

Delivering Resilient Floodplains

Report for the All-Party Parliamentary Group for Nature



About the All-Party Parliamentary Group for Nature

The All-Party Parliamentary Group (APPG) for Nature was launched in July 2019. It provides a forum for engaging and inspiring parliamentarians and others with the natural world, the major threats that it faces today, and the positives that come from a healthy natural environment. The Group has a clear focus to be effective beyond individual meetings and events and will seek to extend its influence wherever possible for the benefit of nature and people.

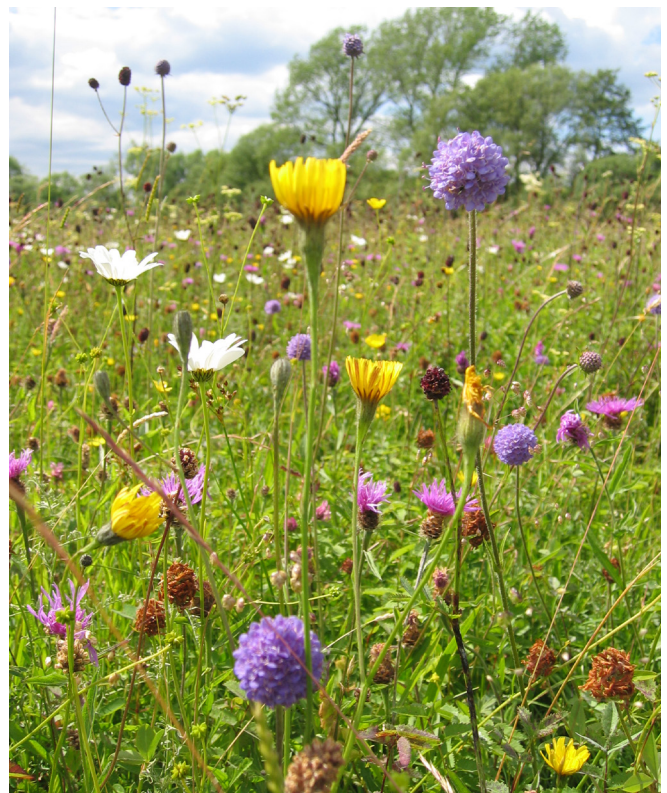


Acknowledgements

Thank you to the [Floodplain Meadows Partnership \(FMP\)](#) for delivering an insightful event on the importance of floodplain meadows on 18th October 2022, and the evidence to support this report. Special thanks to Olivia Nelson, Professor David Gowing, Emma Rothero and Dr Clare Lawson from the Open University. We would also like to thank Andy Rumming for offering a farming perspective on management of floodplain meadows at the event.

Thank you to attendees of the above event for a lively discussion and supporting evidence for this report:

- Barry Gardiner MP (Chair)
- Baroness Bennett of Manor Castle
- John McNally MP
- Mark Prina, Arocha
- Gavin Wilson, RSK Biocensus
- Erika Broom, RSK Biocensus
- Isobel Whitwam, RSK Biocensus
- Ben Kite, EPR Ltd.
- Craig Llewellyn, Atkins
- James Hildreth, Middlemarch Environmental
- Amber Connett, CIEEM (APPG for Nature Secretariat)



Oxford Meadow, Clare Lawson

Published on behalf of the All-Party Parliamentary Group for Nature by the Chartered Institute of Ecology and Environmental Management
© Chartered Institute of Ecology and Environmental Management 2022
Company Number: RC000861 | Registered Charity (England and Wales): 1189915

Summary of Recommendations

- a) **Floodplains should be treated as a distinct entity in all land-related policies, such that their contributions are recognised and promoted.** Notably, new agricultural payment schemes, such as the Environmental Land Management (ELM) schemes, must provide tailored options rather than a one-size-fits-all approach to grasslands.
- b) **Multi-functional habitats, such as species-rich grasslands must form part of the UK's climate-mitigation strategy in order to provide rapid carbon sequestration on a large scale and to maximise benefits for biodiversity.** Remaining meadows and particularly meadows undergoing restoration have considerable value for carbon sequestration and storage, but there needs to be more of them, they need to be bigger, in better condition and more joined-up to reach their potential.
- c) **We urge the Government to develop a Floodplain Strategy, allowing an alignment of different policies and financing, smoothing conflicting objectives and creating clarity, enabling floodplains to deliver greater public goods.** Floodplains cover just 5% of the land in the UK but their contribution to ecosystem services is much higher than this. We therefore need to take particular care of their management.
- d) **Floodplains need to be future-proofed by setting targets for functioning floodplain habitats.**
 - i. **25% of floodplain area needs to be no/low input grassland (which equates to almost 200,000 ha) within 25 years** – this is based on our knowledge of restoration potential and the scale we believe is necessary for functionality.
 - ii. **70,000 ha of this area to be species-rich grassland habitat in Favourable Conservation Status** – to deliver

high-nature-value floodplains and to export nutrients from riverine systems in sufficient quantity to allow natural processes to recover.

- e) Agricultural advice and payments should support the development of traditional skills needed to manage floodplains in a younger farming population. Many surviving meadows are managed by farmers past the typical retirement age. Their younger counterparts need to learn traditional techniques to sustain the services these habitats provide.

Introduction

Floodplain meadows are a distinct grassland habitat found across the United Kingdom (UK). They were created over the past two thousand years by farmers utilising floodplains to produce a reliable hay crop. By cutting the grass crop for hay to feed livestock in the winter and then grazing the land in autumn, a distinctive and extremely species-rich vegetation has developed. Their management has been largely unchanged for a thousand years, during which time meadow was the dominant land-use on floodplains.



Figure 1. Snakeshead Fritillary. Image by Victoria Bowskill, Open University

Floodplain meadows are rich in biodiversity, with good quality meadows containing more than 40 plant species per square metre. They also support numerous animal species including pollinators such as butterflies, bees and hoverflies; birds such as the curlew, lapwing, snipe and skylark; and mammals including water vole, common shrew and otter.

Despite floodplain meadows once being prevalent across the UK, twentieth century urbanisation, mineral exploitation and the intensification of agricultural practices has led to a widespread decline of the habitat, with estimated losses of up to 99% and only 3000 hectares remaining. As dynamic semi-natural systems, species-rich floodplain meadows rapidly lose value through application of artificial agrochemicals, lack of cutting and/or prolonged waterlogging caused by neglect of surface-drainage infrastructure.

Potential for Carbon Storage in Floodplain Meadows

The Open University is conducting a range of research projects looking at the impacts of flooding, water regime, climate change and nutrient cycling on floodplain meadows. The outcomes of their research and other recent studies have shown floodplain-meadow soils to hold a significant store of carbon.

When comparing the top 10 cm of soil with other habitats, soils beneath floodplain meadows store comparable amounts of carbon to ancient woodland, and while peat stores more near the surface, floodplain meadow soils can go much deeper storing huge amounts of carbon below 10 cm. The roots of meadow plant species can extend several metres into the soil, transferring carbon lower down in the profile than arable crops, intensive grasslands or even woodlands. The top 10 cm of soil in a species rich meadow has been measured to have a carbon content of around 13% of its mass, while arable soils typically have a carbon content of just 3%. Regular replenishment during floods ensures floodplain soils are constantly accumulating and able to maintain their fertility. This is in stark contrast to the widespread compaction and erosion found in most lowland agricultural landscapes, from where an estimated 2.9 million tonnes of soil is lost each year. Their alluvial soils are particularly important for carbon sequestration because they grow deeper with each flood event.

There is now a clear understanding amongst the general public of the impact that burning fossil fuels

has on our climate. But less well known is the release of carbon into the atmosphere from degradation of soils and their above-ground ecosystems. The IPCC have estimated that 23% of the carbon released into the atmosphere by human activity has come from land-use change.

Despite this, in comparison with the focus on peatlands and woodland, species rich grasslands such as floodplain meadows have not seen the same explicit support in terms of funding programmes and strategies. Their value and contribution to climate change mitigation and adaptation measures, as well as their role in regulating water quality and storage has not been fully recognised. One consequence of this is that grassland sites with the potential for restoration are vulnerable to inappropriate tree planting or other wetland creation such as bogs/fens.

Recommendation: Multi-functional habitats such as species-rich grasslands must form part of the UK climate mitigation strategy in order to provide carbon sequestration on a large scale and to maximise benefits for biodiversity.

Farming and Floodplain Meadow Management Part 1: Opportunities and Challenges

As we have discussed, the creation of floodplain meadows goes hand in hand with cattle farming. Highly diverse meadows can be used to feed cattle, creating exceptionally nutritious, locally-sourced beef.

Despite this, the need to deliver ever increasing yields has driven farmers away from traditional low intensity systems. Few modern farmers undertake a summer hay cut, instead opting for silage which requires a shorter weather window for cutting and easier storage. Farmers may also struggle with the dynamic nature of floodplains, balancing good years with the risk of summer floods.

Remaining floodplain meadows are managed by a small, ageing population. The knowledge of how to manage these lands in both a profitable and nature-friendly way is being lost.

Much alluvial soil is damaged in the UK – compacted, lacking organic matter and affected by erosion and high nutrient levels where land is managed intensively. Seventy percent (70%) of floodplains are in some form of intensive agriculture (arable, horticultural or

intensively grazed and fertilised). This is because floodplain soils are highly productive, with regular flooding depositing nutrients onto the land making them naturally fertile and self-sustaining. Therefore, taking floodplain land out of farming entirely in order to reduce environmental impacts is likely to result in very substantive losses of productivity. Low intensity cattle farming, producing a high value, quality product can therefore provide a middle ground so long as the market supports these products.

If we are to maximise the multi-functional benefits of this habitat to reach climate mitigation targets (Climate Change Act 2008), maintain high-quality food production and hit the statutory target of halting and reversing declines in biodiversity (Environment Act 2021), we must ensure these agricultural skills are not lost and farmers are supported to manage these habitats and market their products effectively.

Recommendation: Agricultural advice and payments should support the development of traditional skills needed to manage floodplains in a younger farming population.

Farming and Floodplain Meadow Management Part 1: Agri-Environment and Market Support

Post-Brexit agricultural payment schemes, such as Defra's Environmental Land Management Schemes and Welsh Government's Sustainable Farming Scheme, are increasingly moving toward a system of paying farmers to deliver public goods. These include improving water quality, increasing biodiversity, sequestering carbon and increasing access to the natural environment for people.

These schemes provide a crucial opportunity to manage and restore floodplain meadows across their former range.

In addition to rewarding management of the floodplain itself, payments should also be used to reconnect rivers to the floodplains. They are a key part of the river system and reconnecting them will ensure they can flood and drain effectively, reducing downstream flood risk and removing nutrients from rivers. Currently it is estimated that "at least 42% of former floodplains are no longer connected with their rivers and are therefore no longer able to function hydrologically as floodplains"¹.

There are gaps within ELM which do not specifically recognise floodplain land as hydrologically complex and vulnerable land. Consequently there is no clear pathway for targeted options for farmers to manage this land in an ecologically sensitive fashion which will adequately protect and restore alluvial soil. Working groups contributing to the development of ELM advice and payment options have reported resistance to developing a bespoke option within floodplains, instead favouring a standardised option for grasslands. Reports to the APPG for Nature at the event on 18 October do not support this, instead urging Natural England to develop tailored support given the unique requirements of this habitat and challenges presented to land managers by the dynamic conditions.

Recommendation: Floodplains should be treated as a distinct entity in all land-related policies, such that their contributions are recognised and promoted.

Market Conditions

Not only is it important for agri-environment schemes to support delivery of the public goods that a functioning floodplain can provide and to keep stocking density low, there must also be a successful market for the meat products produced.

Current food labelling rules on grass-fed meats mean that a product can be labelled as such if only 51% of the livestock feed is grass. This means higher percentage grass-fed products are not distinguished. This also does not distinguish between the quality of grassland habitat used. One may feed cattle entirely on a species-poor grass sward, or on silage made from such a sward, and be labelled the same as cattle fed on a species-rich meadow diet despite this resulting in different nutritional quality of the meat product.

The Food Strategy provides an opportunity to shift to shorter, fairer and more resilient food supply chains. The government has committed to publishing a land use framework in 2023 to "ensure we meet our net zero and biodiversity targets, and help our farmers adapt to a changing climate, whilst continuing to produce high quality, affordable produce that supports a healthier diet." More detail is needed on how this will be implemented and who will be involved in its development. The land use framework will have wide ranging impacts on both market conditions that can support these systems, as well as our ability to meet biodiversity targets.

Recommendation: Mandatory labelling of percentage grass-fed meat and introduction of a recognised label for species-rich pasture-fed meat.

Opportunities Presented by Planning and Other Policies

Agriculture is not the only sector that will have a major impact on whether or not the UK's floodplains can reach their full potential. Development on floodplains has long been a contentious issue, not only due to the loss of habitat, but also as a result of homes being flooded and the resulting impact on families and insurance costs.

The Environment Agency (EA) conducted an analysis in March 2019 which found 121,000 residential properties were in areas at high-risk of flooding from rivers and the sea, and 458,000 were in medium-risk areas. Meanwhile, 239,000 residential properties were in areas at risk of flooding from surface water, with a further 395,000 at medium-risk.²

The onus for fronting the costs of future insurance must be on developers or local authorities who approve developments on floodplains, not on home owners.

The increasing frequency of extreme weather events makes it vital that the ability of floodplains to slow, store and filter floodwater is restored, so that they can play a critical role in natural flood management. Floodplain soils tend to be highly permeable, often with underlying deposits of sand and gravel, allowing water to replenish the aquifers below and support low summer river flows, buffering rivers against drought. A dry floodplain meadow soil can absorb 50,000 tonnes of water per hectare, and water flow through the soil can be very significant. Conversely, because seasonally inundated floodplain soils are very vulnerable to compaction when wet and erosion when left bare over winter, arable crops such as maize are particularly damaging on floodplains.

In the EA's strategy for addressing flood risk and in River Basin Management Plans, the benefits of natural flood management are recognised. The EA has invested in a £5.2 billion Flood and Coastal Erosion Risk Management Investment Programme until 2026 and the recent publication of the strategy roadmap includes objectives for risk management authorities to double the number of natural flood management (NFM) projects delivered. However, floodplain

meadows were not explicitly included and it would be more effective if instead policy dictated that NFM measures are considered as a component of **all** flood schemes, and are implemented where appropriate.

Nutrient Neutrality

Following a 2018 ruling of the European Court of Justice on the implementation of the Habitats Directive, which clarified that where an internationally designated site (such as a SAC or SPA) is already exceeding its environmental limits, further nutrient inputs must be 'necessarily limited', Natural England issued advice to 42 councils making it clear that no developments should be permitted unless it can be proved that they are 'nitrate and phosphate neutral', a requirement that has become known as 'nutrient neutrality'.

Natural England's catchment-specific nutrient neutrality calculators, established to allow development to go ahead in these areas so long as it 'offsets' the additional nutrient load caused by the development, offer significant potential for private investment in the restoration and management of floodplains. This offers dual benefits of habitat protection and allowing development to continue within the requirements of the Conservation of Habitats and Species Regulations 2017.

Additionally, the mandatory requirement for all new developments (bar specified exemptions) to deliver 10% Biodiversity Net Gain (BNG; Environment Act 2021) presents further opportunities for investment in floodplains, but also challenges that need to be addressed.

Key to this will be Local Planning Authorities taking a joined-up approach to development of Local Nature Recovery Strategies (LNRS; also required by the Environment Act 2021) to identify where floodplains can be restored to best support biodiversity, carbon sequestration and flood alleviation, and then using LNRS to guide BNG requirements and large-scale ELM projects.

Local Authorities will also need to collaborate across boundaries to ensure that strategic planning is happening at a catchment scale.

At a national scale, a floodplain strategy would support these efforts allowing an alignment of different policies and financing, smoothing conflicting objectives and creating clarity, enabling floodplains

to deliver greater public goods. A strategy document should have set targets for functioning floodplain habitats. Based on FMP research and understanding, our suggested targets are:

- i. **25% of floodplain area needs to be no/low input grassland (which equates to almost 200,000 ha) within 25 years** – this is based on our knowledge of restoration potential and the scale we believe is necessary for functionality.
- ii. **70,000 ha of this area to be species-rich grassland habitat in Favourable Conservation Status** – to deliver high-nature-value floodplains and to export nutrients from riverine systems in sufficient quantity to allow natural processes to recover.

Recommendation: we urge the Government to develop a Floodplain Strategy.

Conclusions

Floodplains can deliver a whole suite of public goods if allowed to do so, including flood risk management, sustainable agricultural production, biodiversity conservation, carbon sequestration, water quality improvement, and sediment management plus a wealth of cultural and aesthetic services. The need for these services will only increase as the climate continues to change. However, this important habitat has been overlooked in the push to deliver large-scale carbon storage in other habitats.

¹ Lawson, Clare; Rothero, Emma; Gowing, David; Nisbet, Tom; Barsoun, Nadia; Broadmeadow, Samantha and Skinner, Ann (2018). The natural capital of floodplains: management, protection and restoration to deliver greater benefits. The Valuing Nature Programme, p.4.

² <https://www.gov.uk/government/publications/flood-and-coastal-risk-management-national-report/flood-and-coastal-erosion-risk-management-annual-report-1-april-2018-to-31-march-2019>





Julia Loken, "Long Mead in Late June"

Grosvenor Court
Ampfield Hill
Ampfield
Romsey
Hampshire
SO51 9BD

t: 01962 868626
e: enquiries@cieem.net
www.cieem.net/appg-for-nature

Secretariat
provided by



CIEEM