

## Appendix 5

### Badock's Wood Grasslands - Survey and Management

#### Background

The large expanse of grassland in the north of Badock's Wood Local Nature Reserve was formed when the prefabricated housing estate (known as Bowness Gardens) was demolished in the 1980s. The site is level and generally well-drained. Contemporary seeding of the area appears to have involved certain species which now dominate the majority of the current grassland, forming extensive stands of grass-dominated swards with few herbs. The grasslands have been divided into several sections by paths, both metalled and grassed, and in more recent years by lengths of mainly native scrub species.

In order to improve the botanical interest of the area, Friends of Badock's Wood have carried out wildflower meadow creation in three distinct areas (please see accompanying Figure 3). The group also want to see the diversity of the rest of the grasslands improve through optimum management. Avon Wildlife Trust was commissioned to carry out a full botanical survey of the grasslands and to provide a more precise management regime, to include how frequently the grasslands should be cut and to ensure that the cuts are carried out at the right time of year.

#### Method

The grasslands were surveyed on four occasions during summer 2012; 9 July, 11 July, 12 July, 25 July by Mary Wood MIEEM and Ryan Harris GIEEM. The weather conditions varied from sunny and hot (although damp underfoot) to torrential rain. Each grassland area was assigned a reference, G1 to G6 for the semi-improved grasslands and M1 to M3 for the sown meadows.

The simple to use DAFOR (Dominant, Abundant, Frequent, Occasional, Rare) scale was used to assess plant frequency. Although subjective, the potential observer error can be reduced by using two surveyors, which was the case during each of these surveys. The DAFOR scale provides a relatively quick and repeatable assessment, which can be used to good effect in future monitoring, when it can be observed which species are spreading and which declining.

#### Results

The majority of the grasslands, G1 - G6, consist of semi-improved grassland (i.e. not species-rich). They are extremely grass dominated, with a considerable amount of 'thatch' at ground level, suggesting that they have not been cut every year and/or that the arisings have not been fully removed. It must be noted however that the exceptionally wet summer of 2012 is likely to have favoured excessive grass growth. The grass height was generally around one metre. Yorkshire fog, cock's-foot and false oat grass are the dominant grasses, with rough meadow grass, and occasional red fescue, timothy and common couch. Herb species, most frequently hogweed, creeping buttercup, meadow buttercup, white clover, red clover, common ragwort, ribwort plantain, greater plantain, creeping thistle, broad-leaved dock and curled dock are scattered throughout in varying amounts

across the different grassland areas with goat's-beard also present occasionally. Please see the species list where the DAFOR scale has been assigned for each species across each grassland section. A previous grassland survey (WEC 2009) stated that bulbous buttercup *Ranunculus bulbosus* was one of the commonest herbs but this species appears to have declined, possibly due to the exceptionally heavy rainfall in 2012 which may have favoured the damp-loving creeping buttercup. Hoary cress was found to be frequent in 2009 and this herb still persists, though at lower frequency, except on M3 where it has grown in dense stands. The 2009 report states that species indicative of unimproved grassland were found such as grass vetchling *Lathyrus nissolia* (noted as being present "in very large quantity"), field wood-rush *Luzula campestris*, sweet vernal grass *Anthoxanthum odoratum*, pignut *Conopodium majus* and cuckoo flower *Cardamine pratensis*. The 2012 survey did not find any field wood-rush, pignut or cuckoo flower, and grass vetchling was only found occasionally within the semi-improved grassland areas.

However, despite their overall classification as semi-improved, some of the grasslands now support small extents of less improved or unimproved swards. This is encouraging as these areas have never been sown, suggesting that there may be some colonisation from the sown meadows. Such interest is as follows:-

### **Grassland 1 (G1)**

Ox-eye daisy was found rarely here.

### **Grassland 2 (G2)**

The south western section of this grassland was found to support an area of semi-improved neutral grassland by Quinn (2006), which may have pre-existed the development of the site into prefabricated housing. It included species such as grass vetchling, which was also noted incidentally in this area in 2010???, but apart from the presence of the unimproved indicator grass meadow barley, this area is now similar in composition to the rest of the grassland.

Two grasslands to the south of G2, called G2SW and G2SE show signs of species richness, mainly adjacent to the mown paths in the south beside the woodland. G2SW supports meadow vetchling and self-heal and most importantly yellow rattle, which is locally frequent. As well as being a very attractive species of unimproved grassland, the hemi-parasitic nature of this species (it parasitises grasses but is also able to photosynthesise) means that it will help to control grass growth. This area is becoming invaded by wild cherry saplings, which will need control. There is also a pedunculate oak sapling here, which appears to have been planted as a memorial tree.

G2SE also supports yellow rattle, which is locally frequent; common knapweed is rare but where it is found there are several plants.

### **Grassland 3 (G3)**

The north-eastern margin of G3 has the appearance of being unimproved; here yellow rattle and grass vetchling are locally frequent, and present but rarely found are meadow vetchling, ox-eye daisy and bird's-foot trefoil.

#### **Grassland 4 (G4)**

Meadow barley is found in this grassland, though only rarely. On the western margin lady's bedstraw and common vetch were found rarely, and on the eastern margin grass vetchling was noted incidentally on a guided walk on 1 July. A few plants of a sedge species were found in this grassland.

#### **Grassland 5 (G5)**

This is the area of the prehistoric Mound. Although seeded with perennial rye grass and mown as amenity grassland, i.e. frequently, the Mound itself supports a large swathe of hedgerow crane's-bill, amongst which white campion is occasional. Neither of these species is locally notable or indicative of unimproved grassland, but they add colourful diversity to the site.

#### **Wildflower meadows**

In order to improve the species diversity of the grasslands, three areas were selected by FoBW for wildflower meadow creation, both to enhance them for wildlife and to provide improved visual interest. FoBW also planted wildflower plant plugs of various woodland edge species, such as primrose *Primula vulgaris* and red campion *Silene dioica* in the south of the grasslands in 2009. Creating wildflower meadows is never an easy process and these meadows have all had considerable success. Each one is different in appearance, described in more detail below.

#### **Meadow 1 (M1)**

A linear strip in the north of the site, created in 20???, this meadow is particularly diverse and obviously 'flowery'. Common knapweed is locally abundant, forming large stands. The white flowers of hedge bedstraw are also very obvious, with lady's bedstraw locally frequent. Yellow rattle is also frequent. Wild carrot and basil are present in good quantities, and field scabious is frequent but only in the west of the site at present. Also found, although rarely, are rough hawkbit, ox-eye daisy (the 2009 survey notes that ox-eye daisy may have colonised naturally rather than having been sown), bird's-foot trefoil, cowslip and tufted vetch. Ragged robin was noted in 2009 but the report stated that this species was unlikely to survive in the long-term as it favours damp grassland and the 2012 survey (12 July 2012) suggests that this is correct as none was found. At present creeping thistle is locally frequent. The 2009 report observed that the area was "notably herb-rich and it is likely that several of the introduced species will survive" and the present survey confirms this. The 2009 report also notes that "at this location in particular this sward should be of value for invertebrates since it is adjacent to areas of woodland and tree planting and is sheltered, with a good range of both larval food species and nectar-rich plants".

#### **Meadow 2 (M2)**

Only the south-eastern block of M2 has been sown with wildflower seeds. This area has become more "grassy" than M1, but nevertheless continues to support a diversity of herb species. The most noticeable is common knapweed, with hedge bedstraw and frequent bird's-foot trefoil. Ox-eye daisy

is occasional, with other species such as lady's bedstraw, field scabious, grass vetchling, cowslip and hairy tare occurring only rarely. A few plants of the damp-loving ragged robin persist in the southern section of M2, adjacent to the woodland boundary, where the soil is likely to retain moisture under the woodland canopy. The very invasive non-native species snowberry was noted growing on the woodland edge.

### ***Meadow 3 (M3)***

M3 was prepared to best practice by having the topsoil removed to reduce the soil fertility before being sown. Much of the ground remains quite sparsely vegetated, with bare soil patches, which gives seeds a chance to colonise. This is the least diverse of the sown meadows at present, but it has reasonable diversity and the potential to develop well. Common knapweed, ox-eye daisy and bird's foot trefoil are frequent, while cowslip is occasional and yellow rattle rare. Extensive stands of creeping thistle and hoary cress occur in this area.

## **Discussion and Management**

FoBW have encouraged BCC to mow all the grasslands as wildflower meadows, i.e. in late summer so that the grasses and herbs can grow, flower and set seed. When grasslands are particularly grass-dominated, and also support tall 'weedy' herbs such as docks and thistles, it may be necessary to re-check their status in autumn to assess how "grassy" they are, whether they are subject to a "thatch" suggesting that the arisings had not been well-enough removed. Such a survey was carried out on 24 October by the same surveyors, and the results for each grassland section are shown on Figure 3.

The summer survey showed that several of the semi-improved grasslands now support species of unimproved grasslands, the same species which have been sown on the wildflower meadows. It was very noticeable that the majority of these species were found on the field margins. Paths, both metalled and grass, lie adjacent to the majority of these margins, suggesting that the seeds may have been spread predominantly by human and dog vectors (as well as being wind-blown). This could have occurred in association with the possibility that being close to paths, these grassland margins may have been subject to additional trampling, which could have caused some exposed soil patches in the sward, enabling any transported seeds to have space to germinate and grow. It may be reasonable to suggest that a future workday encourages people to walk through the meadows and then through the grasslands (with or without dogs!) to encourage the wildflowers to spread. Of course this could be done more systematically by gathering seed from the meadows and then broadcasting it across the grasslands. But neither of these two methods is likely to succeed without bare patches of ground within which seeds could germinate.

A spring cut as an additional cut is not recommended where early flowering plants grow, such as cowslip and grass vetchling.

?? grass rake off as additional to BCC cut to remove arisings more fully.

Please see Figure 3 for the timings of grass cutting. As one of the community workdays, the raking of each grassland could be carried out to ensure that the cuttings are fully removed after the grass has been cut, and also to introduce small patches of bare earth into which seeds gathered from the wildflower meadows could be broadcast.

## Badock's Wood Grasslands Species Lists

### Key

Green = unimproved grassland indicators

\* = Uncommon (50-150 1km squares)

(from The Flora of the Bristol Region Green, Higgins, Kitchen and Kitchen 2000)

D = dominant, A = abundant, F = frequent, O = occasional, R = rare, v = very, L = locally

Common Name	Latin Name	AREAS									
		G4/ G6	G5 (Mound)	G3/ G2	G2SE	G2SW	M1	M2	M3	G1	G6
<b>Grasses</b>											
Barren brome	<i>Anisantha sterilis</i>			R			R				
Cock's-foot	<i>Dactylis glomerata</i>	D	Present	D	A	A	D		F	D	
Common bent	<i>Agrostis capillaris</i>										
Common couch	<i>Elytrigia repens</i>	O		O	R	R		R		R	
Creeping bent	<i>Agrostis stolonifera</i>				R	R					
Crested dog's-tail	<i>Cynosurus cristatus</i>				R	R	O	F	O	R	R
False oat-grass	<i>Arrhenatherum elatius</i>	D		D	D	D			F		
Meadow barley	<i>Hordeum secalinum</i>	vLF		R - South	R	RLF					
Meadow fescue	<i>Festuca pratensis</i>							R			
Meadow foxtail	<i>Alopecurus pratensis</i>	R - south of path						O	R	R	
Perennial rye-grass	<i>Lolium perenne</i>	LF- edges	D	R -LA on edge			A - Edge		R	R	
Red fescue	<i>Festuca rubra</i>	LF		LF			LA				
Rough-stalked meadow-grass	<i>Poa trivialis</i>	A		A	F	A	D	A	A	A	
Smooth brome	<i>Bromus racemosus</i>			R - N edge					R		
Sweet vernal grass	<i>Anthoxanthum odoratum</i>			O/ R					O		
Timothy	<i>Phleum pratense</i>	R		R			O	R	R	LF	R
Tufted hair grass	<i>Deschampsia cespitosa</i>	R									
Wall barley	<i>Hordeum murinum</i>	D									
Yorkshire fog	<i>Holcus lanatus</i>			D	D	D	D		F	D	

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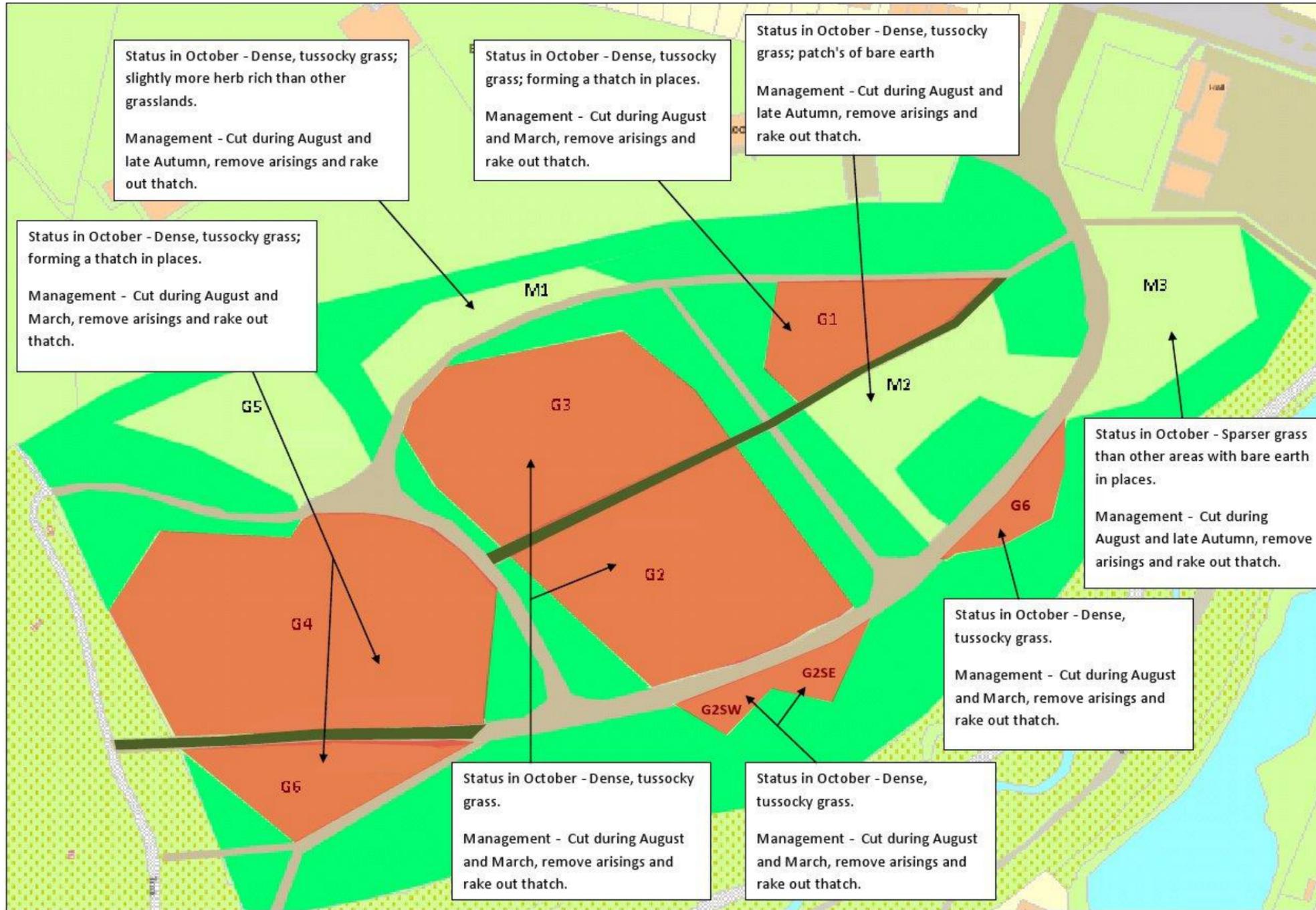
Common Name	Latin Name	AREAS									
		G4/ G6	G5 (Mound)	G3/ G2	G2SE	G2SW	M1	M2	M3	G1	G6
<b>Herbs</b>											
Annual wall-rocket	<i>Diplotaxis muralis</i>		R								
Basil (planted)	<i>Clinopodium vulgare</i>						LF				
Beaked hawk's-beard	<i>Crepis vesicaria</i>	LF - Eastern edge		LF			R				
Black medick	<i>Medicago lupulina</i>					LF	F		R		
Broad-leaved dock	<i>Rumex obtusifolius</i>	O	FLA								
Bush vetch	<i>Vicia sepium</i>			LF		R			R		
Common bird's-foot-trefoil (planted)	<i>Lotus corniculatus</i>			R			R	F	FLA		
Common chickweed	<i>Stellaria media</i>		R								
Common daisy	<i>Bellis perennis</i>		R								
Common field-speedwell	<i>Veronica persica</i>		R								
Common knapweed	<i>Centaurea nigra</i>				RLF		LA	FLA	F		
Common mouse-ear	<i>Cerastium fontanum</i>			R	R	R					
Common nettle	<i>Urtica dioica</i>	Stand in S			RLD						
Common ragwort	<i>Senecio jacobaea</i>	R	Present	O	R	R	R	R	LA	R	R
Common sorrel	<i>Rumex acetosa</i>	R - Western edge					R	R			
Common vetch	<i>Vicia sativa</i>	R					R				
Cornflower	<i>Centaurea cyanus</i>								R		
Cow parsley	<i>Anthriscus sylvestris</i>		R								
Cowslip (planted)	<i>Primula veris</i>						R	R			
Creeping buttercup	<i>Ranunculus repens</i>	A - South of path		F - LA	A	A	R		F		F
Creeping cinquefoil	<i>Potentilla reptans</i>	F		F	O	LO	O	R	O	R	
Creeping thistle	<i>Cirsium arvense</i>	R	R	O	R	LF	O - LF		ALD	R	
Crow garlic	<i>Allium vineale</i>	O		R				R	RLO		
Cuckoo-flower	<i>Cardamine pratensis</i>										
Curled dock	<i>Rumex crispus</i>	R	R	R				R			
Cut-leaved crane's-bill	<i>Geranium dissectum</i>	A		F	O	O	O			O	F
Dandelion	<i>Taraxacum vulgare</i> agg	R	Present	R			R		R	R	
Dove's-foot crane's-bill	<i>Geranium molle</i>		LF				R				

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Field bindweed	<i>Convolvulus arvensis</i>	D		A	A	A	A		A	A	A
Common Name	Latin Name	AREAS									
		G4/ G6	G5 (Mound)	G3/ G2	G2SE	G2SW	M1	M2	M3	G1	G6
Field scabious (planted)	<i>Knautia arvensis</i>						F - West	R			
Germander speedwell	<i>Veronica chamaedrys</i>						R				
Goat's-beard	<i>Tragopogon pratensis</i>	O		O/ R		R	R	R	F	O	R
Goosegrass	<i>Galium aparine</i>			R	R		R	R			
Grass vetchling *	<i>Lathyrus nissolia</i>	R		LF - North edge				R			
Greater bird's-foot- trefoil	<i>Lotus pedunculatus</i>							R			
Greater plantain	<i>Plantago major</i>	R - on edge	O	R - Edges			R				
Greater willowherb	<i>Epilobium hirsutum</i>							R			
Groundsel	<i>Senecio vulgaris</i>								R		
Hairy tare	<i>Vicia hirsuta</i>							R			
Hawthorn	<i>Crataegus monogyna</i>									R	
Hedge bedstraw (planted)	<i>Galium mollugo</i>						F-LA	A			
Hedge bindweed	<i>Calystegia sepium</i>							O			
Hedgerow crane's-bill	<i>Geranium pyrenaicum</i>		LA - mound								
Hoary cress	<i>Cardaria draba</i>	O			R				LF		
Hoary plantain (planted)	<i>Plantago media</i>						O				
Hogweed	<i>Heracleum sphondylium</i>	A, LD in south	O	F - LA	O	O	O	F	O	A	F
Horse-radish	<i>Armoracia rusticana</i>			R							
Lady's bedstraw (planted)	<i>Galium verum</i>	R - west					LF	R			
Large bindweed	<i>Calystegia silvatica</i>				LF						
Meadow buttercup	<i>Ranunculus acris</i>	F		O	F	F	R	O	O	R	O
Meadow vetchling	<i>Lathyrus pratensis</i>	O		R - North only		O		R	R		
Meadow-sweet (planted)	<i>Filipendula ulmaria</i>						R				
Mugwort	<i>Artemisia vulgaris</i>								R		
Musk mallow (planted)	<i>Malva moschata</i>						O	R	R		
Ox-eye daisy (planted)	<i>Leucanthemum vulgare</i>	R - South of		R - North			O	O	F	R	

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		path		edge							
Pedunculate oak sapling	<i>Quercus robur</i>					R					
Prickly sow-thistle	<i>Sonchus asper</i>								R		
<b>Common Name</b>	<b>Latin Name</b>	<b>AREAS</b>									
		<b>G4/ G6</b>	<b>G5 (Mound)</b>	<b>G3/ G2</b>	<b>G2SE</b>	<b>G2SW</b>	<b>M1</b>	<b>M2</b>	<b>M3</b>	<b>G1</b>	<b>G6</b>
<i>Ragged robin (planted)</i>	<i>Lychnis flos-cuculi</i>							R			
Red campion	<i>Silene dioica</i>							O			
Red clover	<i>Trifolium pratense</i>	LA		O	R	F		R	O	O	O
Redshank	<i>Persicaria maculosa</i>			LA							
Ribwort plantain	<i>Plantago lanceolata</i>	LO	R	O	R	O	F	VF	F	O	R
<i>Rough hawkbit (planted)</i>	<i>Leontodon hispidus</i>						R		R		
Scentless mayweed	<i>Tripleurospermum inodorum</i>								R		
Self-heal	<i>Prunella vulgaris</i>					R			O		R
Smooth hawk's-beard	<i>Crepis capillaris</i>				R	R		R			
Smooth sow-thistle	<i>Sonchus oleraceus</i>		R								
Snowberry	<i>Symphoricarpos albus</i>							R			
Spear thistle	<i>Cirsium vulgare</i>							R			
Teasel	<i>Dipsacus fullonum</i>							R			
<i>Tufted vetch (planted)</i>	<i>Vicia cracca</i>						R				
White campion	<i>Silene latifolia</i>		LO								
White clover	<i>Trifolium repens</i>	F	Present	O	VF	VF		O	FLA	O	O
<i>Wild carrot (planted)</i>	<i>Daucus carota</i>						O/F				
Wild cherry sapling	<i>Prunus avium</i>					R	R				
Wood avens	<i>Geum urbanum</i>						R				
<i>Yellow rattle (planted)</i>	<i>Rhinanthus minor</i>			LF - North edge	R	LF - Edges, but spreading in east	F		R		



Legend	
	Grass to be cut in August and have a second cut in March
	Grass to be cut once in August
	Woodland
	Wood chipped path
	Grass path

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Client: Friends of Badock's Wood

Title: Badock's Wood grasslands

Date: 24/10/2012  
 Drawn: RH  
 Job Ref: AWT112  
 Figure 1: Badock's Wood grassland management prescriptions

N ↑

25m