Managing & Restoring Washlands & Species Rich Floodplain Meadows

Sussex Wildlife Trust

What is a species rich meadow?

Orchids, buttercups and oxeye daisies in a Sussex meadow
© M Pilkington

Flower-rich lowland meadows are an important part of our heritage and landscape. Traditionally, most lowland meadows would have been used to provide hay and autumn fodder for grazing animals. Seasonal grazing and hay cropping removes thick grass growth and nutrients enabling more delicate wildflower plants to survive and seed. Some floodplain meadows also allow for manipulation of water levels to encourage fertilisation and early growth of grass.

The high conservation value of these meadows is found in their species richness, their status as an ancient semi-natural grassland type and the presence of rare plants such as marsh cinquefoil and several species of orchid. Rare floodplain grassland communities in Sussex include National Vegetation Classification (NVC) MG5, MG10, MG13 & MG23. Typical species of the lowland meadows include black knapweed (*Centaurea nigra)*, birdsfoot trefoil *(Lotus corniculatus)*, sweet vernal grass *(Anthoxanthum odoratu)* and crested dogs-tail (*Cynosurus cristatus)*. In the past, many floodplain meadows in Sussex were full of cowslips and oxeye daisies.

The bumble bee is in rapid decline. We need bees to help pollinate our food as well as our species rich meadows
© M Monkterry

Why did species rich meadows decline?

Lowland wet meadows have historically been vulnerable to land-use change. Lowland forests were some of the first to be cleared because they were on flat, fertile ground which can be easily drained and cultivated.

Meadow was once the dominant land use on almost all the floodplains in England but 98% of our flower-rich meadows have been lost over the last century through drainage, changes in agriculture and development. Unimproved seasonally-flooded grasslands are even rarer.

In the middle of the last century artificial fertiliser was applied to many lowland meadows to increase their yields of hay. This led to the disappearance of most of the wildflowers. Further agricultural intensification occurred later in the century with a change from hay production to silage. Fields were ploughed and re-seeded with agriculturally improved grasses. Now, most grassy fields are ploughed and re-seeded every few years, as well as being sub surface drained.

Washlands & Species Rich Floodplain Meadows

What is a washland?

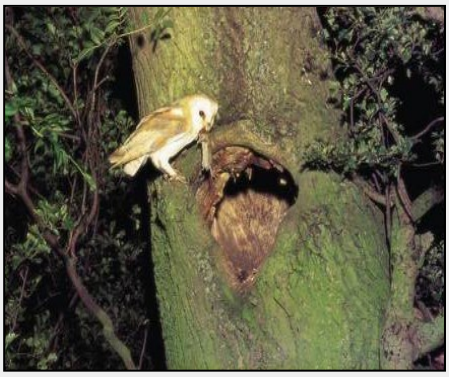
A Sussex washland in action (above) and the same field when not in flood (below)

Washlands are areas of the floodplain into which a river or stream can flood temporarily when river levels are high. In many washlands in Sussex, flooding only lasts a few hours, until flood water subsides and falls naturally back into the river channel. Such washlands have been termed 'flash' washlands to distinguish them from Cambridgeshire washlands which stay flooded for several months in spring.

The floodwater brings with it natural alluvial silt and nutrients, as well as transporting plants, fish, insects and seed from upstream. Because of their floodplain location, washlands can be important early indicators of changes in the wider catchment of water levels, rainfall and nutrient levels.

Why have washlands declined?

Unfortunately many of our rivers and streams have been embanked and canalised so that they no longer interact naturally with their floodplain. Embankments to protect houses from flooding are necessary but there are many areas of the countryside where floodwater could be temporarily stored to alleviate flooding in towns. These washlands not only help with floodwater storage and the recharge of drinking water aquifers, but can also support species rich meadows with a wide variety of wildlife.



The rare barn owl relies on small mammals found in meadow grasslands for food © J Blamire

Species Rich Meadows in Sussex and their importance

In Sussex, wet, wildflower grasslands are one of the most threatened of all habitats. They continue to decline and only a tiny proportion of those remaining are species rich. Lowland floodplain meadows are identified in the EU Habitats Directive as needing protection. A high proportion of remaining floodplain meadows are less than 1 hectare in size, are extremely fragmented and at risk from mismanagement, neglect and destruction. The remnants, though protected by National and European law, are at risk from development, changing climate and from a lack of information on their location and distribution.

When located on floodplains, species rich grasslands are particularly sensitive to changes in rainfall patterns; and their species are sensitive to pollution and excess nutrients often transported by the rivers which flood them. Many of our rivers in Sussex have been managed and altered. Meadows which used to flood regularly are now constantly dry, or over enriched by nutrients causing the loss of species dependent on occasional water logging and low nutrient levels.

Meadows can support up to 40 species of plant per square metre. The abundance of insect life associated with the habitat also attracts bats and birds. Birds of prey such as the barn owl feed on mice and voles hidden in grassy tussocks. The nectar rich plants provide food for butterflies, caterpillars, bees and other insects and the grasslands often support populations of rare nesting birds such as lapwing.

What do floodplain meadows and washlands need?

A washland hay meadow © M Pilkington

Floodplain meadows are sensitive to changes in hydrology, nutrient deposition and cutting and grazing management. There is a complex interaction between these factors, all of which must be considered to understand how to manage them in the long term.

A) Water requirements: Most meadows need floodwater but they need it to be able to freely drain from the surface back into watercourses unhindered following a flood. This prevents the retention of rainwater on the surface for too long which can kill grass and smother flowers. Too much water logging during the growing season can be more damaging than too little at the wrong time of year. Many floodplain grasslands have been drained by sub-surface systems such as grips, gutters and foot drains. These are often maintained for farmers to dry out the land but this significantly alters the meadow's ecology.

B) Nutrient requirements: Floodplain grassland is a naturally productive, species-rich community. A reduction or an increase in nutrients can damage existing plant communities. When hay yields drop to less than 3 tonnes per hectare, this can indicate that the plant community is suffering from inadequate nutrient levels and may result in a decline in plant species.

Alternatively, hay yields of more than 5 tonnes per hectare, increased cover of perennial ryegrass (more than 20%) or a total grass cover of more than 60%, severely damages floodplain meadows. If phosphate levels on a site are too high, the number of plant species will decline rapidly. Some phosphorus inputs come from sources such as sewage treatment works. In such cases, contact the Environment Agency for advice.

Sussex floodplain meadow © M Pilkington

C) Hay cutting and grazing requirements: Many traditional meadows are managed by a mid-summer hay cut, followed by grazing known as 'aftermath grazing'. Aftermath grazing prevents the growth of more competitive plants that are less appealing to cattle and which reduce the diversity of the meadow. Meadows are 'shut up' for hay growth in the spring, with no grazing animals. Grazing meadows into the autumn and early winter is important to create gaps in the grass to enable seedling establishment. Cattle grazing is generally more beneficial than sheep grazing as it creates a more diverse grass structure. Animals are removed from the meadows once soils become wet as they can cause soil compaction.

Washlands cannot be grazed in winter when flooding is likely to occur. The hay cut helps to prevent nutrient accumulation in the grassland and 'opens up' the grass, allowing light in for less competitive flowering plants. Hay yields in traditionally managed species rich systems are typically half that expected from intensively managed grasslands, although the hay is often more nutrient rich and better quality.

Factors affecting meadow habitat decline

Although once of economic value there has been a decline in the perceived value of floodplain meadows in the 21st century. Often traditional meadows have been abandoned or converted to intensive arable or silage production. They can be threatened by the following management:

Fertilisation to increase agricultural production: Fertiliser promotes the growth of common plant species and vigorous grasses, to the exclusion of many wildflower species.

Ploughing and re-seeding or drilling with vigorous grass species: Reduces grassland to a few dominant grass species which outcompete other flowering plants.

Ploughing of the floodplain for arable farming: Flattens out any natural hollows and bumps in the floodplain which would otherwise create a variety of niches for plants, insects and birds.

Herbicide, insecticide and pesticide inputs: Herbicides kill a number of broad-leaved flowering plants. Pesticides and insecticides reduce insect numbers drastically.

High stocking of cattle and sheep: Overgrazing results in poaching of soils, siltation and eutrophication of watercourses, encouragement of competitive broad-leaved species such as nettle, loss of species richness and declines in more delicate flowering plants.

Drainage: Lowered water tables as a result of land drainage; the interruption of natural flood regimes through flood alleviation engineering; surface and ground water abstraction, all alter the natural diversity of vegetation which would otherwise be found in floodplains.

Atmospheric pollution and climate change. Acid rain and air pollutants alter soil chemistry affecting species compositions. Climate change is likely to affect hydrology patterns and to alter flooding and flowering times and plant survival. In turn, this will affect the food sources of invertebrates including important pollinators.

How can I encourage the river to flood my washland meadows?

If your riverside fields flood naturally a few times a year then it is quite possible that this flooding regime is a natural one. Many rivers and streams in the middle and upper reaches of river catchments still have a semi-natural flood regime and will become 'washlands' quite regularly in winter or after it rains heavily.

Look at old farm or archive records to see if you can see any changes in flooding on your land over time, and identify the factors which may have caused this. For example, the installation of a weir or sluice on a river seriously affects river flows and may prevent natural flooding of fields whilst retaining artificially high waterlogging for a large part of the year.

If you have a riverside field which is embanked, or a river which is deeply ditched and straightened then it might be more difficult to restore the natural 'washland' function of the field. However, Sussex Wildlife Trusts Wetland Project can give free advice and site visits to landowners who are interested in restoring their rivers and the natural functions of their floodplain.

How can I restore my riverside fields to species rich meadow?

Southern marsh orchid in a Sussex washland © M Pilkington

Grazing and/or cutting Restoring a traditional hay cut with aftermath grazing over time can be enough to bring flowering plants and delicate grasses back to your meadow. Thistles or dock may require some considered spot treatment/removal but not to the point of elimination as they do provide some useful benefits to wildlife.

Seed harvesting and spreading Some meadows can be helped along by harvesting seed locally and spreading it on the meadow. Where possible use meadow seed from a local source (please refer to Weald Meadow Initiative) and make sure it does not include invasive species and grasses such as ragwort and perennial rye grass (See Appendix 1a for a list of plants which are recommended for Sussex floodplain meadows). Preparation should commence in August, ready for sowing in early autumn after the ground has been grazed/hayed and harrowed hard to produce patches of visible bare ground so that seeds have a chance to establish. If soil fertility is high it may be necessary to remove topsoil and nutrients.

Hay spreading Hay spreading is a less precise but effective method of meadow enhancement, but it requires a local source of flower-rich hay – perhaps from a neighbour's farm. Hay is spread green, immediately after it has been cut. Before the hay is spread, the recipient site requires careful preparation by cutting, grazing and harrowing so that the sward is short and there are patches of bare soil for seed establishment. Make sure that the donor site contains suitable, native, non-invasive species.

Plug planting This is the most labour intensive and expensive option when restoring floodplain meadows, but may be the most effective on a small scale. Individual plants are grown on in pots and planted out in late spring or early autumn. Some meadow plants will only grow from plugs.

Can floodplain meadow restoration be detrimental to other wildlife?

If you have coastal and floodplain grazing marsh on your land then consider these when restoring floodplain meadows and washlands. The needs of ground nesting and wading birds such as corncrake and skylark also need to be considered when timing restoration operations.

Floodplain meadow, if left, will often naturally revert to floodplain woodland. Floodplain woodland is also a rare habitat in Sussex. In most cases it will be obvious whether your land will revert more easily to meadows, reedbed or to woodland. In general the edges of floodplains are more likely to be wooded, with core areas in floodplains remaining open for meadows and reed.

Can I create a network of washland meadows in my river catchment?

Yes. Sussex Wildlife Trust is working closely with Sussex landowners to try and create an 'ecological' network of meadows and other appropriate wetlands in Sussex river catchments. If you are interested in helping and would like to work with your neighbouring landowners then let us know. The more people involved and working closer together, the better the landscape restoration can be achieved for people and for wildlife.

Who can help me with advice on meadow restoration and sourcing machinery and seed?

The Weald Meadows Initiative (WMI)
This is a landowner support system based in the High Weald, which aims to connect meadow owners with their local landscape heritage, increasing their sense of place and enabling them to learn about, value, access and care for Wealden meadows. The WMI:-

- provides site specific management, enhancement and creation advice to landowners
- co-ordinates a wild seed harvesting programme to expand the wildflower grassland resource
- assists landowners to undertake management work, with practical contacts and machinery rings
- monitors grassland condition and target meadow species

Agricultural machinery rings
These may operate in your area, or adverts for machinery shares may be found in agricultural magazines and publications such as *Woodlots* and *Ecolots*.

Royal Botanic Gardens (Kew)
The Vanishing Meadows project, based at Wakehurst is a strategic Unit for the Area of Outstanding Natural Beauty of the High Weald, involving up to 90 meadow owners. They can supply local grown meadow plugs from seed at the Millennium Seedbank for meadow restoration

Sussex Wildlife Trust Wildcall
This phone service offers landowners and the public free advice on anything relating to wildlife and the conservation of species and habitats.

Natural England
If you are involved with the Higher Level Stewardship scheme, you may be eligible for grants and advice to help restore lowland species rich meadows. The schemes are under review so always check with Natural England for up to date information.

Can I get funding to help with floodplain meadow restoration?

Financial incentives are available to help landowners maintain a traditional farmed system and retain high wildlife value on their farm. Agri-environment schemes (through Natural England) may help to finance the management of some sites. Local Wildlife Enhancement Grants may also be able available for meadow restoration through other local organisations such as the Wildlife Trusts.

Streamside washlands can help store floodwater as well as helping wildlife
© M Pilkington

Appendix 1a

Plants we recommend to seed into your meadow

English Name	Latin Name
Birdsfoot trefoil	*Lotus corniculatus*
Cuckoo-flower	*Cardamine pratensis*
Lesser spearwort	*Ranunculus flammula*
Purple loosestrife (wetter fields)	*Lythrum salicaria*
Sneezewort	*Achillea ptarmica*
Red clover	*Trifolium pratense*
Common knapweed	*Centaurea nigra*
Meadow vetchling	*Lathyrus pratensis*
Crested dogstail	*Cynosurus cristatus*
Oxeye daisy	*Leucanthemum vulgare*
Burnet saxifrage	*Pimpinella saxifrage*
Tufted vetch	*Vicia cracca*
Cowslip	*Primula veris*
Common sorrel	*Rumex acetosa*
Ragged robin	*Lychnis flos-cuculi*
Selfheal	*Prunella vulgaris*
Betony	*Stachys officinalis*
Tormentil	*Potentilla erecta*
Devilsbit scabious	*Succissa pratensis*
Pignut	*Conopodium majus*
Sweet vernal grass	*Anthoxanthum odoratum*

Also, grasses such as meadow foxtail, bent, fescues and sedges such as carnation and oval

Appendix 1b

Plants we recommend **NOT** to seed into your meadow

English Name	Latin Name
Perennial (or Italian) Rye Grass	*Lolium perenne*
Cocksfoot	*Dactylis glomerata*
Yorkshire fog	*Holcus lanatus*
White clover	*Trifolium repens*
Hemlock water dropwort	*Oenanthe crocata*
Rushes (They will tend to develop naturally)	*Juncus spp*

Contacts

Sussex Wildlife Trust (Wetlands Project)
www.sussexwildlifetrust.org.uk
01273 497555

Natural England
0845 600 3078
enquiries.southeast@naturalengland.org.uk

Environment Agency
Ask for Fisheries & Biodiversity
or Land Drainage consent teams
03708 506506
www.environment-agency.gov.uk

Sussex Biodiversity Record Centre
www.sxbrc.org.uk
01273 497521

Millennium Seedbank (for plant plugs)
www.kew.org/science-conservation/collections/millennium-seed-bank/about-millennium-seed-bank

Ouse Meadows Restoration Project
www.sussex.ac.uk/cce/index/research/current/riverouse

Weald Meadows Initiative
01424 774668
www.highwealdlandscapetrust.org/weald-meadows-initiative.html

Floodplain Meadows Partnership
www.floodplainmeadows.org.uk

Lowland Meadows Habitat Action Plan
http://jncc.defra.gov.uk/Docs/UKBAP_BAPHabitats-29-Lowland%20Meadows.doc

Wildcall – Free wildlife advice line
01273 494777

References & Further Reading

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