Floodplain Meadow Restoration Case Study
The Morrel, Oxfordshire, River Cherwell

Landownership and site background

This field is part of a mixed arable and livestock (beef) farm, in private ownership. This field has always been managed as a meadow and never been ploughed. Fertiliser was added in about 1997, but not since. It has been in a stewardship scheme since 2010 for restoration of species rich grassland (HK7).

The family wanted to increase the number of wildflowers and grasses, so the field which would otherwise be cut for silage, is being less intensively managed. Hay is used on the farm and also sold for horses elsewhere, where it is well regarded.

Restoration activity

A seed mix was sown in 2010. The advice was to hard graze, scarify in September (harrowed to create some bare earth) and then spread wildflower seed mix. Commercial seed was used.

Current management

Prior to 2017, some years the field was just grazed (extensively, not hard grazed) and sometimes spring grazed to reduce rank vegetation. If it was hay cut, this was towards the end of July/early August. The cattle are put on early and removed when the soils become wetter.

Since 2017 the hay has been cut annually from mid-July. It is typically grazed from September until mid-December, depending on the weather. Animals come off when it gets too wet underfoot. 10 bullocks are used and moved between 4 enclosures every 2-3 weeks with this field one of the 4 enclosures. No fertiliser or herbicides are used and the field is treated as organic.

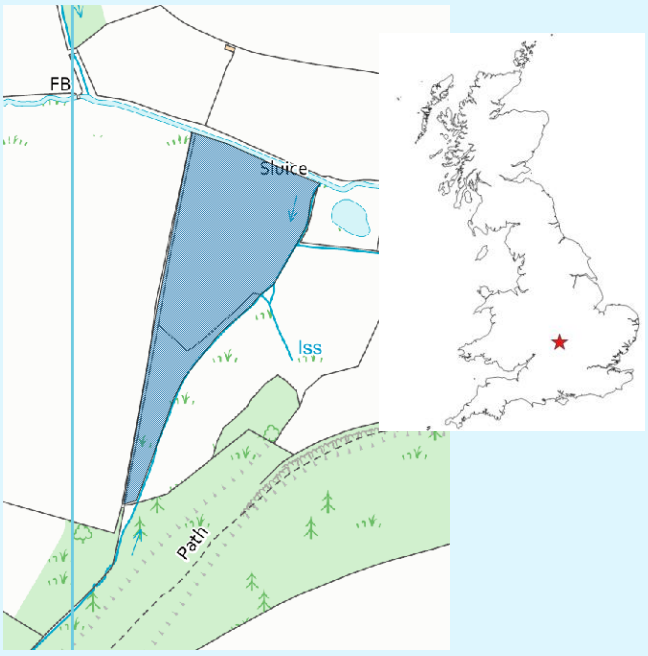
Progress by 2023*

The FMP visited in 2017 and 2021. At both visits, 5 quadrats were recorded and soil profiles were assessed in 2017. Results are shown in Tables 1 and 2.

In 2017, dense patches of meadow foxtail *grass Alopecurus pratensis* occured on cow dung areas. The field was grassy, with cover of Yorkshire fog *Holcus lanatus*, and perennial rye-grass *Lolium perenne* up to 35% in places.

Site information

Size: 2 ha
Public access: No
Phosphorus levels:
Soil type and profile: Sandy loam with gravel and sand from 65 cm
Flood frequency: The field floods from the bottom end.
End use of hay: On farm and sold for horses Elsewhere



The field was wetter towards the stream where creeping buttercup *Ranunculus repens* substitutes bulbous buttercup *R. bulbosus* which is abundant in other parts of the field. The NVC types MG7D *Lolium perenne* leys and related grasslands, were the dominating plant communities. The species richness varied between 12 and 19 species per square metre.

Meadow vetchling *Lathyrus pratensis*, selfheal *Prunella vulgaris*, cowslip *Primula veris*, field woodrush *Luzula campestris*, oxeye daisy *Leucanthemum vulgare*, cuckooflower *Cardamine pratensis* and common knapweed *Centaurea nigra* were found on the field in small amounts.

The presence of orchids in the field is a very positive indicator, however, in 2017 only one plant of southern marsh orchid *Dactylorhiza praetermissa* was found. This is likely to increase if litter deposit is kept to a minimum and grasses are prevented from forming a very dense sward

Table 1 Summary of the botanical data collected*

	2017	2021
Ellenberg F (moisture tolerance)	5.12	5.46
Ellenberg N (fertility)	5.12	5.1
Ellenberg R (Reaction)	6	6.14
Species/quadrat (mean and range /1 m x 1 m)	14.4 (12-19)	20 (16-28)
NVC (top 2 MAVIS subcommunities)	MG7D MG7C	MG4b MG4b

Progress continued

The dominant plant community in 2021 appeared to be Burnet floodplain meadow (MG4 *Alopecurus pratensis – Sanguisorba officinalis*). Species richness has increased over the 4 years since the last survey, varying amongst the quadrats from 16 to 28 sp/m^2.

The functional diversity on the field has also improved substantially, as ruderal species have declined, and stress-tolerant species are better presented in the sward, bringing vegetation composition closer to that of ancient species-rich meadows. However, since 2017 the abundance of competitor species has increased, probably linked to an increase in soil moisture and fertility, as estimated by Ellenberg indicator values (Table1).

This field is in good condition and moving progressively towards a good example of a restoration meadow.

Table 2. Restoration progress*

Yellow highlighted figures show where Langley's Lane Meadow Field 2 is on the scale of restoration progress by 2021.

Field 1	Progress score 2021				
Measure	1 Poor progress	2	3	4	5 very good progress
Average scores from five botanical quadrats per field. Calculated in MAVIS					
Species richness	<8	8 to 12	13-15	16-20	>20
NVC similarity score	<50%	50-55%	55-60%	>60%	>60%
C:S ratio	1.65	1.39	1.23	1.1	1.09
S:R ratio	0.67	0.79	0.81	0.89	0.93

* A summary of the data collection and analysis methods used is available here

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Soil profile recorded in 2017
Orange-brown "sandstone" colour is very uniform along the entire profile

A-Horizon
0-10 cm – light brown, organic silty loam

B-Horizon
10-45 cm – sandy loam
45-65 cm – increasing content of clay

C-Horizon
65-90 cm – yellow-orange sand with 40% gravel

Management recommendations
The site has very good potential to become a species-rich meadow community. Current species richness could be enhanced by planting plug plants of notoriously difficult species to establish including great burnet *Sanguisorba officinalis*, ladies bedstraw *Galium verum* and devil's-bit scabious *Succisa pratensis*.

Consistent management is important to establish a species rich hay meadow and an annual hay cut is more effective compared to summer grazing in supporting a wider spread of these species across the field.

Keep an eye on stocking levels in wet conditions and remove the animals when the soil becomes too damp.

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