

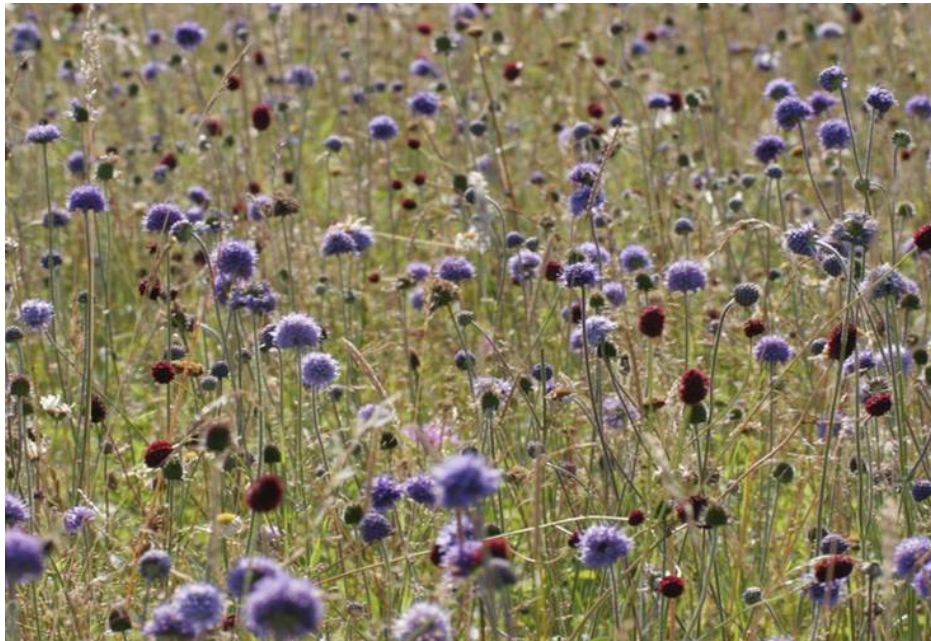
# Floodplain Meadows Partnership



The Open  
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## FLOODPLAIN MEADOWS: A THREATENED HABITAT

Wednesday 21st April 2010

The Open University Campus, Walton Hall, Milton Keynes,  
UK



The Open  
University



Centre for  
Ecology & Hydrology  
NATURAL ENVIRONMENT RESEARCH COUNCIL



This conference has been organised by the Floodplain Meadows Partnership, hosted by the Life Sciences Department at the Open University. Funds have been received from CEPSAR (Open University), and from the Open University Development Office. Many thanks to all those who have helped with the funding and organisation of this event, and most particularly to Michelle Duke who has helped with all elements of conference administration.

**CEPSAR**

Centre for Earth, Planetary, Space & Astronomical Research



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# Programme for the day

9.45 Introduction to the conference and formalities

## **Session 1: Introduction to meadows and their vegetation**

**Chair: Richard Jefferson, Natural England Grassland Specialist**

9.50 John Rodwell: Floodplain Meadows: a European context and history

10.20 David Gowing: Hydrology and vegetation of floodplain meadows in the UK

10.50 Questions

The future of meadows' research: introduction to exercise

## **11.00 Coffee**

## **Session 2 Floodplain Meadow Research from across Europe**

**Chair: Clare Pinches, Natural England Grassland Specialist**

11.20 Jos Verhoeven: Flood nutrient dynamics in meadows

11.50 Norbert Holzel: Nutrient issues and recruitment limitation in flood meadow restoration

12.20 Alison McDonald: Lowland meadows, management and history

12.40 Caitriona Maher: "Irish floodmeadows – flooding, farming, flowers and flies"

13.10 Questions

## **13.20 - 14.30 Lunch and exercise**

## **Session 3: Restoration case studies**

**Chair: Miles King, The Grasslands Trust**

14.30 Robin Field: A restoration case study on the River Nene, Northamptonshire, UK

14.45 Kerry Lock: A restoration case study on the River Thames, Oxfordshire, UK

15.00 Arnaud Duranel: A restoration case study on the River Ray, Oxfordshire, UK

15.15 Matthias Harnisch: Restoration of floodplain-meadows along the northern Upper Rhine; some practical aspects

15.45 Questions

## **15.55 Tea break**

## **Session 4: UK policy on meadows, management and restoration.**

**Chair: Ann Skinner, Environment Agency**

16.15 Jen Heathcote: Historic environment, policy and practise in the UK

16.30 Steve Peel: Meadows in the agri-environment

16.45 Miles King: Conservation incentives and opportunities, a view from the Grasslands Trust

17.00 Questions

Results of research exercise and summing up

17.15 End

## **John Rodwell: Floodplain Meadows: a European context and history**

johnrodwell@tiscali.co.uk

### **Abstract**

Throughout Europe, floodplain meadows long provided a productive source of fodder and grazing land for traditional farming integrated with the unrestrained or managed flooding of mature river valleys. This sustained a diverse range of grassland types related to regional climatic conditions and the particular character of the local farming systems, interactions often expressed in distinctive kinds of cultural heritage as well as in striking kinds of biodiversity. Flood control, reclamation and intensification have everywhere reduced and fragmented this diverse resource and, where grasslands remain, has caused a convergence to ubiquitous, species-poor, high-productivity swards. The intimate relationships between people and nature in place have also been disrupted and distinctive landscape character lost. The Vegetation Map of Europe and the overviews provided by the European Vegetation Survey help us develop an integrated understanding of the diversity of the remaining resource and the prospects for restoration or the creation of new floodplain meadow systems.

### **Biography**

John Rodwell was coordinator of the UK National Vegetation Classification and editor of 'British Plant Communities'. Until recently Professor of Plant Ecology at Lancaster University, he now works independently, providing research products and services for wildlife, environment, agriculture and forestry agencies in the UK and beyond. He has over 30 years' experience of survey and interpretation of grasslands and continues to provide advice and training on their ecology and management. For Natural England he led the team that produced the report UK Lowland Grasslands in a European Context. He represented the UK in the Vegetation Map of Europe project and led the European Vegetation Survey team that produced the Diversity of European Vegetation. He was awarded the 2009 Institute of Ecology and Environmental Management Medal for his 'distinguished contribution to the advancement of vegetation science in Britain and through Europe'.

## **David Gowing Hilary Wallace and Mike Dodd: Hydrology and vegetation of floodplain meadows in the UK**

Department of Life Sciences, The Open University, P.O.Box 75, Walton Hall, Milton Keynes, MK7 6AL  
D.J.Gowing@open.ac.uk

### **Abstract**

The research group at the Open University has been gathering data from a range of UK meadows over the past 15 years to look for patterns in vegetation and how they correspond to environmental variables. This talk will describe the database that has been set up to organise the resultant data and present a preliminary analysis of the hydrological information it contains. Our question is which parameter of soil water regime is most effective at predicting which species are present at a given point.

At a plant community level, we have used cluster analysis to organise the botanical survey results and have identified different sub-community types within the floodplain meadow community as identified by the National Vegetation Classification in the UK. We will briefly describe the sub types and comment of their differentiation with respect to water regime and soil fertility.

### **Biography**

David gained a PhD in Environmental Plant Physiology from Lancaster through studying the way plants responded to drying soil. He developed his research at Cranfield University by studying how vegetation patterns were linked to soil water regimes. Since 2000, he has been at the Open University, where he has continued to look at how vegetation responds to changes in soil wetness and fertility. In 2007, he became director of the Floodplain Meadows Partnership and is interested in all aspects of conservation with respect to this habitat.

## **Jos Verhoeven: Floods and nutrient limitation of riverine grasslands**

Jos T.A. Verhoeven, Boudewijn Beltman and Martijn Antheunisse (Ecology and Biodiversity, Utrecht University, P.O. Box 80084, 3508 TB Utrecht, The Netherlands)

### **Abstract**

Flooding is a natural feature of floodplain habitats. The effects of occasional flooding on the functioning of riverine grasslands have shown that flood events have a major impact on the nutrient dynamics in the floodplain soils. Floodplains along temperate rivers often show nitrogen-limited plant growth; in parts of floodplains that have a low flooding frequency (e.g. once in 20 years), the vegetation responds to flooding with a productivity increase and a period of plant growth without nutrient limitations. This period may last for up to 10 years and is influenced by the management of the grassland (mowing versus grazing). These flood events are also a major controlling factor of the species composition of the vegetation. These issues will be illustrated by recent studies in European riverine grasslands.

### **Biography**

Dr. Verhoeven is professor of Landscape Ecology at the Department of Biology of Utrecht University, The Netherlands. He graduated at the Aquatic Ecology group at Radboud University Nijmegen (1980). He has also held visiting faculty appointments at the Smithsonian Environmental Research Center at Edgewater, Maryland (USA) and Murdoch University at Perth, Western Australia. He is a former Editor of *Wetlands*, and *Wetlands Ecology and Management* and presently serves on the editorial board of *Ecological Engineering*. He is a member of the executive board of INTECOL, the International Association of Ecology. He was the chief organizer of the 7th INTECOL International Wetlands Conference in Utrecht in 2004 (900 participants). He is also active as an expert in large scientific programs (e.g. Knowledge for Climate) and European networks (European Science Foundation, EU-funded projects, e.g. EVALUWET, NICOLAS, EUROLIMPACS, REFRESH). His research focuses on the biogeochemistry of wetlands at the ecosystem level, primarily the interactions between the biogeochemical cycles of carbon, nitrogen and phosphorus and the relation between biodiversity and ecosystem functioning.

## **Norbert Hölzel: Nutrient issues and recruitment limitation in flood-meadow restoration**

Hölzel, Norbert, University of Münster, Institute of Landscape Ecology, Münster, Germany  
nhoelzel@uni-muenster.de

### **Abstract**

Due to their high significance for biodiversity preservation and flood control, the restoration of floodplains has become a major topic on the agenda of environmental policy all over Europe. In the course of restoration measures, the recreation of suitable abiotic site conditions such as more natural flooding regimes and the lowering of nutrient levels are often thought to be sufficient for the restoration of typical and diverse floodplain communities. However, the experience of the past decades has shown us that these measures alone are often not feasible for the re-establishment of desired target communities such as species-rich floodmeadows. Besides raised nutrient levels, seed limitation due to soil seed bank depletion and the inefficiency of water dispersal may act additionally as limiting factors resulting in poor restoration results. As a consequence this means that even along riparian corridors, considered being particularly favourable for plant migration, supplementary introduction measures such as the transfer of plant material from species-rich source stands are of crucial importance to overcome seed limitation. In restoration practice such measures have proved to be extremely successful.

### **Biography**

Norbert Hölzel has worked for more than 10 years in flood-meadow restoration projects along the Northern Upper Rhine in Germany. He is president of the European Chapter of the Society for Ecological Restoration (SER).

## **Alison W. McDonald: Lowland flood-meadows, management and history.**

Department of Plant Sciences, The University of Oxford, Oxford OX1 3RB  
alison.mcdonald@plants.ox.ac.uk

### **Abstract**

MG4 grassland occurs on lowland flood-plains in the UK as a result of >1,000 years of management i.e. cutting for hay in midsummer and aftermath (second grass crop) grazing by cattle, and of flooding in winter. In 1087 this was the most expensive land in England. Until the late 18th century, flood-meadows were shared by all farmers in a village by the allocation of strips of hay by lot. Thereafter flood-meadows were destroyed for several reasons. Historical evidence of meadow management in Oxfordshire will be presented. This management enables a wealth of plants to thrive and some of many invertebrate species to complete their life cycles before the hay is cut. Results from a 24 year-old experimental flood-meadow, Somerford Mead, show that cutting for hay followed by cattle grazing usually produces a diverse sward with a mosaic of habitats for a wide range of invertebrates. Aftermath grazing by sheep is less successful in some years, according to the weather. Cutting for hay and no grazing produces a species-poor sward dominated by tussocky grasses. These results reflect the importance of traditional management practices to the species composition of MG4 grassland and so contribute to a bank of knowledge of this threatened habitat.

### **Biography**

Alison has been studying the history and ecology of the flood-plain landscape near Oxford since 1979 and has been following the succession of plants, and to a lesser extent insects (with Ben Woodcock), in the experimental meadow, Somerford Mead, since it was set up in 1985 and sown with MG4 seed from the local Oxey Mead SSSI a year later.

## **Caitriona Maher, Micheline Sheehy Skeffington and Mike Gormally: Irish floodmeadows – flooding, farming, flowers and flies**

National University of Ireland, Room C307, Botany, Aras de Brun, Galway Ireland

### **Abstract**

The Shannon Callows (flood meadows) are the most extensive river meadows in Ireland. The Shannon River, 386km in length, is designated as a SAC under the EU Habitats Directive and as a SPA under the EU Birds Directive. Two habitats found along the Shannon Callows, namely the Molinia meadows and the lowland hay meadows, are listed in Annex 1 of the EU Habitats Directive.

While much work has been undertaken on callow avifauna and vegetation there is a paucity of information about how plant and associated invertebrate communities are affected by current farming practices or varying hydrological conditions. This study examines the effects of farming practices on plant and dipteran communities across different hydrological zones. Plant communities and elevations were examined across 14 sites (including traditional and improved meadows). Dipteran communities were also sampled with particular reference to marsh flies (Diptera: Sciomyzidae) which are known sensitive indicators of environmental change and hoverflies (Diptera: Syrphidae) which have been shown to be sensitive to flowering plant species diversity. The results of this study will inform callow management with a view to protecting the callows as living farming-dependent ecosystems, for future generations.

### **Biography**

Caitriona graduated from the Botany Department at National University of Ireland, Galway in 2006. Her previous research includes a study of Skealaghan Turlough, Co. Mayo, Ireland. The study examined the effects of grazing on plant and sciomyzid species composition. The main focus of this study was to examine the effects long term exclusion of grazers had on the plant and sciomyzid (Sciomyzidae: Diptera) communities of two hydrologically distinct vegetation zones at Skealaghan Turlough, Co. Mayo. She is currently working on her PhD: a comparative study of the Middle Shannon Callows (flood meadows) with reference to plant & dipteran communities.

## **Robin Field: Meadow Creation at Upper Heyford, Northamptonshire**

Field, R.G., River Nene Regional Park CIC, c/o NCC, Po Box 221, John Dryden House, 8-10 The Lakes, Northampton, NN4 7DE, UK. 01604-237243, e-mail: rfield@northamptonshire.gov.uk.

### **Abstract**

In Northamptonshire many of the riverside meadows have been either improved, lost to arable production or development, so when a chance to recreate an area was offered, a plan was developed with Natural England. Funding was secured from Natural England's Higher Level Scheme for the recreation of 13.5 hectares (33 acres) of wildflower meadow next to the River Nene at Upper Heyford. The site was historically a wet meadow but was converted in the 1970s to arable production. In April 2008 the site was sown with a range of native species from the seed company Emorsgate. The lower part of the meadow was sown with the EM8 meadow mixture for wetlands and encouraged to develop into MG4 grassland (Meadow foxtail – Great burnet). The upper part of the meadow was sown with the basic EM1 meadow mixture and should develop into a drier wildflower pasture. The site is now managed in a traditional way with the lower half cut for hay and aftermath grazed, and the upper half grazed by sheep and cattle. The development of the site is being monitored by the Northamptonshire Wildlife Trust. A butterfly transect recorded 14 species in the first year. During the winter of 2009-2010 large flocks of Redwings and Fieldfares used the site

### **Biography**

Dr Robin Field works for the River Nene Regional Park (RNRP) in Northamptonshire as the Revital-ISE Project Officer. His role involves habitat creation and restoration, access improvements, community involvement and working with farmers and landowners. Previously he has worked as Land Advisor for the RNRP and the Northamptonshire Wildlife Trust, and as a Senior Lecturer at Writtle College in Essex. His Ph.D was an investigation of the Countryside Stewardship Scheme and whether field margins were suitable habitats for butterflies and other research projects including BAP moth and butterfly species.

## **Kerry Lock: A restoration case study on the River Thames, Oxfordshire**

Chimney Meadows Reserve Manager, Berks, Bucks & Oxon Wildlife Trust Chimney meadows Nature reserve, Chimney, Near Bampton, Oxfordshire, OX18 6NT kerrylock@bbowt.org.uk

### **Abstract**

Chimney Meadows is a 250ha nature reserve located within the Upper Thames 22,000ha floodplain. The floodplain is designated as an Environmentally Sensitive Area by the Department for Food and Rural Affairs and categorised as one of the 6 best wetland areas in England. The reserve already boasted 50 ha of SSSI floodplain meadows before an arable reversion project commenced in 2004. Green hay spreading was carried out over an additional 70ha of ex-arable land at Chimney using seed from the SSSI floodplain meadows. This management was intended to overcome dispersal limitation of grassland wild flowers and so promote restoration success. To test for the effects of this, restoration management of green hay spreading was paired with control plots (30x30m) where no seeds were added. Plant species composition, vegetation height and invertebrate assemblages were monitored. The arable reversion research project demonstrated the botanical similarity to the target floodplain grassland community was both greater where hay spreading management had taken place and also increased between 2005 and 2007. The restoration of the phytophagous beetle assemblage was positively correlated to the plants over the same period.

Chimney meadows reserve was subject to one major summer flood event in 2007 and a further two in 2008. Data collated during and subsequent to this period provided an insight into the negative effects of such stochastic events upon species richness of these floodplain meadows. As surveying continues into the future, these data will provide crucial information regarding the recovery and re-colonisation of these communities.

### **Biography**

Kerry Lock: has 13 years experience working in applied conservation ranging from Hen harriers ecology in Orkney to Guanaco ranging behaviour in Argentina. Her PhD focussed on population dynamics, using red grouse as a model to investigate intrinsic mechanisms. Her current role with the Wildlife trust entails managing a 600 acre floodplain reserve and researching the restoration of floodplain meadow communities.

## **Arnaud Duranel: Restoration of MG4 hay meadow in the Upper Ray Meadows Nature Reserve, Buckinghamshire.**

Berks, Bucks & Oxon Wildlife Trust (BBOWT) and Wetland Research Unit, Department of Geography, University College London email: arnaud.duranel.09@ucl.ac.uk

### **Abstract**

The Ray Valley Restoration Project, run jointly by BBOWT and the RSPB, aims at conserving, restoring and creating floodplain habitats at the landscape scale along the river Ray, in Buckinghamshire and Oxfordshire. This is achieved by advising landowners and farmers, and managing nature reserves. In its Upper Ray Meadows Nature Reserve, BBOWT is currently attempting to restore 30 hectares of semi-improved grassland into species-rich MG4 hay meadow.

The sward to be restored was first disc-harrowed to create a large number of patches of bare soil. Green hay was harvested from a nearby MG4 meadow using a forage harvester, and spread on the receptor site using muck-spreaders. Initial data from the field treated in 2008 suggest that green hay spreading has been effective at establishing a very good cover of yellow rattle. However, it appears to be much more effective when associated with disc-harrowing. Species such as great burnet, knapweed and ribwort plantain only became established in the plots that were disc-harrowed, mainly in the large strips of bare soil that did not get colonised by grass species. Another 10 hectares will be treated in 2010, and the site will be monitored over the next few years for plants and terrestrial invertebrates.

### **Biography**

Arnaud Duranel worked as an ecologist for several French conservation organisations called “Conservatoires d’Espaces Naturels”, in Burgundy, Rhône-Alpes and Limousin. In 2004 he undertook an MSc in Conservation at UCL, and completed his dissertation on floodplain meadow restoration at the Centre for Ecology and Hydrology in Wallingford. He then joined BBOWT, where he managed the Upper Ray Project led jointly by BBOWT and the RSPB. Here he supervised the restoration of several semi-improved grasslands into species-rich floodplain hay meadows, both on private land and on BBOWT nature reserves. He is now working at UCL on a PhD research project looking at the eco-hydrology of acidic mires in central France, but is still volunteering for BBOWT, in particular to monitor the meadows he attempted to restore.

## **Matthias Harnisch, Restoration of floodplain-meadows along the northern Upper Rhine, some practical aspects**

Matthias Harnisch, landscape architect, Department of Environment and City Development, Municipality of Riedstadt, Rathausplatz 1, D-64560 Riedstadt, mail to: m.harnisch@riedstadt.de.

Since the late 1990's some projects aiming at the recovery of rare alluvial meadows have been taking place in the city of Riedstadt, which is situated 40 km south-west of Frankfurt in the Holocene floodplain of the northern Upper Rhine. The projects dealt with alliances Cnidion (on rich alluvial soils) and Molinion on rare nutrition-low soils. Aiming at species-enrichment, diaspores are transferred with plant material from old species-rich floodplain-meadows onto ex-arable fields and species-poor meadows. Target species are such rare and endangered species as *Iris spuria*, *Arabis nemorensis*, *Cnidium dubium*, *Viola pumila* or *Iris sibirica*, *Gentiana pneumonanthe*, *Allium angulosum* and *Galium boreale*. The restoration area consists of 60 ha lined up along both sides of the main dyke of the Rhine, thus including areas in the functional floodplain as well as in the fossil floodplain. Beyond solely restoring species-rich floodplain-meadows we could successfully establish an agricultural utilisation system which enables long-term maintenance of the meadows. Therefore local farmers were included from the very beginning. Circumstances in Riedstadt are favourable as there is a high and long-term demand for hay to feed horses. This serves the conservation aims as horses need late cut hay, which in turn enables most of the target species to finish seed-production.

For further information see: [www.stromtalwiesen.de](http://www.stromtalwiesen.de) (information both in german and english)

### **Biography**

1986-1988 Apprenticeship as a landscape gardener, 1988-1993 Studies of landscape architecture, 1994-2000 work in a private office for landscape architecture, since 2001: coordinator for diverse floodplain restoration projects at the Hessian Upper-rhine in Riedstadt. Since 1997 member of the architectural association as a landscape architect.

## **Jen Heathcote: Historic environment, policy and practice in the UK**

Head of Research Policy (Freshwater and Wetlands) English Heritage, 1 Waterhouse Square, 138-142  
Holborn, London, EC1N 2ST Jen.Heathcote@english-heritage.org.uk

**Abstract;** Floodplain meadows, are of interest to English Heritage because of the insight they provide into agricultural traditions, the associated palaeoecological data from which past human manipulation of the environment can be identified, and the legacy of features inherited from their management which can be locally distinctive and contribute to landscape quality and character. The presentation will provide an overview of historic environment approaches to the identification of relict floodplain meadows & their contemporary management practices, understanding their historic distribution and the mechanisms used for their protection. The talk will also include consideration of whether some of the tools developed for use by historic environment professionals could be useful for identifying opportunities for rehabilitation, restoration and re-creation for nature conservation purposes.

**Biography;** Jen Heathcote works for English Heritage where she leads on freshwater and wetland issues that affect the historic environment, including those relating to flood risk management and habitat creation & restoration. English Heritage is a Non-Departmental Public Body and the Government's statutory adviser on the historic environment. It's purpose is to help protect the historic environment of England and promote awareness, understanding and enjoyment of it in all its manifestations.

## **Steve Peel: Meadows in the agri-environment**

Senior Specialist, Agro ecology. Natural England, Otley Road, Lawnswood, Leeds, LS16 5QT  
Steve.Peel@naturalengland.org.uk

**Abstract;** Floodplain meadows have been a target for agri-environment schemes from their inception nearly 25 years ago. Monitoring of ESAs and CSS (the 'Classic Schemes') showed that generally they were effective at maintaining the existing environmental value of grassland but with little evidence of enhancement or restoration. The advent of Environmental Stewardship in 2005 brought the ability in the Higher Level Scheme to focus more clearly on the features within grassland (e.g. plants, invertebrates or birds). It required a clear decision to be made on whether sites had potential for restoration and it enabled advisers to tailor prescriptions to the site, and set appropriate Indicators of Success. It has proved difficult to translate these design improvements into readily understood agreements which deliver outcomes, particularly the restoration of quality priority BAP habitats, but there is evidence of successes. The future for agri-environment, and perhaps particularly for floodplain meadows, is to combine the delivery of biodiversity with other public benefits. These 'ecosystem services' include high-quality livestock products, carbon storage, regulation of water quantity and quality and importantly the cultural service of enthusing and inspiring people.

**Biography;** Steve obtained a degree in agriculture and then worked for the Grassland Research Institute in Thames Valley followed by North Wyke in Devon. He then worked for ADAS in Reading. From 1999 he was a National Grassland Specialist, first with FRCA, then RDS, then Natural England.

## **Miles King: Conservation incentives and opportunities. a view from The Grasslands Trust**

Director of Conservation, The Grasslands Trust, Wessex House, Upper Market St, Eastleigh, Hampshire  
SO50 9FD miles.king@grasslands-trust.org

**Abstract;** Floodplain meadows, like all other semi-natural grassland habitats in the UK, have declined massively in the past 70 years, and are now under severe threat. In this talk, Miles King will assess the conservation measures, incentives and regulations which are available for the protection of floodplain meadows; consider how successful these measures have been to date; consider the threats which continue to act on floodplain meadows, and explore the opportunities that may become available through the development of new initiatives in the next 10 years.

**Biography;** Miles King has been involved with grassland conservation in the UK for 20 years. He has worked as an environmental consultant carrying out survey and monitoring of many important grasslands, worked for a number of wildlife trusts, English Nature and Natural England, was head of conservation at Plantlife and is now Director of Conservation at The Grasslands Trust