# Longford Stream

## The River Ouse Project Report No. 10

University of Sussex

Longford Stream
The River Ouse Project Report No 10

Authors: Peter Heeley, Jacqui Hutson, Will Pilfold, Margaret Pilkington, Sue Rubinstein

University of Sussex 2019

**Front cover**
*Wood Field, upstream from Longford Bridge*

**Contents**



,

# 1 Introduction

This is one of series of reports produced by The River Ouse Project (University of Sussex) about sites in the Upper Ouse catchment. This report provides information to the Environment Agency, Catchment Sensitive Farming, Sussex Flow Initiative, Sussex Wildlife Trust, Ouse and Adur River Trust and other interested stakeholders to enable appropriate decisions to be made about biodiversity enhancement of streamside land linked to flood alleviation and run-off prevention.

Our work has focused particularly on grassland. Moderately species-rich sites have been surveyed and full descriptions are given. Species-poor grassland sites and woodland are briefly described. The report sets our work in context (Section 2) and describes the methods we used (Section 3). Site descriptions (Section 4) give location and a description of present-day vegetation including NVC type and an indication of biodiversity value with relevant changes in land-use over the last 200 years. The potential for enhanced prevention of run-off is considered and recommendations made (Section 5).

# 2 Context

## 2.1 Slowing the flow of water to prevent run-off

The river Ouse in Sussex is a flashy river, which rises quickly after prolonged heavy rain and then soon subsides. It has a wide catchment area with a large number of small streams including the Longford Stream and its tributaries (Figure 1 and Figure 2). The Longford system is mostly bordered by agricultural land with small areas of woodland on imperfect or poor-draining soils.

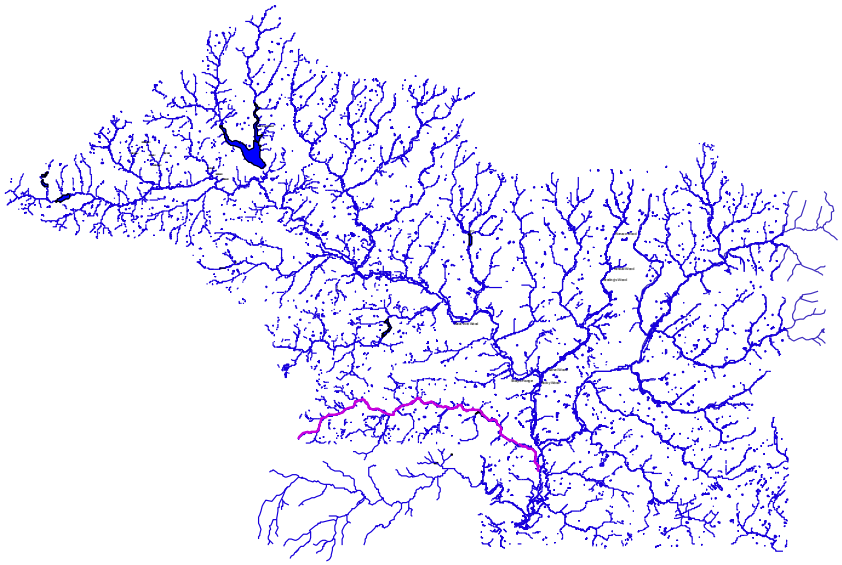

**Figure 1.** Stream System in the Ouse above Barcombe with the Longford Stream shown in purple

Rain falling at the end of a dry period is absorbed initially but, once the ground becomes saturated, any extra rainfall causes flow rates to increase rapidly in these streams. The result is a sudden and dramatic rise in water level downstream. Some of this water spills out on to land bordering the Ouse and its tributaries. Land subject to such flooding is known as ‘flash washland’ because the flooding lasts only a few days, unlike washlands on the Cambridgeshire Ouse, which remain flooded throughout spring. The deepening of streams in the 1970s and 1980s to drain agricultural land has reduced the amount of land subject to this ‘flash’ flooding and we have not found any good washlands along the Longford Stream. This, together with changes in land-use, will have contributed to the amount of sediment accumulating further downstream in Barcombe reservoir.

## 2.2 Wildflower meadows full of butterflies and bumblebees – a Biodiversity Action Plan target plant community

Species-rich meadows are rare. Despite the 1994 Biodiversity Action Plan target of no further depletion of this habitat (UK Action Plan 1994), they have continued to vanish from our landscape. The decline in native bumblebees, which are essential crop pollinators, particularly early in the year when hive bees are inactive, is linked to the decline in flower-rich meadows.

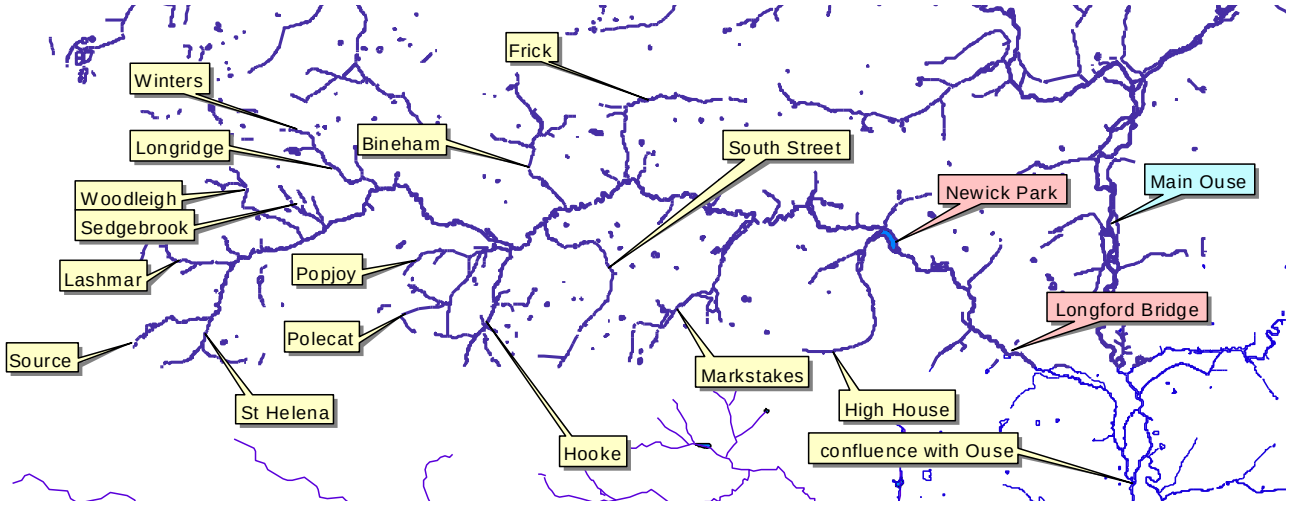


**Figure 2.** Tributaries of Longford Stream

In the days of horse transport, the best land was often used as hay meadow and all along the Longford Stream there were extensive hay meadows and pastures (Figure 3). Wild flowers such as Common Knapweed (*Centaurea nigra*) and Oxeye Daisy (*Leucanthemum vulgare*) grew in profusion. Now only small pockets of flower-rich grassland remain and the connected meadow-scape essential for bumblebees has gone. The linear landscape along such streams provides a wonderful opportunity for reconnecting the flower-rich fragments through grassland enhancement of suitable sites. Our research shows that this can be done on sites where the soil fertility is low by planting wildflower plugs and sowing locally-sourced wildflower seed (The River Ouse Project Report 8). Such enhancement would retain agricultural land in good condition, enabling a return to low-input farming when oil-driven agriculture is no longer possible.

## 2.3 Preventing run-off by absorbing rainwater on valley slopes

The amount of water entering the stream system after heavy rain will be greatly affected by how the land on which the rain is falling is used: whether it is wooded, permanent grassland, arable or built-up. In the Longford catchment, the land is predominately agricultural and in recent years there has been an increase in the amount of land that has been converted from permanent grassland to arable maize to provide winter feed for cattle or short-term ryegrass ley. This is a high input–high output system, which is not a sustainable method of food production (Webbelmann *et al.*, 2013). It is widely recognized that it is better to use permanent grassland for animal production and arable for growing food that is eaten directly by humans.

In the present context, converting permanent grassland to maize or short-term ryegrass ley on the valley slopes along the Longford Stream also has an adverse effect on water retention leading to increased run-off and leaching of fertilizer, sediment and pesticides into the water course.

In contrast, permanent grassland with earthworm tunnels absorbs rainwater: “Our research shows that farmers can make a huge difference in helping to mitigate the effects of climate change. When fields are not ploughed the soil condition is improved naturally by the tunnelling of earthworms, which absorb water at a rate of four to ten times that of fields without worm tunnels. This in turn

helps the soil to take up water during storms and retain it during drought." (Stoate, Game and Wildlife Conservation Trust Press Release, 2011.) The absorptive nature of such grassland is even further enhanced in species-rich examples because they contain deep-rooting perennials such as Yarrow *(Achillea millefolium)* and Ribwort Plantain *(Plantago lanceolata)* (Wilkinson, 2011). Trees and shrubs are more deep-rooting than grassland plants, so areas of woodland within the Longford catchment, are making an important contribution to preventing surface run-off. The Pontbren Project in Wales has demonstrated that planting small areas of woodland and putting in hedgerows along contours reduces run-off and retains water, sediment and nutrients (Flood Risk Management Research Consortium, 2008 and The Woodland Trust Wales, 2013). In the past, there was usually a hedge between the streamside meadows and the arable fields on the slope above.

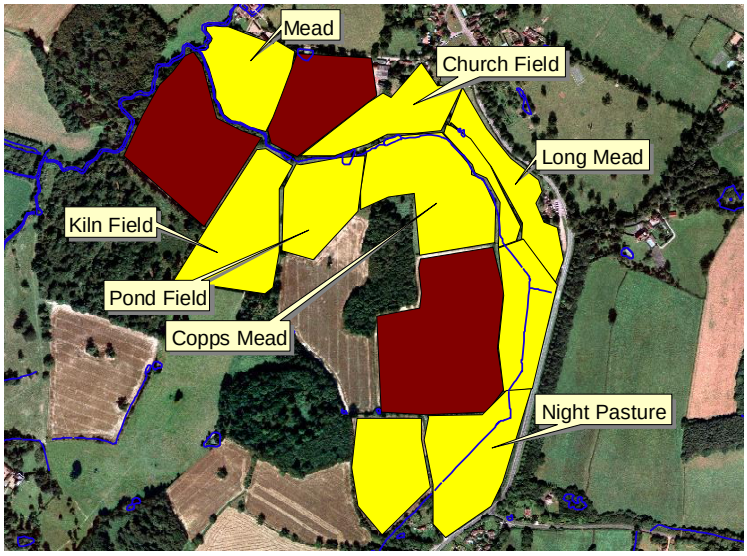


**Figure 3.** Linear Landscape of meadows (yellow) along South Street Tributary of the Longford in 1838 (Chailey Tithe); arable (brown)

### 2.4 Large woody debris dams

Large woody debris dams are an effective way of holding water back in the upper reaches of rivers (Nisbet and Thomas, 2008). Dam construction leads to high rates of sedimentation in the upstream pool, which raises water levels and re-connects the stream with the floodplain. Water quality is improved by removal of sediment and associated nutrients such as phosphate. Many woodland streams in the Ouse catchment have small, naturally occurring debris dams, which are already holding back the water and creating habitat diversity.

## 3. Methods

### 3.1 National Vegetation Classification (NVC) survey of moderately species-rich grassland bordering the Longford Stream

The NVC is the most widely used system for describing vegetation and is particularly useful because it relates to soil properties and site management. We have followed the methods described in Rodwell (1992): recording the abundance of all the species present in a series of sample squares (quadrats) of either 2 x 2 or 4 x 4 metres. From this dataset we can assign an NVC community to the present-day grassland and draw conclusions about how this grassland has evolved in the context of past land use (investigated through document analysis) and about how it could be transformed.

**3.2 Historical Research.** Past land-use has been researched from Dudley Stamp's Land-Use survey maps 1930-1948 and the Tithe Survey.

**4. Site descriptions.** Most of the stream system was walked and is presented in the report

stream by stream starting at the upstream end and working downstream (Figure 2, Table 1). For grassland sites subjected to a NVC survey, OS grid references are given and the results are tabulated showing points of difference between our data and the average for this type of grassland. Species-richness is discussed in relation to present day management and recommendations made. Our ideal plant community is MG5 *Cynosurus cristatus-Centaurea nigra* grassland with 22 (12–38) species per sample. Where springs occur within the meadow leading to areas of rush vegetation the biodiversity increases. The less species-rich plant community MG6

| Name of Stream | Name of Site |
|---|---|
| Longford Stream from source to South Road | |
| St. Helena Tributary | |
| Lashmar Tributary | |
| Longford from South Road to Beresford Lane | |
| Woodleigh Tributary | Furze Field |
| Winter's Tributary | |
| Woodleigh Tributary | Kiln Field |
| | Little James |
| Sedgebrook Tributary | Alder Plot |
| | Sedgebrook Marsh |
| Longridge Tributary | Oakwood Meadow |
| | Oakwood Rush |
| | Three Acres |
| | The Old Plat |
| Longford from Beresford Lane to A275 north bank | |
| Bineham Tributary | Bricky Field |
| | Hilly Field west |
| | Hilly Field east |
| | Pond Field |
| Longford from Beresford Lane to A275 south bank | |
| Polecat Tributary | Seven Acres |
| | Lower Three Acres |
| | Lower Mead |
| | Polecat Gill |
| Popjoy Tributary | |
| Hooke Tributary | |
| South Street Tributary | Night Pasture North |
| | Night Pasture South |
| | Long Mead east |
| | Long Mead west |
| Longford from South Street to Longford Bridge, upper part to Newick Park | |
| Frick Tributary | Five Acre Field grass |
| | Five Acre Field rush |
| | 3&3/4 Acre Field |
| | Long Field grass |
| | Long Field rush |
| | Wood Field |
| Markstakes Tributary | |
| High House Farm Tributary | |
| Longford from South Street to Longford Bridge, lower part from Newick Park | Lower Brook |
| | Wood Field |
| | Four Acre Field |
| | Lower Meadow |
| Longford from Longford Bridge to confluence with River Ouse | Ox Ham |
| | Broad Piece |

T**able 1.** Longford stream system and sites considered worth surveying.

*Lolium perenne-Cynosurus cristatus* grassland with 13 (4-26) species per sample may potentially become MG5 under appropriate management. Crested Dog's-tail (*Cynosurus cristatus)*, a Constant species in MG5 and MG6 grassland, is generally absent from these grasslands in the Ouse catchment and only occurred in two of the meadows in this report. Accordingly, this species is not listed as an absent species in the tables, but its presence in these two meadows is noted.

The locations of all the sites described are shown in the accompanying figures. Scientific names follow those in Rodwell (1991 and 1992) and English names follow Dony *et al*.(1974).

## 4.1 Longford Stream from Source to South Road (Figure 4, Table 1)

The source of the Longford lies to the west of Hundred Acre Lane. The stream flows east until it is joined by **St Helena tributary**. The streamside was walked on 5 October 2016.

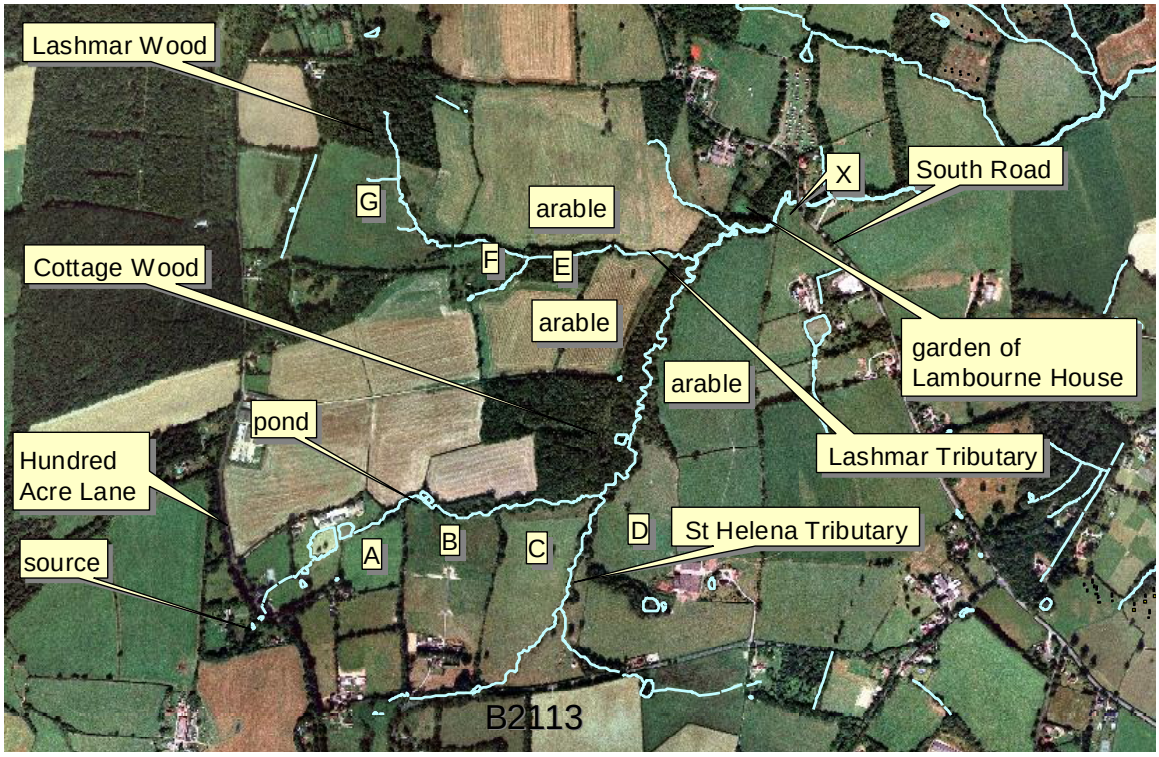


**Figure 4** Longford Stream from Source to South Road

**Fields A and B** were predominately grassy but contained Common Bird's-foot-trefoil *(Lotus corniculatus)* and indigenous grasses. Field B had a bird feed area and a dry pond where it might be possible to hold back water. To the north were arable fields. **Field C** was very tussocky and overgrown, but contained MG5a species including Common Bird's-foot-trefoil and Meadow Vetchling *(Lathyrus pratensis).* It was being grazed by 2 cows. **Field D** was ploughed. **Cottage Wood** is ancient woodland with a mixed canopy of Pedunculate Oak *(Quercus robur)* and Ash *(Fraxinus excelsior)* with Holly *(Ilex aquifolia)* and Hazel *(Corylus avellana)* understorey and ancient woodland species such as Bluebell (*Hyacinthoides non-scripta*) and Dog's Mercury *(Mercurialis perennis)* in the ground flora. There is little separation between the stream and the adjacent arable fields.

**Lashmar tributary** rises in Lashmar Wood, a mixed woodland containing coppiced Oak and a sizeable pond bay which looked as though it would hold back a considerable amount of water after heavy rain. **Field G** was being grazed by cattle on 5 October 2016, but the small streamside area outside the electric fence was relatively species-rich. The narrow shaw contained a massive ancient coppiced Field Maple *(Acer campestre)* and Ash tree, but also a small Wild Service Tree *(Sorbus torminalis)* and Oak standards. **Field F** had been re-seeded with a ryegrass mix containing Chicory *(Cichorium intybus)* leaving only a narrow field margin of more permanent grassland. **Wood E,** a hornbeam coppice wood with Dog's Mercury was very muddy because of extensive run-off from the surrounding arable fields.

Downstream from the confluence with Lashmar tributary, the Longford Stream runs along the southern boundary of a narrow band of woodland close to arable fields and into the garden of Lambourne house where there is a new pond in the wood. In the corner with South Road is a small area of rough un-managed wet grassland **(X)** which is regularly flooded in winter. This contained MG5a species augmented by wet-land species such as Water Mint *(Mentha aquatica),* Gipsywort *(Lycopus europaeus)* and Marsh Bedstraw *(Galium palustre)*.

## 4.2 Longford Stream from South Road to Beresford Lane (Figure 5, Table 1)

Adjacent to South Road the Longford Stream runs through gardens and then there is a series of pastures on the south bank which we walked on 12 October 2016. **Great Meadow** was being grazed by sheep and

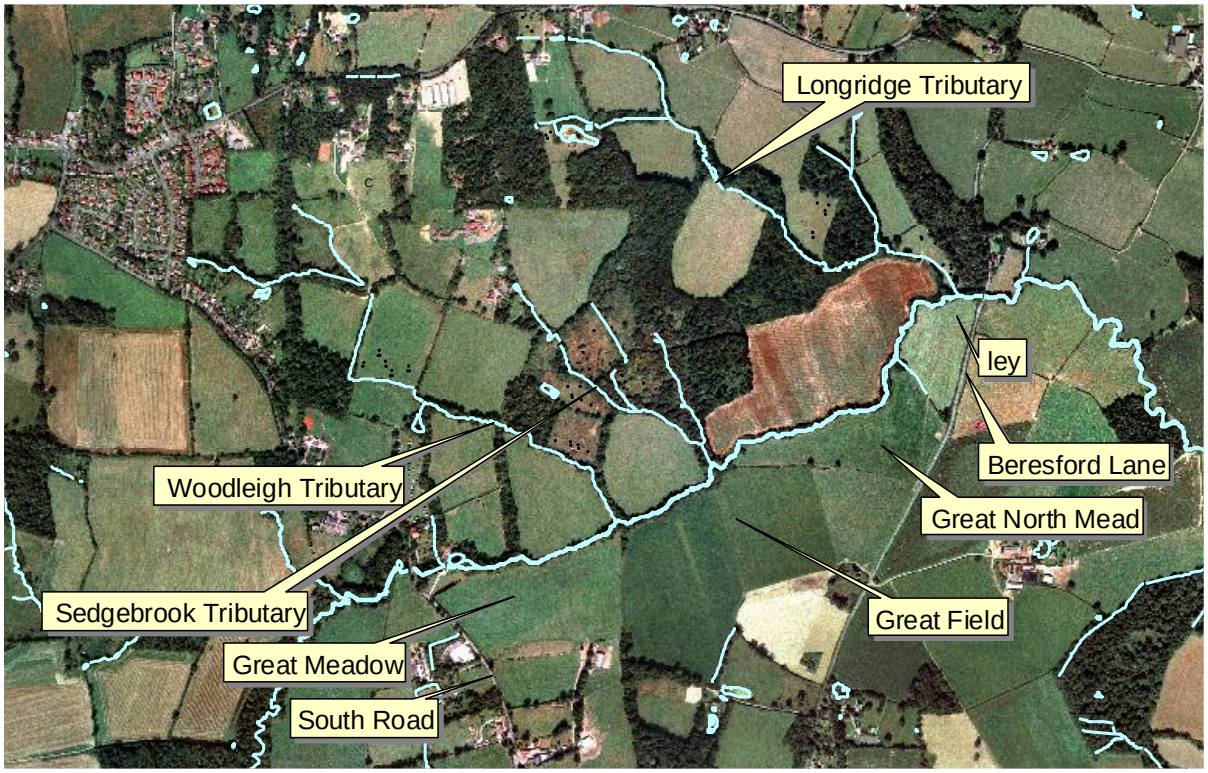


**Figure 5.** Longford Stream from South Road to Beresford Lane

contained Perennial Rye Grass *(Lolium perenne)*, Yorkshire-fog *(Holcus lanatus),* and a few broad-leaved herbs (forbs). **Great Field** had been cut for hay and then grazed by sheep. It contained indigenous grasses and hay meadow forbs including Meadow Buttercup *(Ranunculus acris)* and Meadow Vetchling. The streamside edge of Great Field and Great Meadow was lined with trees forming a narrow shaw with a good mixture of native trees and shrubs. **Great North Mead** was ryegrass-clover ley. Manure had been spread and it was being grazed by cattle.

The north bank of the Longford Stream is interrupted by three substantial tributaries: Woodleigh, Sedgebrook and Longridge. Fields are described starting at the top of each tributary in turn.

## 4.3 Woodleigh Tributary (Figure 6, Table 1)

The Woodleigh Tributary rises among housing on the outskirts of Wivelsfield and then flows along the northern and eastern boundary of Furze Field.

**Furze Field** was walked on 12 October 2016. This grassy field had a pile of horse manure ready for spreading and an area of nettle where manure had been piled up in the past. It was still recognisably MG5, but was degrading under poor management.

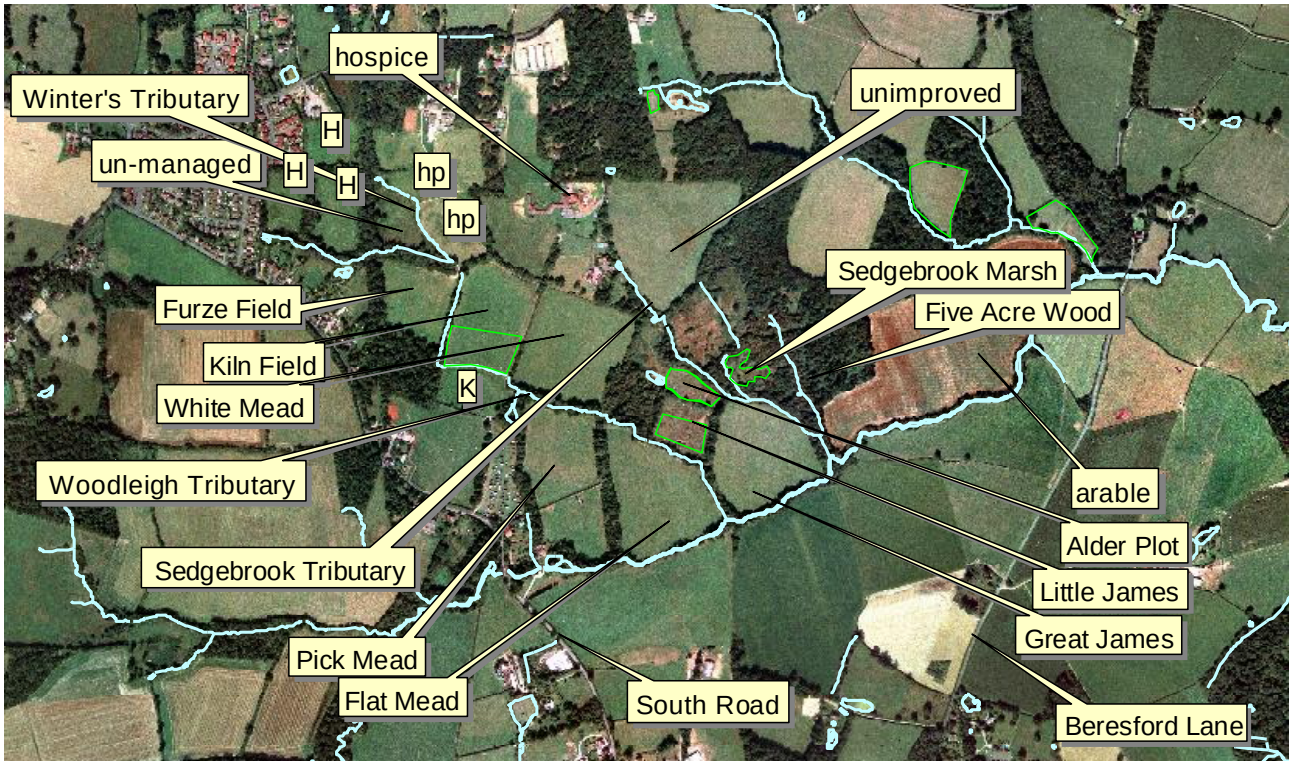


**Figure 6**. Woodleigh and Sedgebrook Tributaries. H = new houses; hp = horse paddocks

**Winter's Tributary** joins Woodleigh Tributary in the NE corner of Furze Field. It is bounded by horse paddocks (hp) to the north and to the south an un-managed field full of ragwort that still contained indigenous grasses and Common Bird's-foot-trefoil on 12 October 2016.

**Kiln Field** (TQ360195) The southern part (about 1ha) was surveyed on 7 June 2017. It was species-poor MG5a with only 15(11-20) species per 4x4m quadrat, but this included Adder's-tongue fern *(Ophioglossum vulgatum)*. It was becoming MG6 due to lack of management. In 1839 it was arable (Plumpton Tithe)

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Kiln Field | MG5a | *Plantago lanceolata* | *Festuca rubra* | *Cerastium fontanum* |
| 7 June 2017 | | *Dactylis glomerata* | *Lotus corniculatus* | *Bromus hordeaceus* |
| | | *Trifolium repens* | | *Ranunculus repens* |
| | | *Centaurea nigra* | | |

**Field K** This grassy field was uncut when we visited on 12 October 2016. It contained indigenous grasses and some MG5 forbs including Meadow Vetchling, but had fewer forbs than Kiln Field.

**White Mead** (TQ361196) was walked on 7 June 2017. It was dominated by indigenous grass species, with Yorkshire Fog particularly abundant, and contained few forbs. Meadow Brown butterflies were abundant. It had been cut for haylage in 2016 and there was evidence of recent herbicide treatment with deformed buttercups and thistles. Managed appropriately it could become MG5.

**Pick Mead** (TQ361194) contained similar species to Kiln Field on 12 October 2016: MG5a was indicated.

**Flat Mead** (TQ363193) was walked on 7 June 2017. It was dominated by indigenous grass species including Crested Dog's-tail, Sweet Vernal Grass *(Anthoxanthum odoeratum)* and Yorkshire Fog and there were patches of forbs including Ox-eye Daisy *(Leucanthemum vulgare)* and Sneezewort *(Achillea ptarmica*) particularly at the eastern end. It had been cut for haylage in 2016 and had been recently treated with herbicide with Meadow Buttercup, Common Sorrel *(Rumex acetosa)*, Docks and Creeping Thistle

particularly affected. The species composition suggested a poor MG5a which could be enhanced if it were managed appropriately without resort to herbicide. Meadow Brown butterflies were abundant. Along the eastern edge wild daffodils were seen in spring.

**Little James** (TQ364194) was surveyed on 21 June 2017. It was MG5a, but with only 18(14-23) species per 2x2m quadrat it was less species-rich than average. There were large patches of Silverweed *(Potentilla anserina),* and Common Spotted-orchids *(Dactylorhiza fuchsii)* were scattered throughout along with some Musk-mallow *(Malva moschata)*. There was quite a deep thatch and no sign of grazing. The field is level now, but about 20 years ago it was a motorcycle or mountain bike circuit with tracks and mounds (personal communication Tony Hutson). Meadow Brown and Marbled White butterflies were abundant. In 1839 Little James was meadow (Plumpton Tithe).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Little James | MG5a | *Festuca rubra* | *Anthoxanthum odoratum* | *Geranium dissectum* |
| 21 June 2017 | | *Centaurea nigra* | *Plantago lanceolata* | *Poa trivialis* |
| | | | *Trifolium repens* | |
| | | | *Trifolium pratense* | |

**Great James** was dominated by indigenous grasses on 12 October 2016, but also had MG5 forbs including Bird's-foot Trefoil, Selfheal *(Prunella vulgaris)* and Ox-eye Daisy. It is separated from the Woodleigh tributary by a shaw.

## 4.4 Sedgebrook tributary (Figure 6, Table 1)

Sedgebrook tributary rises in a garden and then flows between Alder Plot and Sedgebrook Marsh.

**Alder Plot** (TQ364195)is surrounded by hedges, shaws and woodland with a pond on the south west side. The northern part of this meadow had been mown when we visited on 21 June 2017 with the cuttings left on the surface, so our survey focussed on the 0.64 acres (0.26ha) in the south that was uncut. It was M23a with 17(16-20) species per 2x2m quadrat. This is less species-rich than the average of 21 species.

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Alder Plot | M23a | | *Juncus effusus* | *Agrostis canina montana* |
| 21 June 2017 | | | | *Anthoxanthum odoratum* |
| | | | | *Rumex acetosa* |

There was a large patch of the rare Meadow Thistle *(Cirsium dissectum)* as well as Sneezewort and Ragged Robin *(Lychnis flos-cuculi).* Meadow Brown butterflies and grasshoppers were abundant. The large amount of thatch present suggested that cuttings are regularly left on the ground. Consequently species richness is likely to decline. In 1839 it meadow (Plumpton Tithe).

**Sedgebrook Marsh** and Five Acre Wood on the north bank are traversed by two small streams that flow south to join the main Sedgebrook tributary adjacent to Great James.

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Sedgebrook Marsh | M23 | | *Juncus effusus* | *Hydrocotyle vulgaris* |
| 29 June 2006 | | | *Holcus lanatus* | *Potentilla palustris* |

**Five Acre Wood**, a wet chalybeate alder-wood, grades into the marsh to the north.
The massive field on the north side of the main Longford between Sedgebrook Tributary and Longridge tributary was ploughed when we visited on 12 October 2016.

## 4.5 Longridge tributary (Figure 7, Table 1)

Longridge tributary rises near Oakwood Meadow.

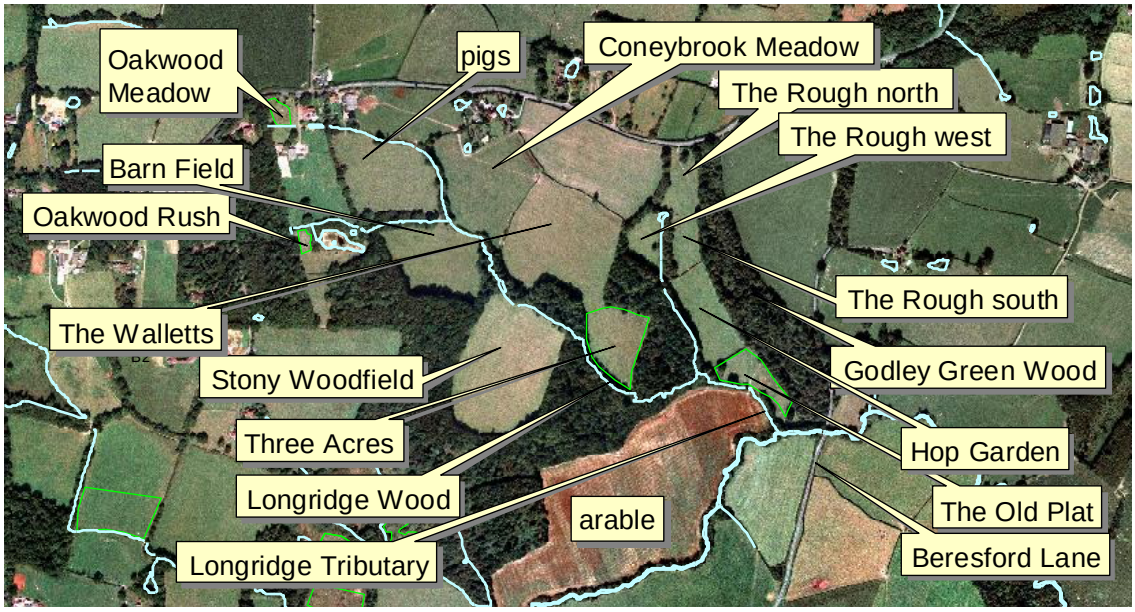


Figure 7 Longridge Tributary

**Oakwood Meadow** (TQ363203) was surveyed on 13 June 2018. There were patches of rush, and we avoided these when placing our quadrats. It was MG5c, but slightly less species-rich than average with 18(16-20) species per 2x2m quadrat. Common spotted orchids were occasional. The meadow is cut once a year and would benefit from aftermath grazing. In 1839 it was woodland (Plumpton Tithe).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Oakwood Meadow | MG5c | *Trifolium repens* | *Agrostis capillaris* | *Agrostis canina montana* |
| 13 June 2018 | | *Trifolium pratense* | *Dactylis glomerata* | *Ajuga reptans* |
| | | | | *Carex flacca* |
| | | | | *Juncus articulatus/acutiflorus* |
| | | | | *Potentilla reptans* |

The pig field has enclosures for rearing rare-breed curly-haired pigs. **Coneybrook Meadow** was being intensively grazed by sheep on 13 June 2018. It was dominated by indigenous grass species including Sweet Vernal grass and Common Bent grass *(Agrostis capillaris)* with few forbs apart from creeping thistle and marsh thistle. There was a small area of rush on the western edge by the stream which contained Common Bird's-foot-trefoil and a good range of wetland species. A grass snake was seen here. It is separated from The Rough by a ditch with a degraded hedge on each side of it. A small tributary, which rises in woodland belonging to St Peter and St James Hospice, flows to the north of Oakwood Rush and joins the Longridge in the north-east corner of Barn Field.

**Oakwood Rush** (TQ363200), an area of tall rush, was surveyed on 13 June 2013. It was species-poor M23a with only 15(13-16) species per 2x2m quadrat, but contained two species of skullcap, *Scutelleria galericulata* and *S. minor,* which don't normally occur together. In 1839 it was woodland (Plumpton Tithe).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Oakwood Rush | M23a | *Juncus effusus* | | *Agrostis canina* |
| 13 June 2018 | | *Galium palustre* | | *Anthoxanthum odoratum* |
| | | | | *Juncus conglomeratus* |
| | | | | *Potentilla reptans* |

**Barn Field** had been cut for hay when we visited on 13 October 2016. It was dominated by indigenous grass species with few forbs, but contained Common Bird's-foot-trefoil**. The Walletts** was the most species diverse of these meadows with Common Bird's-foot-trefoil, Bulbous Buttercup *(Ranunculus bulbosus)* and Red Clover *(Trifolium pratense)* occurring with Common Bent, Sweet Vernal Grass and Red Fescue *(Festuca rubra)*, but it was being intensively grazed by sheep on 13 June 2018 and also contained a lot of Creeping Thistle *(Cirsium arvense)* and Marsh Thistle *(Cirsium palustre).* **Stony Woodfield** was a ryegrass ley. The narrow band of hazel coppice between Barn Field and The Walletts contained oak, ash, and hornbeam *(Carpinus betulus)* with Common Hawthorn *(Crataegus monogyna)* and Blackthorn *(Prunus spinosa)*. It continues to the south as **Longridge Wood** with a network of small streams.

**Three Acres** (TQ369198) had not been grazed when we surveyed on 15 June 2017. There was a lot of nettle in the slightly higher central area and we avoided this when placing our quadrats. It was MG5a with 20(16-23) per 2x2m quadrat: slightly less species-rich than average. One quadrat had Corn Mint *(Mentha arvensis)* and another Trailing St. John's-wort *(Hypericum humifusum)*. In 1838 it was arable (Chailey Tithe).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Three Acres | MG5a | *Festuca rubra* | *Plantago lanceolata* | *Agrostis stolonifera* |
| 15 June 2017 | | *Dactylis glomerata* | *Anthoxanthum odoratum* | *Cerastium fontanum* |
| | | *Centaurea nigra* | | *Ranunculus repens* |
| | | *Trifolium pratense* | | *Taraxacum officinale* |
| | | | | *Vicia tetraspermum* |

A small tributary, joining Longridge Tributary at the south-east corner of Longridge Wood, runs alongside three connected meadows known as The Rough, that were meadows in 1838 (Chailey Tithe). There is a pond at the junction of the tributaries on either side of The Rough west. On both our visits (13 October 2016 and 15 June 2017) the sheep congregated in **The Rough north** and so this field was not surveyed. **The Rough south** is separated from this field by a recent hedge and from Hop Garden by a ditch planted with hazel on its southern bank and goat willow on its northern bank. Sheep move freely between all these fields. It had a similar mix of species to Hop Garden and MG7b was indicated. **The Rough west** was full of large clumps of sharp-flowered rush with lots of Lady's smock *(Cardamine pratensis)* when we visited on 13 October 2016. Marsh bedstraw and Greater Bird's-foot-trefoil *(Lotus uliginosus)* were also present and M23 was indicated. It is separated from the rest of The Rough by the tributary and a W10 woodland shaw. **Hop Garden** was visited on 15 June 2017 when the sward was cropped short by the Hebridean sheep except for clumps of tall rushes which the sheep had not grazed. Species present were similar to The Old Plat suggesting MG7b.

**The Old Plat (east)** (TQ371198) was surveyed on 15 June 2017 although the sward had been closely cropped by Hebridean sheep which had been grazing continuously since at least the previous October. There was a large patch of nettle in the centre of the field where manure had been piled up in the previous autumn (the field is managed organically) and a small wet area of dense rushes to the north; both of these areas were avoided for our quadrat survey. It was MG7b with 10(8-13) species per 2x2m quadrat: slightly more species-rich than average. In 1838 it was meadow (Chailey Tithe).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| The Old Plat (east) 15 June 2017 | MG7b | | *Lolium perenne* *Phleum pratense* | *Holcus lanatus* |

The large arable field on the north bank of The Longford Stream is separated from the Longridge Tributary by a small hedge-bounded field: **The Old Plat (west).** When we visited on 15 June 2017 this sward had also been closely cropped by the Hebridean sheep and with a similar mix of species to The Old Plat (east) MG7b was indicated.

## 4.6 Beresford Lane to A275, north bank (Figure 8, Table 1)

This section starts with two gardens and then two sheep-grazed grassy fields: the downstream one, **Ruff Slip** has a patch of rushes in the middle beside a deep north-south orientated depression which may hold back water at times. There are then two arable fields before Cottage Wood.


**Figure 8.** North bank of Longford from Beresford Lane to A275

**Bineham Tributary,** which rises on Chailey Common, was walked on 19 October 2016. Several of the meadows were considered worth surveying and are included as named sites in Table 1, but requests for survey access in 2017 and 2018 were refused. NVC classification is suggested on the basis of the walkovers.

**NW Beggars Wood field** contained Bird's-foot-trefoil when we visited. A depression with sharp-flowered rush *(Juncus acutiflorus)*, soft rush *(Juncus effusus)*, Lady's-smock *(Cardamine pratensis)* and Lesser Spearwort *(Ranunculus flammula)* may be all that remains of a well (marked w on OS map). **Beggars Wood** is now a Bent grass field with bracken at the edge and a few forbs including Selfheal.

**Bricky Field** (TQ 386200) contained indigenous grasses and MG5 forbs including Bird's-foot-trefoil, Common Knapweed *(Centaurea nigra)*, Red Clover and Oxeye Daisy. MG5a was indicated.

**Harris Mead** contained indigenous grasses and some MG5 forbs including Bird's-foot-trefoil and Red Clover when we walked on 19 October 2016. It was being grazed by sheep on 4 January 2017. The small tributary running across the middle of the field has been diverted round the northern edge of the field leaving a rushy area behind. A large pond was put in by the previous owner in about 2004 in the NW corner. **Saw Pit Field** was a robust agricultural rye-grass ley with clumps of rush on the flat part.
**Bineham Wood** is a species-rich wood with areas of overgrown alder and hornbeam *(Carpinus betulinus)* coppice: Beech *(Fagus sylvatica)*, Birch *(Betula)*, Guelder Rose *(Viburnum opulus)* and Bracken; small Oak standards; and Sweet Chestnut *(Castanea sativa)* away from the stream. Ground flora contained Wood-sorrel *(Oxalis acetosella),* Skullcap *(Scutellaria)*, Lady fern *(Athyrium filix-femina)*, Scaly Male fern *(Dryopteris affinis)*, Broad Buckler fern *(Dryopteris dilatata)*, *Mnium hornum* and *Atrichum undulatum*.

**Hilly Field west** and **Hilly Field east** (TQ 386200) contained indigenous grasses and MG5 forbs including Bird's-foot-trefoil. MG5 was indicated.
**Pond field** (TQ388199) contained indigenous grasses and MG5 forbs including Bird's-foot-trefoil. MG5 was indicated.

.
South of Hilly field west, the stream runs along the edge of a wet alderwood, that continues as a narrow strip adjacent to Cricketing Field. Here the stream has been dammed to make a pond which was full of tussock sedge *(Carex paniculata)* and Water Horsetail *(Equisetum fluviatile)*.
**Cricketing Field** and **Court Field** had indigenous grasses but few forbs except in a strip along the margin of Court Field that had been sown with a wildflower seed mix. The lower part along the stream had lots of nettle and looked as though it may flood. **Bridges Field** contained indigenous grasses, but few forbs. It was being grazed by sheep on 19 October. **Large Broom Hook Lag** contained indigenous grasses, but few forbs.

## 4.7 Beresford Lane to A275, south bank (Figure 9a, Table 1).

This section starts with two fields of ryegrass ley followed by a small wood and then arable fields that were growing maize on 20 October 2016. The Longford then enters an extensive area of scrub and wetland surrounding two small duck ponds and a larger pond at the confluence of Polecat and Hooke Tributaries (Photograph 1).

**Photograph 1.** Area of scrub and wetland surrounding the larger pond at the confluence of Polecat and Hooke Tributaries with an arable field in the distance.

This area will be reducing run-off from the arable fields and could be usefully extended downstream along the north bank of the Longford.

**Polecat Tributary** was walked on 20 October 2016. It rises in the corner of Seven Acres above Polecat Gill.

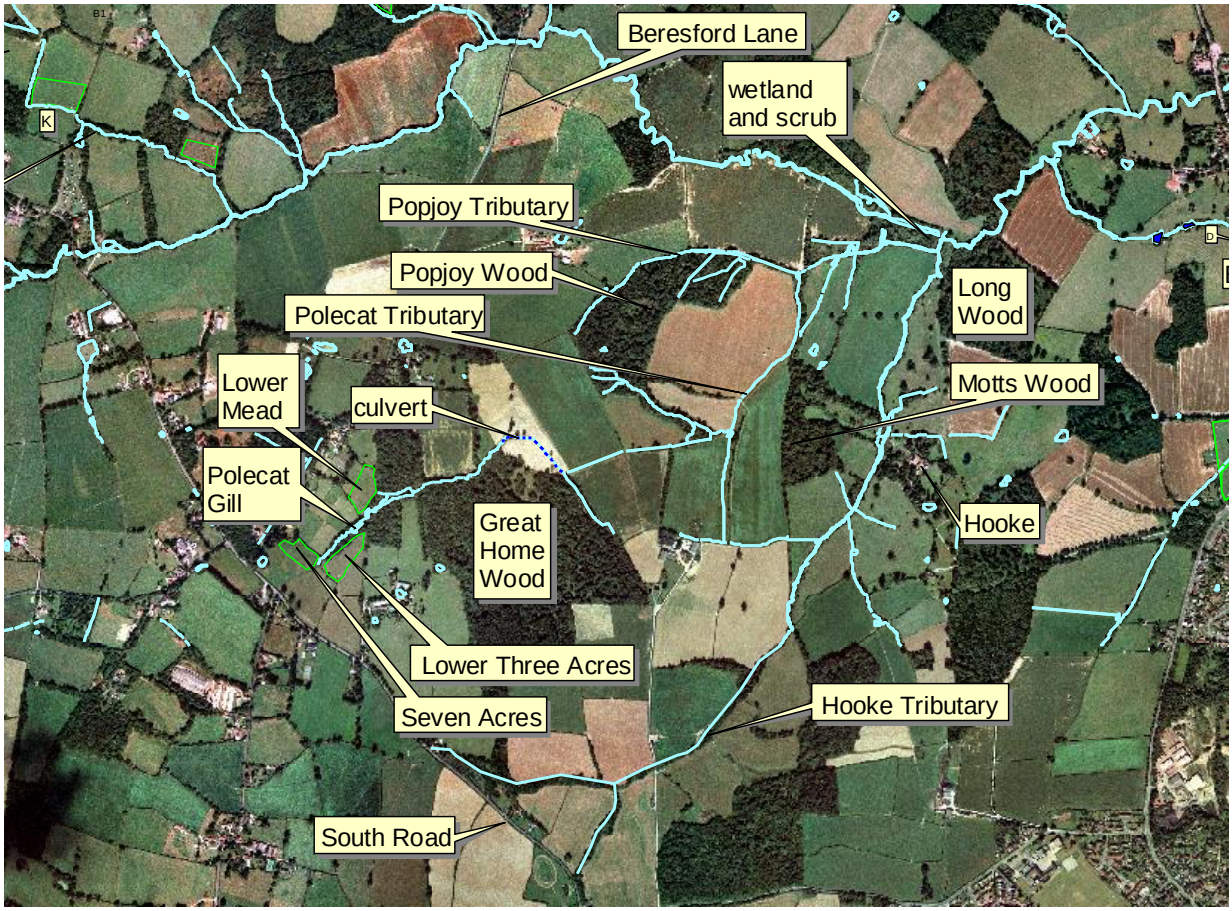


**Figure 9a.** Upstream part of Beresford Lane to A275, South Bank

**Seven Acres** (TQ366183) was surveyed on 14 June 2017. It had been cut for hay, but not grazed. It was MG5a but with only 16(11-19) species per 2x2m quadrat it was less species-rich than the average. It was noted, though, that the species count had been depressed by one particularly species-poor quadrat. Meadow Brown, Common Blue, Small Copper and Skipper butterflies were flying.

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Seven Acres | MG5a | *Centaurea nigra* | *Plantago lanceolata* | *Agrostis canina canina* |
| 14 June 2017 | | | *Dactylis glomerata* | *Potentilla reptans* |
| | | | *Trifolium pratense* | |

**Lower Three Acres** (TQ368183) had been grazed by sheep which were taken out just before our survey on 14 June 2017. Despite an unpromising appearance, it was MG5a with Adder's-tongue fern in four out of five 2x2m quadrats. Overall species richness was low with 13(10-15) species per quadrat which is much less than the average. The Plumpton Tithe does not record how Seven Acres and Lower Three Acres were being used in 1839, but in 1931 they were being managed as meadow (Land Utilisation Survey).

| Name of Meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Lower Three Acres | MG5a | *Plantago lanceolata* | *Festuca rubra* | *Ranunculus repens* |
| 14 June 2017 | | *Dactylis glomerata* | | |
| | | *Centaurea nigra* | | |
| | | *Trifolium pratense* | | |

**Lower Mead** (TQ368184) had been horse-grazed but cuttings from the previous year were still on the ground when we surveyed on 14 June 2017. It was MG5c with 17(12-23) species per 2x2m quadrat which is

less species-rich than average. Common spotted orchids were occasional. The Plumpton Tithe does not record how this meadow was being used in 1839, but in 1931 it was being managed as meadow (Land Utilisation Survey).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Lower Mead | MG5c | *Plantago lanceolata* | *Dactylis glomerata* | *Agrostis canina montana* |
| 14 June 2017 | | *Centaurea nigra* | *Trifolium pratense* | |

**Polecat Gill** (TQ367183) was surveyed on 3 May 2017. We recorded the species present in four 30m lengths upstream from two small ponds and the lake in Polecat Wood. There was little water in the gill and the ground flora lacked many of the usual gill constants such as *Pellia epiphylla,* Broad Buckler fern, Wood-sorrel, and Honeysuckle *(Lonicera periclymenum).* Pedunculate Oak was constant in the canopy, but there was no Holly. Four natural debris dams were present: 30cm, 60cm and two 1m high (see photograph 2).

**Photograph 2.** Polecat Gill showing debris dam, 3 May 2016 (Kate Gold)

**Great Home Wood,** is a Hornbeam and Hazel coppice wood, The stream runs close to the edge of this **wood** so there is little separation from the ryegrass and clover ley in the adjacent field. At the northern end of the wood, the stream emerges into a cattle-grazed field with indigenous grasses and a few forb species including Red Clover and Selfheal, but it soon disappears into a culvert and remains underground across this extensive field. It then passes through a series of ryegrass-clover leys grazed by cattle.

**Popjoy Tributary** was walked on 20 October 2016. It rises in **Popjoy Wood**; an Oak-Bracken-Bramble wood surrounded by arable fields.

**Hooke Tributary** was walked on 19 and 25 October 2016. It rises in a blackthorn thicket close to South Road and flows between sheep-grazed grassland. Most of this grassland had been re-seeded fairly recently. Downstream, closer to Motts Wood and The Hooke, the landscape becomes more park-like with scattered trees (photograph 3). The sheep-grazed grassland here is composed of indigenous grasses and a few forbs and is traversed by wet ditches containing Lady's-smock and Meadow-sweet *(Filipendula ulmaria).*

**Photograph 3.** Park-like landscape traversed by wet ditches at The Hooke

**South Street Tributary** (Figure 9b, Table 1) was walked on 16 October 2014. It rises in fields to the west of South Street.

**Night Pasture North** (TQ392186) was surveyed on 4 June 2015. It was MG6a *Alopecurus pratensis* variant and with only 10(8-13) species per 2x2m quadrat is less species-rich than average.

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Night Pasture North | MG6a *Alopecurus* | *Lolium perenne* | *Trifolium repens* | *Agrostis capillaris* |
| 4 June 2015 | *pratensis* variant | | | *Poa trivialis* |

It was meadow in both 1838 (Chailey Tithe) and 1932 (Land Utilisation Survey).

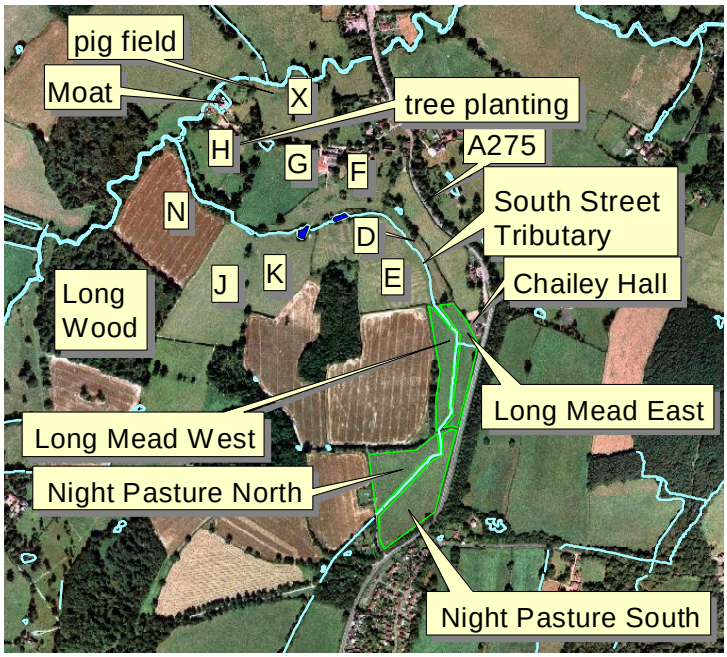


**Figure 9b.** Beresford Lane to A275, South Street Tributary

**Night Pasture South** (TQ393185) was surveyed on 4 June 2015. It was MG6b and with 13(7-19) species per 2x2m quadrat is about average species-richness.

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Night Pasture South | MG6b | *Festuca rubra* | *Lolium perenne* | *Alopecurus pratensis* |
| 4 June 2015 | | | *Trifolium repens* | *Ranunculus repens* |
| | | | | *Agrostis capillaris* |
| | | | | *Poa trivialis* |
| | | | | *Stellaria graminea* |

It was meadow in both 1838 (Chailey Tithe) and 1932 (Land Utilisation Survey).

**Long Mead East** (TQ394188) was surveyed on 4 June 2015. It was It was MG6b and with 12(11-14) species per 2x2m quadrat is less species-rich than average.

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Long Mead East | MG6b | | *Lolium perenne* | *Anthoxanthum odoratum* |
| 4 June 2015 | | | *Festuca rubra* | *Agrostis capillaris* |
| | | | | *Poa trivialis* |

It was meadow in both 1838 (Chailey Tithe) and 1932 Land Utilisation Survey).

The shallow ditch running across the middle of the meadow had Reedmace *(Typha latifolia),* Hard Rush *( J inflexus)* and Compact Rush *(J. conglomeratus),* Water Figwort *(Scrophularia auriculata),* Floating Sweet Grass *(Glyceria fluitans).* The stream dividing Long Mead East from Long Mead West was shallow with similar species and Meadow-sweet and Soft rush at the edge. Sheep present on 16 October 2014 were moving freely between fields.

**Long Mead West** (TQ394189) was surveyed on 4 June 2015. It was MG6b and with only 10(6-13) species per 2x2m quadrat is less species-rich than average. It was meadow in both 1838 (Chailey Tithe) and 1932 (Land Utilisation Survey).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Long Mead West | MG6b | *Festuca rubra* | *Lolium perenne* | *Poa trivialis* |
| 4 June 2015 | | | | |

Downstream the series of fields (D, F, and G and E, K, and J) were walked on 16 October 2014. They contained indigenous grasses but few forbs. The stream in Field D had been dug out and was much deeper than upstream and at the downstream end of this long narrow field there was a wet area with Floating Sweet Grass, Soft Rush and Hairy Sedge *(Carex hirta)*. The stream by Field F runs through a pond and a mire with Reedmace *(Typha latifolia)*. The arable field N had an unploughed margin that contained Common Knapweed, an MG5 species absent from the sheep-grazed fields surveyed in 2015 (photograph 3).

**Photograph 4.** Looking across South Street Tributary to Night Pasture South with sheep grazing (16 October 2014). Night Pasture North is in the foreground. These meadows are waterlogged for much of the time and are holding back water and sediment.

**Field H**, a wet meadow in 2000, has been planted up with trees.
Downstream on the main Longford Stream, **pig field** no longer has pigs and within the last 10 years has been sown with wildflower meadow mix. The edge at **X** floods in winter.

## 4.8 South Street to Longford Bridge upper part to Newick Park (Figure 10, Table 1)

**Frick Tributary** was walked on 9 March 2017 from the upstream end of Frick wood down to the confluence with the main Longford. Upstream there is a large pond and then a gill-like section with a steep side to the south topped with mature Pedunculate Oaks, but little tree cover to the north where the stream runs close to a grassy field. The stream bed then becomes deep with a muddy bottom as it flows through alderwood with some Hazel coppice. The area to the south, which is shown as woodland on recent OS maps, is now a series of unimproved cattle-grazed fields that were surveyed on 3 and 9 May 2018. The cattle roam freely between all the meadows during spring and summer. The grass is then rested before cattle or sheep graze again. It is not cut under Stewardship agreement (personal communication from owner). On 3 May the grass was well-grazed with some bare or moss-covered ground. It was wet with standing water in places and there were areas of rush, which we surveyed separately. The aerial photo from 1999 shows that all these fields had their present day boundaries in 1999.

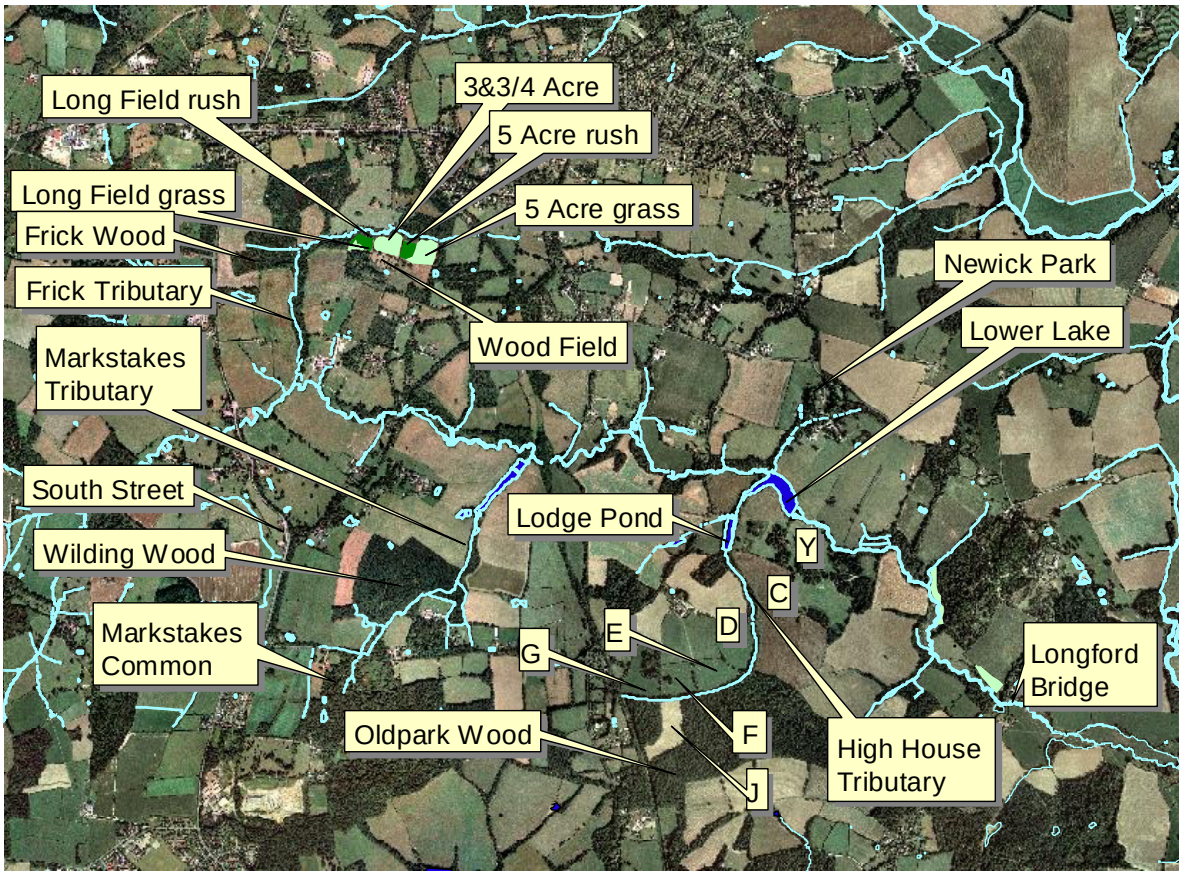


**Figure 10.** South Street to Longford Bridge, upstream section to Newick Park.

**Five Acre grass** (TQ402205) was surveyed on 3 May 2018. It was MG5a and with 21(13-18) species per 2x2m quadrat was of average species richness. Cowslips and common spotted orchids were present in the field. In 1838 Five Acre Field was arable (Chailey Tithe).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Five Acre grass | MG5a | *Plantago lanceolata* | *Festuca rubra* | *Cirsium palustre* |
| 3 May 2018 | | *Dactylis glomerata* | *Trifolium pratense* | |

**Five Acre rush** (TQ401205) was surveyed on 3 May 2018. It was M23a and with 21(18-22) species per 2x2m quadrat is of average species-rich.

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Five Acre rush | M23a | | *Juncus effusus* | *Cirsium palustre* |
| 3 May 2018 | | | *Galium palustre* | *Pulicaria dysenterica* |
| | | | *Juncus acutiflorus* | *Ranunculus repens* |

**3&3/4 Acre** (TQ400205) was surveyed on 3 May 2018. It was MG5a, but with only 16(14-20) species per 2x2m quadrat was much less species-rich than average. In 1838 it was arable (Chailey Tithe).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| 3 & 3/4 Acre | MG5a | *Plantago lanceolata* | *Festuca rubra* | *Brachythecium rutabulum* |
| 3 May 2018 | | *Dactylis glomerata* | *Centaurea nigra* | |
| | | | *Trifolium pratense* | |

**Long Field grass** (TQ399205) was surveyed on 9 May 2018. It was MG5c but with only 17(13-18) species per 2x2m quadrat is much less species-rich than average.
In 1838 Long Field was arable (Chailey Tithe).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Long Field grass | MG5c | *Plantago lanceolata* | *Centaurea nigra* | *Brachythecium rutabulum* |
| 9 May 2018 | | *Dactylis glomerata* | *Trifolium pratensis* | |

**Long Field rush** (TQ399205) was surveyed on 9 May 2018. It was M23a but with only 16(15-19) species per 2x2m quadrat is much less species-rich than average.

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Long Field rush | M23a | | | *Ajuga reptans* |
| 9 May 2018 | | | | *Anthoxanthum odoratum* |
| | | | | *Ranunculus acris* |

**Wood Field** (TQ399204) was walked on 9 May 2018. It was clearly MG5 with similar species to Five Acre grass. Cowslips were occasional and common spotted orchids rare.

Downstream Frick tributary flows south in a wide flat-bottomed valley filled with alderwood but with steep well-drained sides. The arable field to the west had a wide margin that was uncultivated.

**Markstakes Tributary** was walked on 16 March**.** It issues on Markstakes Common and flows under Markstakes Lane and into Wilding Wood. Most of this wood is ancient with a species-rich ground flora and a good mix of tree and shrub species including Hazel coppice with Oak, Ash, Spindle *(Euonymus europaeus)* and Midland Hawthorn *Crataegus laevigata)*. There is an area of alderwood and the stream widens out into a mini-floodplain which will be soaking up water. The western part of the wood away from the main stream has been planted up with Western Hemlock and on the south-east side there is a small area of Hornbeam coppice. North of the wood the fields were being grazed by Alpacas. Where the footpath crosses there is a pond with Marsh-marigold *(Caltha palustris)* in it and north of the footpath a large lake.

**High House Tributary** was walked on 25 October 2017. It rises by a dismantled railway embankment and flows along the edge of a western 'extension' of Oldpark Wood. This extension is separated from the main body of the wood by a ryegrass ley **(J). G, F** and **E** are short-term ryegrass leys. E had been recently treated with herbicide. The grass was dead and water was lying in pools on the surface. F contained a tree-lined pond. Field **D** contained indigenous grass species and a few forb species including red clover.
**Oldpark Wood** is a hornbeam coppice wood with Pedunculate Oak standards and bracken in places. Along the streamside edge of Field **C**, there was a narrow strip of woodland used for rearing pheasants that contained Sweet Chestnut at the upstream end and downstream hazel coppice with Birch and Pedunculate Oak in the canopy. C was recently reseeded ryegrass ley. **B** contained indigenous grasses and a few forbs including Yarrow. Lodge Pond was separated from B by a strip of woodland. Downstream from Lodge Pond there was an extensive area of alderwood leading into the Lower Lake in Newick Park where the tributary joins the main Longford.

## 4.9 South Street to Longford Bridge, lower part from Newick Park (Figure 11, Table 1)

This section was walked on 28 September 2012 and 25 October 2017. On 25 October 2017 fields on both sides of Lower Lake were being used to farm Red Deer with a large deer fence beside the public footpath and a deer-handling unit in the corner of Field Y. Field Y contained indigenous grasses but few forbs. Fields 5 and 4 were walked on 28 September 2012. They contained indigenous grasses, but few forbs. Downstream the west side of the Longford was arable while the east side had a series of species-rich meadows which were surveyed. There was a wetland area between Four Acre Field and Lower Meadow.

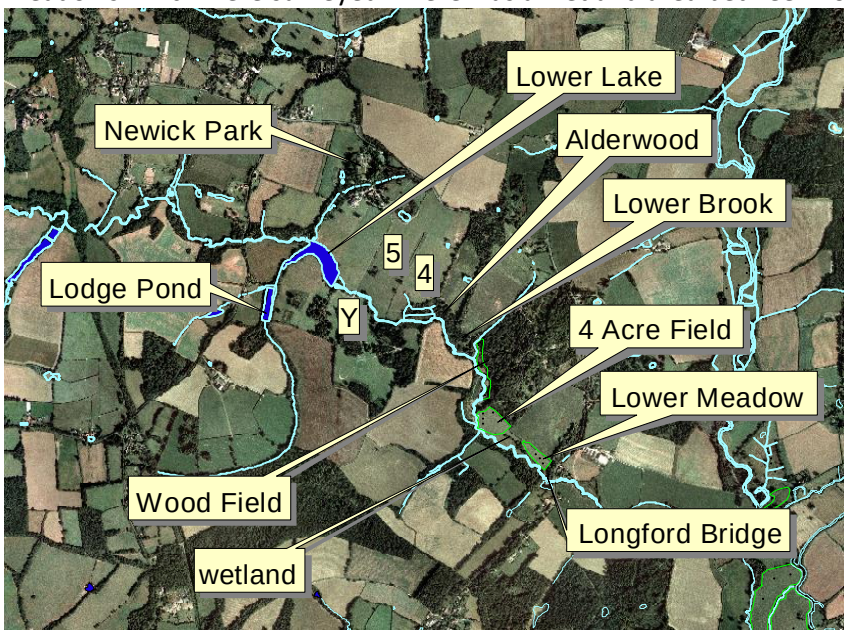


**Figure 11.** Newick Park to Longford Bridge

**Lower Brook** (TQ427188) was surveyed on 8 May 2013. It was M28b: *Iris pseudacorus-Filipendula ulmaria* mire with 13(9-17 species per 4x4m quadrat. It was pasture in 1839 (Newick Tithe).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Lower Brook 8 May 2013 | M28b | | *Iris pseudocorus* | *Rumex obtusifolius* |

**Photograph 5.** Lower Brook on 8 May 2013 with Meadowsweet, Marsh-marigold and Yellow Iris.

**Wood Field (photograph on front cover)** (TQ428187) was surveyed on 8 May 2013. It was MG5c with 23(14-36) species per 2x2m quadrat. It was wood in 1840 (Barcombe Tithe).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Wood Field | MG5c | *Trifolium pratense* | *Lotus corniculatus* | *Rhytidiadelphus squarrosus* |
| 8 May 2013 | | | *Plantago lanceolata* | *Veronica chamaedrys* |
| | | | *Dactylis glomerata* | |
| | | | *Trifolium repens* | |
| | | | *Centaurea nigra* | |

**Four Acre Field** (TQ428184) was surveyed on 26 June 2013. It was MG6b with 13(11-16) species per 4x4m quadrat. It was arable in 1840 (Barcombe Tithe).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Four Acre Field | MG6b | *Lolium perenne* | *Trifolium repens* | *Lotus corniculatus* |
| 26 June 2013 | | | *Cerastium fontanum* | *Luzula campestre* |
| | | | | *Ranunculus repens* |

**Lower Meadow** (TQ430183)was surveyed on 26 June 2013. It was MG5a and slightly less species-rich than average with 19(14-21) species per 2x2m quadrat. It was meadow in 1840 (Barcombe Tithe).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Lower Meadow | MG5a | | *Dactylis glomerata* | *Achillea millefolium* |
| 26 June 2013 | | | *Trifolium pratensis* | *Luzula campestre* |
| | | | | *Cerastium fontanum* |
| | | | | *Ranunculus repens* |

## 4.10 Longford Bridge to Confluence with River Ouse (Figure 12, Table 1)

Immediately downstream from Longford Bridge, gardens extend down to the streamside. The south side was walked on 30 September 2012. The stretch down to Dallas Lane was meandering and tree-lined with had a series of grassy fields. Cattle could move freely between these fields and they were heavily-grazed. They contained indigenous grasses with patches of rush in places but few forbs apart from Yarrow and Selfheal at the edge of the first field. The last field had been re-seeded recently and all these fields will have developed from re-seeded grass. If they could be left unploughed now they would gradually acquire more biodiversity.

Downstream from Dallas Lane was walked on 30 September 2012.
**Wetland 1** contained a range of wetland species including Tussock Sedge, Meadowsweet, Water Mint and Hemlock Water-dropwort *(Oenanthe crocata).* **Wetland 2** was more varied with patches dominated by Meadowsweet while other areas were dominated by Branched Bur-reed *(Sparganium erectum)* or Soft Rush. Devil's-bit Scabious *(Succisa pratensis),* Tormentil *(Potentilla erecta),* Greater Bird's-foot-trefoil and Common Knapweed were present. A wide track had been cut through to facilitate pheasant shooting.
**Field 2** had indigenous grasses but few forbs and there were patches of Hard Rush *Juncus inflexus*. The meandering stream was tree-lined with the extensive area of alderwood, **Paygate Shaw,** on the east side.

Below Paygate Shaw, brushwood barriers have been put in by the Ouse and Adur River Trust to prevent bank erosion and create sheltered backwaters; and also to increase flow diversity within the channel. Just upstream from Overs Bridge they have removed vegetation that was choking the stream and created another backwater. Willow whips have been planted to stabilise the bank and the streamside of Ox Ham

has been fenced. Since 1999 an area of woodland has been planted in the southern tip of Ox Ham incorporating some older Hazel coppice.

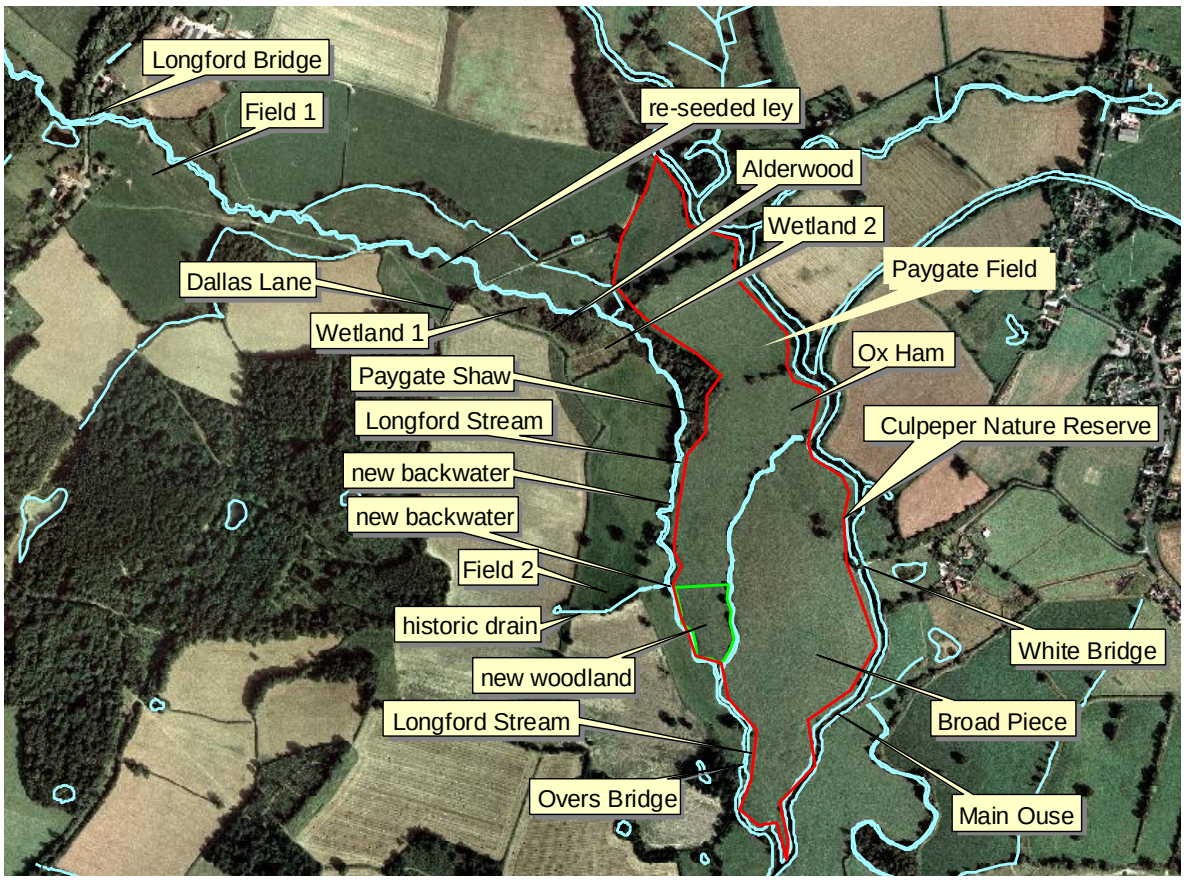


**Figure 12.** Longford Bridge to confluence with River Ouse.

**Paygate Field** was walked on 28 May 2017. This grassy field was dominated by Meadow Foxtail *(Alopecurus pratensis)* but also contained Pignut *(Conopodium majus)*, Red Clover and Meadow Vetchling.

**Ox Ham** (TQ442175) was surveyed on 28 May 2017. It was MG5a but with 20(17-23) species per 4x4m quadrat it was less species-rich than average. Bulbous buttercup was occasional. It was meadow in both 1840 (Barcombe Tithe) and 1931 (Land Utilisation Survey).

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Ox Ham<br>18 May 2017 | MG5a | *Lotus corniculatus*<br>*Plantago lanceolata*<br>*Centaurea nigra* | *Dactylis glomerata*<br>*Anthoxanthum odoratum*<br>*Trifolium pratense* | *Geranium dissectum*<br>*Taraxacum officinale*<br>*Cerastium fontanum*<br>*Alopecurus pratensis*<br>*Bromus hordeaceus*<br>*Ranunculus repens* |

**Broad Piece** (TQ443173) was surveyed on 28 May 2017 when it was being grazed by a few Sussex Brown cattle. It was MG5a but with only 20(15-23) species per 4x4m quadrat was less species-rich than average.

| Name of meadow and date of survey | NVC | absent constants | low frequency constants | additional constants |
|---|---|---|---|---|
| Broad Piece<br>18 May 2017 | MG5a | *Dactylis glomerata*<br>*Centaurea nigra*<br>*Anthoxanthum odoratum* | *Lotus corniculatus*<br>*Plantago lanceolata* | *Geranium dissectum*<br>*Taraxacum officinale*<br>*Cerastium fontanum*<br>*Alopecurus pratensis* |

It was meadow in both 1840 (Barcombe Tithe) and 1931 (Land Utilisation Survey).

The Longford Stream joins the main River Ouse at the southern tip of Broad Piece.

# 5. Recommendations

## 5.1 Converting arable land to permanent grassland

The Longford catchment contains a considerable amount of arable land growing short-term grass ley or cereal crops.

Ploughing and reseeding grassland leads to:

- A decline in crop pollinators and other beneficial insects
- An increase in nutrient (e.g. phosphate) getting into the river system
- An increase in run-off leading to increased sediment load downstream.

Instead permanent grassland absorbs rainwater in earthworm tunnels and prevents nutrients and sediment getting into the river system.

Most wheat and maize is grown to feed to animals kept indoors. Maize is particularly bad because bare soil is left over winter leading to severe run-off of sediment and the harmful chemicals used in its production (including metaldehyde, herbicides and pesticides). The growing of cereal crops to feed to animals also leads to:

- More expensive and less healthy winter feed for animals with associated increase in harmful greenhouse gases

Instead progressive farming techniques can be used to produce pasture-fed meat and dairy products. Such progressive farming produces more healthy food (Pasture-for-life website) and is essential if we are to feed the world in 2050 (United Nations Food and Agriculture SOL-m).
Converting these fields to permanent grassland would:

- Reduce run-off and the amount of sediment, metaldehyde and nutrients (e.g. phosphate) getting into the river system. Water companies have begun to favour catchment management solutions to tackle water quality issues rather than expensive and less sustainable artificial treatment of water (Natural England, 2012).
- Provide grazing for sheep and/or cattle: a more sustainable and healthy option for farm animals, which results in less greenhouse gas emissions than feeding grain-crop silage to indoor animals.

We have identified the following arable fields:

Field D p.8

Field labelled ‘arable’ in Figure 7 p.12

Stony Woodfield p.13

Arable fields to west of Cottage Wood p.14

Saw Pit Field p.14

2 fields of ryegrass ley at start of section 4.7 p.15

Arable fields around Popjoy Wood; sheep-grazed re-seeded grassland on Hooke Tributary p.17

Fields G F E and J by Oldpark Wood and Field C on High House Tributary p.21

Cattle-grazed fields upstream from Dallas Lane p.23

2 maize fields on south bank of Longford upstream from Hooke Tributary p.15

## 5.2 Species-rich meadows

Our studies have been directed particularly towards remaining areas of species-rich grassland.
Such sites:

- Reduce run-off and the amount of sediment and nutrients getting into the river system
- Absorb rainwater in worm tunnels
- Provide grazing for sheep and/or cattle
- Provide pollen and nectar sources for bumblebees and other beneficial insects.
- Take up rainwater through plants with roots at different levels in the soil.

This applies to grassland on the slopes above the water course as well as sites bordering the stream. Every encouragement should be given to the landowners of such sites to continue managing the sites appropriately. Such sites should not be used for tree planting.

We have identified the following species-rich meadows:

Furze Field p.9
Kiln Field p.10
Sedgebrook Marsh, Little James, Alder Plot p.11;
Oakwood Meadow, Oakwood Rush p.12
The Walletts, Three Acres, The Rough west p.13
Bricky Field, Harris Mead, Hilly field west, Hilly Field east, Pond field p.14
Seven Acres, Lower Three Acres p.16
Lower Mead p.17
Night Pasture South p.18
Long Mead East and West p.19
Frick meadows: Five Acre Field p.20,
3&3quarter Acre, Long field, Wood Field p.21
Newick Park to Longford Bridge: Lower Brook p.22,
Wood Field, Four Acre, Lower Meadow p.23
Ox Ham, Broad Piece p.24

We have also identified the following areas of permanent grassland with some wildflower interest:

Woodleigh Tributary: Field K , White Mead, Flat Mead p.10,
Coneybrook Meadow p.12
Barn Field p.13
Bineham Tributary: NW Beggars Wood, Beggars Wood p.14
South Street Tributary: Night Pasture North p.18

## 5.3 Washland grassland

Grassland which floods at peak flow provides the following additional benefits:

- Contributes to flood alleviation by holding back peak flow.
- Reduces sediment load downstream by increasing the roughness of the flood plain.
- Reduces the effect of more extreme and unpredictable weather patterns due to climate change.

We have identified the following areas of washland grassland:

X: a small area of rough grassland by South Road p.8
Court Field p.15
The streamside (X) of Pig Field p.19.

## 5.4 Hedgerow planting combined with species-rich grassland

Another strategy for reducing the pollution caused by the arable fields identified above would be to sow strips of species-rich grassland along the stream-sides and then to plant hedges to separate these small fields from the adjacent arable fields.
This would be particularly effective where large arable fields border the stream system.

For example: Field N at confluence of South Street Tributary with main Longford Figure 9b p. 18.

## 5.5 Tree planting

Another strategy for reducing the pollution caused by the arable fields would be to plant narrow bands of woodland (shaws) along the stream system.
Again this would be particularly effective where large arable fields border the stream system.

For example: along stream-side of north bank of main Longford downstream from the area of wetland and scrub at the confluence of Polecat and Hooke tributaries p.15.

## 5.6 Debris dams

The short length of Polecat Gill had 4 natural debris dams p.17.

# 6. References


Dony, J.G., Perring, F.H., & Rob, C.M. (1974). *English Names of Wild Flowers.* BSBI, London.

Flood Risk Management Research Consortium (2008). Impacts of upland land management on flood risk: multi-scale modeling methodology and results from the Pontbren experiment. FRMRC Research Report UR 16.

Natural England (2012). Delivering the ecosystem approach on the ground – an evaluation of the upland ecosystem service pilots.

Nisbet, T R and Thomas, H. 2008. *Project SLD 2316: Restoring Floodplain Woodland for Flood Alleviation. Final Report*. DEFRA.

Pasture-for-life website. https://www.pastureforlife.org

Rodwell, J.S. (ed) (1991). *British Plant Communities, Volume 2. Mires and Heaths*. Cambridge University Press, Cambridge.

Rodwell, J.S. (ed) (1992). *British Plant Communities, Volume 3. Grasslands and montane communities*. Cambridge University Press, Cambridge.

Stoate, C. (2011). Earthworms are the farmer's new weapon against climate change threat. Game and Wildlife Conservation Trust Press Release. http://www.gwct.org.uk/about-us/newes/3270.asp

The River Ouse Project Report 8. Grassland Enhancement Field Trial in Iron Gates Mead: a riverside meadow at Sheffield Park, East Sussex. Available as a pdf to download from project website at http://www.sussex.ac.uk/riverouse

The Woodland Trust, Wales (2013). The Pontbren Project. A farmer-led approach to sustainable land management in the uplands. Coed Cadw Woodland Trust.

UK Action Plan 1994 http://jncc.defra.gov.uk/PDF/UKBAP_Action-Plan-1994.pdf

United Nations Food and Agriculture SOL-m. http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/SOL_Concept_Note.pdf

Webbelmann, M., Schmutz, U., Wright, J., Udall, D., Rayns, F., Kneafsey, M., Trenchard, L., Bennett, J. & Lennartsson, M. (2013). *Mainstreaming Agroecology: Implications for Global Food and Farming Systems*. Centre for Agroecology and Food Security Discussion Paper, Coventry: Centre for Agroecology and Food Security.

Wilkinson, I. (2011). Herbal leys. *Cattle Breeder*, Spring 2011, pp. 4–5


.