

# National Vegetation Classification survey of **Blo' Norton Little Fen**

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## National Vegetation Classification survey of Blo' Norton Little Fen

By OHES Environmental on behalf of:

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#### 1 INTRODUCTION

#### 1.1 The site

Blo'Norton Little Fen [TM 034 791] is a 4.17 ha block of wet carr woodland on the north bank of the River Little Ouse, adjacent to The Lows, as shown in Figure 1. It is on the Norfolk register of County Wildlife Sites and is a priority habitat for biodiversity conservation in the UK (Wet Woodland Biodiversity Action Plan). The Little Ouse Headwaters Project (LOHP) leases Little Fen from the Blo'Norton Fuel Allotment Trust. A limited amount of tree clearance was undertaken by Blo'Norton Fen Conservation group in the late 1990s, but the site is currently maintained as 'non-intervention' woodland.

Figure 1. Site location<sup>1</sup> Public footpaths ...... Permissive footpaths LOHP Land SWT Land Little Fen The Low Blo 'Norton The Frith Hinderclay Fen

The fen occupies the eastern margin of a peatbody extending eastwards from the Botesdale Brook. Here, Tallentire (1969) identified a bed of calcareous mere lake-muds similar to those found beneath the Blo'Norton-Thelnetham Fen and Lopham Little Fen (Tallentire 1953). Blo'Norton Little Fen extends across the thinning peat, which is underlain by a basal sand layer. The site is bounded to the east by First and Second Terrace sands and gravels and to the north by Head deposits on the upland margin (Mathers et al. 1993).

Little Fen supplied peat for fuel until the 1930s and its surface is pitted with the remains of former peat diggings. Aerial photographs from the 1940s show the fen as treeless, when it was likely that it supported a similar suite of wetland species found in other fens in the valley. The cessation of

<sup>&</sup>lt;sup>1</sup> Figure clipped from part of map shown on <a href="http://www.lohp.org.uk/our-sites">http://www.lohp.org.uk/our-sites</a> [Accessed September 2012]



management resulted in the loss of about a third of the open fen to invading scrub by the 1960s. Since then, progressive lowering of the water-table has resulted in loss of virtually all of the open fen and its associated rarities.<sup>2</sup> Recent rises in the valley watertable has led to scrub dieback in the wettest areas of the fen and colonisation of open patches by Reed.

#### 1.2 The brief

As part of the programme of habitat restoration planned by LOHP, OHES Environmental has been asked to conduct a detailed vegetation survey of Blo'Norton Little Fen, using the National Vegetation Classification, and to interpret the results.

The survey results will provide both a record of the types of vegetation at this stage in the programme, and will also allow some broad comparisons with regional (e.g. Haslam's work) and national vegetation types (Rodwell's NVC) and their hydrological requirements (e.g. Baroum et al 2005; Wheeler et al. 2009).

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<sup>&</sup>lt;sup>2</sup> Paragraph paraphrased from <a href="http://www.lohp.org.uk/our-sites/blonorton-little-fen">http://www.lohp.org.uk/our-sites/blonorton-little-fen</a> [Accessed September 2012]



#### 2. METHODOLOGY

The National Vegetation Classification (NVC) is the common standard for defining types of vegetation and describing them within a British and European context (JNCC 2012<sup>3</sup>). The classification is widely used by Natural England in the context of SSSI designation and assessment and in meeting their European obligations through implementing the Habitats Directive. Given the international significance of calcareous fen vegetation and the encompassing SAC designation, the NVC has been employed to describe the vegetation of much of the Little Ouse valley and its immediate surroundings, including other LOHP sites.

The survey methodology is described in detail in Rodwell (2006). In summary, the types of vegetation at Blo'Norton Little Fen are distinguished by the broad class of habitat (e.g. woodland and open fen) and by their plant species composition. The main vegetation types are described by selecting a number of representative plots (usually of  $50 \times 50$  metres for woodland and  $4 \times 4$  metres for species-poor open fen). Each plot is assessed for the presence and areal cover of all plants and ground mosses - using the Domin cover-abundance scale - and for other attributes such as height of the vegetation and the amount of bare ground or depth of standing water. Species authorities follow Stace (2010) for higher plants and Hill et al. (2008) for bryophytes.

The sample plots for each vegetation type are then grouped together by their similarity – as Tables 1-4 in section 3. Each species in a table is given a constancy score (from I to V) to show how frequently it tends to occur in that kind of vegetation on the fen. The tables are then compared with the published NVC accounts (Rodwell 1991a,b-2000a).

In section 4, an interpretation of the site's vegetation is developed using the published accounts, other fieldwork in the area and also knowledge from examining similar kinds of vegetation elsewhere.

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<sup>&</sup>lt;sup>3</sup> c.f. <a href="http://jncc.defra.gov.uk/page-4259">http://jncc.defra.gov.uk/page-4259</a> [accessed 18th July 2012]



#### 3. RESULTS

The survey was undertaken during July 2012, following an extended period of high rainfall in the previous month. Fieldwork was constrained by areas of impenetrable sallow scrub and the frequency of peat diggings in parts of the wet woodland. It is likely that parts of this habitat were not accessed.

The survey results are presented in two sections:

- 1 Woodland types
- 2 Open fen vegetation

A brief account is given of all vegetation types recorded. For convenience, all vegetation community tables are given at the end of the results section. The distribution of the recorded vegetation stands is shown in Figure 2, found at the end of the report.

#### 3.1 Woodland types

Four woodland types are distinguished on Little Fen that correspond to the history of management on the fen and their location.

Two communities can be described as wet woodland, and occupy about three-quarters of the site.

The more mature southern half is distinctly taller and more developed than the younger sallow scrub to the north, and can be assigned to the *Phragmites australis* sub-community of *the Alnus glutinosa-Carex paniculata* woodland (W5a). Here, the canopy of this alder carr is dominated by Alder with occasional Downy Birch. The shrub layer is typically and largely made up of Grey Willow, though some other species have colonised. The field layer is most obviously characterised by Common Reed with associate fen species, often marking the most open peat diggings. At the time of survey, standing water extended onto much of the ground surface, and here scattered Reed and Nettle give these patches a somewhat weedy appearance. Species of drier woodland are mostly restricted to alder boles and fallen branches. Here, Remote Sedge and Broad Buckler fern are abundant, often growing with typical woodland mosses, including *Mnium hornum*. As shown in Table 1, most of the associate species are typical of rich fen, and include a number of fen mosses. With an average plot record of 18 species, however, this is not a species-rich form of wet woodland.

To the north, there is an abrupt margin to the alder canopy, which gives way to an often continuous canopy of Grey Willow, marking the transition to sallow scrub. Much of this stand is covered by the spreading and sprawling branches of the sallow, casting the often dense shade of the colonisation phase of this species onto fen. Here, the character of the former fen is a palimpsest marked by thin



patches of Reed and sparse lianes of Hedge Bindweed. Where the sallow canopy is more recently established, or affected by dieback, thick patches of reed predominate, with sparse fen associates. A marked feature of the stand, however, is its undulating ground surface, with former diggings typically thickly reed-covered and drier rises supporting summer-dry reed with Nettles and scattered grasses. The stand as a whole can be accommodated within the *Alnus glutinosa-Filipendula ulmaria* sub-community of the *Salix cinerea-Betula pubescens-Phragmites australis* woodland.

While the southern and western margins of the wet woodland abut the river or the peatland vegetation of The Lows, the eastern and northern margins grade into dry woodland. On the northern fringe, this is a gradual transition through a stand of Aspen over a rather weedy ground flora including Nettle and Ground Ivy, to a line of boundary oaks. The sampled central part of the stand can be referred to the *Primula vulgaris-Glechoma hederacea* sub-community of *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland (W8a), though the stand is immature and largely forms a transition from the wetter woodland types.

This woodland follows the eastern boundary southwards along a narrow (<15 m in width) strip to a diffuse boundary with a drier woodland characterised by an almost entire canopy of Silver Birch with occasional Oak, over a mosaic of Broad Buckler Fern and Yorkshire Fog. This is more clearly the degraded margin of the floodplain terrace and is bounded to the south by the modern course of the River Little Ouse, where excavation spoil marks the fullest development of this young woodland. While clearly belonging to the *Quercus robur-Pteridium aquilinum-Rubus fruticosus* community (W10), it currently lacks the definitive characters of the published sub-communities.



Photo 1. W5a Alnus-Carex alder carr



Photo 2. W2a Salix-Betula-Phragmites sallow scrub



Photo 3. W10 Quercus-Pteridium-Rubus dry woodland





#### 3.2 Open fen vegetation

Substantive patches of open fen were not located within the sallow scrub, and it is likely that coalescing Grey Willow shrubs have closed gaps created by tree clearance or dieback<sup>4</sup>. One patch was located along the western margin. This small area is reed-dominated with some Reed Canarygrass, over scattered Nettle and dry rich-fen associates. It is assigned to the *Epilobium hirsutum* subcommunity of *Phragmites australis-Urtica dioica* tall-herb fen (S26d).

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<sup>&</sup>lt;sup>4</sup> Note that the stand was assessed by partial walkover owing to the difficulty in traversing through the scrub and peat diggings.



#### 3.3 Vegetation community tables

Table 1. Community composition of the Alder Carr woodland W5a Alnus-Carex woodland, Phragmites sub-community

				1	1	1	
Sample	3	4	5	6	7		
Tree canopy		1	1	l		I	
Alnus glutinosa	7	10	9	10	10	V	
Betula pubescens	5				1	II	
				•		ı	
Canopy height (m)	15	15	15	15	15		
Tree canopy cover (%)	65	95	85	95	95		
Shrub layer				1	1	1	
Salix cinerea	7	4	4	1	4	V	(1-7)
Salix cinerea sapling	2	1			1	III	(1-2)
Fraxinus excelsior sapling	1				2	II .	(1-2)
Alnus glutinosa sapling		4				I	(4)
Betula pubescens sapling			1			I	(1)
Crataegus monogyna		1				I	(1)
Rosa canina agg		1				ı	(1)
Charle lavor acres (0/)	45	15	-	1	10	ĺ	
Shrub layer cover (%)	45	15	5	1	10		
Herb and ground layers							
Phragmites australis	8	5	8	7	5	V	(5-8)
Carex remota	3	6	3	4	3	V	(3-6)
Dryopteris dilatata	2	2	2	3	3	V	(2-3)
Kindbergia praelonga	4	3	1	3	4	V	(1-4)
Brachythecium rutabulum	2	2	1	4	3	V	(1-4)
Solanum dulcamara	4	3		1	2	IV	(1-4)
Carex acutiformis	3	4			4	III	(3-4)
Mnium hornum			2	2	3	III	(2-3)
Iris pseudacorus	4		_	2	1	III	(1-4)
Mentha aquatica	1		2		3	III	(1-3)
Rubus fruticosus agg		1		2	2	III	(1-2)
Eupatorium cannabinum	2	1			2	III	(1-2)
Filipendula ulmaria		1	1		2	III	(1-2)
Rhizomnium punctatum			2	1	1	III	(1-2)
Urtica dioica		1	1		2	III	(1-2)
							` '
Poa trivialis				2	2	II	(2)
Epilobium palustre			1		2	II	(1-2)
Calystegia sepium				2	1	Ш	(1-2)
Plagiomnium undulatum		1	2			II	(1-2)
Galium palustre	1				1	II	(1)
Equisetum palustre	1				1	II	(1)

Cont'd



Sample	3	4	5	6	7		
Holcus lanatus			1			1	(1)
Cirsium palustre	1					I	(1)
Sward cover (%)	70	45	60	45	25		
Bryophyte cover (%)	10	3	4	10	10		
Water cover (%)	60	50	60	50	40		
Water depth (cm)	10	15	20	40	25		
		•	•	•	ı .	ı	
Number of species	18	18	16	14	25	Av.	18.2



Table 2. Community composition of the Sallow Scrub
W2a Salix-Betula-Phragmites woodland, Alnus-Filipendula sub-community

Sample	9	10	11	12	13		
Tree canopy						J	
Salix fragilis			4		4	1 п	(4)
Alnus glutinosa					7	1	(7)
			1			1	` '
Canopy height (m)	0	0	20	0	15		
Tree canopy cover (%)	0	0	5	0	40	]	
Shrub layer							
Salix cinerea	9	8	8	9	6	1 v	(6-9)
Crataegus monogyna					6	1	(6)
Prunus spinosa					4	1	(4)
Betula pubescens sapling		1				1	(1)
Alnus glutinosa sapling			1			ı	(1)
						- -	
Shrub layer cover (%)	85	60	65	80	65		
Herb and ground layers		T 0	Ι ο			1 ,,	(2.0)
Phragmites australis	6	8	8	5	3	V	(3-8)
Brachythecium rutabulum	2	1	1	3	5	V	(1-5)
Kindbergia praelonga		2	2	5	4	] IV	(2-5)
Calystegia sepium	3	3	1	3		IV	(1-3)
Caryotegra copram						1	(= 0)
Urtica dioica	4			6	3	III	(3-6)
Poa trivialis			4	4	3	III	(3-4)
						- -	
Galium aparine	3		3			II	(3)
Solanum dulcamara		3	2			II	(2-3)
Holcus lanatus				3	2	ll	(2-3)
Arrhenatherum elatius				2	2	j II	(2)
Glechoma hederacea					8	] ,	(8)
Carex acutiformis			5				(5)
Eupatorium cannabinum		3				ı	(3)
Cirsium arvense			3			] 1	(3)
Mentha aquatica			2			I	(2)
Phalaris arundinacea		2				ı	(2)
Epilobium hirsutum		1				I	(1)
Sward cover (%)	25	55	65	50	55	1	
Sward cover (%) Bryophyte cover (%)	35 2	55 3	65 3	50 20	55 25		
Water cover (%)	40	50	30	20	10	1	
Water depth (cm)	10	5	1	20	1	1	
Sp ()						1	
Number of species	6	10	13	9	13	Av.	10.2



### Table 3. Community composition of the woodland margins Sample 1: W8a Fraxinus-Acer-Mercurialis woodland, Primula-Glechoma subcommunity

Sample 2: Quercus-Pteridium-Rubus woodland

Sample	1	2
Tree canopy		
Betula pendula		10
Quercus robur	5	4
Populus tremula	8	
Canopy height (m)	10	15
Tree canopy cover (%)	80	94
Shrub layer		
Salix cinerea	4	
Prunus spinosa	4	
Shrub layer cover (%)	10	0
Herb and ground layers		
Dryopteris dilatata	1	9
Kindbergia praelonga	5	3
Holcus lanatus	2	5
Brachythecium rutabulum	2	2
Rubus fruticosus agg	3	1
Lonicera periclymenum	2	2
Glechoma hederacea	6	
Urtica dioica	5	
Poa trivialis	4	
Dryopteris filix-mas	2	
Geranium robertianum	2	
Galeopsis tetrahit agg	2	
Solanum dulcamara	1	
Stellaria media	1	
Tamus communis	1	
Hypnum cupressiforme		2
Rubus idaeus		1
Sward cover (%)	45	80
Bryophyte cover (%)	20	4
Water cover (%)	0	0
Water depth (cm)	0	0
Number of species	19	10



### Table 4. Community composition of the Common Reed stand S26d Phragmites-Urtica tall-herb fen, Epilobium hirsutum sub-community

Sample	8
Phragmites australis	10
Kindbergia praelonga	4
Urtica dioica	4
Calystegia sepium	3
Phalaris arundinacea	3
Galium aparine	2
Epilobium hirsutum	2
Cirsium palustre	1
Sward cover (%)	95
Bryophyte cover (%)	5
Water cover (%)	10
Water depth (cm)	1
Number of species	8



#### 4. INTERPRETATION

The character of vegetation present on Blo' Norton Little Fen clearly reflects both its landscape position and the surface geological materials, and also the response of its constituent species to the history of management at the site and recent changes to its hydrology.

The area of wetland corresponds to the mapped geology, though it is likely to have formerly extended into what is now the central part of the W8a *Fraxinus-Acer-Mercurialis* stand. Here, scattered fen associates beneath Aspen may represent a diffuse boundary that has been more clearly a wetland margin in the past.

This boundary marks the edge of an expanse of peat extending westwards over The Lows. The presence of Nettle and Rough Meadow-grass in the drier areas of wetland vegetation, and the paucity of bryophytes in these stands may be indicative of the effects of groundwater lowering in recent decades. A fall in the watertable typically causes the peat surface to dry, leading to a flush of nutrients released as the peat surface breaks down. Extended periods of summer-dry conditions may also prevent successful germination of most fenland plant species.

A second effect of groundwater lowering is peat shrinkage, and the high proportion of standing water in Little Fen at the time of survey may mark a shift in hydrological behaviour on parts of the site from an irrigated shallow peat body – fed partly by groundwater seepage – to more of a sump woodland where surface water and shallow throughflow collect. This may explain, at least in part, the development of the wet woodland stands toward W5a *Alnus-Carex* woodland, with no evidence for seepages.

The wet woodland development through coalescing sallow colonisation typical of W2a *Salix-Betula-Phragmites* scrub has been a feature of sites elsewhere in the Little Ouse and Waveney valleys, which, when coupled with groundwater lowering, has often been extremely detrimental to the preservation of populations of more sensitive wetland plant species. However, the woodland stands support a palimpsest of open fen vegetation, and the flora associated with the peat diggings may remain as viable parts of a buried seed-bank.

It is concluded that Blo' Norton Little Fen has experienced, in common with many parts of the Little Ouse valley system (Haslam 1965), a prolonged period of perturbation subsequent to the lowering of the watertable compounded by heavy shading from the developing woodland canopy. However, its history of peat digging may have provided refuges of summer-wet peat for a buried seed-bank of wetland species.

It is therefore recommended that targeted scrub clearance – with follow-up fen cutting – is regarded as an option for management of parts of the W2a sallow scrub. This could be initiated on a small



scale to investigate the response of the seed bank of selected former peat diggings, ideally accessible from The Lows. The intention would be to clear sufficient over-shading from scrub and tall reed fen to encourage germination and establishment from the peat surface.

It is also recommended that the W5a *Alnus-Carex* woodland continues to be maintained as a non-intervention area.



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Figure 2. Distribution of the recorded vegetation stands and samples at Blo'Norton Little Fen

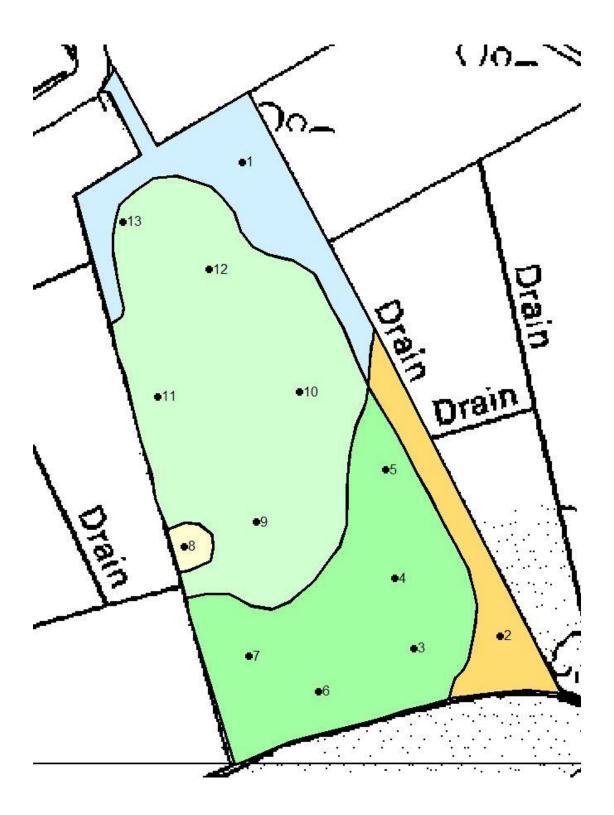
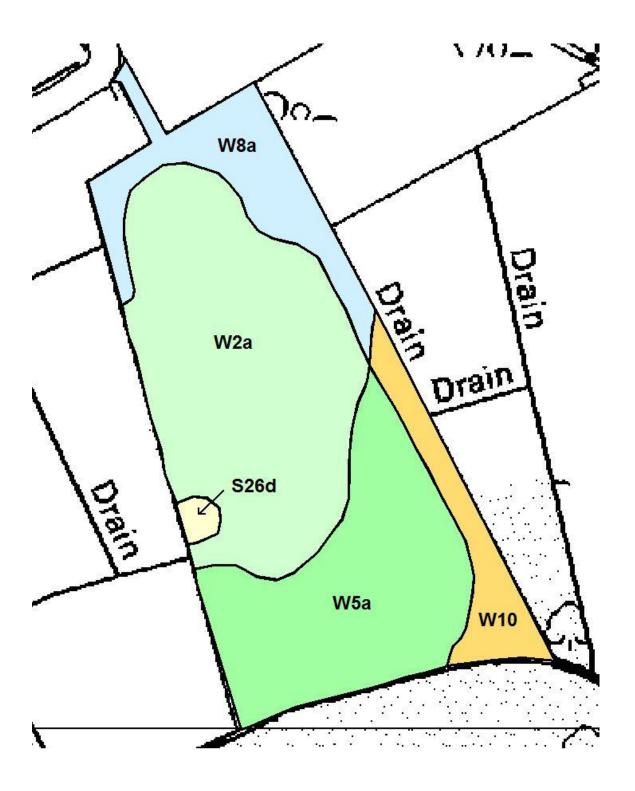




Figure 3. Distribution of NVC communities at Blo' Norton Little Fen





#### Appendix 1. Location of survey sample plots with allocated NVC codes

Plot	Easting	Northing	NVC Code
1	603375	279305	W8a
2	603485	279089	W10
3	603461	279074	W5a
4	603436	279120	W5a
5	603436	279156	W5a
6	603395	279067	W5a
7	603357	279145	W5a
8	603380	279189	S26d
9	603413	279104	S2a
10	603338	279125	S2a
11	603338	279199	S2a
12	603336	279263	S2a
13	603300	279281	S2a



#### Appendix 2. Species list for Blo'Norton Little Fen

This list is primarily a record of species recorded within plots selected for the NVC survey. Additional species are included where these have been noted during fieldwork. The compilation is intended as a contribution to the total species list of plants for the site.

Scientific name	Common Name
Higher plants	
Alnus glutinosa	Alder
Arrhenatherum elatius	False Oat-Grass
Berula erecta	Lesser Water-parsnip
Betula pendula	Silver Birch
Betula pubescens	Downy Birch
Caltha palustris	Marsh-marigold
Calystegia sepium	Hedge Bindweed
Carex acutiformis	Lesser Pond-sedge
Carex remota	Remote Sedge
Carex riparia	Greater Pond-sedge
Cirsium arvense	Creeping Thistle
Cirsium palustre	Marsh Thistle
Crataegus monogyna	Hawthorn
Deschampsia cespitosa subsp. cespitosa	Tufted Hair-grass
Dryopteris dilatata	Broad Buckler-fern
Dryopteris filix-mas	Male-fern
Epilobium hirsutum	Great Willowherb
Equisetum palustre	Marsh Horsetail
Eupatorium cannabinum	Hemp-agrimony
Filipendula ulmaria	Meadowsweet
Fraxinus excelsior	Ash
Galeopsis tetrahit agg.	Common Hemp-nettle
Galium aparine	Cleavers
Galium palustre	Marsh Bedstraw
Geranium robertianum	Herb-Robert
Geum urbanum	Wood Avens
Glechoma hederacea	Ground-ivy
Hedera helix	Common lvy
Holcus lanatus	Yorkshire-fog
Iris pseudacorus	Yellow Iris
Lemna minor	Common Duckweed



Lonicera periclymenumHoneysuckleMentha aquaticaWater Mint

Myosotis scorpioidesWater Forget-me-notPhalaris arundinaceaReed Canary-grassPhragmites australisCommon Reed

Poa trivialis Rough Meadow-grass

Populus tremulaAspenPrunus spinosaBlackthorn

Quercus roburPedunculate OakRanunculus repensCreeping Buttercup

Rosa canina agg.Dog-roseRubus fruticosus agg.BrambleRubus idaeusRaspberryRumex sanguineusWood DockSalix cinereaGrey WillowSalix fragilisCrack-willow

Sambucus nigra Elder

Solanum dulcamara Bittersweet

Stachys sylvaticaHedge WoundwortStellaria mediaCommon Chickweed

Tamus communis Black Bryony
Typha latifolia Bulrush

Urtica dioica Common Nettle

#### **Bryophytes**

Atrichum undulatum Common Smoothcap

Brachythecium rutabulumRough-stalked Feather-mossHypnum cupressiformeCypress-leaved Plait-mossKindbergia praelongaCommon Feather-moss

Lophocolea bidentata s.l. Bifid Crestwort

Mnium hornumSwan's-neck Thyme-mossOxyrrhynchium speciosumShowy Feather-moss

Plagiomnium undulatum Hart's-tongue Thyme-moss

Rhizomnium punctatum Dotted Thyme-moss