Upper Bottom at the top of Wilderness Reach.

Uck Report

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1 Introduction

This is one of series of reports produced by University of Sussex River Ouse Project about MORPH (Middle Ouse Restoration of Physical Habitat) sites. This report provides information to the Environment Agency, Trees River Uck Project (TrUck), Ouse Upstream Thinking (OUT), Uckfield Flood forum and other interested stakeholders to enable appropriate decisions to be made about biodiversity enhancement of riverside land in the Uck catchment linked to flood alleviation.

Our work has focussed particularly on streamside grassland, but we have also surveyed gills in upstream woodland. The two main objectives for grassland sites were to characterise species-rich sites using the National Vegetation Classification (NVC) and to assess the suitability of species-poor sites for either grassland enhancement or wet woodland restoration. Our objectives for woodland sites were to assess their contribution to flood alleviation and to characterise species-rich sites using a floristic table developed from data collected from gills in the upper Ouse catchment, which includes the river Uck, between 2006 and 2011.

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; frequency of flooding and potential for the site to act as a flash washland; and relevant changes in land-use over the last 200 years. An assessment of the ecosystem services currently provided by the site is considered in relation to the potential for enhanced flood alleviation by suitably-placed debris dams, washland enhancement, riparian woodland planting or changes in agricultural use of land (such as a change from arable to permanent grassland or hedgerow planting).

2 Context

2.1 A washland flood alleviation strategy

The river Uck, a tributary of 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 four main tributaries upstream from Uckfield – High Hurstwood Stream, Tickerage Stream, Lepham Stream and Framfield Stream – and a large number of small streams, many of which become dry in their upper reaches during summer (Figure 1). This 'capillary' system is mostly well-wooded with imperfect or poor-draining soils. Mini-floodplains alternate with steep-sided sections known locally as 'Gills'. 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 Uck and its main 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 straightening of parts of the river Uck in the middle of the 20th century and the deepening of streams in the 1970s and 1980s to drain agricultural land have reduced the amount of land subject to this 'flash' flooding and this, together with changes in land-use, have contributed to the destructive flooding of homes and businesses downstream in Uckfield and Lewes, most notably in 2000.

A flood alleviation strategy for Uckfield depends on holding back the peak flow temporarily in the upper regions until water from lower down the system has passed through the town. Flash washlands, which flood briefly and then drain quickly, are ideal because they soon become available to store water again. Another strategy is to slow the flow of water with debris dams and/or tree planting (Newcastle University and Environment Agency, 2011, and Nisbet *et al*., 2011). Such naturally functioning systems are better for biodiversity and inexpensive compared with hard structures and sluice gates.

2.2 Flash washlands in the Uck catchment

Like the rest of the Middle Ouse, flash washlands in the Uck catchment:

- flood for 2–3 days during periods of peak flow after heavy and prolonged rain, usually during winter;
- have free-draining soil as a result of the sandy silt brought down in floodwaters from the High Weald;
- until the middle of the 20th century most were managed as hay-meadows or pasture with flower-rich 'Crested Dog's-tail–Common Knapweed Grassland' (MG5 grassland in the National Vegetation Classification – see section 3.1). Such grassland tolerates short duration flooding;
- are too dry for most of the year to support wetland plants unless they contain permanently wet areas fed by springs;

- have maximum biodiversity when a matrix of spring-fed wetland areas occurs within MG5 grassland.

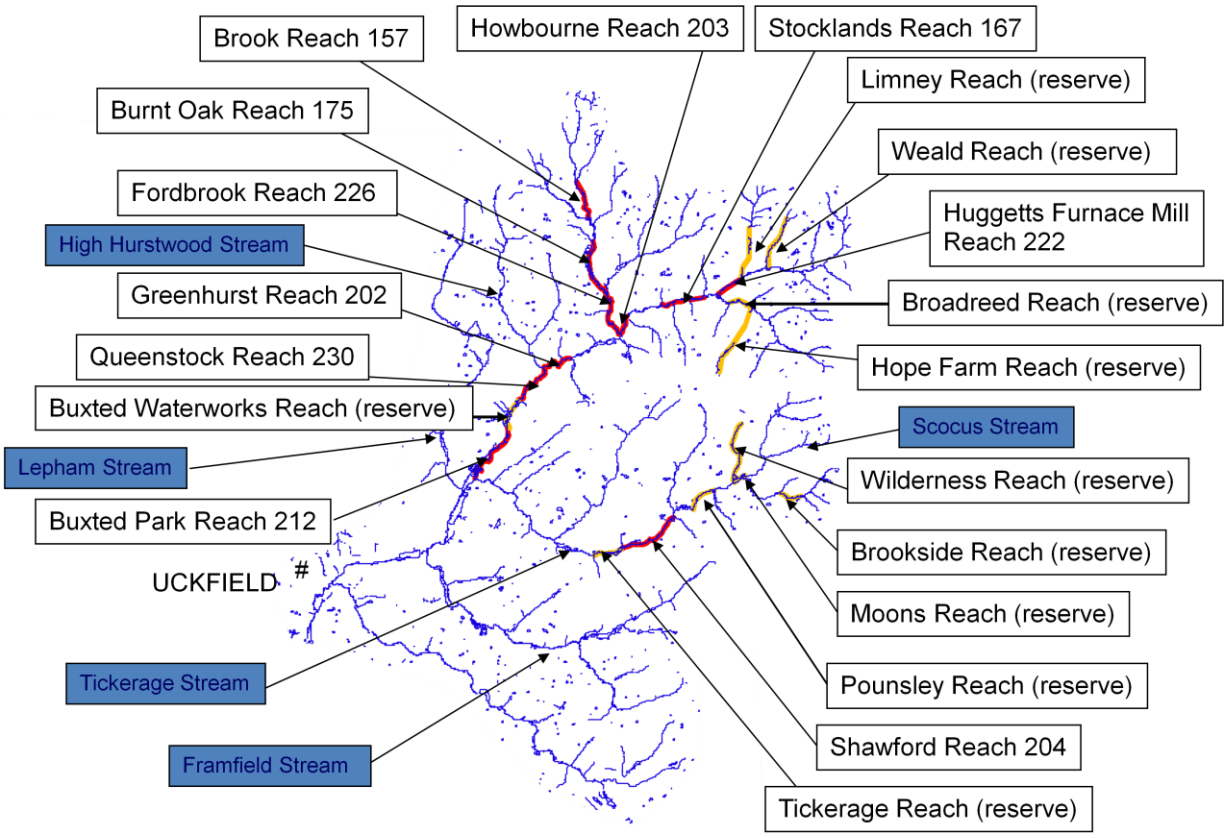

Figure 1. CRIM reaches in Uck catchment

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

Wildflower meadows (such as MG5 in the National Vegetation Classification) are rare. Despite the 1995 Biodiversity Action Plan target of no further depletion of this habitat, 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.

In the days of horse transport, the best land was often used as hay meadow and all along the river there were extensive hay meadows and pastures. Wild flowers such as common knapweed and oxeye daisies 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 the Uck provides a wonderful opportunity for re-connecting 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 Weald Meadow Initiative wildflower seed. Such enhancement would retain agricultural land in good condition, enabling a return to low-input farming when oil-driven agriculture is no longer possible.

2.4 Flood alleviation vegetation on valley slopes

The type of land that rainwater falls on in the upper catchment will have a profound effect on the amount entering the stream system after heavy rain. In the Uck catchment, the land is predominately agricultural with a patchwork of small fields, hedges and woodland, but in recent years there has been a big 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 on the valley slopes in the upper part of the Uck catchment also has an adverse effect on water retention and so will contribute to flooding downstream in Uckfield. The soil becomes compacted leading to increased run-off and leaching of fertilizer, sediment and pesticides into the water course (Figure 3. Maize field in upper Uck catchment).

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. It also helped to buffer our stream from flooding during heavy rain” (Stoate, 2011). The absorptive nature of such grassland is even further enhanced in species-rich examples because they contain deep-rooting perennials such as yarrow and ribwort plantain (Wilkinson, 2011).

Trees and shrubs are more deep-rooting than grassland plants. Fortunately, the Uck catchment retains much of the typical High Weald landscape of small fields, hedges and woodland, but it is important to acknowledge the contribution of hedgerows and woodland to flood alleviation. The Pontbren Project in Wales (Flood Risk Management Research Consortium, 2008 and The Woodland Trust Wales) has demonstrated that both planting small areas of woodland and putting in hedgerows along contours prevent rapid run-off and retain water, sediment and nutrients. In the past, there was usually a hedge between the streamside meadows or ‘brooks’ and the arable fields on the slope above. We identify areas where these have been lost and where new hedges could be planted with additional benefit.

2.5 Riparian woodland planting

Hydrological modeling on the river Laver catchment (in North Yorkshire) showed that 40 ha of woodland planting spread over four sites would delay the arrival of a 1-in-100-year flood in downstream Ripon by almost 1 hour (Nisbet and Thomas, 2008). However, the woodland planting did not go ahead for a number of reasons:

- Restoring the land to wet grassland and applying for a HLS grant was more attractive because it would preserve the capital value of the land and the option of converting back to cereals remained.
- Stock would not be able to access the river for water.
- Farm woodland payments cease after 15 years.
- Scope for high timber yield would be compromised by the need to maintain a shrub layer and dead wood; both of which contribute to roughness and hence flood alleviation.
- Possible loss of trees and fencing from floodwater plus cost of clearing up trapped litter.

The report concluded that the most effective places to plant woodland are low lying, wet sections and where there are relic side channels. Even small woodland plantings (20 m wide) would generate a lag effect. Washlands with riparian tree planting are more effective at holding back water than grasslands sites, but may be a less attractive option to farmers. The Trees River Uck Project (TrUck) has money to plant trees on the river Uck to alleviate flooding and we identify the sites where this would, in our opinion, be appropriate.

2.6 Large woody debris dams

Large woody debris dams are an effective way of holding water back in the upper reaches of rivers (Thomas and Nisbet, 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.

These dams can be constructed around an existing overhanging fallen tree by cutting so that one end drops into the watercourse and then dragging another log (1.5 times the channel width) into place to form a cross. Debris builds up on the upstream side. Since the debris may be washed out during storm events, these dams should not be constructed just upstream from culverts, which might block. However, in the upper reaches of the watercourse escaping debris is usually retained by a downstream debris dam (Thomas and Nisbet, 2008). Many of the gills we have surveyed have small, naturally occurring debris dams, which are already holding back the water and creating habitat diversity (Figure 2).

Figure 2. Natural debris dam in Limney Gill.

2.7 Position of flood alleviation measures in the river system

The position within the river system of any Catchment Riparian Intervention Measures (CRIMs), such as debris dams, washland re-creation or woodland planting, is critical. If the water is held back close to Uckfield, flooding will be worse because water from higher up in the catchment will catch up with water from lower down. Instead water needs to be held back in the upper reaches to allow water from lower down to pass through Uckfield first.

Hydrological modeling on the Uck watercourse, undertaken by the University of Durham (Byers, 2010), has shown that peak flow can be reduced by 9 m^3s^{-1} when 10 appropriately placed Catchment Riparian Intervention Measures (CRIMs) are used together (coloured red in Figure 1) The project also identified the next best 10 reaches (coloured orange in Figure 1) which it was hoped might be used in place of one or more of the top 10 should they prove to be unusable (for example because of existing land-use – land-use was not included in the Durham model). While direct substitution is not possible without taking out the rejected reach and running the model again, the position in the catchment of these additional reaches reinforces the idea that water should be held back high up away from Uckfield. For ease of reference we have given names to the CRIM reaches identified in the Durham model (Figure 1 and Table 1).

Table 1. Numbers and names of Uck CRIM reaches

Order	Number	Name of Reach or stream	Description, NVC community or Gill Group, Date surveyed
1	157	Brook Reach	Arable and permanent grassland; full survey not done
2	167	Stocklands Reach	Stocklands washland, MG5c, plus small area MG1e, south bank, 2011
			Huggetts Furnace, Long Bottom and West Mead, MG5a grassland, north bank, 2010
		Little Pell Stream	Anthill Field, MG5c, and Woody's Field, MG5c, Stocklands Gill, Group 3A, 2011
		Upstream from Reach 167	
		Great Pell Stream	Stocklands meadows, 2014
11 to 20		Broadreed Reach	Broadreed cattle-grazed pasture and cut-off meander, 2013
		Upstream from Broadreed Reach	Broadreed cattle-grazed pasture and stewardship meadows, 2014
			Broadreed Gill, 2015
11 to 20		Hope Farm Reach	Hope Farm horse paddocks, 2013
			Spring Farm meadows, 2014
3	175	Burnt Oak Reach	Fishing lakes, 2010
4	202	Greenhurst Reach	Unmanaged permanent grassland with arable above, 2010
		Upstream from Reach 202	Hammer Meadow washland, MG1e (Greenhurst), 2011
5	203	Howbourne Reach	Not surveyed
		Upstream from Reach 203	Hastingford Farm, Upper Bottom and Lower Bottom, north bank, MG5a, 2010, and House Meadow and Lower Colt's Field, South Bank, MG5a, 2010, and Hastingford Lodge Rush Pasture, MG10a, 2010
6	204	Shawford Reach	Pounsley Manor, 2012
			Shawford Farm Brook, MG10/M23, 2012
			Shawford Wood, very wet alder wood
			Springfield Washland, MG5a; main meadow, MG5a and MG10a, 2012
			Brook Field, MG1e, 2012
			Horse paddock and sheep-grazed field, 2012
			Yew Tree, MG5a, 2012
			Acre Piece, MG6b, 2012
		Upstream from Reach 204	
		Hole Stream	Hole Wood, Group 1, 2010
11 to 20		Pounsley Reach	Not surveyed
11 to 20		Wilderness Reach	Wilderness ,MG6b, 2013
			Upper Brook East and West, MG5c, 2013
			Lower Brook, MG5c, 2013
			Brook 3 and 20 Acre, 2014
11 to 20		Moon's Reach	Not surveyed
		Upstream from	

		Moon's Reach	
		Scocus Stream	Hadlow Deep Wood Gills, South and North, 2014
			Little England Meadows, 2014
			Scocus Wood, Group 1, 2010
		Brookside Reach	Not surveyed
7	212	Buxted Park	Not surveyed
		Upstream from 212	
11 to 20		Buxted Waterworks Reach	Not surveyed
8	222	Huggetts Furnace Mill	Owner doesn't want survey done
		Upstream from 222	
11 to 20		Limney Reach	Limney Wood Gill, Group 3A, 2013
			Limney Farm Brooks: Upper 4 Acre Brook, MG10a, and Lower 4 Acre Brook washland, MG5a, and slope, MG6b, 2012
			Far East Mead, MG6b, 2011
11 to 20		Weald Reach	Weald Farm Gill, Group 3A, 2012
9	226	Fordbrook	Improved grassland, 2010, not surveyed
10	230	Queenstock	Queenstock, MG5a , species-rich meadow, 2012
			Upper Reeves Bottom, MG5 plus area of MG1c, 2011
		Upstream from 230	
		High Hurstwood Stream	Park House Gill, Group 1, 2013
			White Coppice Farm washland species-rich grassland, MG8, 2013
11 to 20		Tickerage Reach	Tickerage Castle meadow, MG5a, Tickerage Castle swamp, 2012
			Tickerage Mill washlands, Middle Paddock, MG6b, Lower Paddock, MG10a, 2012
		Downstream from Tickerage	
		Waste Wood stream	Waste Wood Gill, Group 1, 2010
			Downstream, Waste Wood, 2010
			Ruthven's Washland, MG10a/M23a, 2011
		Lower Tickerage Stream	Gatehouse Green Washland, MG6b, 2011
			Great Streele Upper Brook washland, MG10a; dry area, MG7b, 2010
			Great Streele Lower Brook washland, MG10a/M23b and slope, MG5c, 2010
		Main Uck below Tickerage	Buxted Anthill Grassland, MG1e, 2009
			Buxted Meander Meadow, MG10, 2009
		Lepham stream	Home Farm gill, Group 3A, 2009
			Perryman's Farm Gill, Group 3A, 2011
			Stonehouse Gill: upper, 2012; lower, 2013
			Front Wood Gill, Group 3A, 2011
			Olives Wood, Group 3B, 2011
			Maxine's washland, MG13 with MG5a on slope above, 2011
			Buxted Park Mire: A and B, M27; C, M23a, 2010
		Framfield Stream	Bungalow Meadow, MG5a, 2013
			Fox Wood Gill, Group 3A, 2013

3 Methods

3.1 National Vegetation Classification (NVC) survey of principal grassland habitats bordering the Middle Ouse

The NVC is the most widely used system for describing vegetation and is particularly useful in the context of the present report because it relates to soil properties and site management. We followed the methods described in Rodwell (1992). Scientific names are those used in Rodwell (1992), while English names follow Dony *et al*. (1974). The starting point is a botanical survey, which records the abundance (determined by a visual estimate of percentage cover using the Domin scale; see Box 1 for a description) 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 assign an NVC community to the present-day

grassland based on the frequency (percentage of quadrats in which each species is present) and abundance of each species. Points of difference between our data and the average for this type of grassland are noted. We can then draw conclusions about how this grassland has evolved in the context of past land use and about how it can be transformed in future.

Box 1
Frequency
I – occurs in 1-20% of samples; II – occurs in 21-40% of samples; III – occurs in 41-60% of samples;
IV – occurs in 61-80% of samples; V – occurs in 81-100% of samples.
Domin values: percentage cover being assessed by eye in each sample
10, 91-100%; 9, 76-90%; 8, 51-75%; 7, 34-50%, 6, 26-33%, 5, 11-25%; 4, 4-10%; 3, <4% with many individuals; 2, <4% with several individuals; 1, <4% with few individuals.

3.2 Determination of historical land use and flooding

The historical land use of sites was investigated through document analysis and oral history interviews with local farmers.

3.3 Gill surveys

Previous gill surveys have used the NVC to describe the whole area of woodland in which the gill occurred (Burnside *et al*., 2006). In the River Ouse project we have taken a different approach and used linear samples of 30-m lengths of stream valley; recording all the plants present in each 30-m sample. Using samples from 18 gills surveyed between 2006 and 2012 in the upper Ouse Catchment we have divided the gills into four groups. These Gill Groups are described by a floristic table (Table 2) based on average frequency of species within each group. Gills described In this report have been assigned to a Gill Group based on frequency of species occurring in at least five samples and points of difference between particular examples and the average given in the floristic table are noted. For example, if the frequency of any species that would have expected frequencies of IV or V in the gill's assigned group are lower, then these species are tabulated. In addition, species that have a frequency of V, rather than the frequency expected in that gill group, are also tabulated as additional constants.

Table 2. Frequency of species occurring in 30-m sample lengths of stream valley

	Group 1	Group 2	Group 3A	Group 3B
Constants				
Pellia epiphylla	V	V	V	V
Mnium hornum	V	V	V	V
Rubus fruticosus	V	V	V	V
Dryopteris dilatata	V	V	V	V
Atrichum undulatum	IV	V	V	V
Hyacinthoides non-scripta	V	IV	V	V
Oxalis acetosella	V	IV	V	V
Lonicera periclymenum	V	V	IV	IV
Ilex aquifolium	IV	V	IV	IV
Fraxinus excelsior	III	III	IV	IV
Discriminators for Group 1				
Scapania undulata	**IV**	II	I	I
Chiloscyphus polyanthos	**IV**	III	III	III
Isothecium myosuroides	**IV**	III	III	I
Betula pubescens	**IV**	III	I	II
Veronica montana	III	**IV**	**V**	**V**
Cardamine flexuosa	III	**V**	**V**	**IV**
Circaea lutetiana	I	**V**	**IV**	**V**
Carex pendula		**III**	**III**	**III**
Discriminators for Group 2				
Ajuga reptans	I	**V**	I	II
Athyrium filix-femina	I	**V**	II	IV
Lysimachia nemorum	II	**V**	I	III
Quercus robur	III	**V**	III	III
Fagus sylvatica	III	**IV**	I	II

Sorbus aucuparia	II	**IV**		I
Carex remota	II	**IV**	I	II
Pseudotaxiphyllum elegans	II	**IV**	II	II
Pteridium aquilinum	II	**IV**	I	I
Dryopteris aemula	I	**II**		
Ranunculus flammula	I	**II**		
Kindbergia praelonga	**V**	III	**V**	**V**
Ranunculus ficaria	**V**	II	**V**	**V**
Corylus avellana	**IV**	II	**V**	**V**
Hedera helix	**IV**	II	**IV**	**V**
Cardamine pratensis	**V**	I	**V**	**V**
Anemone nemorosa	**V**	I	**V**	**IV**
Carpinus betulus	**II**		**III**	**II**
Discriminators for Group 3				
Lamiastrum galeobdolon	III	III	**V**	**V**
Dryopteris affinis	II	III	**IV**	**V**
Chrysosplenium oppositifolium	III		**V**	**IV**
Alnus glutinosa	II	III	**IV**	**IV**
Thamnobryum alopecurum		I	**II**	**II**
Thuidium tamariscinum	**V**	**IV**	I	II
Discriminators for Group 3A				
Poa trivialis	II	III	**V**	III
Plagiomnium undulatum	III	III	**IV**	III
Brachythecium rutabulum	I	III	**IV**	II
Arum maculatum	I	I	**IV**	II
Hypnum cupressiforme	III	III	**IV**	I
Fissidens taxifolius	II	I	**IV**	I
Deschampsia cespitosa	I		**IV**	III
Conocephalum conicum	I		**IV**	III
Primula vulgaris	I	II	**III**	II
Conopodium majus	I		**III**	II
Adoxa moschatellina			**III**	II
Galium odoratum			**I**	
Allium ursinum			**I**	
Blechnum spicant	**V**	**V**	II	**IV**
Discriminators for Group 3B				
Mercurialis perennis	I		II	**III**
Angelica sylvestris	I		II	**III**
Acer campestre			I	**II**
Rhizomnium punctatum	**V**	**IV**	**V**	III
Associates				
Plagiothecium succulentum	III	IV	III	II
Geum urbanum		III	II	III
Hookeria lucens	I		I	
Cardamine amara			I	

3.4 Assessment of Ecosystem Services provided by site in relation to options for enhanced flood alleviation

Ecosystem Services have been defined as: “the benefits provided by ecosystems that contribute to making human life both possible and worth living” (Millennium Ecosystem Assessment 2005). It can be difficult to assess these benefits in strictly economic terms, but the concept can still be usefully applied to land-use decisions by drawing attention to the benefits or detrimental effects of different land-use scenarios (Natural England, 2012). We have identified the following possible benefits and detrimental effects. These are discussed for sites within CRIM Reaches and recommendations made about future management.

Benefits

1. Pollen and nectar sources for bumblebees and other beneficial insects.
2. Absorption of rainwater in worm tunnels.

3. Water taken up by roots of plants at different levels in the soil.
4. Contributing to flood alleviation downstream by holding back peak water flow [depends on position in catchment].
5. Contributing to flood alleviation by increasing roughness of flood plain.
6. Ameliorating the effect of climate change, which is likely to lead to more extreme and unpredictable weather patterns.
7. Contribution to water quality. Water companies have made a start by favouring catchment management solutions to tackle water quality issues rather than expensive and less sustainable artificial treatment of water (Natural England, 2012). This is the thinking behind OUT (SE Water project: Ouse Upstream Thinking).
8. Providing winter feed for animals.
9. Providing autumn grazing for sheep 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.

Adverse effects of industrial/non-biological landscapes

1. Decline in crop pollinators and other beneficial insects.
2. Increase in amount of sediment, metaldehyde (slug pellets) and nutrients such as phosphate getting into the river system [necessitating expensive artificial and chemical treatment of water].
3. Increase in run-off leading to flooding downstream [depends on position in catchment].
4. Providing expensive and less healthy winter feed for animals with a greater increase in harmful greenhouse gases.

4 Site descriptions

Site descriptions are ordered according to the effectiveness of the associated CRIM reach in reducing peak flow (Overflow Model, Byers, 2010), and include surveyed sites upstream from the CRIM reach. The location and extent of each site is shown on the map of the reach and the OS grid reference for the centre of the site is given.

Botanical survey results for grassland sites were analysed using the National Vegetation Classification (NVC) and are presented as NVC type with important specific differences tabulated. Present-day management is noted. Our target plant community is MG5 with 22 (12–38) species per sample. Where springs occur within the meadow leading to areas of M23a rush vegetation with 21(6–39) species per sample, the biodiversity increases, but the wet ground is unable to absorb floodwaters reducing the flood alleviation properties of the washland.

Perennial Rye Grass (*Lolium perenne*) and Crested Dog's-tail (*Cynosurus cristatus*) generally occur at low frequency or are absent from MG5 and MG6 grasslands in the upper Ouse catchment.

Gills in the Upper Ouse, including the Uck catchment, have been divided into four groups based on frequency of species occurring in 30-m lengths of stream valley (see Table 2). Site descriptions for Uck gills give the gill group and any important specific differences (see Section 3.3).

Where appropriate historical information based on document research and oral history interviews with landowners is given.

4.1 Brook Reach 157

The public footpath was walked on 12 September 2010, but no detailed surveys have been done. The streamside is steep and wooded. The slopes above have arable fields with maize (Figure 3) and meadows with species-rich grassland such as meadows A and B in Figure 4 and Figure 5. Meadow C had cut hay drying in it at the time of our walk. In 1931 all these fields were meadow (Land Utilisation Survey).

Recommendations: convert arable land to permanent grassland thus removing adverse effects on Ecosystem Services (ES) and providing all the ES benefits listed.

Figure 3. Maize field with compacted soil above Brook Reach

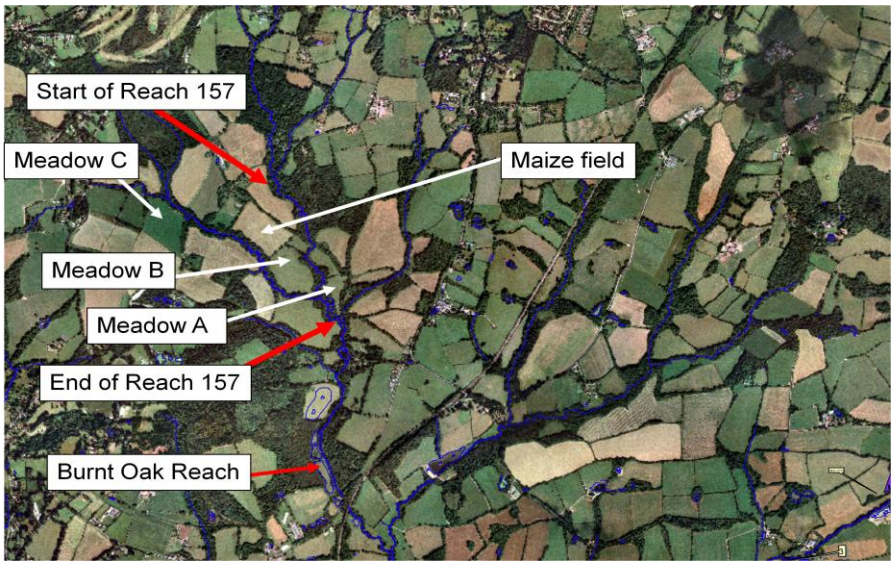

Figure 4. Brook Reach 157.

Figure 5. Species-rich grassland above Brook Reach.

4.2 Stocklands Reach 167

South bank

Stocklands Main Washland (TQ528258, Figure 6) is species-rich MG5a, our target plant community with 28 (18–33) species per sample. It is cut for hay and the aftermath grazed by sheep. At the time of the Tithe Survey (1844) it was being managed as pasture. Birch Field, on the slope above (TQ528257) is also species-rich MG5a with 23 (19–28) species per sample and is also cut for hay and aftermath grazed by sheep. At the time of the Tithe Survey (1844) it was arable. In the early 1930s both fields were meadow (Land Utilisation Survey). Both the Main Washland and Birch Field were ploughed in 2002. Green hay from Woody's Field (see p.15) was spread on Birch Field in 2002; the Washland below regenerated naturally (personal communication, owners July 2013). The small ungrazed area (TQ529258) at the upstream end is species-rich MG1e (*Arrhenatherum elatius* grassland) with 20 (18–22) species per

sample. The slope above this (TQ529258) is also ungrazed and is species-rich MG5c with 20 (17–23) species per sample (Figure 6). In the early 1930s both fields were meadow (Land Utilisation Survey).

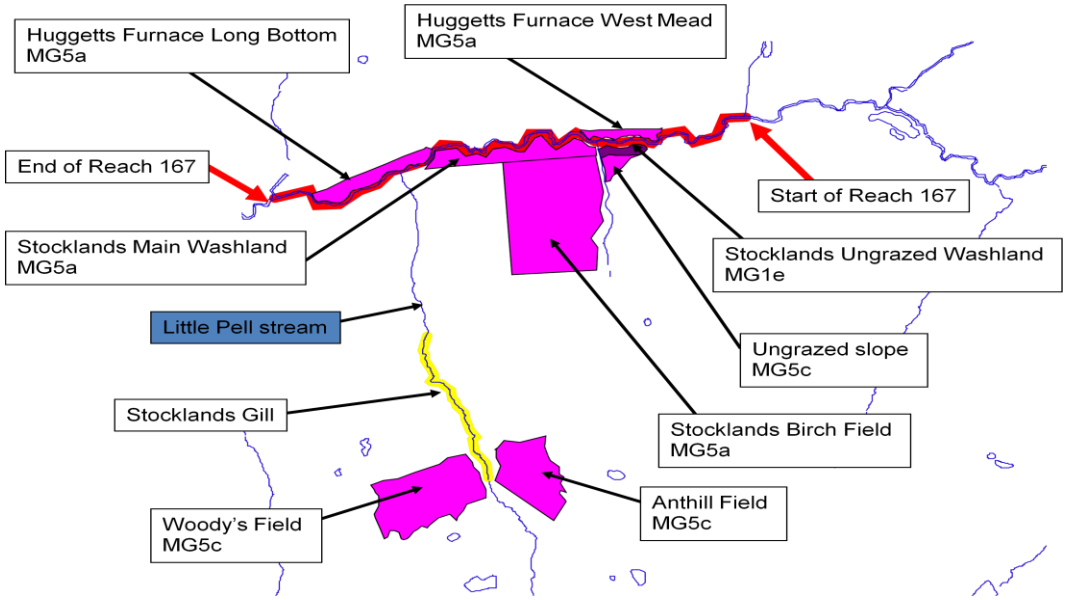

Figure 6. Stocklands Reach 167

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Stocklands Ungrazed Washland 2011	MG1e		*Heracleum sphondylium*	*Potentilla reptans* *Rumex acetosa* *Stellaria graminea*
Stocklands ungrazed slope 2011	MG5c	*Lotus corniculatus* *Trifolium repens*	*Trifolium pratense*	*Conopodium majus* *Lathyrus montana*
Stocklands Main Washland 2011	MG5a		*Festuca rubra* *Lotus corniculatus* *Dactylis glomerata*	*Cirsium arvense* *Poa trivialis* *Trifolium dubium*
Birch Field 2011	MG5a		*Plantago lanceolata*	*Ranunculus repens* *Trifolium dubium* *Veronica chamaedrys*

Recommendations: retain present land-use and management, which is contributing to all ES benefits identified.

North bank

Huggetts Furnace Long Bottom (TQ526258) and West Mead (TQ529259) (Figure 6) are species-rich MG5a grassland, but not washlands. At the time of the Tithe Survey (1844) and in 1931 (Land Utilisation Survey) both were being managed as meadow. The slope above looks similar and was being grazed by sheep on 3 January 2010 but detailed surveys have not been undertaken.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Huggetts Furnace Long Bottom 2010	MG5a		*Festuca rubra* *Lotus corniculatus*	*Heracleum sphondylium* *Ranunculus repens* *Taraxacum officinale* *Vicia cracca*
Huggetts Furnace West Mead 2010	MG5a		*Centaurea nigra* *Lotus corniculatus*	*Cirsium arvense* *Ranunculus repens* *Taraxacum officinale*

Recommendations: retain present land-use and management, which is providing ES benefits 1-3 and 6-9. It is difficult to see how these meadows could be made into washlands in order to provide ES benefits 4 and 5.

Little Pell Stream entering Stocklands Reach at downstream end

Anthill Field (TQ528251, Figure 6) is species-rich MG5c grassland with 31 (24–38) species per sample, but is not a washland. It is grazed by sheep, but not cut for hay because there are large anthills. At the time of the Tithe Survey (1844) it was being managed as pasture and in 1931 it was meadow (Land Utilisation Survey).

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Anthill Field 2011	MG5c	*Cynosurus cristatus*	*Lolium perenne* *Trifolium repens*	*Genista tinctoria* *Pimpinella saxifraga* *Potentilla reptans* *Pseudoscleropodium purum* *Stellaria graminea* *Veronica chamaedrys*

Woody's Field (TQ527251, Figure 6) is species-rich MG5c grassland with 25 (18–30) species per sample, but is not a washland. It is cut for hay and aftermath grazed by sheep. At the time of the Tithe Survey (1844) it was being managed as pasture and in 1931 it was meadow (Land Utilisation Survey).

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Woody's Field 2011	MG5c	*Cynosurus cristatus*	*Lolium perenne* *Anthoxanthum odoratum*	*Ajuga reptans* *Rhinanthus minor*

In Stocklands Gill (TQ526253, Figure 6) seven lengths were surveyed in 2011 and the data compared with the Ouse Gills Floristic Table. This gill is characteristic of Group 3A, the most commonly occurring type of gill.

Name of Wood and date of survey	Group	Absent constants	Low frequency constants	Additional constants
Stocklands Gill 2011	3A		*Lamiastrum galeobdolon*	

Upstream from Reach 167

Great Pell Stream

Stocklands meadows (TQ535253, Figure 7) are species-rich permanent grassland cut for hay and grazed by sheep. They are to be surveyed in 2014.

Broadreed Reach (reserve CRIM reach)

The cattle-grazed pasture on the south bank belonging to Broadreed Farm (TQ539257, Figure 7) was walked in 2013, but not surveyed. There is a cut-off meander along part of the northern field margin.

Upstream from Broadreed Reach

Broadreed Farm pastures form a series of cattle-grazed pastures and two species-rich stewardship meadows (TQ547256 and TQ548257, Figure 7) to be surveyed in 2014.

Broadreed Gill (TQ547257, Figure 7) to be surveyed in 2015.

Hope Farm Reach (Reserve CRIM Reach)

Hope Farm has two horse-grazed paddocks upstream on the east bank TQ537250 and TQ538250 (Figure 7); these are fairly species-rich permanent grassland but detailed surveys have not been undertaken.

Immediately downstream, Spring Farm has a series of meadows on both sides of the stream, which are cut for hay and grazed by sheep; a sample of these will be surveyed in 2014.

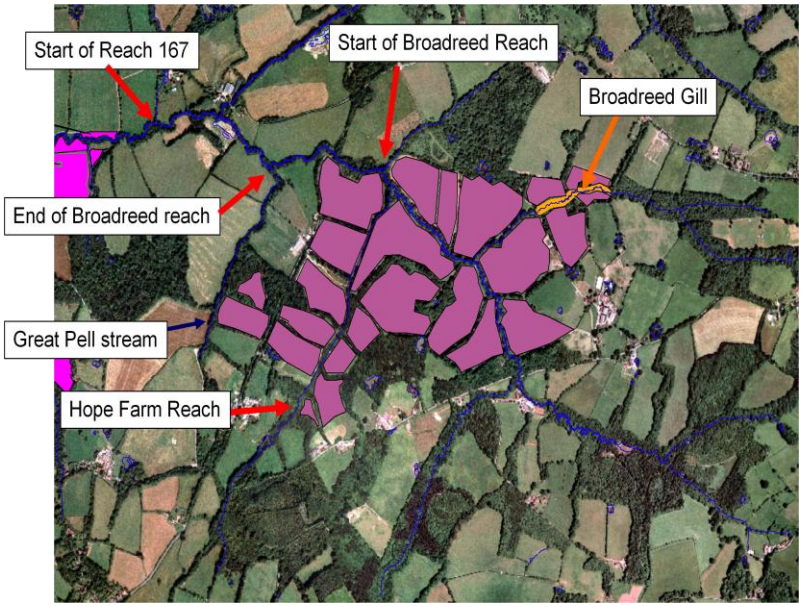

Figure 7. Upstream from Reach 167: Broadreed Reach and Hope Farm Reach (reserve CRIM reaches)

4.3 Burnt Oak Reach 175

The public footpath along Burnt Oak Reach (Figure 8) was walked on 14 September 2010, but no surveys have been done. There are private fishing lakes behind a locked gate.

Figure 8. Burnt Oak Reach 175

4.4 Greenhurst Reach 202

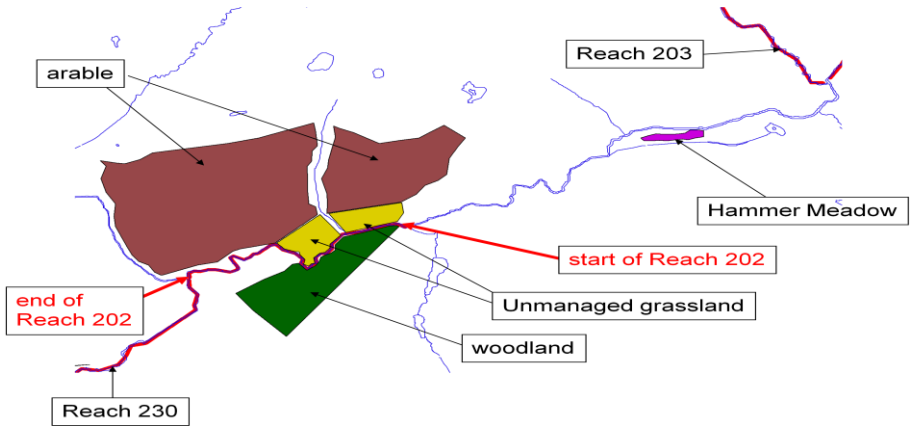

Figure 9. Greenhurst Reach 202.

North bank had unmanaged permanent grassland with seed heads of Common Knapweed (*Centaurea nigra*) and alder saplings when walked on 15 December 2010, and there was arable land on the slope above. A full botanical survey has not been done. In 1931 (Land Utilisation Survey) this grassland was meadow and the 1911 Ordnance Survey map shows the streamside meadows separated from the fields on the slope above by hedges (Figure 10). Woodland on the south bank has not been surveyed.

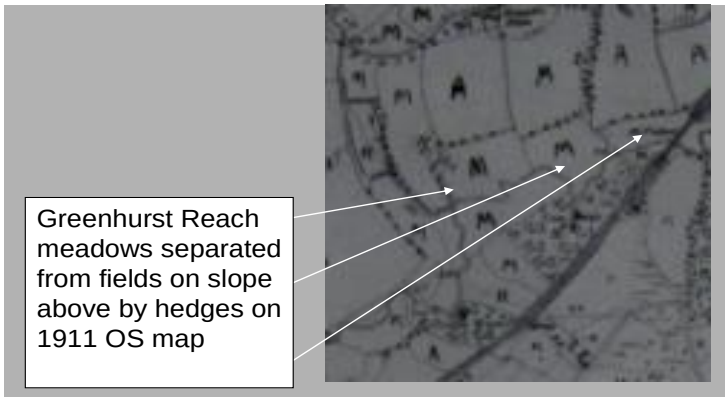

Figure 10. A small part of the Land Utilisation Survey on the 1911 Ordnance Survey map.

Recommendations: Plant trees in unploughed strip at bottom of slope and reinstate the hedges between this area and the arable field above. This will increase the roughness of the floodplain (ES benefit 5) and decrease the adverse effects of 2 and 3.

Upstream from Greenhurst Reach 202

Hammer Meadow (TQ512250, Figure 9) is species-rich wet grassland MG1c (*Arrhenatherum elatius* grassland) with 22 (15–29) species per sample.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Hammer Meadow 2011	MG1c		*Dactylis glomerata*	*Angelica sylvestris* *Calystegia sepium* *Cirsium arvense* *Equisetum arvensis* *Galium aparine* *Impatiens glandulifera* *Juncus acutiflorus* *Rubus fruticosus* *Urtica dioica*

Hammer Meadow floods about twice in the winter, but used to flood frequently before the river was cleared out by River Board in the 1980s. The river flows faster now and the banks keep falling in. Also the streamside alders are no longer pollarded and so they fall over, taking the bank with them (Oral History interview by Peter Heeley 27 January 2011).

At the time of the Tithe map (1840) the meadow was being used as pasture, but then was hay meadow from the early 1930s (Land Utilisation Survey) until 30 years ago. It is now unmanaged (Oral History interview with owner by Peter Heeley 27 January 2011).

Recommendations: this site is reverting to woodland and would be a suitable site for planting black poplars. This would increase the roughness of the floodplain (ES benefit 4). Water could also be held back by creating debris dams (ES benefit 6), possibly using some of the alders that are falling into the river. In this way the river could be restored towards its condition pre the 1980s.

4.5 Howbourne Reach 203

Howbourne Reach 203 (Figure11) has not been surveyed.

Upstream from Howbourne Reach 203

North Bank

Upper Bottom, Hastingford Farm (TQ520257, Figure 11) is target MG5a grassland, but with only 18 (13–23) species per sample it is not as species-rich as the NVC standard. At the time of the Tithe Survey (1844) and in 1931 (Land Utilisation Survey) it was being managed as a meadow, and it was not ploughed during the war. It is still cut for hay and cattle-grazed, and acts as a washland (personal communication with owner).

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Upper Bottom 2011	MG5a	*Cynosurus cristatus* *Festuca rubra* *Dactylis glomerata*	*Lolium perenne* *Lotus corniculatus*	*Alopecurus pratensis* *Ranunculus repens* *Rumex acetosa*

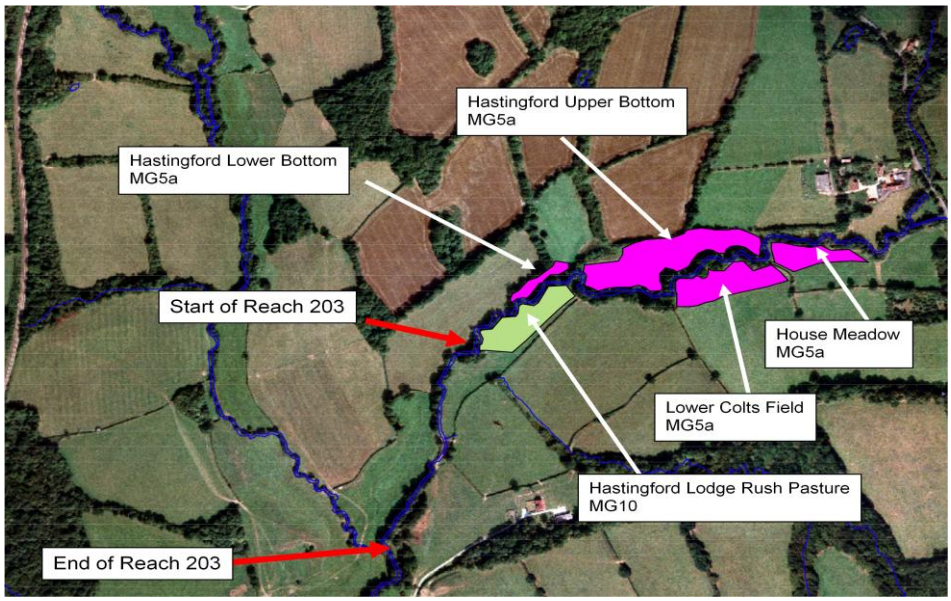

Figure 11. Upstream from Howbourne Reach 203

Lower Bottom, Hastingford Farm (TQ518256, Figure 11) is target MG5a grassland with average species-richness of 20 (16–24) species per sample. This tiny meadow at the downstream end of Upper Bottom is surrounded by trees and contains the uncommon streamside plant Common Valerian (*Valeriana officinalis*) within the body of the meadow as well as along the stream bank. At the time of the Tithe Survey (1844) and in 1931 (Land Utilisation Survey) it was being managed as a meadow and it was not ploughed during the war.

Name of meadow and date of survey	NVC	Absent constants	Low-frequency constants	Additional constants
Lower Bottom 2010	MG5a		*Lolium perenne* *Cynosurus cristatus* *Festuca rubra* *Lotus corniculatus* *Plantago lanceolata* *Dactylis glomerata* *Trifolium repens* *Trifolium pratensis*	*Phleum pratensis* *Poa trivialis* *Ranunculus repens*

South Bank

House Meadow (TQ522257) is target MG5a grassland, but not species-rich with only 15 (14–15) species per sample. At the time of the Tithe Survey (1840) the meadow was being used as pasture and in 1931 (Land Utilisation Survey) it was being managed as meadow. It was not ploughed during the war. The present owners graze with a suckler herd, but the meadow was managed by dairy farmer until he died a few years ago and has not been ploughed for 20–25 years (personal communication, Hastingford Farm owner). We have no information about flooding.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
House Meadow 2010	MG5a	*Cynosurus cristatus* *Lotus corniculatus* *Plantago lanceolata* *Dactylis glomerata*	*Centaurea nigra*	*Alopecurus pratensis*

Lower Colt's Field (TQ521256, Figure 11) is MG5a grassland, but not particularly species-rich with 18 (16–21) species per sample. At the time of the Tithe Survey (1840) the meadow was being used as pasture and in 1931 (Land Utilisation Survey) it was being managed as meadow. The present owners graze with a suckler herd, but the meadow was managed by dairy farmer until he died a few years ago and has not been ploughed for 20–25 years (personal communication, Hastingford Farm owner). We have no information about flooding.

Name of meadow and date of survey	**NVC**	**Absent constants**	**Low frequency constants**	**Additional constants**
Lower Colt's Field 2010	MG5a	*Cynosurus cristatus* *Festuca rubra*	*Lotus corniculatus* *Plantago lanceolata* *Dactylis glomerata*	*Alopecurus pratensis* *Lotus uliginosus* *Ranunculus repens*

Hastingford Lodge rush pasture (TQ518256, Figure 11) is species-rich rush pasture MG10a with 15 (11–16) species per sample. At the time of the Tithe Survey (1840) the field was plantation but by 1931 (Land Utilisation Survey) it was meadow. The present owners graze with a suckler herd but the meadow was managed by a dairy farmer until he died a few years ago and has not been ploughed for 20–25 years (personal communication, Hastingford Farm owner). We have no information about flooding.

Name of meadow and date of survey	NVC	absent constants	low frequency constants	additional constants
Hastingford Lodge Rush Pasture	MG10a			*Cardamine pratensis* *Carex hirta* *Poa trivialis*

Recommendations: retain present management, which is providing ES benefits 1-9.

4.6 Shawford Reach 204

North Bank

Pounsley Manor garden and cattle-grazed field (Figure 12) were walked on 1 January 2012, but not surveyed. In the early 1930s (Land Utilisation Survey) the field was meadow.

Shawford Farm Brook washland (TQ522213 and TQ521213, Figure 12) is rush pasture intermediate between MG10 and M23 with a species-richness of 17 (14–18) species per sample. The site looked unmanaged in January 2013 (Figure 13) and at the time of our survey in May of the same year. In 1840 (Framfield Tithe Survey) it was being managed as pasture and in the early 1930s (Land Utilisation Survey) it was meadow. The site is more wooded today and this increasing roughness will be holding the water back.

Name of meadow and date of survey	**NVC**	**Absent constants**	**Low frequency constants**	**Additional constants**
Shawford Farm Brook 2012	MG10		*Juncus effusus*	*Rumex acetosa*
	M23	*Galium palustre*	*Juncus effusus* *Lotus uliginosus*	

Recommendations: If the owners are agreeable, this low-lying wet site looks ideal for riparian woodland planting and, as it comes within a key CRIM reach, flood alleviation becomes paramount.

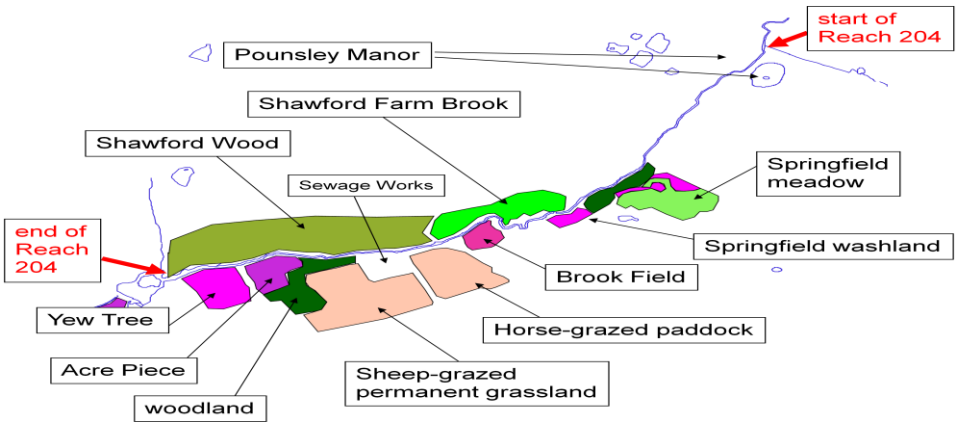

Figure 12. Shawford Reach 204

Figure 13. Shawford Farm Brook in January 2012, viewed from the road.

Shawford Wood is very wet alderwood with chalybeate springs. It has not been surveyed.

South Bank

At Pounsley Manor (Figure 12) the streamside is a garden with a lake. Downstream from this is wet alderwood and then agriculturally-improved fields grazed by cattle, which were walked on 1 January 2012, but not surveyed. In the early 1930s (Land Utilisation Survey) these fields were meadow.

Springfield meadow (TQ524213, Figure 12) is predominately MG10a rush pasture with 13 (10–14) species per sample. Drier areas away from the spring-water were sampled separately and are target MG5a grassland with 19 (15–24) species per sample. The grassland looked as though it had been cut and half of the field had been grazed by horses, but the other half was ungrazed at the time of our visit (17 May 2012).

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Springfield meadow 2012	MG10a		*Juncus effusus*	*Anthoxanthum odoratum* *Cardamine pratensis* *Juncus acutiflorus* *Rumex acetosa*
Drier areas of meadow	MG5a	Lolium perenne Cynosurus cristatus	*Plantago lanceolata* *Dactylis glomerata*	*Brachythecium rutabulum* *Ranunculus repens* *Rumex acetosa*

				Stellaria graminea

Springfield washland (TQ522213, Figure 12) is not grazed and some trees have been planted into the area. It is a not very species-rich example of MG5c with 18 (17–20) species per sample. In the early 1930s (Land Utilisation Survey) the field was meadow. We have no information about how frequently the site floods. However, the trees planted here will be absorbing rainwater and run-off from the horse-grazed paddock above (Flood Risk Management Consortium, 2008) even if the site does not regularly flood, and so will be contributing to flood alleviation in this important CRIM reach.

Name of meadow and date of survey	**NVC**	**Absent constants**	**Low frequency constants**	**Additional constants**
Springfield washland 2012	MG5c	*Plantago lanceolata* *Trifolium repens*	*Lotus corniculatus* *Dactylis glomerata* *Trifolium pratensis*	*Ranunculus repens* *Rumex acetosa*

Recommendations: retain present management.

Brook Field (TQ521212, Figure 12) slopes up from the stream away from floodwaters and may be grazed by horses. It is MG1e (*Arrhenatherum elatius* grassland), but not a very species-rich example of this plant community with 16 (12–18) species per sample. Note: *Arrhenatherum elatius* is not eaten by horses. In 1840 (Framfield Tithe Survey) the field was being managed as pasture and in the early 1930s (Land Utilisation Survey) it was meadow. It is still predominately dry grassland, unlike Shawford Brook on the other side of the stream (Figure 14). However, the coarse *Arrhenatherum elatius* grassland is not as species rich as our target hay-meadow vegetation.

Name of meadow and date of survey	**NVC**	**Absent constants**	**Low frequency constants**	**Additional constants**
Brook Field 2012	MG1e	*Heracleum sphondylium*	*Dactylis glomerata*	*Agrostis capillaris* *Ranunculus repens* *Rumex acetosa* *Stellaria graminea*

Figure 14. Brook Field in January 2012 with Shawford Brook in left-hand distance

Recommendations: This site is not such an attractive site as Shawford Brook for riparian woodland planting but a band of trees could be planted along the stream side, which would absorb rainwater and run-off from the slope above and so contribute to flood alleviation in this important CRIM reach.

Horse-grazed paddock (TQ521211, Figure 12) was not surveyed

Sheep-grazed permanent grassland (TQ520211, Figure 12) was visited on 27 March 2012. It had lots of worm-casts and a narrow strip of woodland along the streamside. A full NVC survey was not done. In the early 1930s (Land Utilisation Survey) the field was meadow.

Recommendations: retain present management, which is providing ES benefits 1 to 4; 6, 7 and 9.

Acre Piece (TQ518211) is species-rich MG6b with 16 (12–21) species per sample. It is not a washland. It is lightly grazed by three dexter cattle. In 1840 (Tithe Survey) it was arable but in the early 1930s (Land Utilisation Survey) it was meadow.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Acre Piece 2012	MG6b	*Cynosurus cristatus*	*Lolium perenne*	*Rumex acetosa* *Stellaria graminea*

Recommendations: this meadow is very close to our target MG5a plant community and is providing ES benefits 1 to 4; 6, 7 and 9.

Yew Tree (TQ517211, Figure 12) is target MG5a with 18 (16–20) species per sample. It is not a washland and is lightly grazed by three dexter cattle. In 1840 (Framfield Tithe Survey) it was being managed as pasture.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Yew Tree 2012	MG5a	*Cynosurus cristatus*	*Lolium perenne* *Plantago lanceolata* *Centaurea nigra* *Trifolium pratensis*	*Rumex acetosa* *Stellaria graminea*

Recommendations: retain present management which is providing ES benefits 1 to 4; 6, 7 and 9.

Upstream from Shawford Reach 204

Hole Stream

Hole Wood Gill (TQ531231 and 528228, Figure 15). Nine lengths were surveyed in 2010 and the data compared with the Ouse Gills Floristic Table. This gill is characteristic of Group 1 (Table 2 Ouse Gills Floristic Table).

Name of Wood and date of survey	Group	Absent constants	Low frequency constants	Additional constants
Hole Wood Gill 2010	1		*Thuidium tamariscinum*	

Pounsley Reach (CRIM reserve reach): (Figure 15). This has not been surveyed.

Upstream from Pounsley Reach (Figure 15).

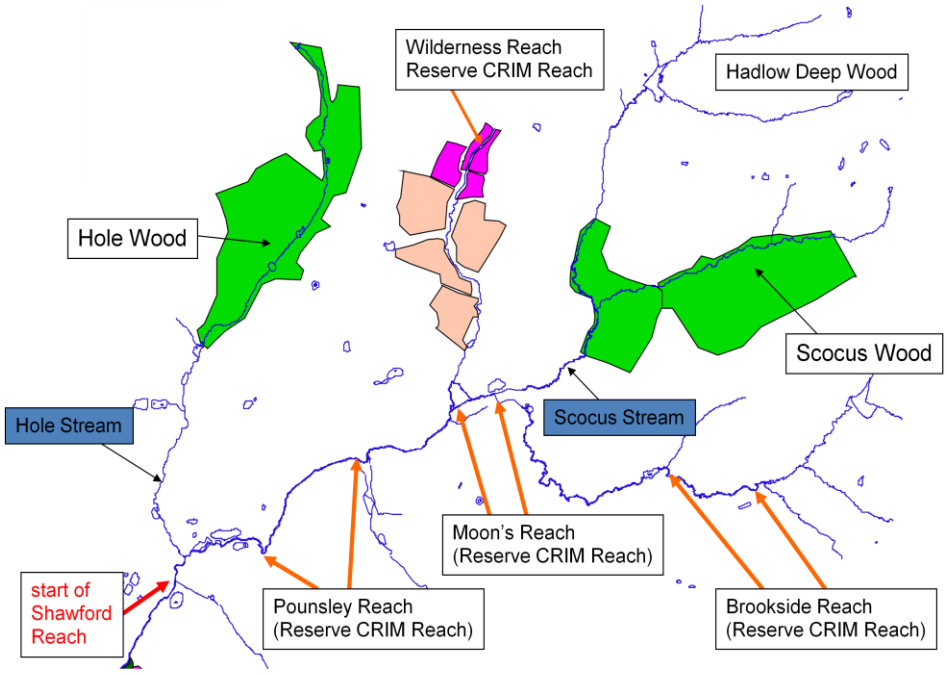

Figure 15. Upstream from Shawford Reach 204

Wilderness Reach (reserve CRIM reach; Figure 15 and 16)

West Bank

Wilderness (TQ537234, Figure 16) is MG6b of average species-richness with 15 (13–18) species per sample. This site is cut for hay but the aftermath is not grazed (personal communication with owner, 2013). There is a narrow band of wet woodland along the stream and the bottom of the field floods. The rest of the field slopes upwards but is wet, which makes the hay cut difficult to manage. At the time of the Tithe Map survey (1843) it was being managed as pasture.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Wilderness 2013	MG6b	*Cynosurus cristatus*	*Lolium perenne* *Festuca rubra*	*Agrostis stolonifera* *Trifolium repens* *Cirsium arvense* *Rumex acetosa*

Upper Bottom West (TQ538235, Figure 16) is species-rich MG5c with 22 (19-23) species per sample in the dry parts and 25 (21–29) in the rush areas. Common Spotted-orchid (*Dactylorhiza fuchsii*) is particularly abundant. At the time of the Tithe map survey (1843) it was being managed as pasture. From the oral history interview with the owner by Peter Heeley (13 January 2014), the meadow has not been ploughed for at least 30 years and has had no chemical fertiliser or herbicide for 30–40 years. It is cut for hay after mid-July and is grazed once over by 'keep' sheep from Romney Marsh in winter. Previously a swamp, it was drained by German prisoners of war in the 1940s and the stream created. It does not flood.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Upper Bottom West 2013	MG5c	*Lolium perenne* *Cynosurus cristatus*	*Festuca rubra* *Dactylis glomerata* *Centaurea nigra*	*Calliergon cuspidata* *Dactylorhiza fuchsii* *Hypochoeris radicata* *Rumex acetosa*

Oast House Field (Figure 16) and other horse-grazed fields were walked on 14 February 2013 but NVC surveys were not done. Oast House Field has trees planted into a central area and there is generally a narrow band of alderwood along the stream.

East Bank

Upper Bottom East (TQ538234, Figure 16) is MG5c with average species-richness for this sub-community having 23 (19–26) species per sample. Common Spotted-orchid (*Dactylorhiza fuchsii*) is particularly abundant. At the time of the Tithe map survey (1843) it was being managed as pasture. From the oral history interview with the owner by Peter Heeley (13 January 2014), the meadow hasn't been ploughed for at least 30 years and has had no chemical fertilizer or herbicide for 30–40 years. It is cut for hay after mid-July and is grazed once over by 'keep' sheep from Romney Marsh in the winter. Previously a swamp, it was drained by German prisoners of war in the 1940s and the stream created. It does not flood.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Upper Bottom East 2013	MG5c	*Lolium perenne*	*Cynosurus cristatus* *Lotus corniculatus* *Dactylis glomerata* *Centaurea nigra*	*Brachythecium rutabulum* *Dactylorhiza fuchsii* *Hypochoeris radicata* *Ranunculus repens* *Rumex acetosa* *Taraxacum officinale*

Lower Bottom (TQ538233, Figure 16) is MG5c with average species-richness for this sub-community having 23 (19–28) species per sample. At the time of the Tithe map survey (1843) this site was being managed as pasture. This meadow hasn't been ploughed for at least 30 years and has had no chemical fertilizer or herbicide for 30–40 years. It is cut for hay after mid-July and is grazed once over by 'keep' sheep from Romney Marsh in the winter. Previously a swamp, it was drained by German prisoners of war in the 1940s and the stream created. It does not flood (oral history interview with the owner by Peter Heeley, 13 January 2014).

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Lower Bottom 2013	MG5c	*Dactylis glomerata*	*Lolium perenne* *Festuca rubra* *Lotus corniculatus* *Trifolium repens*	*Agrostis canina* *Cirsium palustre* *Hypochoeris radicata* *Lotus uliginosus* *Ranunculus repens* *Rumex acetosa*

Brook 3 looks similar to Upper and Lower Bottom and is managed in the same way by the farmer, who refers to them all as 'brooks' (oral history interview with the owner, 13 January 2013). At the time of the Tithe map survey (1843) it was being managed as pasture. It is to be surveyed in 2014.

Twenty-Acre also looks similar to Upper and Lower Bottom and is managed in the same way by the farmer (oral history interview, 13 January 2013). It has not been ploughed or fertilized for at least 30 years, but was arable at the time of the Tithe map survey (1843). It is to be surveyed in 2014.

Recommendations: retain present management which is providing ES benefits 1 to 4 and 6 to 9.

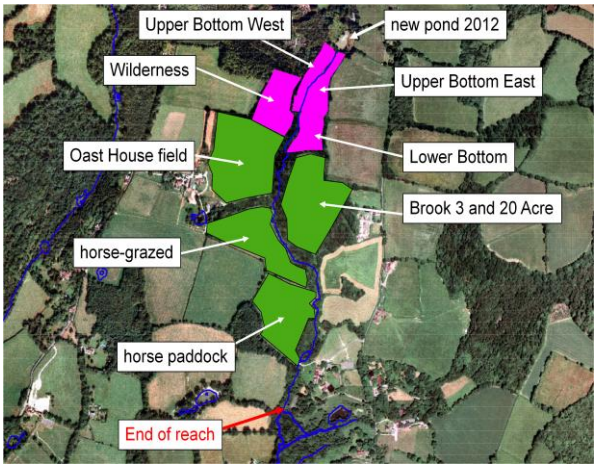

Figure 16. Wilderness Reach (reserve CRIM reach).

Moon's Reach (CRIM reserve reach)

Moon's Reach (Figure 15) has not been surveyed.

Upstream from Moon's Reach

Scocus Stream (Figure 15)

Hadlow Deep North Gill: (TQ548239, Figure 15) is to be surveyed in 2014.

Hadlow Deep South Gill: (TQ549236, Figure 15) is to be surveyed in 2014.

Little England Farm: Middle Field (TQ544235, Figure 15) and three other meadows are to be surveyed in 2014.

Scocus Wood Gill (TQ551231 and 547229, Figure 15) Eight lengths were surveyed in 2010 and the data compared with the Ouse Gills Floristic Table. This gill is characteristic of Group 1. The rare gill moss *Hookeria lucens* occurred in two lengths.

Name of Wood and date of survey	Group	Absent constants	Low frequency constants	Additional constants
Scocus Wood Gill 2010	1			*Chrysosplenium oppositifolium* *Lamiastrum galeobdolon*

Brookside Reach (CRIM reserve reach) (Figure 15) This has not been surveyed.

4.7 Buxted Park Reach 212

Buxted Park Reach 212 has not been surveyed (Figure 17).

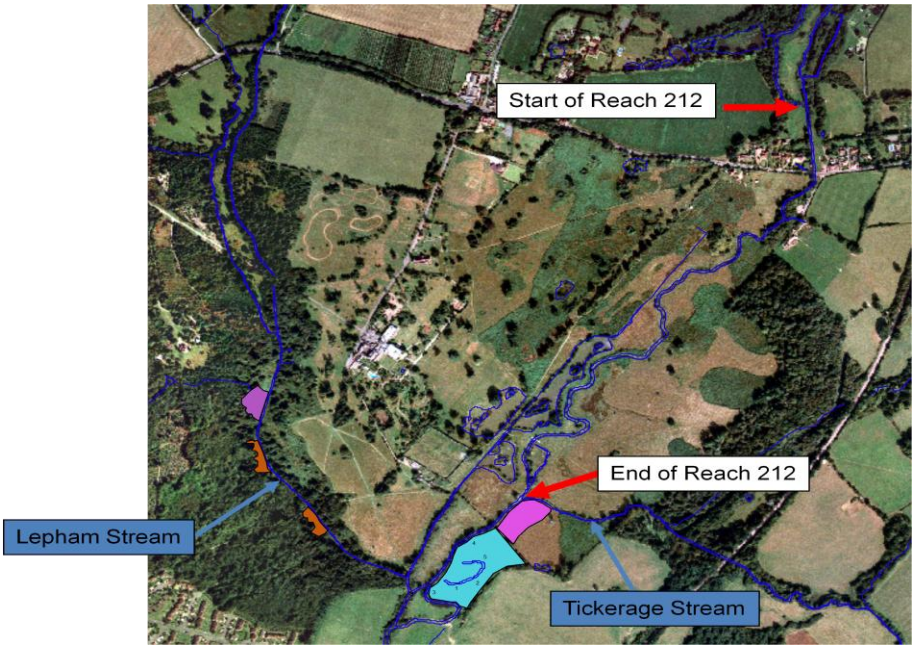

Figure 17. Buxted Park Reach 212.

Upstream from Buxted Park Reach 212

Buxted Waterworks (reserve CRIM reach) (Figure 18) The south bank of this reach was walked on 15 December 2010, but no surveys were done. A field with anthills (Figure 18) had some MG5 forbs and there was evidence of some grazing by sheep and horses. In the early 1930s (Land Utilisation Survey) the field was meadow.

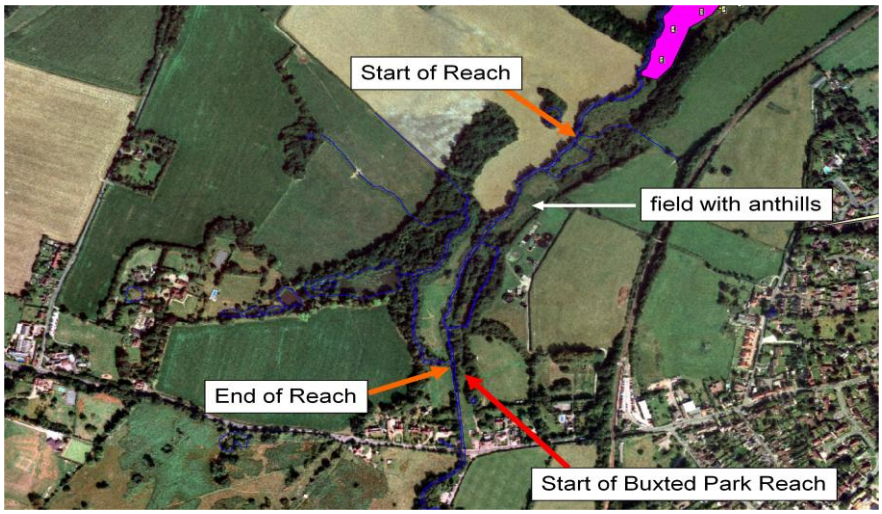

Figure 18. Buxted Waterworks (reserve CRIM reach).

4.8 Huggetts Furnace Mill Reach 222

The landowners of Huggetts Furnace Reach 222 (Figure 19) did not want a survey done.

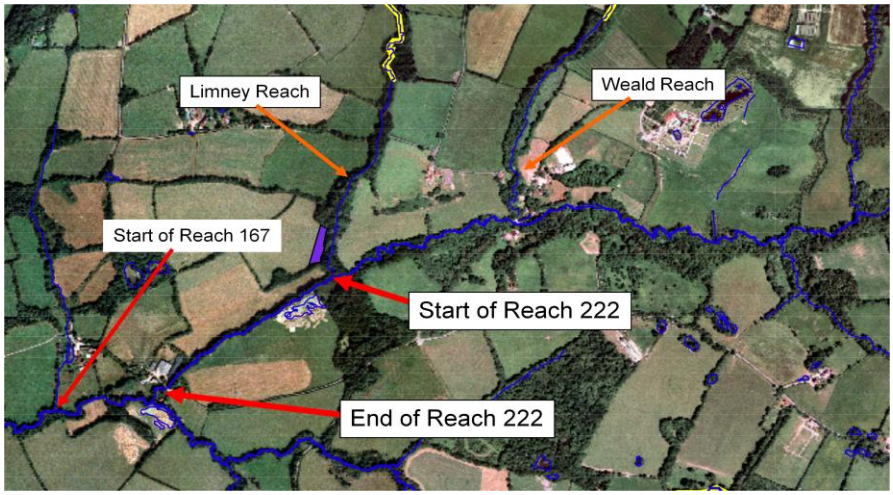

Figure 19. Huggetts Furnace Mill Reach 222 and upstream from 222.

Upstream from Huggetts Furnace Mill Reach 222

Limney Reach (reserve CRIM reach), (Figure 20)

West Bank and East Bank

Limney Gill (TQ540272 and TQ540269, Figure 20). Eight lengths were surveyed in 2013 and the data compared with the Ouse Gills Floristic Table. Limney is Group 3A.

Name of Wood and date of survey	Group	Absent constants	Low frequency constants	Additional constants
Limney Gill 2013	3A		*Fraxinus excelsior* *Brachythecium rutabulum* *Circaea lutetiana*	*Allium ursinum* *Chiloscyphus polyanthos* *Thamnobryum alopecurum*

East Bank

Upper 4 Acre Brook (TQ540272, Figure 20) is a species-rich example of MG10 rush pasture with 19 (12–23) species per sample. It is usually cattle-grazed, but had been horse-grazed in the winter prior to our visit. It is not fertilized and has never been ploughed (personal communication from owner, June 2012). In the early 1930s (Land Utilisation Survey) the field was meadow.

Name of meadow and date of survey	**NVC**	**Absent constants**	**Low frequency constants**	**Additional constants**
Upper 4 Acre Brook 2012	MG10		*Juncus effusus*	*Anthoxanthum odoratum* *Cerastium fontanum* *Poa trivialis* *Ranunculus acris*

Lower 4 Acre Brook washland (TQ540271, Figure 20) is target MG5a of lower than average species-richness with 16 (11–25) species per sample. It is cattle-grazed and cut for hay in some years. It is not fertilized and has never been ploughed (personal communication from owner, June 2012). In the early 1930s (Land Utilisation Survey) the field was meadow.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Lower 4 Acre Brook washland 2012	MG5a	*Cynosurus cristatus* *Dactylis glomerata* *Festuca rubra*	*Lolium perenne* *Lotus corniculatus* *Trifolium pratensis* *Trifolium repens* *Centaurea nigra*	*Cerastium fontanum* *Ranunculus repens*

Lower 4 Acre Brook slope (TQ540271, Figure 20) is MG6b of average species-richness with 14 (12–18) species per sample**.** It is cattle-grazed and cut for hay in some years.

Name of meadow and date of survey	**NVC**	**Absent constants**	**Low frequency constants**	**Additional constants**
Lower 4 Acre Brook slope	MG6b	*Lolium perenne*	*Cynosurus cristatus* *Festuca rubra*	*Ranunculus repens*

Recommendations: retain present management, which is providing all ES benefits. Lower 4 Acre Brook provides a buffer zone between the stream and the vineyard on the slope above. There is also a hedge between the Brook and the Vineyard which should be retained.

Far East Mead (TQ538263, Figure 20). Only the washland part of this large field was surveyed. It is MG6b of average species richness with 14 (13–17) species per sample. In the early 1930s (Land Utilisation Survey) the field was meadow and it has not been ploughed in living memory. Farmyard manure was spread in 1996, but not since, and some wildflower seed has been scattered to improve species-richness. It is grazed by sheep (personal communication from owner, 2011).

Name of meadow and date of survey	**NVC**	**Absent constants**	**Low frequency constants**	**Additional constants**
Far East Mead 2011	MG6b	*Festuca rubra*		*Ranunculus repens* *Trifolium pratensis*

Recommendations: retain present management which is providing all ES benefits.

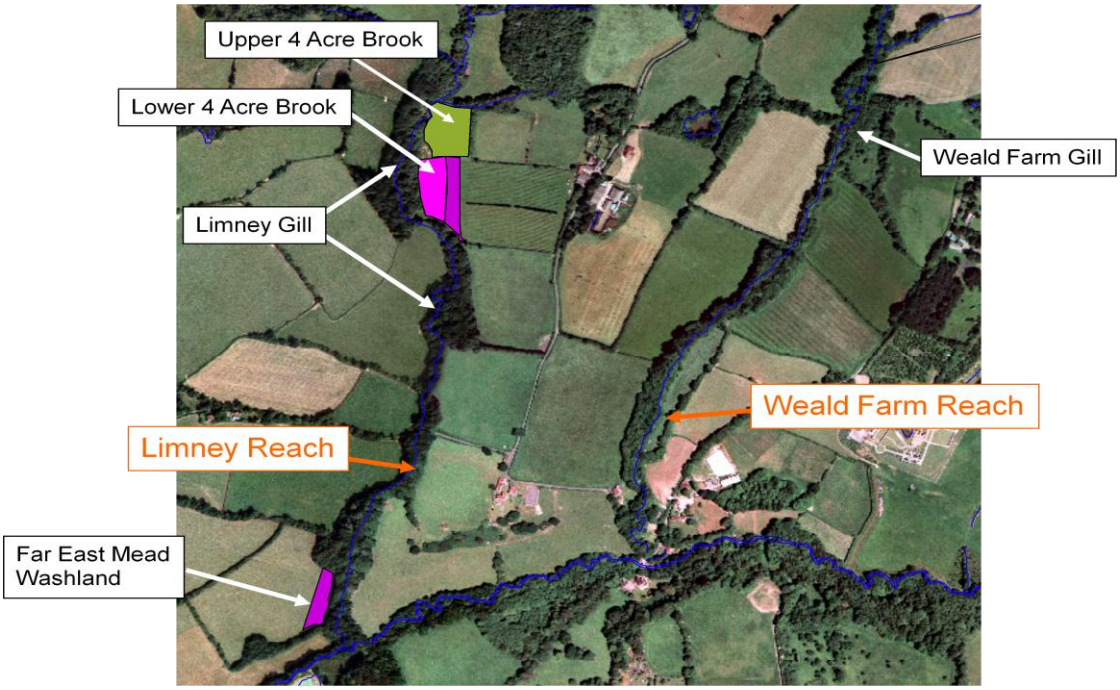

Figure 20. Limney and Weald Farm Reaches (reserve CRIM reaches).

Weald Reach (reserve CRIM reach)

Weald Farm Gill (TQ546271, Figure 20). Five 30-m lengths were surveyed in 2012 and the data compared with the Ouse Gills Floristic Table. Weald is characteristic of Group 3A, the most commonly occurring type of gill. Agriculturally improved grassland on the slope above is grazed by cattle and is fertilized. It was not surveyed.

Name of Wood and date of survey	Group	Absent constants	Low frequency constants	Additional constants
Weald Farm Gill 2012	3A		*Lonicera periclymenum* *Cardamine flexuosa* *Alnus glutinosa* *Poa trivialis* *Hypnum cupressiforme* *Deschampsia cespitosa*	*Galium aparine* *Blechnum spicant* *Plagiothecium nemorale*

4.9 Fordbrook Reach 226

The public footpath down Fordbrook Reach (Figure 21) was walked on 15 September 2010. The stream-side is steep and narrow and tree-lined while the grassland above was agriculturally improved and grazed by cattle. It has not been surveyed. In 1931 it was meadow (Land Utilisation Survey).

Recommendations: Conversion to permanent grassland would mitigate against adverse effects 2 and 3 and provide ES benefits 2 and 7.

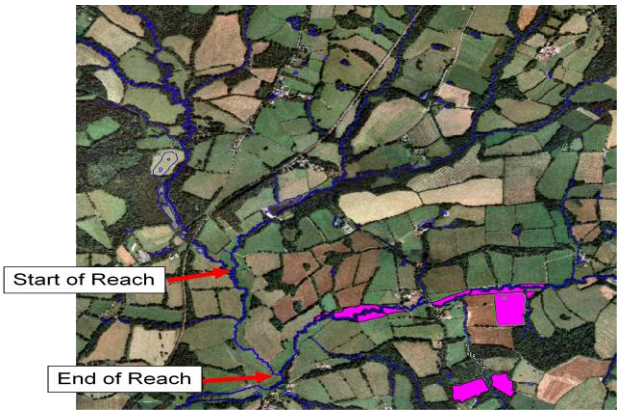

Figure 21. Fordbrook Reach 226.

4.10 Queenstock Reach 230

East side

Queenstock (TQ502244, Figure 22). This cattle-grazed meadow is target MG5a with 20 (15–27) species per sample – slightly less species-rich than the average for this type of grassland. It contains spring-fed areas of rush, but species content was not substantially different from the rest of the meadow. At the time of the Tithe survey (1840) this meadow was being used as rough pasture and in the early 1930s (Land Utilisation Survey) the field was meadow. Just downstream from Queenstock meadow the course of the river has been changed with a straight channel cutting off a meander (Figures 23 & 24). Figure 24 is a 1931 historic map showing the meander *in situ*. An aerial photograph from 1947 shows the straight channel (Figure 25). This new channel was dug out by the army in 1946 (personal communication from landowner, 2011).

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Queenstock 2012	MG5a	*Cynosurus cristatus*	*Lolium perenne* *Plantago lanceolata* *Centaurea nigra* *Trifolium pratense*	*Ranunculus repens*

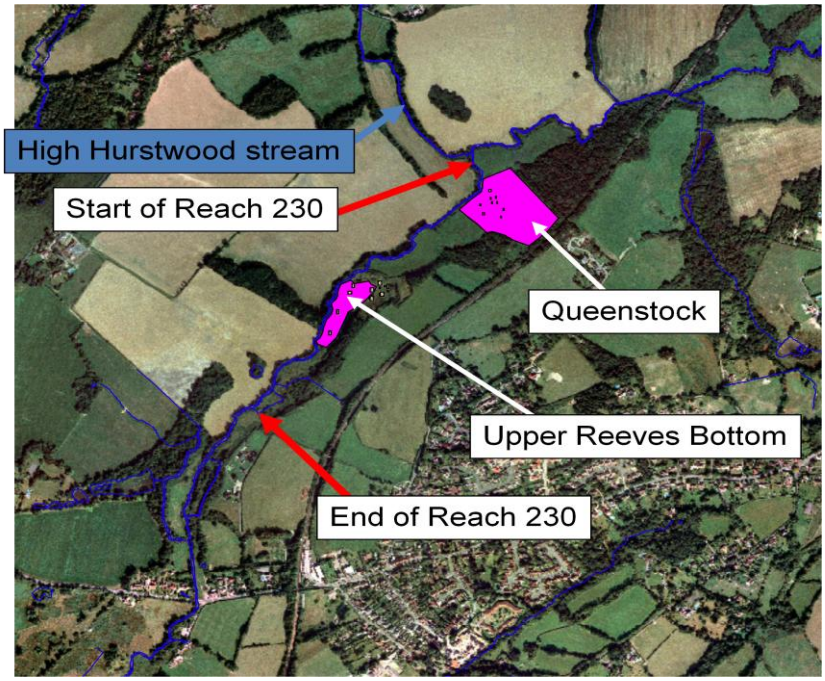

Figure 22. Queenstock Reach 230.

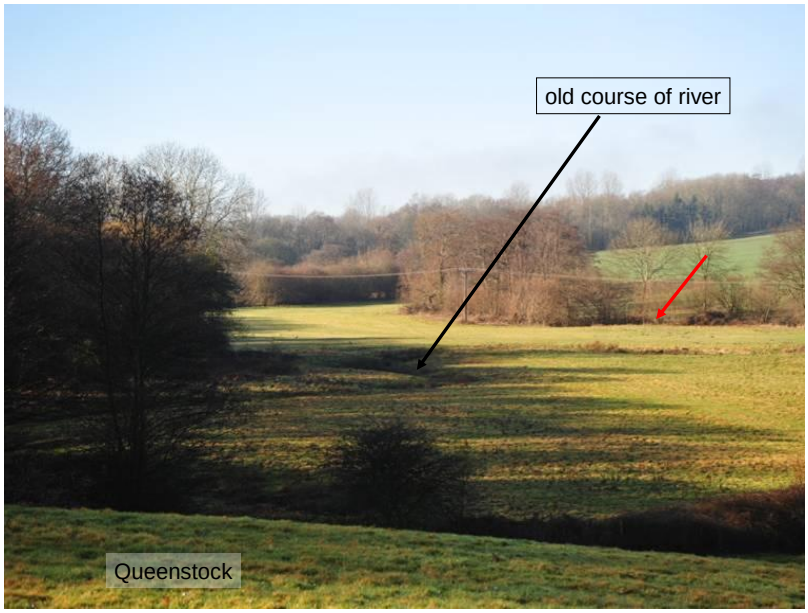

Figure 23. Looking from Queenstock meadow showing the old course of river. The red arrow shows the position of the present river.

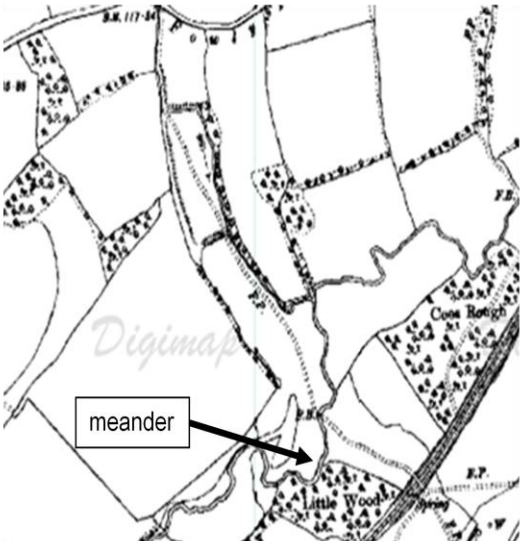

Figure 24. 1931 map showing course of the Uck. OS (Ordnance Survey) at Edina Digimap e. Grid ref TQ42, in ancient roam in historic digimap. Print map 1:5000 from 1931 county Series 1: 2500, 3rd revision edition
Available at http://digimap.edina.ac.uk/main/services.jsp?collection=historic accessed 20 February 2012.

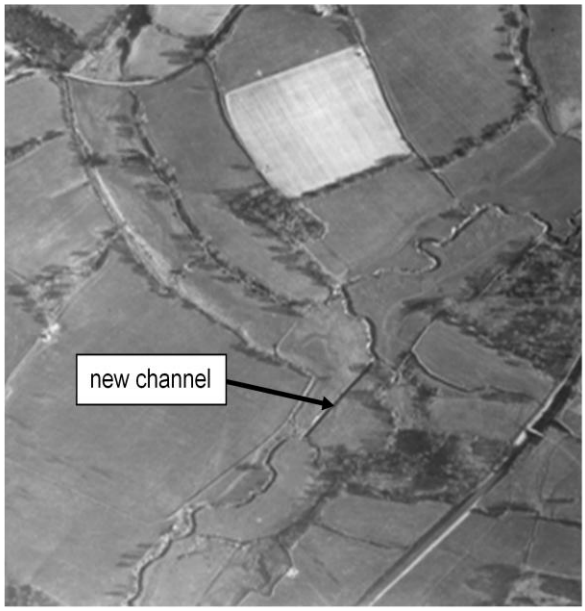

Figure 25. 1947 aerial photograph showing a straight section of the Uck (SAPC), Sussex air photo catalogue – 1940s. Photo no. 2034 FS CPE/UK1966. 10 April 1947. Global Studies Resource Centre, University of Sussex.

Recommendations: Reconnecting the meander to the river (provided this could be done with minimal disturbance) would make a major contribution to flood alleviation by slowing down the flow of water and increasing the amount of water flooding onto the land at peak flow (ES benefits 4, 5 and 6).

Upper Reeves Bottom (TQ498241, Figure 22). This washland meadow is target MG5a, but with 19 (17–22) species per sample is slightly less species-rich than the NVC standard. In the 1950s it contained Cowslips (*Primula veris*) and it was managed organically as cattle-grazed pasture until 20 years ago. It is now rented to a farmer who cuts for hay in late June or early July, but it is not grazed. Some NPK is applied annually at the rate of 125 kg per hectare. The meadow floods several times over winter, but the water only lasts a few days. (oral history interview with land owner by Peter Heeley, 2011). A small area in the NE corner (TQ499242) contains Crosswort (*Cruciata laevipes*) and has not been cut or fertilized for 20 years. This is MG1c (*Arrhenatherum elatius* grassland) and is much more species-rich than the average for this type of grassland with 23 (21–26) species per sample.

Name of meadow and date of survey	**NVC**	**Absent constants**	**Low frequency constants**	**Additional constants**
Upper Reeves Bottom 2011	MG5a	*Cynosurus cristatus* *Plantago lanceolata* *Trifolium repens* *Trifolium pratense*	*Lolium perenne* *Lotus corniculatus*	*Taraxacum officinale* *Stellaria graminea* *Alopecurus pratensis*
Crosswort area	MG1c		*Arrhenatherum elatius* *Dactylis glomerata*	*Alopecurus pratensis* *Cirsium arvense* *Galium aparine* *Galium cruciata* *Ranunculus repens* *Rumex acetosa*

Recommendations: retain present management, which is providing ES benefits 1-8. Some autumn grazing might lead to increased species-richness and would provide ES benefit 9.

West side

Re-seeded agriculturally-improved grassland was seen across the river on a walk in 15 December 2010, but it has not been surveyed). In the early 1930s (Land Utilisation Survey) the fields were all meadows.

Upstream from Queenstock Reach 230

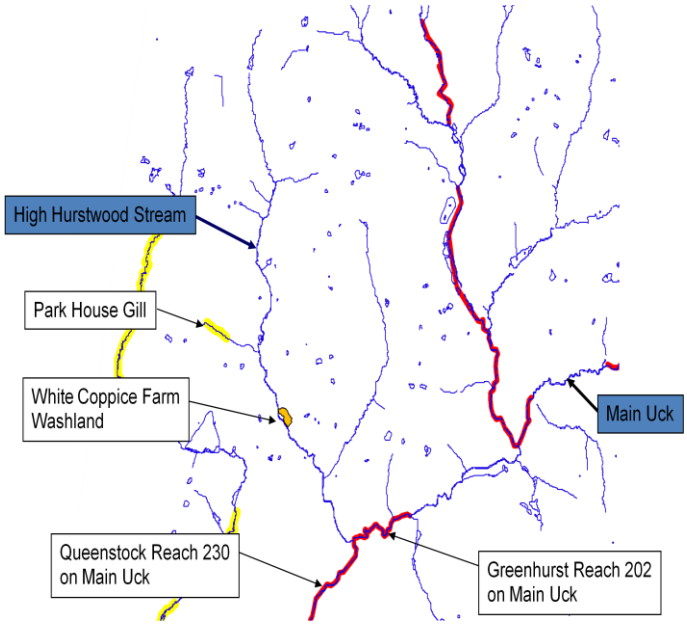

Figure 26. Upstream from Queenstock Reach 230, High Hurstwood Stream.

High Hurstwood Stream

Park House Gill (TQ490260, Figure 26). Six lengths were surveyed in 2013 and the data compared with the Ouse Gills Floristic Table. Park House is Group 1.

Name of Wood and date of survey	Group	Absent constants	Low frequency constants	Additional constants
Park House Gill 2013	1	*Scapania undulata* *Thuidium tamariscinum*	*Cardamine pratensis*	*Carpinus betulinus* *Psuedotaxiphyllum elegans* *Hookeria lucens* *Thamnobryum alopecurum*

White Coppice Farm (TQ495254, Figure 26). This wonderful wet meadow is our only example of MG8 (*Cynosurus cristatus–Caltha palustris* grassland) and although slightly less species-rich than the average with 24 (19–28) species per sample, it is more species-rich than our target MG5 community. The washland meadow is extensively grazed by one horse and cut for hay after the orchids have seeded (personal communication with owner, 2010). In 1931 it was meadow (Land Utilisation Survey).

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
White Coppice 2012	MG8	*Festuca rubra* *Leontodon autumnalis*	*Cynosurus cristatus* *Caltha palustris* *Anthoxanthum odoratum*	*Lychnis flos-cuculi* *Pulicaria dysenterica* *Dactylorhiza praeterissima* *Equisetum fluviatilis* *Cardamine pratensis* *Carex hirta* *Lotus uliginosus*

Recommendations: retain present management, which is providing ES benefits 1-7.

Tickerage Reach (reserve CRIM reach)

North bank

Tickerage Castle meadow (TQ513211, Figure 27) is horse-grazed and topped, but not fertilized (personal communication from owner, 14 April 2012). This MG5a meadow had been recently grazed by horses prior to our survey on 16 May 2012 and was slightly less species-rich than the average for this type of meadow with 20 (16–22) species per sample. It is not a washland. At the time of the Tithe map (1840) this meadow was being managed as pasture and in the early 1930s (Land Utilisation Survey) it was meadow.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Tickerage Castle 2012	MG5a	*Lolium perenne* *Cynosurus cristatus*	*Festuca rubra* *Trifolium pratensis*	*Veronica chamaedrys* *Stellaria graminea* *Rumex acetosa* *Ranunculus repens* *Conopodium majus*

Tickerage Castle swamp (TQ511211, Figure 27). This lovely wetland area (which was visited on 14 April 2012, but not surveyed) contains Yellow Iris (*Iris pseudacorus*), Opposite-leaved Golden Saxifrage (*Chrysosplenium oppositifolium*), Hemlock Water-dropwort (*Oenanthe crocata*), Branched Bur-reed (*Sparganium erectum*), Wild Angelica (*Angelica sylvestris*), Lady's-smock (*Cardamine pratensis*), Water Figwort (*Scrophularia auriculata*) and Indian Balsam (*Impatiens glandulifera*). The drier edge contained Wood Anemone (*Anemone nemorosa*), Moschatel (*Adoxa moschatellina*), Bluebell (*Hyacinthoides non-scripta*), Dog's Mercury (*Mercurialis perennis*) and Yellow Archangel (*Lamiastrum galeobdolon*). The well, which supplies water to the house, is located close to the boundary with Tickerage Meadow.

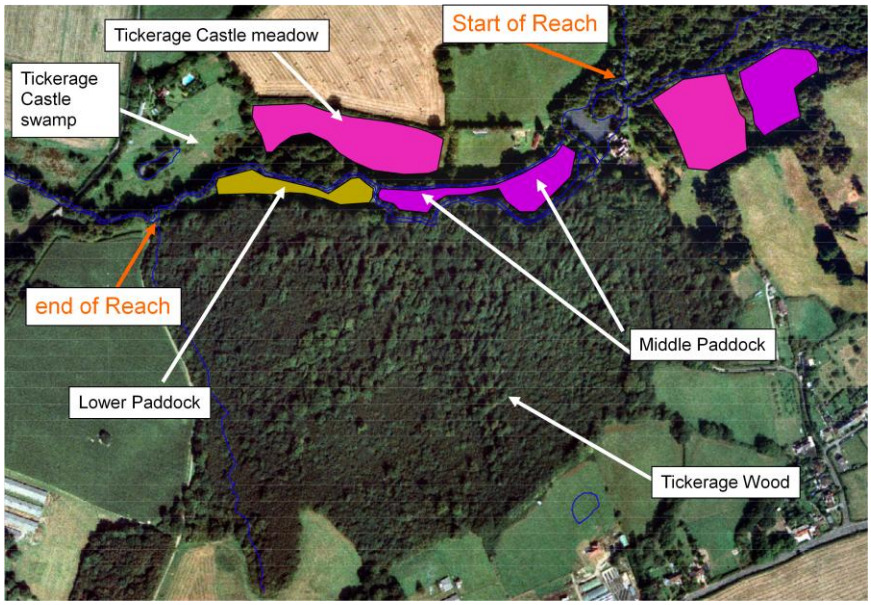

Figure 27. Tickerage Reach (reserve CRIM reach).

South Bank: Tickerage Mill washlands

Middle Paddock TQ515210 and TQ513210 (Figure 27). This washland, which is lightly grazed by six sheep, is MG6b of average species-richness with 16 (14–22) species per sample.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Middle Paddock 2012	MG6b	*Lolium perenne* *Cynosurus cristatus* *Trifolium repens*		*Alopecurus pratensis* *Eurhynchium praelongum* *Poa trivialis* *Rumex acetosa*

Lower Paddock (TQ512210, Figure 27) is species-rich MG10a with 15 (13–17) species per sample. Deer regularly break down the electric fence, so this washland is not being grazed at present because it is not safe for the sheep

(personal communication from owner, 2012). At the time of the Tithe survey (1840) both paddocks were being used as pasture and in the early 1930s (Land Utilisation Survey) both paddocks were meadows.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Lower Paddock 2012	MG10a			*Poa trivialis* *Stellaria alsine*

Recommendations: retain present management, which is providing ES benefits 1-7 and 9.

Downstream from Tickerage Reach

Waste Wood Stream

Waste Wood Gill (TQ523239 and TQ520236, Figure 28). Five lengths were surveyed in 2010 and the data compared with the Ouse Gills Floristic Table. Waste Wood Gill is Group 1.

Name of Wood and date of survey	Group	Absent constants	Low frequency constants	Additional constants
Waste Wood Gill 2010	1		*Rubus fruticosus* *Isothecium myosuroides* *Hedera helix*	*Fagus sylvatica*

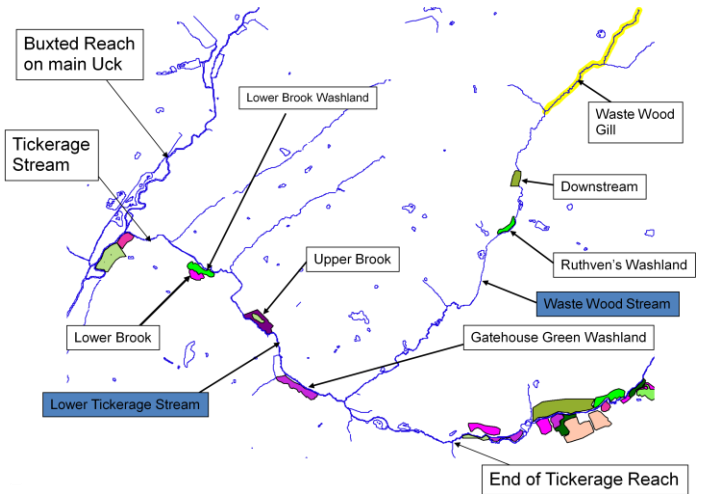

Figure 28. Downstream from Tickerage Reach.

Downstream, Waste Wood (TQ515228, Figure 28). This small area of very wet alderwood (reputed to have swallowed a cow!) was W7 (Alder-Ash-Yellow pimpernel woodland). Only two ground flora samples were surveyed in 2010 within one large sample for trees and shrubs, so it was not possible to decide on sub-community. Common Valerian (*Valeriana officinalis*) and Twayblade (*Listera ovata*) were present.

Ruthven's Washland (TQ514225, Figure 28). This rush pasture floods regularly; even in July if there are 2–3 days of rain (personal communication from owner, 2011) and is intermediate between MG10a and M23a with 22 (19–26) species per sample. It is grazed by cattle. In the early 1930s (Land Utilisation Survey) the field was meadow.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Ruthven's Washland	MG10a			
2011	M23a		*Galium palustre*	*Ranunculus flammula* *Cerastium fontanum* *Taraxacum officinale*

Recommendations: retain present management which is providing ES benefits 1-7 and 9.

Lower Tickerage Stream

Gatehouse Green Washland (TQ500214, Figure 28). This species-rich example of MG6b with 20 (16–28) species per sample floods frequently in winter. At the time of the Tithe survey (1840) this washland was being used as pasture and in 1931 as meadow (Land Utilisation Survey).

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Gatehouse Green 2010	MG6b		*Cynosurus cristatus*	

Upper Brook (Great Streele) (TQ497218, Figure 28). The washland area is MG10a rush pasture of average species richness with 12 (8–16) species per sample. The dry areas are MG7b (*Lolium perenne–Poa trivialis* pasture) with 10 (7–14) species per sample, which is similar to the average species-richness for this community. At the time of the Tithe survey (1840) Upper Brook was being used as pasture and in 1931 as meadow (Land Utilisation Survey).

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Upper Brook washland area 2010	MG10a			*Poa trivialis* *Glyceria fluitans*
Upper Brook dry area 2010	MG7b			*Cardamine pratensis*

Lower Brook washland area (Great Streele) (TQ493222, Figure 28). This wonderful washland is a species-rich example of M23b (*Juncus acutiflorus* rush pasture) with 23 (18–26) species per sample.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Lower Brook washland area 2010	M23b			*Ranunculus repens* *Poa trivialis* *Cardamine pratensis*

Lower Brook slope (Great Streele) (TQ493222, Figure 28) is target MG5c of average species-richness with 22 (18–27) species per sample.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Lower Brook slope 2010	MG5c	*Lolium perenne* *Cynosurus cristatus* *Ranunculus repens*	*Trifolium pratensis*	*Carex hirta* *Conopodium majus*

At the time of the Tithe survey (1840) Lower Brook was being used as pasture and in 1931 as meadow (Land Utilisation Survey).

Oral history interviews with owner on 8 November and 6 December 2012 (Peter Heeley) revealed that for the last 12 years these washlands have had a low input grassland management regime with sheep grazing in winter (when the cattle are indoors being fed on hay or silage from the fields above) and cattle-grazing in summer. They flood whenever there are a few days of rain – badly in 2000 when the culvert collapsed.

Recommendations: retain existing management – ideal agroecological approach with all ES benefits.

Main Uck below confluence with Tickerage Stream

Buxted Park Anthill Grassland (TQ488224, Figure 29) is a species-poor example of MG1e (*Arrhenatherum elatius* grassland) with only 15 (11–17) species per sample. Management is covered by an SSSI agreement. In the early 1930s (Land Utilisation Survey) the field was meadow.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Buxted Park Anthill Grassland 2009	MG1e	*Heracleum sphondylium* *Centaurea nigra*	*Lotus corniculatus*	*Agrostis capillaris* *Festuca rubra* *Potentilla reptans* *Ranunculus repens* *Rumex acetosa* *Stellaria graminea* *Veronica chamaedrys*

Buxted Park Meander Meadow (TQ487223, Figure 29) is a species-rich example of MG10 (*Holcus lanatus–Juncus effusus* rush pasture) with 18 (16–21) species per sample. It is intermediate between MG10a (*Juncus effusus* sub-community) and MG10b (*Juncus inflexus* sub-community) with the frequency of *Juncus effusus* and *Carex hirta* agreeing with MG10b, but the absence of *Juncus inflexus* agreeing with MG10a. In the early 1930s (Land Utilisation Survey) the field was meadow.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Buxted Park Meander Meadow 2010	MG10			

Recommendations: The meander in this meadow should not be restored because it is too close to Uckfield and holding the water back here will mean that water from higher up in the catchment will arrive at the same time making the flooding situation worse.

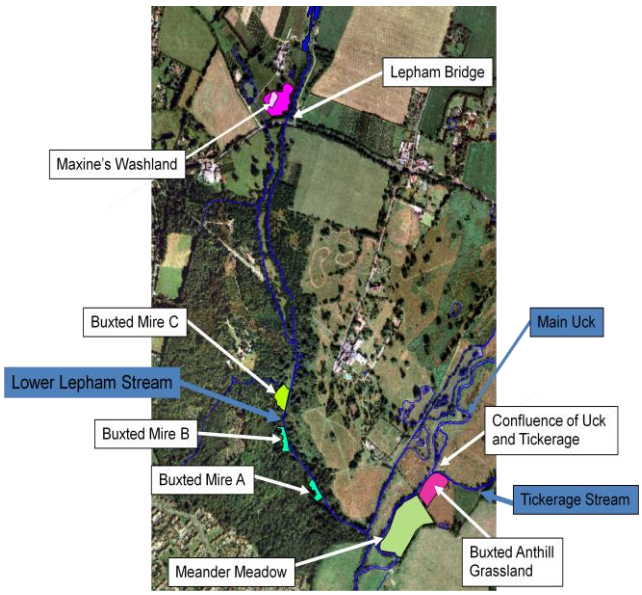

Figure 29. Main Uck below the confluence with the Tickerage Stream.

Lepham Stream

Home Farm Gill (TQ483266, Figure 30). Six lengths were surveyed in 2009 and the data compared with the Ouse Gills Floristic Table. Home Farm Gill is Group 3A.

Name of Wood and date of survey	Group	Absent constants	Low frequency constants	Additional constants
Home Farm Gill 2009	3A		*Dryopteris dilatata*	*Angelica sylvestris* *Carex pendula* *Galium aparine* *Geum urbanum* *Ribes rubrum* *Rumex obtusifolius*

Perryman's Gill (TQ482264, Figure 30). Six lengths were surveyed in 2011 and the data compared with the Ouse Gills Floristic Table. Perryman's Gill is Group 3A. The rare gill moss *Hookeria lucens* was found in one length.

Name of Wood and date of survey	**Group**	**Absent constants**	**Low frequency constants**	**Additional constants**
Perryman's Gill 2011	3A		*Dryopteris affinis*	*Anthriscus sylvatica*

Stonehouse Gill Upper (TQ481260, Figure 30). Seven lengths were surveyed in 2012 and the data compared with the Ouse Gills Floristic Table. Upper Stonehouse Gill is Group 3A.

Name of Wood and date of survey	**Group**	**Absent constants**	**Low frequency constants**	**Additional constants**
Upper Stonehouse 2012	3A	*Lonicera periclymenum*	*Veronica montana* *Cardamine flexuosa* *Corylus avellana* *Rhizomnium punctatum*	*Carpinus betulus* *Primula vulgaris*

Stonehouse Gill Lower (TQ480255, Figure 30). Five lengths were surveyed in 2013 and the data compared with the Ouse Gills Floristic Table. Stonehouse Gill is Group 3A. The rare gill moss *Hookeria lucens* occurred in 3 lengths.

Name of Wood and date of survey	Group	Absent constants	Low frequency constants	Additional constants
Lower Stonehouse 2013	3A	*Dryopteris dilatata*	*Cardamine flexuosa* *Conocephalum conicum*	*Galium aparine* *Isothecium myosuroides*

Fronts Wood Gill (TQ490246, Figure 30). Six lengths were surveyed in 2011 and the data compared with the Ouse Gills Floristic Table. Front's Wood Gill is Group 3A.

Name of Wood and date of survey	**Group**	**Absent constants**	**Low frequency constants**	**Additional constants**
Front's Wood Gill 2011	3A		*Dryopteris affinis*	*Allium ursinum* *Anthriscus sylvatica* *Eurhynchium striatum* *Galium aparine*

Olives Wood (TQ485241, Figure 30). The bottom of this wood, where the stream is, floods frequently – more frequently now than 50 years ago (personal communication from owner, 2010). Five lengths were surveyed in 2011 and the data compared with the Ouse Gills Floristic Table. Olives is Group 3B.

Name of Wood and date of survey	**Group**	**Absent constants**	**Low frequency constants**	**Additional constants**
Olives Wood 2011	3B	*Chrysosplenium oppositifolium* *Blechnum spicant*	*Pellia epiphylla* *Lonicera periclymenum* *Oxalis acetosella*	*Anthriscus sylvestris* *Brachypodium sylvaticum* *Carex pendula* *Galium aparine* *Geum urbanum* *Mercurialis perennis* *Rumex obtusifolius* *Silene dioica* *Taraxacum officinale* *Urtica dioica*

Maxine's Washland (TQ482236, Figure 30) is predominately MG5a grassland of average species-richness with 23 (15–29) species per sample. The lowest-lying parts are MG13 (*Agrostis stolonifera–Alopecurus geniculatus* grassland) with 14 (10–18) species per sample, which is more species-rich than the average for this community. In the early 1930s (Land Utilisation Survey) the field was meadow.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Maxine's Meadow 2011	MG5a	*Cynosurus cristatus*	*Lolium perenne* *Festuca rubra* *Lotus corniculatus* *Dactylis glomerata*	*Stellaria graminea* *Ranunculus repens* *Alopecurus pratensis*
lower lying areas	MG13			*Ranunculus repens* *Potentilla anserina*

Recommendations: Retain present management, which is providing ES benefits 1-7.

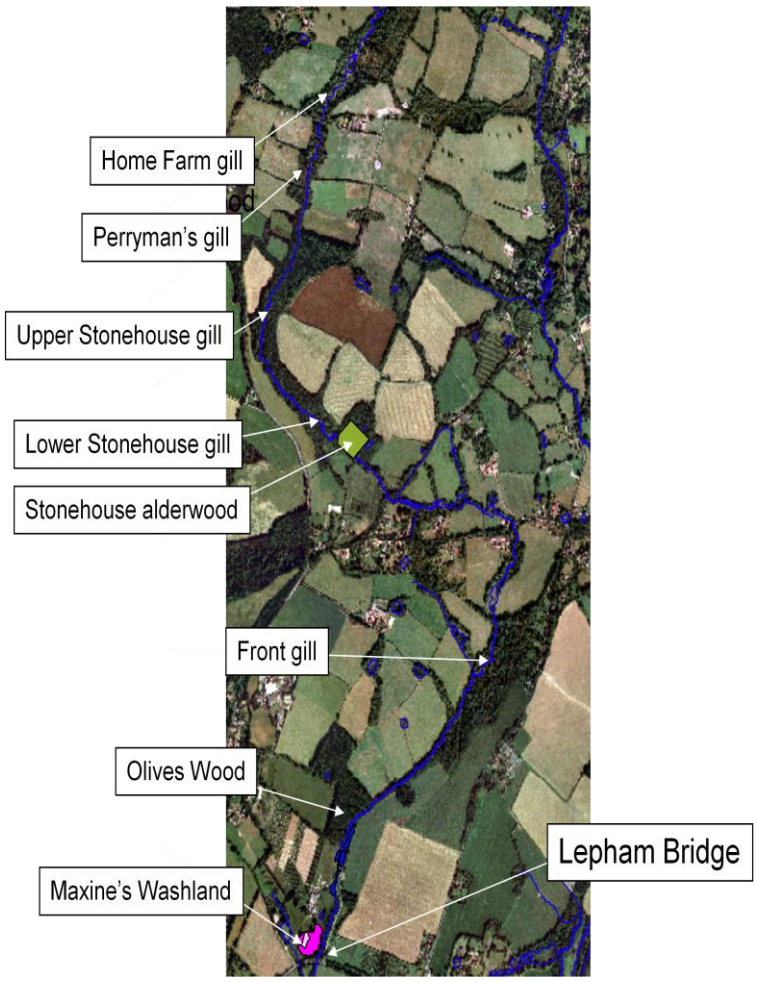

Figure 30. Upper Lepham Stream.

Buxted Park mire A (TQ482227, Figure 29) is M27 mire of average species-richness with 17 (11–25) species per sample. Marsh-marigold (*Caltha palustris*) and Yellow Iris (*Iris pseudacorus*) grow under the trees (alder wood) surrounding area A.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Buxted Park mire A 2010	M27			*Poa trivialis*

Buxted Park mire B (TQ482225, Figure 29) is species-rich M27 mire with 21 (18–24) species per sample.

Name of meadow and date of survey	**NVC**	**Absent constants**	**Low frequency constants**	**Additional constants**
Buxted Park mire B 2010	M27			*Equisetum palustre* *Poa trivialis* *Pteridium aquilinum* *Ranunculus repens* *Rumex obtusifolius* *Urtica dioica*

Buxted Park mire C (TQ484224, Figure 29) is a species-poor example of M23a mire with only 18 (16–22) species per sample.

Name of meadow and date of survey	**NVC**	**Absent constants**	**Low frequency constants**	**Additional constants**
Buxted Park mire C 2010	M23a		*Juncus effusus*	*Equisetum palustre* *Oenanthe crocata* *Ranunculus repens* *Rumex obtusifolius*

Recommendations: Retain present management, which is providing ES benefits 1-7.

Framfield Stream

Bungalow Meadow West (TQ514185, Figure 31) is a very species-rich example of MG5a with 27 (25–30) species per sample. Bungalow Meadow East (TQ515185) is even more species-rich with 29 (2733) species per sample and is also MG5a. Both meadows are full of anthills.

Name of meadow and date of survey	NVC	Absent constants	Low frequency constants	Additional constants
Bungalow West 2013	MG5a	*Lolium perenne* *Cynosurus cristatus*	*Plantago lanceolata* *Trifolium pratensis*	*Poa trivialis* *Potentilla reptans* *Pseudoscleropodium purum* *Ranunculus repens* *Rumex acetosa* *Stellaria graminea* *Veronica chamaedrys*
Bungalow East 2013	MG5a		*Festuca rubra* *Cynosurus cristatus* *Plantago lanceolata* *Trifolium pratensis* *Lolium perenne*	*Pimpinella saxifraga* *Stellaria graminea* *Veronica chamaedrys*

Oral history interviews were conducted with the owner on 12 August 2013 and 10 October 2013 (Peter Heeley). Bungalow Field was originally part of Barnet Wood Common. The site has not been ploughed or fertilized. The large number of anthills prevents hay cutting and the site is normally grazed by sheep from February until April and by cattle from July to November. Herdwick sheep were present at the time of the survey in June because the owner was trying to control the invading scrub. The stream flowing between the two meadows floods a couple of times in winter.

Recommendations: retain present management which is providing ES benefits 1-7.

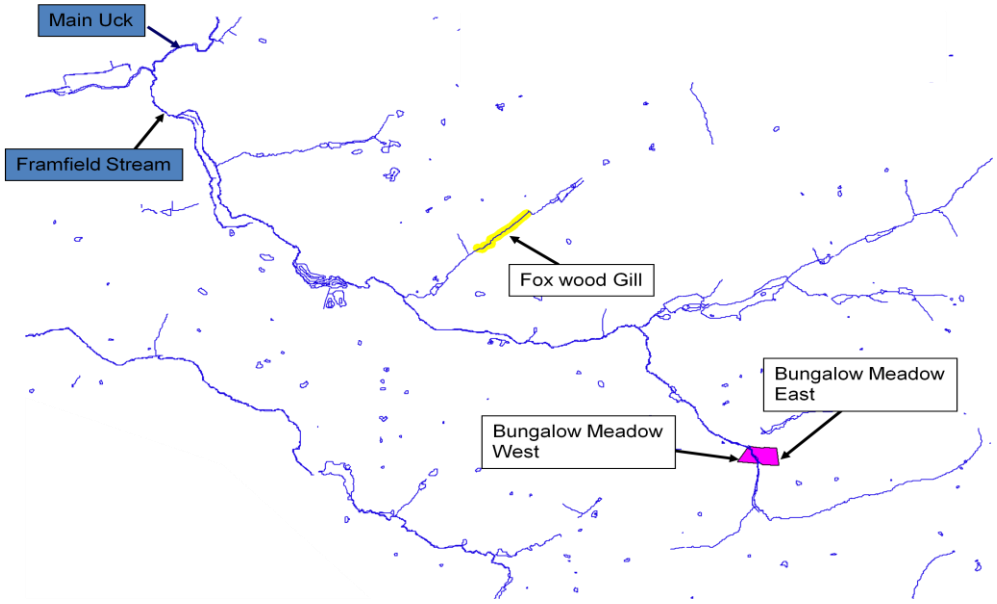

Figure 31. Framfield Stream.

Fox Wood Gill (TQ500200, Figure 31). Five lengths were surveyed in 2013 and the data compared with the Ouse Gills Floristic Table. Fox is Group 3A.

Name of Wood and date of survey	Group	Absent constants	Low frequency constants	Additional constants
Fox Wood Gill 2013	3A		*Atrichum undulatum* *Lonicera periclymenum* *Fraxinus excelsior* *Lamiastrum galeobdolon* *Chrysosplenium oppositifolium* *Fissidens taxifolius* *Rhizomnium punctatum*	*Fissidens bryoides*

5 Conclusions from our research

5.1 Tree planting

There is not a lot of potential for woodland planting. Much of the streamside is already wooded. We have identified a large number of gills containing a specialised and particularly diverse flora as well as areas of wet alderwood. In addition, we have identified a considerable amount of species-rich grassland providing a wide range of ecosystem services and such sites should not be used for riparian woodland planting.

We have identified only one site which we think is suitable for extensive woodland planting: Shawford Farm Brook in Reach 204.

For some sites where there are already trees we recommend additional tree planting: Greenhurst Reach 202; Brook Field in Reach 204; and Hammer Meadow upstream from Greenhurst Reach.

5.2 Hedgerow planting

We identify one reach where hedgerows could be planted along the contour to separate arable fields from riverside land: Greenhurst Reach 202.

5.3 Debris dams

Most of the gill woodland contains natural debris dams, which are increasing habitat diversity as well as retaining run-off. The part played by these natural features in flood alleviation needs to be recognised together with the ecological importance of retaining gill woodland.

We identify one section of river where debris dams could be constructed using existing riverside alders, which require coppicing: Greenhurst Reach 202.

5.4 Re-connecting cut-off meanders

Queenstock Reach 230, one of the top 10 CRIM reaches, contains a meander, which was cut off in 1946 and could be re-connected.

5.5 Converting arable to permanent grassland

Considerable benefits both to flood alleviation and to water quality could be achieved by converting arable land (both maize and short-term ryegrass leys) adjacent to the water course to permanent grassland. In particular we identify Brook Reach 157, where maize was grown in 2010, and Fordbrook Reach, where there was extensive agriculturally-improved grassland in 2010.

5.6 Species-rich meadows

Until relatively recently much of the streamside land was managed as hay meadow with species-rich grassland. Fortunately we have found some lovely remaining examples. Such sites are vital for the range of ecosystem services that they provide and are also important in flood alleviation and in maintaining water quality, whether they are streamside washlands or on the slopes above the water course. 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.

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