BIODIVERSITY PACK
HABITAT GUIDE

WET GRASSLANDS

Wet Grassland is a broad habitat type of floodplains which includes the species-rich cropped meadows and grazed pasture of the lowlands, and species-poorer grazing marshes of floodplains and coastal areas. A hydrological regime involving periodic inundation is the uniting feature, whether natural or managed. In addition to any botanical interest, many wet grasslands support important bird and invertebrate assemblages, including many species of conservation concern.

Terrestrial wetland habitats are formed by the flow and retention of water in the landscape. Their nature is determined by landform and hydrological pathways, the characteristics of the water supply, and climatological and biological influences which generate a mosaic of wet grasslands, fens, bogs, and other habitats of various degrees of wetness and types of hydrochemistry.

The UK Biodiversity Action Plan (published in 1994), described the biological resources of the UK which were identified as being the most threatened and required conservation action – our priority species and habitats. Detailed plans set out actions to protect and restore our threatened wildlife, and work continues today, as a key part of the delivery within **Biodiversity 2020** and the **Water Framework Directive (WFD)**. Across catchments, action to enhance our many freshwater habitats is intrinsically linked; with works to rivers able to benefit wetland habitats, and vice versa. Delivery on a catchment scale can take account of these synergies, and can look to secure opportunities to achieve biodiversity benefits across the full range of habitats present within a catchment.

WFD AND B2020 SYNERGIES: SOME CROSSOVER

As terrestrial wetland habitats, wet grasslands fall under the **Water Framework Directive** primarily as a feature of Protected Areas, which must achieve their conservation objectives under the Directive. Delivery under WFD can also benefit a wide range of species that are the focus of B2020 Outcome 3 (protecting species). Under **Biodiversity 2020**, activity to enhance or create Priority Habitats (Outcome 1a or 1b) can benefit adjacent water bodies, for example via land management changes which enhance water quality by reducing pollutant inputs. The same is the case with the restoration of degraded ecosystems (outcome 1D), through activity such as reconnecting rivers and their floodplains.

VARIATION IN SWARD STRUCTURE PROVIDES FEEDING OPPORTUNITIES AND BREEDING SITES FOR WADING BIRDS

WET GRASSLANDS IN A CATCHMENT CONTEXT

Within the broader grassland spectrum, wet grasslands are found across inundated floodplains or in areas with high water tables, occurring across a spectrum of nutrient and water supply regimes. At their margins, transitions to riparian, coastal and valley side habitats occur, and the health of the wet grassland resource within a catchment will be influenced by the management of these adjacent habitats, and by the wider hydrological regime.

Important in traditional farming systems because of high fertility, wet grasslands also play a valuable role in flood storage

Important in traditional farming systems because of high fertility, wet grasslands also play a valuable role in flood storage, and their restoration and management has scope to deliver a range of ecosystem services, particularly around biodiversity and natural flood management.

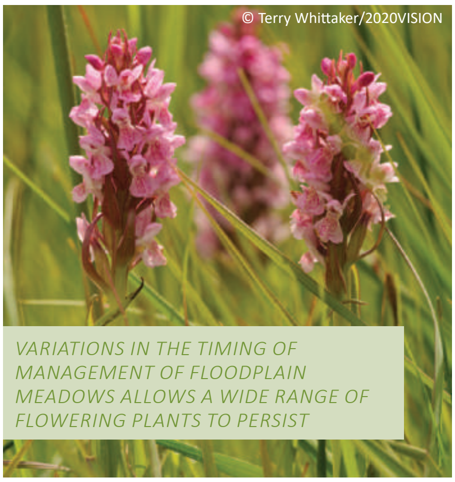
Natural ecosystem function can play a key role in this; all floodplain habitats in the UK exhibit a degree of human impact, although less modified examples give an indication of the range of natural hydrological processes that wet grassland restoration could seek to deliver.

NATURAL ECOSYSTEM FUNCTION IN WET GRASSLANDS

Wet grassland systems exhibit a broad nutrient gradient across the floodplain, with high nutrient availability in frequently flooded areas, decreasing as the floodplain rises towards the valley sides. Under natural conditions, the inundation gradient will generally follow a similar pattern, although valley edges may also be influenced by springs and flushes.

Wet, nutrient-rich areas nearest the river experience the greatest variations in water level, and typically support species-poor but highly productive vegetation, dominated by tall vigorous grasses such as common reed and reed sweet-grass. Large areas can provide important habitat for bittern and marsh harrier.

With declining flood frequency, areas further from the river are less nutrient-enriched, and support a wider range of species. The habitat features that this flooding gradient generates support birds of wet grassland, and are crucial for the breeding success of waders including snipe, lapwing and redshank, which now fail to breed across large parts of their former range. Lapwing require a close-cropped sward for nesting and feeding.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VARIATIONS IN THE TIMING OF MANAGEMENT OF FLOODPLAIN MEADOWS ALLOWS A WIDE RANGE OF FLOWERING PLANTS TO PERSIST

Redshank also feed in short swards but require adjacent tussocky areas in which to conceal their nests. Snipe feed in damp soil, probing the soft ground around channels and pools, and favour longer vegetation for nesting. This gradient of habitat requirements can be provided across the floodplain, from the lapwing-friendly conditions produced on drier ground with a lower water table, through to wetter areas which cater for snipe. Meeting such requirements by restoring a natural hydrological regime may be more sustainable in the longer term than continual manipulation of the hydrology.

Now found only infrequently across central England, lowland floodplain meadows were once widespread – their decline since the 1930s has been estimated at 97%

Valley grasslands may be influenced by the waters of springs as well as by fluvial flooding; these springs bring water which is lower in sediment and nutrient, and complicate the simplistic picture of a wetness gradient which decreases with distance from the river. The spring water varies in character with aquifer geology, influencing the vegetation communities, for example generating a transition to the grass-of-Parnassus, marsh valerian and butterwort of calcareous valley head fens.

Now found only infrequently across central England, lowland **floodplain meadows** were once widespread – their decline has not been accurately quantified but the loss since the 1930s of unimproved lowland grasslands as a whole has been estimated at 97%. Commonly cropped for hay and then aftermath grazed, their productivity stemmed from the natural, nutrient-rich silt deposited by rivers in flood. Highly valued, they were often divided into strips allowing villagers their 'dole' of hay, and were then communally grazed until the ground became too wet. Variations in the timing of the hay cut by different managers allowed a wide range of flowering plants to set seed and thrive, contributing to species diversity.

Distinct assemblages of species with similar soil moisture and fertility requirements can often be seen, reflecting a site's hydrological gradient – for instance, marsh marigold thrives along channels and in wetter flushes, whilst common knapweed indicates higher or more freely draining ground. Some sites also support very rare species, such as Creeping Marshwort, found mainly on the muddy margins of fluctuating ponds and on bare wet ground within the Oxford Meadows SAC.

GRAZING MARSH DITCH SYSTEMS CAN PROVIDE IMPORTANT HABITAT FOR WATER VOLE


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AT A GLANCE GUIDE WET GRASSLANDS

Wet grasslands are found across **INUNDATED FLOODPLAINS** or areas with **HIGH WATER TABLES**

Habitat variety provides a close-cropped sward for nesting **LAPWING**, tussocky areas that conceal **REDSHANK**, and damp mud for probing **SNIPE**

Calcareous springs and seepages may be species-rich, supporting low-growing **SEDGES**, carpets of **BROWN MOSSES**, and **BROADLEAVED PLANTS**

Varying the timing of haymaking on **floodplain meadows** allows a range of **WILDFLOWERS** to thrive

Flooded washlands support large numbers of **WINTERING BIRDS**

The drainage ditches of **grazing marsh** can be botanically rich and support **WATER VOLES** and **AQUATIC INSECTS**

Whilst many systems flooded naturally, **water meadows** were actively flooded or 'floated', via complicated systems of carriers, control structures (weirs, hatches, sluices), ridges and drains, to achieve the same end. Spring flooding warmed the ground and stimulated grass growth, creating an 'early bite' which enabled longer grazing and/or additional hay crops. Most common in chalk river valleys, they dominated the floodplain landscapes of Wiltshire, Dorset and Hampshire. More intensively and uniformly managed than floodplain meadows, they tended to be less botanically diverse, but supported important species assemblages and are valued today for landscape, biodiversity and cultural heritage.

Washlands such as the Ouse Washes are embanked areas created for flood storage. Whilst both floodplain grasslands and water meadows generally experience gradual changes in water levels, washes may be subject to sudden and prolonged inundation, likely to increase with climate change and increasing development. Characteristic plant communities tolerant of extended periods of inundation and drying have developed, and when flooded, the sites often support large populations of wintering birds.

Grazing marsh of the coasts or floodplains, such as Pevensey and Somerset Levels, can be considered as much a landscape type as a habitat, being defined by hydrological and topographical features rather than flora. Comprising pasture or meadow that is periodically inundated, it typically contains larger 'drains' and smaller ditches of standing water. These channels, constructed to drain the land and create productive agricultural grasslands, are often the last vestige of interesting botanical and invertebrate communities that would have been widespread prior to drainage. Many rare aquatic species are now largely confined to these features or to ponds and other associated open waters which dot the grazing marshes. In coastal situations, the transition from freshwater to brackish or saline conditions gives rise to an important and characteristic flora and fauna, including stoneworts, pondweeds and bladderwort, and now-rare aquatic snails and beetles.

PRESSURES ON OUR WET GRASSLANDS

A wide range of human activities, past and present, have damaged and changed the natural wetland habitat resource.

Many declines in wetland wildlife can be directly related to **drainage** schemes. Land drainage related to agriculture or flood defence has modified natural floodplain regimes, resulting in a lowered water table and the loss of wetland plant and invertebrate species. This is exacerbated by an increased intensity of management enabled by drier conditions; from use of agrochemicals and changes to cutting or grazing regimes at the lesser end, to conversion to arable at the more extreme. Added to the major effects of drainage, **abstraction** and **water level management** further modify patterns and volumes of water supply. From a **climate change** perspective, all wet grasslands will be sensitive to changes in seasonal rainfall and flooding patterns. Reductions in summer rainfall and increased evaporation will put stress on wet meadow communities in late summer and autumn, with those systems that are primarily rain-fed being most affected. More prolonged winter and spring flooding is also likely to drive changes in plant communities.

In contrast to natural nutrient supply, **nutrient pollution**, either waterborne from agriculture or effluents, or through atmospheric deposition of nitrogen, can create major shifts in vegetation and associated fauna and generally results in a decline in diversity. Grazing management can either compound or mask these changes. In addition, ditches appear particularly susceptible to the spread of **non-native plant species** which can rapidly alter the vegetation throughout the ditch profile.

To complicate the picture, some of our existing wetland sites have formed in hydrologically modified landscapes in areas that would not naturally have supported them; for example, floodplain grazing marsh. Some of these sites are large, occurring in heavily altered landscapes (including those below sea level having been 'reclaimed' from the sea). The maintenance and condition of these sites is dependent on a continuation of the modifications that created them.

KEY PRESSURES ON WET GRASSLANDS

MANAGEMENT:
The abandonment of traditional practices, such as grazing and hay-cutting, leads to the degradation of wet grasslands and their associated wildlife

ENRICHMENT:
Nutrient enrichment via nitrogen deposition and from effluent and agricultural runoff causes shifts in plant communities on wet grasslands

DRAINAGE:
Drainage for agriculture and flood defence modifies natural floodplain regimes, lowering the water table and affecting plantlife

CLIMATE CHANGE:
Predicted extreme rainfall events, and drier, warmer summers will lead to major changes in water regimes and plant communities

ABSTRACTION:
Abstraction of water for supply and consumption alters natural flow regimes, often exacerbating issues on floodplains and affecting species

INVASIVE SPECIES:
Non-native and invasive species can impact characteristic biological communities through direct competition or the alteration of habitats

KEY MANAGEMENT MESSAGES


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WATER LEVEL MANAGEMENT STRUCTURES IMPEDE NATURAL FLOW REGIMES

- **RESTORATION OF** NATURAL PROCESSES

Measures that seek to restore natural processes – hydrological, geomorphological and water quality regimes – are key to delivering wetland habitat objectives. These range from protection (e.g. tackling pollutant inputs) to direct intervention (e.g. reinstating flows). Yet the physical form and hydrological regime of some wet grasslands (the most 'man-modified') would be radically altered by the complete restoration of natural processes. Understanding past modifications and their impacts (perhaps via GIS / models) allows practitioners to consider how the site would function under natural conditions, taking this as a foundation for planning restoration, and factoring in implications for existing habitats and species, both in and adjacent to the site.

- **LARGE-SCALE** PERSPECTIVE

The condition of wet grasslands depends on many factors including what is happening in the catchment and in the atmosphere above. Restoring hydrology and natural water quality and chemistry in the catchment is crucial – it is not only about addressing direct impacts on the wetland site.

- **TAKING ACTION IN** THE RIGHT ORDER

Interventions undertaken within wetlands, such as water-level raising and drain blocking, will not deliver the greatest possible biodiversity benefits unless pollutant inputs are tackled first.

- **TAKING THE** LONG VIEW

Whilst active intervention can be important in kick-starting restoration, taking a longer term approach enables natural recovery to play the fullest role possible. For instance, long-term plans to tackle over-abstraction will support the return to a more natural wet grassland hydrological regime. A long-term vision encourages management decisions which are more sustainable, particularly if the seemingly 'immovable' socioeconomic constraints of today may be resolved in the longer term.

- **SPECIES** MANAGEMENT

In some circumstances the preferred management regimes for key species and habitats may be incompatible. For example, manipulation of water levels or land form successfully used to meet the habitat needs of certain species, such as wading birds, will prevent the establishment of naturally functioning wetland habitats. As with all priority habitats, the ideal, of course, is that wet grasslands develop within landscape-scale initiatives, where natural hydrological processes will create a full range of self-sustaining habitats and dependent species populations. At a smaller scale, when restoring naturally functioning habitats the implications for priority species and other species of conservation concern need to be considered (see below - this is particularly important for 'man-made' wet grassland).

- **RATIONALISING CHANGES** IN SPECIES DISTRIBUTION AND ABUNDANCE

The current distribution of many rare (and more common) wet grassland species is limited as a result of previous habitat loss or degradation. For example, the fidelity of water voles to ditch systems within grazing marshes is a reflection of restriction to a diminished habitat resource which was once more widespread; this distribution should prompt the restoration of natural processes that generate appropriate habitat. Where a return to natural water level management would create a more valuable habitat across the floodplain but result in the

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loss of biodiverse ditch systems, habitat provision should be secured elsewhere. Plans for species conservation and ecosystem restoration should therefore take into account the (positive and negative) implications for species of the restoration of natural processes, and of climate change. Suitable habitat needs to be maintained or created to prevent local or regional extinctions and to aid species recovery. Direct management, including reintroduction, can also be considered to assist in the transition to restored environmental conditions.

• SUCCESSION

In large highly natural wetland landscapes, succession will likely be offset by disturbance elsewhere; in other more managed landscapes, it may instead be desirable to maintain a wetland at a particular stage. For instance, rotational management of ditch systems 'resets' the habitat to earlier successional stages, allowing a range of species, including plants and animals with a restricted or very restricted distribution, to persist. Natural processes will still play an important underpinning role, generating for example local disturbance and unimpacted water supply mechanisms, as generally the richest sites are those with good water quality, and a complex mosaic of habitats which result from varied hydrology, topography and grazing.

• BARRIERS TO CONNECTIVITY WITH WIDER ENVIRONMENT

Reinstating connectivity is a key step in restoring a naturally functioning wetland environment and in maintaining a diverse plant and animal community. Non-natural features within and around wetlands, such as a deepened river channel separating river flow from the floodplain grasslands, should be addressed where possible; modification of structures (or their operation) to minimise their impacts is the next best option. A long view will often need to be taken where other factors such as poor incoming water quality need to be addressed before physical restoration is effective; and wherever impacts will be felt more widely, for example, if neighbouring land may become wetter as a result of restoration measures.

• UNDERSTANDING THE LOCATION OF EXISTING FRESHWATER BIODIVERSITY

To maximise the benefits of restoration work, and eliminate damage to priority or endangered species, it is important to obtain a clear picture of the distribution of local freshwater biodiversity, (indeed, this knowledge is legally necessary for some species). Practitioners should take account of standing water, running water and wetland biodiversity. Specialist advice can be valuable; for example, work being undertaken by the Freshwater Habitats Trust to identify 'Important Freshwater Areas' could inform local delivery.

REFERENCES AND FURTHER READING

- A narrative for conserving freshwater and wetland habitats in England
- Floodplain Meadows Partnership Website and Technical Handbook
- Lowland Grassland Management Handbook (2nd edition)
- RSPB (1997) The Wet Grassland Guide

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