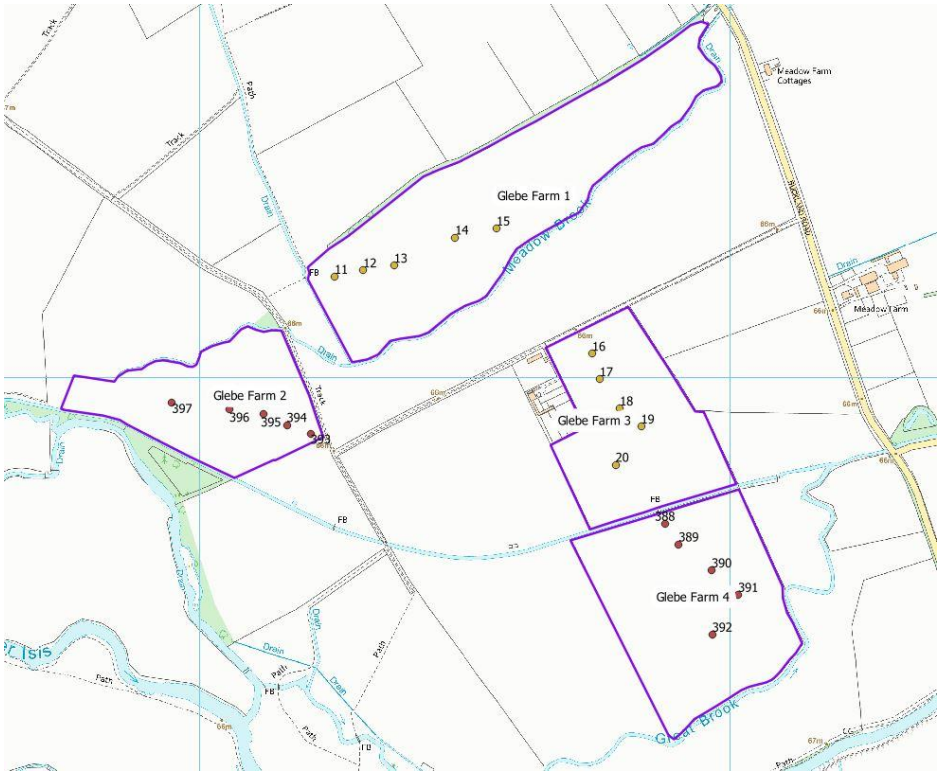
Site Visit Assessment Form –Glebe Farm (Weald, South of Bampton) Oxfordshire



The map shows quadrats recorded in 2017 and 2021 (yellow) and in 2021 only (brown).
The form records survey results collected from various site visits, and includes feedback following discussions with the landowner.

Site Name Glebe Farm Field Names 1 = Wilcox 2 = Ferris 3 = Hoskins Barn 4 = Bottom Hoskins	**Grid Ref** 1 = SP325013 2 = SP320009 3 = SP328009 4 = SP329005	**County** Oxfordshire	
River Thames	**Ownership** Private	**Designation** None	**Size (ha)** 1 = 16.1 ha 2 = 7.6 ha 3 = 8.6 ha 4 = 11.7 ha
Date of surveys 16the May 2017 17th June 2021 **Interview** 17th May 2021	**Meeting with** Landowner	**Managed by** Landowner	
Management and History			

The landowner's father owned the farm in the 1940's and had to clear a lot of scrub to farm it.
There are 112 acres in wildflower meadow, which were all originally planted with 30 m grass margins with arable in centre of field, until the early 1990's. Hoskins Barn Field was arable in the 1960's.

Hay yield has not diminished, but as an organic farmer, the owner worries about reduced P levels. Sometimes can't sell hay.
2020 was a very dry spring. The standing crop was sold to an organic dairy farmer. The landowner pulled the ragwort before cut.

Agri environment agreement

Were in ESA, and when this was designated they created 30 m headlands around Hoskins Barn Field.

HLS scheme was started in 2003 and was renewed in 2011. Green hay was bought from Chimney Meadows (a whole field's worth of green hay was purchased from BBOWT - possibly Big Shoals Mead in the NNR). Cut late July with a mower and picked up with forage harvester. Field was sprayed possibly 3 times using round-up in October, April and June in the preceeding year and then green hay was spread. Spread with a muck spreader and then rolled.

Current management

Take an annual hay cut and aftermath graze. Agreement says to cut after 10th July but 2 or 3 times have had a derogation to cut earlier-end June/early July, due to favourable weather window for hay making. Sheep (never cattle) are put on site from end August to end October. Sheep can't stay over winter as fields flood. Sell hay (are organic), although doesn't feel they need the organic status particularly.

All 4 parcels have been identically managed since sowing. They have had a late (after 10th July) cut of hay removed and then had aftermath grazing for a couple of months with sheep. They are all registered organic and have had no muck or fertilizer applied.

Hay cut is supposed to be after 10th July, but can cut as early as 25th June through a derogation, (not allowed a derogation more than one year in three). Since 2017 the shepherd has changed. Before then, sheep were in from August and off by November. Now, sheep are on later to fatten over winter, maybe November through to January. Sometimes therefore the shepherd has to rescue the sheep when there are floods. The landowner monitors the soil to check for poaching and compaction and asks the shepherd to remove the sheep if there is evidence.

This year (2021) the hay was cut on the 13th and 14th of July. The hay was baled on 18th July, having had a very hot dry week. The 4 fields had a good yield of 462 big 'Quadrant' bales which weighed about 420 kg each. The farm has been organic for many years and the yield has been as low as 250 bales and so they were pleased with this result.

Restoration

Technique used/Dates

1. All fields were in the Environmentally Sensitive Area Scheme in October 1999 and were plantedwith Tier 03C Arable Margin Buffer Strips from 5 to 30 metres wide in September 1999, with 10% Kampe Timothy, 10 % Sparta Cocksfoot, 10 % Balin Smooth Talk Meadow Grass, 25% Senu Meadow Fescue, 10% Southlands Crested Dogstail, 25% Reptans Red Fescue and 10 % Cochise Tall Fescue.

2. The centres of the 2 Hoskins Fields (SP3200 9357 and 8190) were planted to grass and wildflower in 2003. This was a total of 15.94 ha and the headlands were left as they were. The sown mix was 1 kg wild flower UK origin comprising: - 10% Yarrow, 5% Knapweed, 5% Meadow Sweet, 10% Lady's Bedstraw, 2% Devils Bit Scabious, 10% Oxeye Daisy, 2% Cowslip, 10% Common Sorrel, 10% Red clover, 17% Birdsfoot Trefoil, 3% Ragged Robin, 16% Self Heal and the following grass species: - 3kg Smooth Stalked Meadow Grass, 3kg Common Bent, 4kg Crested Dogstail, 2kg cocksfoot, 0.5kg Meadow foxtail and 0.5% sweet vernal grass.

3. The wild flowers didn't germinate well, so another 1 kg mix of wildflowers wasadded in 2004. This worked and the headlands are now largely colonised with wild flowers.

4. In July 2006, after 11 months fallow following wheat, the centres of Wilcox SP3201 5935 and Ferris Field SP3200 0396 were sown with green hay harvested from Chimney Meadows National Nature Reserve. The green haying worked very well. This was a total of 16.98 ha and the existing ESA margins were left as they were. These headlands have now been colonised by wildflowers.

The site has also been used for seed harvesting by a company called Brightseeds.

Hydrology	Fields flood, but not every year, although some parts do flood annually. Water can stay on site for 6 weeks, but typically 2 weeks. Been drier recently. Last 2 winters (2020 and 2019) have been wet. The whole of Field 1 is flooded. Field 2 floods in patches, Field 3 floods every year down the middle, not the whole field. Field 4 floods annually, but not all, just the 2/3 in the southern area. Typically flooding occurs in January. Fields are fairly free draining.
Flooding regime Water management Soil-water levels (indicated by auger hole/any other data)	
Current site interest	Attached excel spreadsheet for botanical data

Field 1. Wilcox

2017. Field was dominated by several forbs like bulbous buttercup *Ranunculus bulbosus*, (up to 65%), bird's-foot trefoil *Lotus corniculatus* (up to 25%), red clover *Trifolium pratense* (up to 35%) and ribwort plantain *Plantago lanceolata (*10%). Less abundant but more or less evenly spread across the field were cowslip *Primula veris,*

pepper saxifrage *Silaum silaus,* goat's-beard *Tragopogon pratensis*, selfheal *Prunella vulgaris* and field woodrush *Luzula campestris.* Other forbs like common knapweed *Centaurea nigra,* common mouse-ear *Cerastium fontanum,* rough hawkbit *Leonthodon hispidus,* and meadow buttercup *Ranunculus acris* were much more uncomon in the field. Small grasses like red fescue *Festuca rubra* and sweet vernal grass *Anthoxanthum odoratum* reached 10% of the ground cover, other grasses were much less abundant. Species richness was relatively high (17.6 species per m^2). Overall, this restored meadow community is making very good progress, which is probably helped by a relatively low soil fertility (Ellenberg indicator score N=3.96) and a free draining soil.

2021. The species richness on the field increased on average up to 24 species per m^2, in places up to 30 species per m^2. Winter floods in 2019 and 2020 helped to slightly increase soil nutrients (Ellenberg indicator score N=4.32), which, in turn supported a higher abundance of grasses like red and meadow fescues, crested dog's-tail grass *Cynosurus cristatus* and yellow oat-grass *Trisetum flavescence*. Wet winters supported spread of white clover *Trifolium repens* and meadow buttercup *Ranunculus acris*, while red clover *Trifolium pratense* and bulbous buttercup *Ranunculus bulbosus* slightly decreased their abundance. The population of glaucous sedge *Carex flacca* is well established, which is a sign of good meadow restoration progress. Dry subcommunities of MG5 and MG4 types (British NVC classification) scored over 70% confidence in MAVIS calculator, which, again, is an excellent sign of restoration success. Species functional diversity on the meadow is well balanced and similar to ancient, well-established meadows. Ratio of C:S:R Grime's functional types is considered as one of three major characteristics for meadow restoration success (Rothero, Tatarenko, Gowing, 2020). Vegetation in Field 1 showed C:S=0.86 and S:R=1.1 – values, which are well in range for an excellent balance of functional diversity in the meadow. Overall, Field 1 has demonstrated an excellent restoration success rate.
This field qualifies as a Priority Habitat according to the Priority Habitat Indicator species lists.

Field 2. Ferris.
2017. The field was dominated by red fescue (up to 50%), sweet vernal grass (up to 15%) and creeping buttercup *Ranunculus repens* (up to 50%). 25 species were recorded in a walk-over, but quadrat data were not taken here. Species diversity was probably a bit lower than in Field 1. There appeared to be fewer forbs that had germinated and the high percentage of red fescue which forms a compact litter across the meadow, is likely to stop seedlings of weak-competitor species to grow.

2021. Quadrat data were collected on the field in 2021. The field is a good example of MG4 meadow, its typical and dry-end subcommunities MG4a and MG4v2 scoring over 60% confidence in MAVIS calculation. Species diversity ranges from 17 to 20 species per m^2, which is not the highest for these types of plant communities. However, the vegetation shows an excellent functional diversity, similar to Field 1 (C:S=1.05; S:R=0.98). Comparing to Field 1, Field 2 has the wetter (Ellenberg soil moisture score F=5.1) and slightly more fertile conditions (Ellenberg soil nutrients

N=4.98). This results in higher abundance of grasses, in particular, red fescue *Festuca rubra* and rye grass *Lolium perenne*. Reduction of their growth in the drier years will support an increase in diversity of herbs.

This field qualifies as a Priority Habitat according to the Priority Habitat Indicator species lists.

Field 3. Hoskins Barn

2017. The field has very species-rich edges 20-30 m wide, with a lot of ladies bedstraw *Galium verum,* cowslip, and yellow rattle *Rhinanthus minor.* On the field there are several large areas of tall meadow foxtail grass *Alopecurus pratensis*, but vegetation is very short and sparse in the drier corner near River Ouse. Similar to Field 1, vegetation of this field is more or less similar to MG4-type of burnet floodplain meadow *Alopecurus pratense-Sanguisorba officinalis* grassland. However, compared to Field 1, this field was much grassier, dominated by meadow foxtail grass (up to 80%) with a significantly smaller abundance of forbs. A higher clay content in the soil probably supports an area of higher nutrients, which was reflected by the higher Ellenberg indicator value (N=5.78) in this field compared to Field 1. However other quadrats in the field (e.g. around quadrat 20) have a lower fertility, so the field is patchy. The soil profile was very short and had a good amount of sand in the profile at quadrat 20 which suggests a free draining soil in good connection with ground water.

Micro topography appeared to play a key role in species distribution and community composition in this field. Higher ground around the edges and in one corner of the meadow accommodates an MG4 community of the drier subtype, while the central part of the field lies lower and is likely to be more nutrient rich (and species poor) as water is likely to sit here for longer before draining.

2021. The diversity of microtopography continues to drive the differences in vegetation. As low as 6 species per 1 m^2 are recorded in the central part of the field, where soil fertility Ellenberg's indicator score is N=6.2. Up to 22 species per 1 m^2 occurred in the wide edges of the field, where the nutrient level is lower (N=4.8). Vegetation in the field overall scored over 70% confidence for the typical MG4v2 plant subcommunity. However, functional diversity is not sufficiently high yet. The dominance of grasses shifts C:S ratio to a higher level (1.31) than it is desirable for a characteristic of good restoration success (reference level in <1.1). The S:R ratio in the field (0.87) fits into the reference value 0.84 - 0.89, which indicates good progress in meadow restoration (Rothero, Tatarenko, Gowing, 2020).
Overall, the field serves several ecosystem services – maintaining a species rich meadow community around the wide edges, and accommodating flood water in the central part. The combination of higher and lower elevations also ensure that plants have a wider range of conditions to survive in contrasting weather.

This field qualifies as a Priority Habitat according to the Priority Habitat Indicator species lists.

Field 4. Bottom Hoskins

2017. It was very grass poor, but had a lot of herbs including yellow rattle *Rhinanthus minor*. Quite a lot of bare ground, moss, and thistle were also evident. 36 species were recorded in a walk-over of the field. The species ranged from dry-specialists like bulbous buttercup *Ranunculus bulbosus,* yarrow *Achillea millefolium* and ladies bedstraw *Gallium verum,* to the wet-specialists like common spike rush *Eleocharis palustris* and hard rush *Juncus inflexus* in lower lying areas. The low grass ground cover could suggest relatively low nutrient levels in the soil.

2021. The field still has about 20% of bare ground surface, possibly due to prolonged flooding in the previous 2 years, but the abundance of yellow rattle has decreased, so grasses now have more chances to recover. Quadrat data were collected in the field in 2021. Vegetation scored over 60% similarity to MG4v2 and MG4b – typical MG4 plant subcommunities. Ellenberg's indicator score for soil fertility is not low (N=5.16). The field has good potential to increase the species number higher than currently recorded (15-18 species per 1 m ^{2}). Functional diversity looks good for the ratio C:S=1.08, which is below the reference value of 1.1. Ratio S:R=0.81, which should be improved up to over 0.89 reference value to be closer to a good restoration success.

This field qualifies as a Priority Habitat according to the Priority Habitat Indicator species lists.

Phosphorus levels	Sampled by landowner in 2021 Available phosphorus is low in all fields.

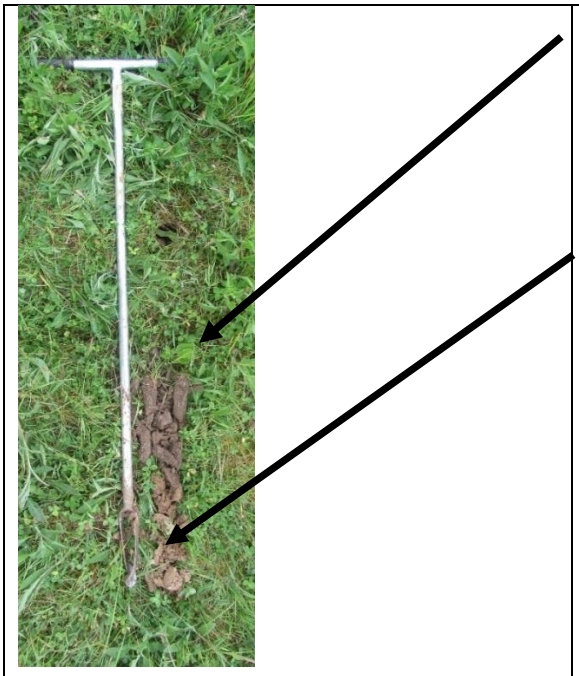
Soil profiles

Soil profile in field 1 (Q13)

A horizon
0 - 10 cm Top soil, dark brown, plant roots, silty loam

B horizon
10 - 25 cm loam
25 - 50 cm sandy clay loam
50 - 70 cm sandy clay 5%, gravel<5%, clay

A well-draining soil horizon with sand and gravel from 50 cm depth.



Soil profile at quadrat 20 (field 3)

A horizon
0 – 25 cm – light-brown agricultural layer, silty loam

B horizon
Sharp border with next horizon
25 – 40 cm – red-brown sandy clay
40 – 50 cm – sand with some clay and calcareous gravel

A short soil profile closely connected to the gravel/sand layer. This should be a free draining soil, with little waterlogging

Site manager aspirations/objectives

Continue to develop species rich meadows for HLS objectives.
The landowner feels that his hay should sell for a premium as it is organic and river meadow. Organic growers and farmers tell him off for reducing the soil fertility. The landowner would like to see scientific evidence that the herbs in the meadows have magnesium and other nutrients to demonstrate that they are good for stock health. All four fields to be listed on the Priority Habitat Inventory if possible (if the fields are priority grassland then the landowner can obtain some grants under the Countryside Stewardship Scheme to keep their management as it has been e.g. a late cut of hay, no inputs and then winter grazing with adjusted sheep).

Management recommendations

Consistent hay cut management will be sufficient to maintain and support further species diversity on the fields 1, 2 and 4. The central part of field 3 might benefit from nutrient reduction in the soil by taking two hay cuts a year for a couple of years (June/September), weather permitting. However this may be difficult to implement due to the shorter day length for drying and the lower yield from a second cut making it uneconomical.

Field 4 has potential for further improvement, possibly through focused seed sowing or planting plug plants to increase the species diversity on the site. Species of herbs like great burnet *Sanguisorba officinalis*, Devils' bit scabious *Succisa pratensis*, meadowsweet *Filipendula ulmaria*, and sawwort *Serratula tinctoria* as well as small sedges like glaucous sedge Carex flacca will make a very valuable addition to the plant community. Currently, their seedlings have a good chance to establish in the meadow as there are many patches of bare ground with no competition from the grasses, as it's seen in 2021.

If yield is a concern in the non-flooded areas, the application of FYM might be considered at an appropriate rate.

Glebe Farm	2017	2021	2021	2017	2021	2021
	Field 1	Field 1	Field 2	Field 3	Field 3	Field 4
Ellenberg F (moisture tolerance)	4.6	4.76	5.1	4.96	5.36	5.2
Ellenberg N (fertility)	3.96	4.32	4.98	5.78	5.58	5.16
Ellenberg R (Reaction)	6.34	6.36	6.42	6.12	6.2	6.32
Species/quadrat (mean and range /1 m x 1 m)	17.6 (16-21)	24.4 (19-30)	18.6 (17-20)	14.4 (10-20)	15.4 (6-22)	16 (15-18)
NVC (top 2 MAVIS subcommunities)	MG4b MG4a	MG5a MG4a	MG4a MG4v2	MG4c MG4b	MG4v2 MG4c	MG4v2 MG4b