area payments are also under transition and may in effect become decoupled. Cross-compliance under Good Agricultural and Environmental Condition (GAEC) is key to SFP payment. The relevant GAEC issues for heathland are 'overgrazing', 'undergrazing' and 'encroachment of unwanted vegetation'. To enable SFP payment, claimants may farm in fairly normal ways or just meet GAEC. For the latter, land must be able to return to agricultural use within the next growing season. Such notional agricultural use could range very widely, and may never actually require to be grazed (eg muirburn).

For *in situ* land managers, with complex farms, farmhouses and families to consider, the impacts are proving immense. Financial returns for upland livestock without the former subsidies are typically negative and current systems are arguably unsustainable. For many, SFP will cross-subsidise the farming operations as they adapt. They will seek productive livestock solutions, meaningful economic solutions under agri-environment schemes and ways to meet minimal criteria for SFP and LFA payments. Larger land-owners, with hired labour, are likely to act in more extreme manner. The new era started 18 months ago with the following trends:

- abandonment, or partial abandonment of active farming, especially of difficult land;
- warming interest in income from agri-environment schemes, complementing other priorities;
- search for easier care stock and management systems – with reduced labour requirement;
- search for more productive stock to use the hill area for some parts of the year;
- an uncertain / unstable future for hill livestock grazing use;
- declines in the labour force and skills for land management activities.

Over the UK a much reduced intensity of grazing might be the main overall outcome, but there may be areas of increased intensity, areas outside cross compliance controls, greater variation in the management type and intensity with increased dependence on agri-environment schemes to provide the prime focus for upland land management. Upland land use and farming will change. Given the scale of management change, habitat change is inevitable and unpredicatable.

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NOTES

SYSTEMATIC REVIEW OF HEATHLAND MANAGEMENT

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The (re-)introduction of grazing on lowland heathland has generated widespread concern among the public, and for this reason, there is a need to collate the best information available to support management proposals involving heathland grazing. Here we describe results of a systematic review of research that has examined the impacts of grazing on heathland, in comparison with other management approaches. As few formal research studies investigating this issue have been completed to date, we also describe a questionnaire survey that is currently being undertaken, designed to collect and synthesize evidence based on the observations made by heathland managers themselves. Suggestions will be presented regarding how such expert knowledge can be combined with information from research investigations, to provide evidence for and against different management options.

NOTES

BREAKING DOWN THE BOUNDARIES – TOMORROW'S HEATHLAND HERITAGE IN PEMBROKESHIRE

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There is more lowland and coastal heathland in Pembrokeshire than any other part of Wales, supporting significant populations of priority fauna such as chough and marsh fritillary butterflies, and a characteristic wetland flora that includes a number of threatened species. Livestock farming is a significant driver of the Welsh landscape, and the Celtic fringes are no exception. Grazing withdrew relatively recently from the majority of the lowland sites in the 1980s. Boosted by funding through the Tomorrow's Heathland Heritage programme, the National Trust has been able to expand and develop its ongoing work to reintroduce grazing with cattle and ponies onto its own heathland properties and, through working in partnership with other bodies and land managers, has directly undertaken the restoration of a series of inland commons of varying ownership. This work is in turn being taken on by local farmers. The 'Gweundir Byw Sir Benfro – Pembrokeshire's Living Heathlands' project has challenged the perceived norms about what is heathland, who should restore it and what function it serves in the modern landscape.

NOTES

ZONES OF SURVIVAL – THE ARCHAEOLOGY OF HEATHLANDS IN NE SCOTLAND

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Since man first arrived in NE Scotland c9000 years ago he has slowly altered the landscape, with the first farmers in the Neolithic period starting to clear the land for farming by slash and burn method. The destruction of the natural habitat continued on a larger scale through the Bronze Age and Iron Age, with upland sites in the earlier periods being built when the climate was more favourable to agriculture and the land better drained than the lower valleys.

People have also used wetland areas for centuries as a source of food or a place of refuge. However, with changes in climate and soils, areas that were once dry have become wetlands or, on lower ground, moorland may have developed over ground once fertile but now made sour. Peat growth in particular can obscure large areas of prehistoric settlement, many features of which can still be preserved under the peat (Hunter, 1996).

In some coastal areas sand dune systems with coastal heath now overlie once productive areas, with early sites being revealed occasionally by sand movement, especially after storms (Ralston, 2000).

The coming of the Agricultural Revolution in Scotland in the late 18th & 19th centuries made the greatest impact, with drainage clearing many former wet areas and destroying numerous archaeological sites, which now lie under large arable areas and are only occasionally visible as crop mark features in arable crops. With the changes in agricultural techniques the upland areas became less desirable and less accessible to later farm machinery.

Today the heath and moorland areas have not been as disturbed by later agricultural developments as has the lower ground, so they can still contain intact field systems, settlements and defensive sites from the earlier periods. The preservation and extent of some of these sites can make some of them of national, if not international importance.

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NOTES

MANAGING MOORLANDS FOR HEATHER AND THE WHOLE COMMUNITY

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Heathlands and moorlands dominated by dwarf shrubs have seen a decline in area and condition. Part of this decline is a consequence of over-exploitation by grazing animals forcing the vegetation into one dominated by more grazing tolerant grasses. Recently, many efforts have been made at improving the condition of some areas and in restoring others.

Two experiments are reviewed, one on degraded 'dry-heath' (Pakeman *et al.* 2003) and one on degraded 'wet-heath' (Hulme *et al.* 2002), where grazing levels were manipulated to rehabilitate dwarf shrub-dominated plant assemblages. The experiments showed that:

- recovery was proportional to the reduction in stocking rate;
- recovery was appreciable at 0.7–0.9 sheep ha^{-1} yr^{-1}, so recovery can be integrated with some economic return;
- on wet-heath summer grazing was necessary to prevent dominance by purple moor grass;
- effective management is best based on utilisation rates rather than stocking levels due to the different productivity of different areas.

Degradation and restoration are usually measured in terms of heather or dwarf shrub cover, but they also affect a wide range of other species. Large scale restoration (grazing exclusion and mechanical restoration) schemes have been analysed to show how plant bugs (*Hemiptera*), moths (*Lepidoptera*) and subordinate plant species respond to management. Comparisons showed:

- degradation causes major shifts in icommunity composition (Littlewood *et al.* 2006);
- controlled grazing was better at restoring the vegetation assemblage (Littlewood *et al.* in press a);
- *Lepidoptera* followed the same pattern as the plants, but hemipteran assemblages were most closely restored after mechanical restoration (Littlewood *et al.* in press b);
- 'heather' restoration substantially restored other parts of the moorland community.

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NOTES

RECREATION AND ACCESS

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Thirty years ago we may have seen conservation and recreation use of moorland and heathland in conflict. Conservation needs were very often determined by the changes occurring in agricultural management including the management of grouse moors. In the lowlands the loss of grazing and in the uplands the issues of over grazing have concentrated the conservationists energies.

The long-standing battleground of the right to roam in England, Wales and Scotland to mountain, moor, heath and down has been resolved by the introduction the right of access through the CROW Act and the Land Reform Act. What have these pieces of legislation brought to the benefits of upland and lowland heath for conservation and people? What issues still need to be addressed to ensure that these landscapes and habitats can be made accessible to people while at the same time retain their quality?

The proposition is that access is a benefit for good to the better conservation management of heath and moor. By engaging positively with those who enjoy moors and heaths for outdoor recreation a greater appreciation and understanding will be engendered for their long term management.

NOTES

THE ECOLOGICAL CONTEXT FOR LARGE-SCALE HABITAT MANAGEMENT AND RE-CREATION

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At first glance it seems that heathlands are very dynamic over time, but spatial dynamics are less important. This is partly derived from management and restoration which concentrates on modifying temporal dynamics, eg burning, cutting, scrub and bracken control, and seed sowing.

I shall illustrate the great importance of large-scale spatial dynamics in lowland heaths, and will show why such processes must be considered in management and restoration.

Long-term data sets show changes in rare heathland plants over time. Many have declined in occurrence, although some have expanded, such as the Marsh Gentian. However, within these gross dynamics we see patterns of loss and re-colonisation. I will discuss whether these species are showing metapopulation dynamics or other more subtle types of regional dynamics.

Lowland heaths provide one of the few examples whereby plant species interact to influence each other's large-scale distributions. The two dwarf gorse species have separated distributions which overlap in certain areas. Within these overlap zones we see further evidence of mutual exclusion.

Lowland heaths provide classic examples of habitat fragmentation. Recent work is showing the impacts of this fragmentation, for example on the Dartford warbler. This bird has responded not only to habitat loss but also to other consequences of fragmentation. These include avoidance of smaller and more isolated heaths and reduced breeding success in heaths surrounded by urban development.

Scrub invasion is a highly spatial process. Analysis of patterns of invasion illustrates how the status (eg size, vegetation type) of individual heaths is unimportant, but the distribution of scrub in and around a heath at the start of a time period heavily influences the change in scrub cover over that period.

Our accumulating data sets for the dispersal of heathland species show large differences in dispersal potential, but also the importance of various species interactions for facilitating dispersal, such as ants dispersing gorse. Such data are being used to model spread and distribution change of heathland plants.

This evidence of the importance of large-scale processes in heathlands raises the question of how we can influence these processes to aid the maintenance and re-creation of heathland. I shall discuss the role of free-range grazing in this context and how we can consider landscape structure in conservation planning.

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NOTES

LANDSCAPE MAPPING OF ECOLOGICAL NETWORKS

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Establishing an appropriate evidence base to underpin the widespread application of 'opportunity mapping' in land use management in the UK presents a considerable challenge. Even though established ecological principles are available these are often either mis-represented, or more commonly, completely ignored in favour of bottom-up approaches that stress local knowledge. While local participation is clearly important, there is an inequality of skills and knowledge between different areas that means that current ecological thinking is often not applied and strategic issues that require a national overview, such as climate change, are often ignored. Clearly if the expenditure of taxpayers money and the limited resources available to conservation is to be justified, we need more than just visions and partnerships. The challenge is to incorporate specialist knowledge and strategic delivery objectives into a range of products and toolkits that can help inform local decision making. This presentation will consider how this can be achieved through the application of a spatially explicit product that defines functional habitat networks and a spatially explicit toolkit that defines habitat potential. Together these approaches clearly identify the areas for maintenance, enhancement and restoration of different habitats in a consistent and ecologically robust manner. Their application and future development will also be considered.

NOTES

OPPORTUNITY MAPPING AND THE PLANNING SYSTEM

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Recent changes to land-use planning in England and Wales broaden its traditional role and support a stronger spatial dimension. The RSPB advocated the reflection of habitat expansion opportunities through strategic planning mechanisms in its report *An Assessment of the Value and Practicality of Habitat Re-creation Opportunity Mapping: A pilot study covering East Dorset, Purbeck and Christchurch* (November 2004), summarised in the leaflet *Making Space for Wildlife: Positive Planning for Biodiversity*. In August 2005, the ODPM published the new *Planning Policy Statement 9: Biodiversity and Geological Conservation (PPS9)* for England, which takes on board the key recommendations from *Making Space for Wildlife*. It represents a clear steer from Government on the role of planning in enhancing, as well as protecting, environmental assets.

Specifically, PPS9 advises regional planners to identify broad areas for habitat restoration and enhancement in Regional Spatial Strategies (RSS). Local Development Frameworks (LDFs) are required to identify areas for the creation of priority habitats that contribute to the regional targets set out in the RSS, and support this through appropriate policies. Both the RSS and LDFs are subject to annual monitoring, which will identify actions to ensure that targets are met in future years. The most effective and logical way to identify, agree, allocate and safeguard these areas is through a spatial, map based approach. Such an approach has been developed in a number of English Regions, eg Nature Map in SW England, and should, therefore, be reflected in emerging LDFs. Arrangements in Scotland, Wales and N. Ireland are under review, and opportunities therefore exist to reflect this spatial approach to positive planning for biodiversity throughout the UK.

The availability of accurate and readily intelligible data will be crucial to mapping habitat expansion opportunities. In reflecting these opportunities, planners require a reasonable level of certainty that the land they map is the most appropriate for habitat expansion and therefore that it is identified through a rigorous process, following a robust methodology. The onus is on the planning authority to gather the necessary information, but they need to be supported by bodies that possess specialist information and skills.

The reflection of habitat expansion opportunities through development plans in England represents a major step towards integrating Habitat Action Plan (HAP) targets with the land use planning system. Once reflected, the planning systems throughout the UK offer limited scope to deliver the habitat expansion: Options include earmarking developer contributions for this purpose, requiring 'green infrastructure' provision and requiring open space to divert pressures from new development on existing wildlife sites. However, even without a mainstream implementation mechanism through the planning system, this approach enables planning decisions to be informed by potential, as well as extant, wildlife value, and by the opportunity cost of their loss.

NOTES

DELIVERING LARGE-SCALE HEATHLAND RE-CREATION

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Lowland heathland has a long history of decline dating back over a hundred years. Thomas Hardy wrote in 1895 that the heaths of Dorset "*being virtually one in character and aspect, though their unity, or partial unity, is now somewhat disguised by intrusive strips and slices brought under the plough with varying degrees of success, or planted to woodland*".

Today, following perhaps 20 years of concerted conservation, the surviving heathland habitats are in general well protected and their conservation status is for the most part improving. However, they remain highly fragmented; the remaining 58,000ha in England is made up of over 3,000 fragments. This puts immense pressure on the wide range of rare wildlife that is dependent on Lowland Heathland, and limits the intrinsic appeal that expansive heathland landscapes would otherwise have. It also puts immense pressure on the habitat itself through rapid successional colonisation, and other human related pressures.

All this underpins a strong rationale for restoring expansive heathland landscapes that are of great cultural, community and biological value. The need to re-create heathland is recognised in the UK Biodiversity Action Plan, which has set a target for it. This has been cascaded into a range of policy and delivery mechanisms (for example the Higher Level Stewardship scheme in England), such that many of the constraints on restoring heathland landscapes have been removed. Two things remain; one is to develop a long term vision for Lowland Heathland that we can all agree to, and the other is to demonstrate that it is achievable. They will then, hopefully, make it difficult to not deliver.

This paper will present some of the evidence that heathland re-creation is achievable, and hence lend support to developing such a vision, through case examples.

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