

Bishop's Meadows NVC Survey (SU835462)



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Summary

A National Vegetation Classification (NVC) survey was conducted on an area of grassland in Farnham known as Bishop's Meadow (central grid reference SU835462), to provide The Bishop's Meadow Trust with a habitat baseline for future comparison.

Bishop's Meadow comprises rough species poor semi-improved grassland, more specifically MG1 *Arrhenatherum elatius* grassland, which reflects the management neglect of this habitat. This habitat type is very common over the UK. Whilst currently a floristically unremarkable habitat, it does have plenty of potential.

Whilst the vegetation community is considered common and widespread on a national and local scale, the site does represent an area of local wildlife importance and forms a habitat mosaic including rough grassland, tall ruderal vegetation, scrub, trees, bankside vegetation and a stream. It is likely to provide habitat for a wide range of invertebrates, birds, small mammals and reptile species and is therefore considered to be of conservation value in a local context.

With appropriate management this site will gradually improve in biodiversity. The quality of the grassland and number of vascular plants will increase and it will continue to support local wildlife.

1.0 Introduction

1.1 Background

Isobel Girvan, Consultant Ecologist was asked to undertake a specialist survey known as a National Vegetation Classification (NVC) survey of an area of grassland known as Bishop's Meadow (central grid reference SU835462), located in central Farnham, Surrey. Dr Rachel O'Hara, Consultant Ecologist, also assisted with the survey and analysis.

The site visit was carried out on the 14th June 2012 (notes from the previous years survey were used dated 13th July 2011) with the objective to identify and map the grassland NVC communities. It was undertaken in response to a request from Bishop's Meadow Trust who require baseline information to enable future comparison and inform their management plan.

1.2 Commissioning Brief

- To carry out a field survey of the grassland within Bishop's Meadow using the NVC survey techniques.
- To describe the survey process stating criteria used and sources of information.
- To show the extent of the NVC boundaries on a map.
- To provide justification for the communities/sub-communities identified and any anomalies.
- To provide a considered evaluation of the species, habitats and vegetation communities present to assess its conservation value.
- To present a species list of the species present.
- To provide brief management recommendations.

1.3 Survey area

The area of the survey was defined by the extent of the boundaries on Figure 1.

1.4 Quality Assurance & Environmental Management

Isobel Girvan is a member of the Institute of Ecology and Environmental Management (IEEM) and follows the Institute's Code of Professional Conduct when undertaking ecological work.

1.5 Site Background

The eastern grid reference for Bishop's Meadow is SU83824651 and the grid reference for the western boundary is SU83174611. The total area of the meadow is 12.83 hectares (ha) and comprises semi-improved neutral grassland, tall herb vegetation, running water and scrub.

It is located to the south of Farnham town. It is part of a complex of other fields and meadows, with the River Wey running along the southern edge.

The underlying geology for the site is Folkestone and Alluvium. This gives rise to a pelo-stagnogley soil known as Denworth. This is a slowly permeable, seasonally waterlogged clay soil associated with permanent grassland and is widely distributed over Great Britain.

Historically the old Surrey maps indicate that Bishop's Meadow has been open meadows and fields since before John Roque's map of 1768 and was known as Bishop's Meade.

1.6 NVC Introduction

The NVC survey is a system of classifying natural habitat types according to the vegetation communities they contain. It was developed during the 1970's and 1980's to provide a scientific basis for the description of all natural, semi-natural and major artificial habitats in Great Britain. It is published in five volumes (following Rodwell 1991a *et seq.*) and includes over 250 plant communities. The result is a standardised system that ecologists can use to describe plant communities. All neutral grasslands in the UK can be described using 13 main NVC mesotrophic grassland types (MG1 – MG13).

1.7 Uses for NVC

Knowledge of the NVC communities on a site can indicate its value for nature conservation as well as being a guide for management. It may be used as a basis for the identification and characterisation of vegetation community features for historical representation for future use and as a precursor to the establishment of a monitoring programme.

2.0 NVC Methodology

2.1 General

The general procedure for NVC mapping, (as defined in Hill *et al*, 2000 ed.) suggests starting with boundaries and edges of sites, and working inwards if possible, from known location to unknown locations, i.e. marked pathways and from field to field. Also by eye, selecting areas of uniform vegetation for mapping and taking quadrats and colouring the areas covered by each vegetation type on the map to ensure a full coverage and mark in the appropriate NVC code, where known prior to analysis.

However, this is not always practicable, with time restrictions and other limitations. As it notes in the NVC users handbook (Rodwell, 2006), limited time and resources may make it necessary to economise with the general framework of the NVC survey methodology. If vegetation types can be reliably identified without sample collection then there may be justification for not recording plots.

In most cases during this survey the NVC classification was determined by surveyor knowledge and experience, quadrat data and in some cases by using minimalist approach to data collection for use with the NVC key. This enabled the surveyor to collect significant amounts of data for classification in the field and analysis afterwards to gain a good judgement of the grassland types present. Analysis used keys from the NVC handbooks and MAVIS computer analysis programme from the Centre of Ecology and Hydrology as a guide. Survey data was input into MAVIS so that stands could be assigned to appropriate communities by comparing the constancy of the constituent species of each stand with the characteristic profiles of the NVC.

When quadrat data was collected, each homogenous stand sampled up to 5 randomly selected 2m by 2m quadrats. A quantitative measure of the abundance was recorded using percentage cover. Cover was assessed by eye as a vertical projection on the ground of the live and above ground parts of the plant in the quadrat. Data is presented in Appendix 1.

2.2 NVC Mapping

Communities were digitally mapped by Surrey Biological Information Centre (SBIC) onto MapInfo. NVC types were mapped, where possible, in *situ* with notes taken to aid completion of the written descriptions. In addition aerial photographs from 2001 were used to aid with mapping. Most vegetation has been classified as a single NVC unit (down to sub-community type, where possible). The extent of the NVC classifications are presented on Figure 1 with their corresponding alpha-numeric codes.

2.3 Species Identification

It was possible to record the majority of species seen to specific and where relevant, sub-specific level. However, no aggregates of Dog Rose, Bramble or Dandelion were separated.

The list of species recorded during the 2011 and 2012 surveys are provided in Table 8 in Section 6.

Throughout the report all tree, shrub and field layer species (grasses and herbs) are referred to in the text by their common names. Scientific names are given in Table 8, following nomenclature of Stace, *A New Flora of the British Isles*, 3rd edition (2010).

2.4 Limitations

- NVC surveys cannot produce black and white results.
- All vegetation communities are on a continuum and Figure 1 therefore should be regarded as dynamic.
- Intermediates can occur and vegetation is rarely a perfect fit.
- Vegetation may be interpreted differently by different surveyors.
- A single one-off survey is insufficient to record all plants present in any given site.

3.0 Results

3.1 Introduction

This section provides the detailed analysis of the different NVC types that were found on the site.

A full community description is not provided, but can be seen in the relevant Rodwell (1991 *et seq.*). The salient points are provided in summary format.

3.2 Main Grassland - MG1 *Arrhenatherum elatius* grassland

Comparison of the survey results against the NVC classifications suggest an affinity with MG1 *Arrhenatheretum elatioris* grassland. However it is too species poor to classify further. It closely resembles and keys out to MG1a but MAVIS software indicates that it also is close to MG1b. It is not an ideal fit to either sub-community as it lacks Red Fescue (a constant for MG1a), Common Nettle (a constant for MG1b) and many of the associated forb preferentials.

MG1 grassland is dominated by False Oat-grass and Cock's-foot, producing a tussocky grassland habitat. As is common in this community the tussocks and litter accumulation have depressed the species richness and only tall herbs such as Creeping Thistle, Wild Teasel and Common Nettle are found in small quantities. Rodwell suggests that in this community, at the height of summer, sprawling legumes will be apparent such as Meadow Vetchling. Whilst this was recorded in the overall species list, it did not so much sprawl, as appear infrequently.

The surveys recorded a low range of common and widespread species that are characteristic of rough unmanaged grassland. The survey area was dominated by dense tussocks of False Oat-grass with Cock's-foot and few forbs. Other grasses that completed the sward included occasional Meadow Foxtail, Timothy and rare Barren Brome. Meadow Barley, a grass that is noticeably declining throughout Surrey, is locally frequent and sometimes locally abundant in the west, particularly in the north west part of the site. Those forbs that were recorded included Common Ragwort, Creeping Thistle, Common Nettle, Hogweed, Wild Teasel and Broad-leaved Dock.

MG1 is a common community, characteristic of ungrazed or irregularly cut grassland. The presence of so much False Oat-grass is often an indication of its succession towards Hawthorn and Blackthorn dominated scrub.

3.3 Paths - MG7b *Lolium perenne* leys and related grasslands *Lolium perenne-Poa trivialis* leys

The path grassland is frequently trampled, leaving only the trample resistant, short cropped species in evidence.

This is a more species rich sub-community than others in the MG7 sub-communities. Perennial Rye-grass and Rough Meadow-grass are co-dominant with frequent Cock's-foot and occasional Annual Meadow-grass.

Dicotyledons are represented by species such as White Clover, Greater Plantain and Ribwort Plantain.

3.4 Tall Ruderal Marginal Vegetation - Transitional between MG1 *Arrhenatherum elatius* grassland *Filipendula ulmaria* sub-community and S26b *Phragmites australis-Urtica dioica* tall herb fen *Arrhenatherum elatius* sub-community

There are hints towards an inundation grassland, defined by short lush grasses occupying low-lying depressions that are regularly inundated by water, particularly in the central northern section. This area keyed out to S26b *Phragmites australis-Urtica dioica* tall herb fen *Arrhenatherum elatius* sub-community. However there was the absence of Common Reed suggesting that it is transitional between this and the MG1c *Filipendula ulmaria* sub-community. This small stand typically comprised of Meadow Foxtail, False Oat-grass with Common Nettle, Creeping Thistle, Cleavers and Meadowsweet.

3.5 Tall Ruderal Marginal Vegetation/Scrub - Transitional between MG1c *Arrhenatherum elatius* grassland *Urtica dioica* sub-community and OV26d *Epilobium hirsutum Arrhenatherum elatius-Heracleum sphondylium* sub-community

Close to the neighbouring cemetery there is a small section of Hawthorn successional scrub over tall grassland and ruderal vegetation. Bramble is locally dominant. Under this comes abundant False Oat-grass with frequent Common Bent, Yorkshire-fog, Cock's-foot, Common Nettle and Creeping Thistle. More occasionally the following are found; Perennial Rye-grass, Meadow Barley, Common Ragwort, Yarrow, Creeping Buttercup, Red Clover, White Clover and Lesser Stitchwort.

The cemetery corner area is moving rapidly towards a W21 Hawthorn scrub community.

3.6 OV24 *Urtica dioica-Galium aparine* community typical sub-community

This tall ruderal vegetation is found along the bankside edges and most closely resemble OV24 tall herb vegetation, noted for its False Oat-grass, Common Nettle, Cleavers and Creeping Thistle elements. Also present in varying quantities are Hogweed and Broad-leaved Dock.

3.7 W21a *Crataegus monogyna-Hedera helix* scrub community

The Hawthorn scrub is situated along the River Wey on the south eastern boundary, along the central line as well as along the ditchline in the west of the site. A lot of British hedges and scrub conform to this scrub community with its thorny bushes.

3.8 W22 *Prunus spinosa*-*Rubus fruticosus* scrub community
Developing Blackthorn scrub, with some Hawthorn also present.

4.0 Evaluation

4.1 Vegetation Community Evaluation

There is little published information on the distribution of NVC types and therefore the distribution notes provided in Table 1 below give an overview based on notes in the NVC accounts (Rodwell 1991a *et seq*). It also presents the area in hectares and total % cover of the main mapped grassland NVC communities.

Table 1 – NVC distribution notes, area & percentage cover

NVC community	Distribution notes	Area (ha)	% cover
MG1	The <i>Arrhenatheretum</i> is a highly common community of British lowlands, and reflect a management neglect i.e. low grazing intensity.	11.08	86.4
MG7b	A distinctive grassland typically found on seasonally-flooded river valleys in southern England.	Too small to measure accurately	
MG1/S26b	Unknown distribution.	0.02	0.15
MG1c/OV26d	Unknown distribution.	0.38	3.00
OV24	This community is ubiquitous through the lowlands.	0.85	6.63
W21a	This is a common community.	0.44	3.43
W22	This is a common community.	0.05	0.39

4.2 Vegetation Community Conclusions

The MG1 grasslands reflects under-management which allows this coarse grass dominate the sward, but can also be rectified, with a tweak in the overall management style.

4.3 Species Evaluation

A total of 146 species were recorded at Bishop's Meadow from four recent surveys:

Surrey Botanical Society 24th August 2010
Surrey Wildlife Trust 14th August 2010
Surrey Wildlife Trust 13th July 2011
Surrey Wildlife Trust 14th June 2012

Whilst this is a relatively high number of species, it can be said that the meadow overall has a high grass to forb ratio. I.e. there are lots of species present, but most of the herbs are found in low quantity.

4.4 Indicator Species

Using the list of Species Typical of Grassland of Conservation Interest in Surrey taken from the Guidance for the Selection of Sites of Nature Conservation Importance in Surrey (Gibbs, 2008) 17 indicator species have

been recorded at Bishop's Meadow between 2010 and 2012. This indicates how rich the site is in indicator species for neutral grassland.

To put this in context, if the site were to be put forward for Site of Nature Conservation Importance (SNCI) selection, the guidance suggests that to qualify as an SNCI for neutral grassland the site should support 15 or more of these indicator species (of which two should be Surrey Rare Plants, see next section).

In addition a further two indicator species were recorded in 25th June 1991 by Ecologist, Chris Hall, and could still be present. They are:

- Corky-fruited Water-dropwort
- Smooth Meadow-grass

Table 2 – Grassland Indicator Species recorded at Bishop's Meadow

Common Name	
Sweet Vernal-grass	Yellow Loosestrife
Water-cress	Timothy
Square-stalked Willowherb	Common Sorrel
Meadowsweet	Pepper-saxifrage
A Hawkweed agg.	Marsh Woundwort
Meadow Barley	Lesser Stitchwort
Meadow Vetchling	Goat's-beard
Oxeye Daisy	Hairy Tare
Common Bird's-foot Trefoil	

4.5 Surrey Rare Plant Register Plants

A list known as Surrey Rare Plant Register (SyRPR, 2012) has been compiled by Surrey Botanical Society of species that are considered to be rare, scarce or of conservation importance in Surrey. The list also contains species that are nationally or internationally important and where appropriate, designations from the Vascular Plant Red Data List for Great Britain, (Cheffings & Farrell, (Eds) JNCC 2005).

None of the species recorded during 2010-2012 are on the list, although the following has been recorded in the past (Hall, 1991):

Table 3 – Rare species

Common Name	Comments
Corky-fruited Water-dropwort	Locally Rare / VC17 Scarce

In addition the following plants have been recorded as locally frequent and whilst not rare, are in decline.

Table 4 – Species in decline

Common Name	Comments
Meadow Barley	Most commonly found near the Thames in pastures on the clay. Usually plentiful where it occurs (Lousley, 1976), but generally in decline in Surrey.
Pepper-saxifrage	Commonly found on Weald Clay, London Clay and Gault (Lousley, 1976), but generally in decline in Surrey.

4.6 Species of Principal Importance/Surrey Rare species

No Species of Principal Importance (SPI) (i.e. UK BAP Priority Species) have been recorded on the site.

4.7 Non-native species

The overwhelming majority of plants are native common species (Preston *et al.* 2002), but inevitably some non-native naturalised garden species have arrived by various means (accidental and deliberate), and some are more serious and are or have the potential to be invasive. Thankfully there is only one on the site and it is listed below in Table 5, and this is being actively managed though help from local volunteers. It is also on the Wildlife & Countryside Act (amended 1981) Schedule 9 Invasive Plant Species which makes it an offence to plant or cause it to grow spreads in the wild. It only covers a very small percentage of the overall cover of the survey site.

Table 5 – Non-native species

Common Name
Himalayan Balsam

4.8 Potentially invasive species

The plant charity Plantlife (Thomas, 2010) has undertaken research to try to identify non-native plants that may become invasive in the future and those seen on the periphery edge, close to the path in the north eastern corner are listed below.

Table 6 – Potentially invasive species

Common Name
Garden Privet
Snowberry sp., Hebe sp., Honeysuckle sp. – some of these species are on the list

4.9 Surrey invasive species (draft)

In addition the following is on the draft of the Surrey Invasive Species List (in.prep.):

Table 7 – Surrey invasive species

Common Name
Canadian Goldenrod
Sycamore

5.0 Management Recommendations

5.1 Grassland

Neutral grassland requires active management in order to retain and improve its conservation interest. Without appropriate management, tall vigorous grasses such as False Oat-grass will continue to dominate and dead plant matter will carry on accumulating. This suppresses the less vigorous species and the botanical diversity of the grassland declines. The key to managing grasslands is to remove each years growth of vegetation. This can be achieved by grazing (as in traditional pastureland), cutting or a combination of the two (as in traditional hay meadows). This is being achieved at Bishop's Meadow with an annual hay cut, however the NVC results would suggest that the cutting regime is promoting a slightly less species rich and grass dominated sward.

There is plenty of evidence of agricultural improvement on the site evident from the relatively flat topography and the abundance of mesotrophic grasses. Indeed it was known to be ploughed up until the 1960's and then again in the 1990's.

Resumption of an appropriate grazing or mowing regime can normally bring about a more species rich and floristically interesting sward by reducing the False Oat-grass cover as well as other coarse grasses and reducing nutrient input, thereby allowing finer grasses and herbs to prevail.

Hay meadows are cut traditionally in late June to early July. If possible this could be adjusted to ensure all nesting birds have fledged and that all of the plants have set seed. Following the cut, the arisings should be removed. If possible the grassland should then be aftermath grazed in September until late autumn.

In order to enhance the site for its floristic diversity it is suggested that an early spring cut would help to reduce the tall coarse grass component early in the season and help to reduce nutrient input into the soil. This should then be followed by an end of summer hay cut. However, there will be other components/restrictions on the management other than the sward diversity such as invertebrates, birds and reptiles.

It is thought that aftermath grazing would help to increase the floristic diversity. Aim to keep a relatively open sward without excessive poaching. The timing of grazing of pastures will depend on local conditions and the needs of particular species on the site. Light trampling is good as it provides bare areas for seed germination.

Another suggestion is to carry out a hay cut on the western part of the meadow in July, then harrow and introduce green hay from the cemetery site. Obviously some dialogue with the cemetery owners will be required and a survey of this area should be carried out to ensure that the correct type of

species are present. Then add cattle (or horses?) to ensure that the hay material is well trampled to help set the seeds into the ground.

5.2 Hedges/scrub

Some trees and scrub are an important component of grassland habitats. Bishop's Meadow, has some areas of scrub and some further interplanting would enable interlinking around the fields.

5.3 Invasive non-native species

The Himalayan Balsam management using local volunteers will be tackling the problem and considerably reducing the invasion. This will need to be on-going to keep on top of it.

Canadian Goldenrod is a potentially invasive species and should be monitored carefully. Annual pulling may be required.

5.4 Further surveys

It is recommended that in 5 years time another NVC survey is commissioned. This will assess any changes of the community types and whether there has been a tendency towards a more species-rich community, reflecting the change in management.

6.0 Vascular Species List

Table 8 – Vascular species list recorded at Bishop’s Meadow 2010-12

P = present D = Dominant A = Abundant F = Frequent O = Occasional R = Rare

* = Species Typical of Grassland of Conservation Interest in Surrey

+ = Invasive or potentially invasive species

SBS = Surrey Botanical Society IG = Isobel Girvan CM = Chris Matcham (former Rivers and Mammals Project Officer SWT) ROH = Rachel O’Hara (Consultant Ecologist)

Scientific Name	Common Name	Presence/Abundance			
		SBS 2010	IG/CM 2010	IG 2011	IG/ROH 2012
<i>Acer pseudoplatanus</i>	Sycamore				R
<i>Achillea millefolium</i>	Yarrow	P		R	R
<i>Agrostis canina</i>	Velvet Bent				R
<i>Agrostis capillaris</i>	Common Bent	P	P	O	O
<i>Agrostis stolonifera</i>	Creeping Bent				F
<i>Alliaria petiolata</i>	Jack-by-the-hedge		P	R	R
<i>Alnus glutinosa</i>	Alder		P	R	R
<i>Alopecurus pratensis</i>	Meadow Foxtail		P	R	O
<i>Anisantha sterilis</i>	Barren Brome		P	R	R
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass *			R	R
<i>Anthriscus sylvestris</i>	Cow Parsley		P	R	R
<i>Apium nodiflorum</i>	Fool’s Water-cress		P	R	R
<i>Artemisia vulgaris</i>	Mugwort		P		
<i>Arrhenatherum elatius</i>	False Oat-grass		P	A	A
<i>Ballota nigra</i>	Black Horehound			R	R
<i>Barbarea vulgaris</i>	Winter-cress *	P			R
<i>Betula pendula</i>	Silver Birch			R	R
<i>Brachypodium sylvaticum</i>	False-wood Brome	P		R	R
<i>Bromus hordeaceus</i>	Soft-brome			R	
<i>Bromus sterilis</i>	Barren Brome			R	R
<i>Calystegia sepium</i>	Hedge Bindweed		P	LF	R
<i>Capsella bursa-pastoris</i>	Shepherd’s-purse	P		R	R
<i>Carduus crispus</i>	Wetted Thistle	P		R	R
<i>Carex divulsa ssp. divulsa</i>	Grey Sedge	P			R
<i>Carex divulsa ssp. leerii</i>	Leer’s Sedge	P			
<i>Carex hirta</i>	Hairy Sedge	P			R
<i>Castanea sativa</i>	Sweet Chestnut			R	
<i>Centaurea nigra</i>	Common Knapweed			R	R
<i>Cerastium fontanum</i>	Common Mouse-ear	P		R	R
<i>Chamerion angustifolium</i>	Rose-bay Willowherb		P	R	R
<i>Circaea lutetiana</i>	Enchanter’s Nightshade	P			R
<i>Cirsium arvense</i>	Creeping Thistle		P	LF	LF
<i>Cirsium vulgare</i>	Spear Thistle		P	R	R

Scientific Name	Common Name	Presence/Abundance			
		SBS 2010	IG/CM 2010	IG 2011	IG/ROH 2012
<i>Convolvulus arvensis</i>	Field Bindweed	P		R	R
<i>Crataegus monogyna</i>	Hawthorn		P	R*	LF
<i>Crepis capillaris</i>	Smooth Hawks-beard	P		R	R
<i>Dactylis glomerata</i>	Cock's-foot		P	F	F
<i>Dipsacus fullonum</i>	Wild Teasel		P	R	R
<i>Dryopteris filix-mas</i>	Male Fern	P			
<i>Elymus repens</i>	Common Couch		P	R	R
<i>Epilobium hirsutum</i>	Great Willowherb		P	R	R
<i>Epilobium parviflorum</i>	Hoary Willowherb			R	
<i>Epilobium tetragonum</i>	Square-stalked Willowherb *			R	
<i>Equisetum arvense</i>	Field Horsetail		P		
<i>Eupatorium cannabinum</i>	Hemp Agrimony				R
<i>Schedonorus arundinacea</i>	Tall Fescue	P		R	R
<i>Festuca rubra agg.</i>	Red Fescue	P		R	R
<i>Filipendula ulmaris</i>	Meadowsweet *		P	R	R
<i>Fraxinus excelsior</i>	Ash		P	R	R
<i>Galium aparine</i>	Cleavers		P	R	R
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill		P	R	R
<i>Geranium molle</i>	Dove's-foot Crane's-bill	P		R	R
<i>Geranium pyrenaicum</i>	Hedgerow Crane's-bill	P			R
<i>Geum urbanum</i>	Herb Bennet/Wood Avens	P		R	R
<i>Glechoma hederacea</i>	Ground-ivy	P		R	R
<i>Glyceria maxima</i>	Reed Sweet-grass		P		
<i>Hebe sp.</i>	A hebe +			R	
<i>Hedera helix ssp. helix</i>	Common Ivy		P	R	R
<i>Heiracium agg.</i>	A hawkweed sp.*				R
<i>Heracleum sphondylium</i>	Hogweed	P		R	R
<i>Holcus lanatus</i>	Yorkshire-fog			F	O
<i>Hordeum murinum</i>	Wall Barley		P		R
<i>Hordeum secalinum</i>	Meadow Barley *		P	R	LF
<i>Humulus lupulus</i>	Hop		P	R	R
<i>Hypochaeris radicata</i>	Cat's-ear		P		
<i>Ilex aquifolium</i>	Holly			R	R
<i>Impatiens glandulifera</i>	Himalayan Balsam +		P	LA	R
<i>Iris pseudocorus</i>	Yellow Iris			R	R
<i>Lactuca serriola</i>	Prickly Lettuce		P	R	R
<i>Lamium album</i>	White Dead-nettle		P	R	R
<i>Lapsana communis</i>	Nipplewort	P		R	R
<i>Lathyrus pratensis</i>	Meadow Vetchling *	P		R	R
<i>Lemna minor</i>	Common Duckweed		P	R	R
<i>Leucanthemum vulgare</i>	Oxeye Daisy *			R	R
<i>Ligustrum ovalifolium</i>	Garden Privet +			R	

Scientific Name	Common Name	Presence/Abundance			
		SBS 2010	IG/CM 2010	IG 2011	IG/ROH 2012
<i>Lolium perenne</i>	Perennial Rye-grass		P	O	LA
<i>Lonicera sp.</i>	A Garden Honeysuckle +			R	
<i>Lotus corniculatus</i>	Common Bird's-foot Trefoil *			R	R
<i>Lycopus europaeus</i>	Gipsywort		P		
<i>Lysimachia vulgaris</i>	Yellow Loosestrife *			R	R
<i>Malva sylvestris</i>	Common Mallow		P	R	R
<i>Matricaria discoidea</i>	Pineappleweed		P		
<i>Medicago lupulina</i>	Black Medick	P			R
<i>Mentha aquatica</i>	Water Mint			R	R
<i>Myosotis arvensis</i>	Field Forget-me-not			R	R
<i>Myosotis scorpioides</i>	Water Forget-me-not		P		
<i>Myriophyllum spicatum</i>	Spiked Water-milfoil		P		
<i>Oenanthe crocata</i>	Hemlock Water-dropwort		P	R	R
<i>Persicaria amphibia</i>	Amphibious Bistort	P			
<i>Persicaria maculosa</i>	Redshank		P		R
<i>Phalaris arundinacea</i>	Reed Canary-grass		P		R
<i>Phleum pratense</i>	Timothy *		P	R	R
<i>Helminthotheca echioides</i>	Bristly Oxtongue	P	P		R
<i>Plantago lanceolata</i>	Ribwort Plantain	P		R	O
<i>Plantago major</i>	Greater Plantain	P		R	R
<i>Poa annua</i>	Annual Meadow-grass	P		O	LF
<i>Poa trivialis</i>	Rough Meadow-grass		P	LF	O
<i>Polygonum arenastrum</i>	Equal-leaved Knotgrass	P		R	R
<i>Populus nigra c.f. gigantea</i>	Lombardy Poplar			R	R
<i>Potentilla reptans</i>	Creeping Cinquefoil	P		R	R
<i>Prunus cerasifera var. pissardii</i>	A Cherry Plum	P			
<i>Prunus laurocerasus</i>	Cherry Laurel			R	
<i>Prunus spinosa</i>	Blackthorn			R	R
<i>Pulicaria dysenterica</i>	Common Fleabane	P			
<i>Quercus robur</i>	Pedunculate Oak		P	R	
<i>Ranunculus acris</i>	Meadow Buttercup	P		R	R
<i>Ranunculus fluitans</i>	River Water-crowfoot		P		
<i>Ranunculus repens</i>	Creeping Buttercup	P	P	R	R
<i>Nasturtium officinale</i>	Water-cress		P		
<i>Rosa canina agg.</i>	Dog Rose agg.		P	R	R
<i>Rosa sp.</i>	A cultivated rose			R	
<i>Rubus fruticosus agg.</i>	Bramble agg.	P		R	R
<i>Rumex acetosa</i>	Common Sorrel *	P		R	R
<i>Rumex conglomeratus</i>	Clustered Dock	P			
<i>Rumex crispus</i>	Curled Dock	P		R	R
<i>Rumex obtusifolius</i>	Broad-leaved Dock		P	R	R

Scientific Name	Common Name	Presence/Abundance			
		SBS 2010	IG/CM 2010	IG 2011	IG/ROH 2012
<i>Salix fragilis</i>	Crack Willow		P	R	R
<i>Sambucus nigra</i>	Elder		P	R	R
<i>Scrophularia auriculata</i>	Water Figwort	P			
<i>Scrophularia nodosa</i>	Common Figwort	P			
<i>Senecio jacobaea</i>	Common Ragwort		P	R	R
<i>Senecio vulgaris</i>	Groundsel		P		
<i>Silaum silaus</i>	Pepper-saxifrage *	P			
<i>Sison amonum</i>	Stone-parsley	P			
<i>Solanum dulcamara</i>	Bittersweet		P		R
<i>Solidago canadensis</i>	Canadian Goldenrod +	P			
<i>Sonchus asper</i>	Prickly Sow-thistle		P		R
<i>Sonchus oleraceus</i>	Smooth Sow-thistle			R	
<i>Sparganium erectum</i>	Branched Bur-reed		P	R	R
<i>Stachys palustris</i>	Marsh Woundwort *	P			
<i>Stachys sylvatica</i>	Hedge Woundwort		P		R
<i>Stellaria graminea</i>	Lesser Stitchwort *			R	
<i>Symphoricarpos sp.</i>	A snowberry +			R	
<i>Symphytum officinale</i>	Common Comfrey	P		R	R
<i>Syringa vulgaris</i>	Lilac +			R	
<i>Taraxacum officinale</i>	Dandelion	P		R	R
<i>Tragopogon pratensis</i>	Goat's Beard *	P		R	R
<i>Trifolium dubium</i>	Lesser Trefoil	P			R
<i>Trifolium pratense</i>	Red Clover		P	R	R
<i>Trifolium repens</i>	White Clover		P		R
<i>Ulmis procea</i>	English Elm			R	
<i>Urtica dioica</i>	Common Nettle		P	LA	R
<i>Veronica chamaedrys</i>	Germander Speedwell			R	
<i>Vicia hirsuta</i>	Hairy Tare *			R	
<i>Zannichellia palustris</i>	Horned Pondweed		P		









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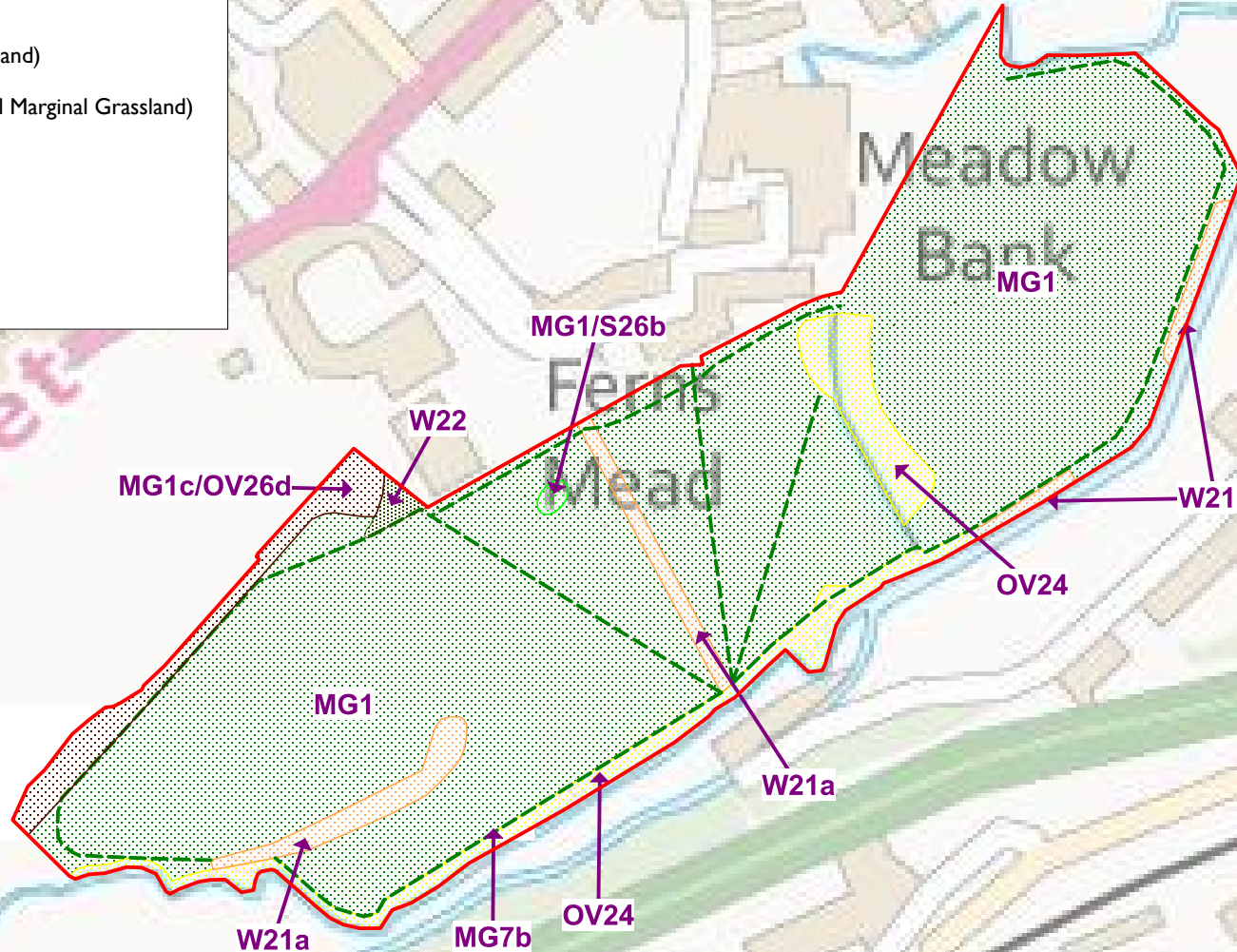
Figure 1

Figure 1
Bishop's Meadow, NVC Survey Results

Key

-  Survey Area
-  MG1 (Main Grassland)
-  MG7b (Paths)
-  MG1 / S26b (Damper Grassland)
-  MG1c / OV26d (Tall Ruderal Marginal Grassland)
-  OV24 (Tall Ruderal)
-  W21a (Scrub)
-  W22 (Scrub)

Please note: locations are approximate



Appendix 1 – Quadrat Data

Main Grassland - MG1 *Arrhenatheretum elatioris* grassland

SU	8359 4624	8367 4629	8371 4629	8373 4633	8376 4635	Frequency	Variation
Quadrat	1	2	3	4	5		
<i>Arrhenatherum elatius</i>	90	90	90	100	80	V	80 – 100
<i>Dipsacus fullonum</i>	-	2	6	-	-	II	2 – 6
<i>Poa trivialis</i>	4	3	-	-	-	II	3 – 4
<i>Rumex ??*</i>	-	1	-	1	-	II	1 – 1
<i>Alopecurus pratensis</i>	-	1	-	-	-	I	1
<i>Anthriscus sylvestris</i>	2	-	-	-	-	I	2
<i>Bromus sterilis</i>	1	-	-	-	-	I	1
<i>Cirsium arvense</i>	-	-	-	1	-	I	1
<i>Dactylis glomerata</i>	5	-	-	-	-	I	5
<i>Epilobium hirsutum</i>	-	-	-	-	1	I	1
<i>Epilobium tataragonum</i>	-	-	-	-	1	I	1
<i>Geranium dissectum</i>	2	-	-	-	-	I	2
<i>Heracleum sphondylium</i>	-	6	-	-	-	I	6
<i>Rumex crispus</i>	-	-	-	-	5	I	5
<i>Symphytum orientale</i>	-	-	-	-	4	I	4
<i>Urtica dioica</i>	-	-	-	2	-	I	2
	6	6	2	4	5		
Total number of species	16						
Mean number of species	4.6						

<p>MAVIS output</p> <p>NVC: MG1b 45.11</p> <p>NVC: OV24 43.64</p> <p>NVC: OV24b 42.48</p> <p>NVC: OV24a 40.98</p> <p>NVC: MG1a 40.51</p> <p>NVC: S26b 38.80</p> <p>NVC: MG1c 37.82</p> <p>NVC: OV26d 36.70</p> <p>NVC: OV27 35.40</p> <p>NVC: MG1 34.34</p>	<p>MG1 constants:</p> <p><i>Arrhenatherum elatius</i></p> <p><i>Dactylis glomerata</i></p> <p><i>Holcus lanatus</i></p> <p><i>Heracleum sphondylium</i></p>	
	<p><u>MG1a preferentials</u></p> <p><i>Anthriscus sylvestris</i> (II)</p> <p><i>Agrostis stolonifera</i> (II)</p> <p><i>Lamium album</i> (I)</p> <p><i>Papaver rhoeas</i> (I)</p> <p><i>Capsella bursa-pastoris</i> (I)</p> <p><i>Sonchus asper</i> (I)</p> <p><i>Aegopodium podagraria</i> (I)</p>	<p><u>MG1b preferentials</u></p> <p><i>Urtica dioica</i> (V)</p> <p><i>Galium aparine</i> (II)</p> <p><i>Epilobium hirsutum</i> (I)</p> <p><i>Artemesia vulgaris</i> (I)</p>

Paths - MG7b *Lolium perenne* leys and related grasslands *Lolium perenne*-*Poa trivialis* leys

SU	8358 4622	8364 4626	8381 4651	8345 4626	8347 4624	Frequency	Variation
Quadrat	1	2	3	4	5		
<i>Lolium perenne</i>	5	90	15	80	75	V	5-90
<i>Poa trivialis</i>	65	20	10	10	10	V	10-65
<i>Dactylis glomerata</i>	15	5	40	-	10	IV	5-40
<i>Poa annua</i>	-	-	-	5	5	II	5
<i>Geranium dissectum</i>	2	-	-	-	-	I	2
<i>Agrostis capillaris</i>	5	-	-	-	-	I	5
<i>Bromus hordeaceus</i>	10	-	-	-	-	I	10
<i>Plantago lanceolata</i>	-	-	30	-	-	I	30
<i>Plantago major</i>	-	-	-	10	-	I	10
	6	3	4	4	4		
Total number of species	9						
Mean number of species	4.2						

NVC: MG7A 53.61
NVC: MG7B 51.80
 NVC: MG7 44.31
 NVC: OV23b 42.86
 NVC: OV23 40.76
 NVC: MG7E 39.75
 NVC: OV24 38.73
 NVC: OV23c 38.41
 NVC: MG7D 38.15
 NVC: MG7F 38.12

Damp grassland – Transitional between MG1 *Arrhenatherum elatius* grassland *Filipendula ulmaria* sub-community and S26b *Phragmites australis-Urtica dioica* tall herb fen *Arrhenatherum elatius* sub-community

SU	8347 4630	8345 4629	8345 4628	Frequency	Variation
Quadrat	1	2	3		
<i>Alopecurus pratensis</i>	2	65	50	V	2 - 65
<i>Urtica dioica</i>	2	25	10	V	2 - 25
<i>Arrhenatherum elatius</i>	65	-	3	IV	3 – 65
<i>Filipendula ulmaria</i>	30	-	30	IV	30 – 30
<i>Myosotis arvensis</i>	4	-	1	IV	1 – 4
<i>Rumex ??</i>	3	-	6	IV	3 - 6
<i>Galium aparine</i>	2	2	-	IV	2 - 2
<i>Cirsium arvense</i>	3	10	-	IV	3 - 10
<i>Poa trivialis</i>	-	-	1	II	1
<i>Brassica nigra</i>	-	-	1	II	1
	8	4	8		
Total number of species	10				
Mean number of species	6.7				

MAVIS output

NVC: S26b 56.72

NVC: OV24a 53.33

NVC: S26a 50.76

NVC: OV24 50.67

NVC: OV24b 46.96

NVC: MG1b 43.76

NVC: OV26d 40.82

NVC: S26 40.69

NVC: MG1c 40.65

NVC: OV26 40.58

**Tall Ruderal Marginal Vegetation/Scrub - Transitional between MG1c
Arrhenatherum elatius grassland *Urtica dioica* sub-community and OV26d
Epilobium hirsutum *Arrhenatherum elatius*-*Heracleum sphondylium* sub-
community**

SU				Frequency	Variation
	1	2	3		
<i>Arrhenatherum elatius</i>	40	5	15	V	5-40
<i>Dactylis glomerata</i>	20	-	20	IV	20
<i>Crataegus monogyna</i>	35	-	40	IV	35-40
<i>Rubus fruticosus</i> agg.	-	90	20	IV	20-90
<i>Ranunculus acris</i>	5	-	2	IV	2-5
<i>Rumex acetosa</i>	5	-	-	II	5
<i>Alopecurus pratensis</i>	-	1	5	IV	1-5
<i>Urtica dioica</i>	-	5	5	IV	5
<i>Cirsium arvense</i>	5	-	-	II	5
<i>Rumex obtusifolius</i>	-	5	-	IV	5
<i>Hordeum murinum</i>	-	1	-	II	1
<i>Festuca arundinacea</i>	-	1	-	II	1
	6	7	7		
Total number of species	12				
Mean number of species	6.6				

NVC: MG1b 42.06
NVC: MG1c 39.51
NVC: OV26d 38.99
NVC: OV25b 37.04
NVC: MG9b 33.90
NVC: MG1 32.42
NVC: MG1a 32.32
NVC: MG9 30.39

Tall ruderal/nettle vegetation – OV24 *Urtica dioica*-*Galium aparine* community

SU	8357 4621	8358 4623	8359 4624	8363 4625	8379 4635	Frequency	Variation
	1	2	3	4	5		
<i>Urtica dioica</i>	80	90	40	85	90	V	40 – 90
<i>Galium aparine</i>	8	5	35	4	10	V	4 – 35
<i>Cirsium arvense</i>	8	-	2	3		III	2 – 8
<i>Elytrigia repens</i>	2	5	1	-		III	1 – 5
<i>Arrhenatherum elatius</i>	-	-	1	-	2	II	1-2
<i>Anthriscus sylvestris</i>	-	-	10	-	2	II	2-10
<i>Dactylis glomerata</i>	2	-	-	-	2	II	2
<i>Heracleum sphondylium</i>	-	-	15	-	-	I	15
<i>Symphytum orientale</i>	-	-	-	15	-	I	15
<i>Calystegia sepium</i>	-	1	-	-	-	I	1
<i>Lamium album</i>	-	-	1	-	-	I	1
	5	4	8	4	5		
Total number of species	11						
Mean number of species	5.2						

NVC: OV24 61.44

NVC: S26b 60.70

NVC: OV24a 60.20

NVC: MG1b 56.83

NVC: OV25b 56.19

NVC: OV24b 56.10

NVC: OV26d 52.36

NVC: OV25 48.57

NVC: OV26e 47.88

NVC: W21a 47.27

Scrub – W21a *Crataegus monogyna*-*Hedera helix* scrub

SU	8379 4637	8382 4645		Frequency	Variation
	1	2	3		
<i>Crataegus monogyna</i>	85	95	60	V	60-95
<i>Urtica dioica</i>	5	1	5	V	1-5
<i>Rosa canina</i> agg.	10	-	-	I	10
<i>Galium aparine</i>	5	-	-	I	1 – 5
<i>Anthriscus sylvestris</i>	-	-	10	I	10
<i>Dactylis glomerata</i>	2	-	-	I	2
<i>Rubus fruticosus</i> agg.	-	-	25	I	25
	5	4	8		
Total number of species	11				
Mean number of species	5.2				

NVC: W21a 45.53

NVC: S26a 41.41

NVC: OV24a 39.92

NVC: OV24 38.46

NVC: W21 36.73

NVC: OV24b 34.70

NVC: W21b 33.10