

Monitoring of Fairfield Association Meadow, Woodland and Arable Margins Lancaster, 2017

a report for
the Fairfield Association



compiled by

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1 Introduction and Methods

This report was commissioned by the Fairfield Association to continue monitoring the development of:

- the meadow in the Association's Fauna nature reserve;
- Pony Wood; and
- the seeded margins of arable fields in the Association's Flora nature reserve.

1.1 The Meadow

Since 2011, an area of grassland in the south-eastern part of the Fairfield Association Fauna Nature Reserve has been managed as meadowland; with exclusion of grazing stock during the spring and early summer, removal of ragwort, some seeding to encourage a more diverse meadow sward and cutting of the grassland in the summer (late July/ early August) with subsequent removal of the hay to prevent a build up of nutrients.

The site has been monitored each summer since 2011; using methods outlined in the *Fairfield Association meadow survey training notes* (Skelcher 2012) to determine whether these management works are being effective in producing a botanically rich meadow and to guide future management of the plot. This monitoring principally involves recording the presence or absence of a number of key plant species that are indicators of either 'lowland meadow' or of 'semi-improved grassland', within ten 2 x 2 m quadrats across the meadow. The ten monitoring points were selected each year to provide broad cover over the full meadow area, while each individual quadrat was selected locally to be representative of the wider meadow vegetation around each point. Areas near to the fence line or merging with the rush-pasture next to Lucy Brook were avoided because these were more likely to support vegetation that was not typical of the majority of the meadow.

According to the criteria outlined in Skelcher (2012), a successfully managed meadow should support at least two 'lowland meadow' indicator species in five or more quadrats (frequent) and at least two species in three or more quadrats (occasional). These criteria are based upon expectations for meadow management under the Defra Higher Level Stewardship agri-environment scheme. Through good management, a greater diversity and frequency of indicator meadow species should be expected over time, indicative of a herb-rich lowland meadow.

In 2011 and 2012, monitoring took the form of a training event with a number of Fairfield Association members in attendance. In 2013 to 2017 monitoring was undertaken by Graeme Skelcher but has remained open to Fairfield Association members who wished to attend. In previous years, only a single survey has been carried out in July or early August, but in 2017 two assessments were made; one within the usual mid-summer period on 12 July plus an earlier visit on 30 May.

1.2 Pony Wood and Arable Margins

Following the successful works on the Fauna nature reserve, the Fairfield Association acquired a further 36 acres of land to the south of this site; bought in stages between 2011 and 2013. The land includes a small area of mature woodland, called Pony Wood, and fields which have subsequently been managed for arable crops (wheat in 2017), with broad, seeded 'wildlife' strips around their margins. As with the Fauna nature reserve, this land (the Flora nature reserve) has also been entered into Higher Level Stewardship.

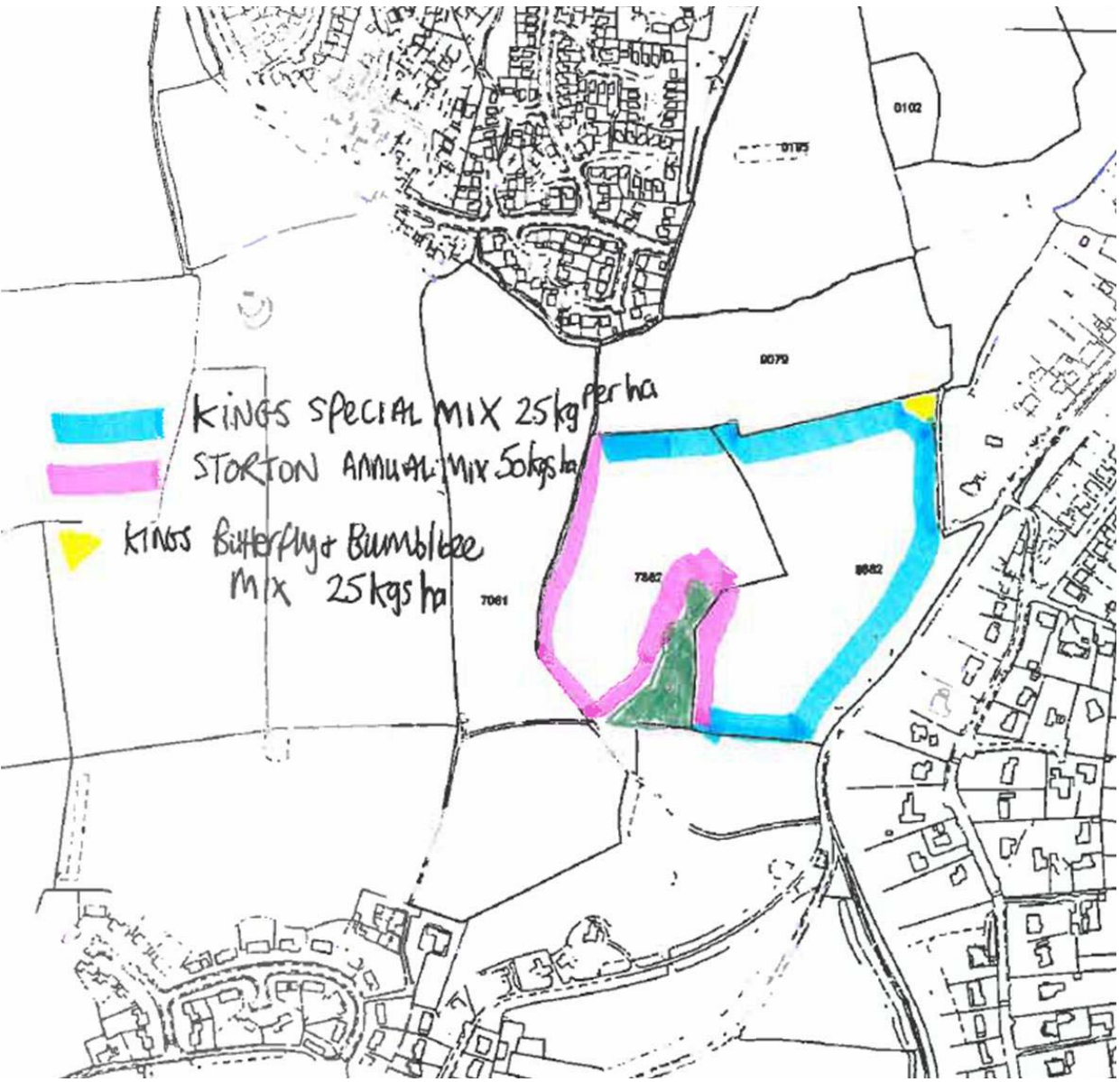
Monitoring of both the woodland and the arable margins was set up in the summer of 2015, following a similar methodology to that used for the meadow. Again, 10 monitoring points were selected to provide broad cover over the full area of each habitat (with, in the case of the arable margins, 10 points each for the two types of seed mix used - see Map 1), with each individual point again selected locally to be representative of the wider vegetation around each point. For the arable margins, vegetation was again assessed within 2 x 2 m plots. For the woodland, the field-layer was assessed with 4 x 4 m plots while trees and shrubs were considered within an area of about 50 x 50 m (i.e. up to about 25 m around a standing point). Because of the relatively small size of the wood, it was appropriate for some features to simply be assessed at a 'whole wood' level.

In 2015 and 2016, only the mature woodland of Pony Wood (covering c 1 acre/ 0.4 ha) was assessed. In 2017 additional points were also considered within a recently planted area (c 0.6 acres/ 0.23 ha) adjacent to Pony Wood and a small, mature copse (0.25 acres/ 0.01 ha) which is now connected to Pony Wood by this new plantation.

The monitoring criteria selected for the woodland and arable margins were based on the targets for management provided by Natural England for Higher Level Stewardship (HLS) management. For the woodland, this included ensuring frequency of certain tree species (selected for both nature conservation and landscape value), general canopy and shrub cover, and frequency of key woodland herb indicator species. Additional factors have also been included for consideration, which are not requirements for HLS but are indicative of a healthy wood. For the arable margins, targets included cover of key wildlife-friendly herb and grass species included in the seed mixes. Additional observed species were noted that were not listed in the seed mixes but which are nevertheless desirable to encourage. In 2016, Pony Wood was assessed on 20 April and the arable margins were assessed on 28 July.

Map 1: Location of Seed-mixes applied to Arable Margins

Map provided by the Fairfield Association, 2015



2 Results

2.1 The Meadow

In May 2017 (see Appendix 1a), one species from the 'lowland meadow' indicator list was recorded as 'dominant' (yellow rattle) and three species were 'rare' (black knapweed, ox-eye daisy and cowslip). From the 'semi-improved grassland' indicator list, two species were 'dominant' (meadow buttercup and ribwort plantain), one was abundant (common sorrel), one was frequent (red clover) and three were 'rare' (yarrow, cuckoo flower and field wood-rush).

In July 2017 (see Appendix 1b), one species from the 'lowland meadow' indicator list was recorded as 'dominant' (yellow rattle), one was 'frequent' (black knapweed), one was 'occasional' (ox-eye daisy) and two species were 'rare' (common spotted-orchid and greater bird's-foot trefoil). From the 'semi-improved grassland' indicator list, two species were 'dominant' (meadow buttercup and ribwort plantain), two were frequent (red clover and common sorrel), one was 'occasional' (common cat's-ear) and two were 'rare' (self-heal and yarrow).

The mean cover of herbs over the 10 quadrats was 56%, with no quadrat having less than 30% cover. All potentially negative meadow features were absent or recorded within acceptable limits. The principal negative feature noted was the presence of ragwort, which occurred at less than 1% cover in four of the 10 quadrats in July and was absent from the other six.

2.2 Pony Wood

Pony Wood mostly comprised mature trees over an almost absent understorey with a mostly grassy field-layer. Of the trees required to be present at regular intervals, mature ash and beech were both at least frequent within sampled stands (see Appendix 2a) but oak and birch were not present. Canopy cover in the established woodland area met the HLS target, but the shrub-layer is extremely sparse. Most of the trees were mature or over-mature, with very few younger trees. However, tree regeneration (ash and sycamore) was recorded at nine of the ten sample points.

In the field-layer, bluebells were found frequently (recorded at six stops) and two other indicator species were also present; primrose and ramsons. The target for 2 indicator species being occasional within 8 years, therefore, seems likely to be achieved once the woodland layers develop and the grasses become less dominant in the field-layer. The non-target woodland herb lesser celandine was also abundant (recorded at eight stops).

Undesirable field-species were few, with common nettle being rare but sycamore regeneration being fairly widespread.

The copse (Appendix 2b) included mature and early-mature ash and oak in its canopy, and also supported a healthy shrub-layer; both layers being within HLS target extents. Tree regeneration (mainly ash) also appeared to be vigorous. Of the target woodland field species, only bluebell was recorded, but these were numerous. Non-target woodland herbs lesser celandine and lords-and-ladies were also present. Of the undesirable field-species, only a few common nettle were recorded, while sycamore regeneration was not observed. While not listed specifically as an undesirable species, the presence of a clump of the large, non-native Spanish bluebell *Hyacinthoides hispanica* was also noted.

No mature trees were present within the plantation (Appendix 2b), with only tree saplings planted in recent years forming a moderate shrub-layer. Oak and birch were frequent components of this. No tree regeneration was observed in this area and none of the target woodland herbs were present, though there was some lesser celandine present. The undesirable field-species common nettle was also recorded.

2.3 Arable Margins

Four of the target species for the Storton mix margins were present in 2017, with one fractionally exceeding the target cover (fodder radish with recorded cover at sample points of 61.5%), one within the target cover (mustard at 18.5%) and two below the required cover (spring wheat at 3.5% and gold of pleasure at 1% (Appendix 3a). This falls just short of the margin target that there should be between 5% and 60% of at least three sown desirable species by year 2. Borage and tansy-leaved Phacelia were also found occasionally within these margins, which added to the diversity and value for insects, but were not listed as part of the Storton mix.

In the HE10 margins, all of the desired seeded grass species (crested dog's-tail, timothy, smooth meadow-grass, red fescue and common bent) were present in 2017. However their average combined cover per quadrat was just 33% (see Appendix 3b) which falls short of the target of 75% cover after the first year of seeding. The bulk of the grassland cover was provided by creeping bent (30%) and Yorkshire-fog (14%), along with the desired common bent (15%) and red fescue (12.5%); all of which were recorded in at least seven of the ten sample points. Ryegrass, meadow foxtail, sweet vernal-grass and rough meadow-grass were also present in much smaller amounts.

Three of the five HLS-required herb species were present within the HE10 margins. However, while there was a reasonable cover of black knapweed (16%) and ribwort plantain (12.5%), yarrow was scarce and not actually recorded at any of the sample points. Again, this falls short of the requirement that by year 2 there should be at least three of the desirable sown herb species each with cover of between 5 and 60%. Herb cover was highest along the northern margin and, to a lesser extent, on the southern margin, but herbs were extremely scarce along the eastern margin. Nevertheless, at least some ribwort plantain was recorded at all ten sample points, including those along the eastern margin. Other desirable herb species recorded within the northern-margin, but not listed as target species for the HE10 mix, were greater knapweed and the non-native (but still attractive to insects) borage (though the latter was not recorded within any sample points).

Of the listed 'undesirable' species, curled dock and broad-leaved dock were found only rarely within HE10 samples but small amounts of common nettle were frequent within the Storton samples (at 7 out of 10 stops).

3 Discussion

3.1 The meadow

Table 1: Abundance of indicator species (Go6 = Lowland meadow; Go2 = Semi-improved grassland) at Fairfield Meadow in each year since 2011, together with values of other indicators of meadow quality.
D = Dominant; A = Abundant; F = Frequent; O = Occasional; Rare = Rare

Indicator		2011	2012	2013	2014	2015	2016	2017
		6 August	5 July	19 July	10 July	15 July	5 July	12 July
overall % herb/sedge cover (target > 20%)		15	15	47	56	59	75	55.5
overall % undesirable species (target < 5%)		5	<5	1	<1	<1	1	<1
overall % bare ground (target < 10%)		0	0	0	0	0	0	0
overall % scrub (target < 5%)		0	0	0	0	0	0	0
overall % large sedges, rushes, reeds (< 30%)		0	0	0	0	0	0	<1
Species								
yellow rattle	Go6		O	A	A	D	D	D
black knapweed	Go6						R	F
ox-eye daisy	Go6					R	O	O
orchids	Go6					R	R	R
greater bird's-foot trefoil	Go6							R
meadow buttercup	Go2	R	A	O	A	D	D	D
ribwort plantain	Go2	R	O	O	O	A	D	D
red clover	Go2	R	O	R	O	O	F	A
common sorrel	Go2	O	R	R	R	R	F	A
common cat's-ear	Go2	R				R	R	O
self-heal	Go2	R	R		R	R	O	R
yarrow	Go2	O	R	R	R	R	R	R
field wood-rush	Go2	R						
germander speedwell	Go2	R						

Table 1 shows that there has been a progressive improvement in the quality of the meadow since 2011. The percentage herb cover increased significantly from 2012 to 2013 and has remained at around 50% or more since this time, while the cover of non-desirable species (mainly ragwort) has decreased from 5% cover over the whole site to no more than 1% over the last five years.

The 'lowland meadow' indicator species yellow rattle was present at every one of the ten sampled stops for the third successive year. Black knapweed has spread appreciably in 2017, being found at six of the sampled stops, after only being recorded for the first time, at only a single stop, in 2016. Ox-eye daisy and common spotted orchid appear to have become established, having now been recorded in three successive years; the former was recorded as 'occasional' for the second successive year, but the orchid continues to be only thinly scattered in the sward and was recorded within just one sampled quadrats in 2017.

Two 'lowland meadow' indicator species were recorded for the first time in 2017; greater bird's-foot trefoil and cowslip. The former was only seen in one location (and not within any of the sampled stops) in July while the latter was only apparent during the monitoring carried out in May.

The July results show a continued increase in diversity and cover of indicator species compared to previous years and the site is now extremely close to meeting the standard for 'lowland meadow' status. Sufficient 'lowland meadow' indicator species are now present overall, with two species 'frequent' or more but only one 'occasional' species. An increase in cover to 'occasional' of any one of the three indicator species currently recorded as 'rare' would be sufficient to meet the required criteria of two species at least 'frequent' and two at least 'occasional'.

The 'semi-natural grassland' indicators have also continued to increase, with four species now 'dominant' or 'abundant' (meadow buttercup, ribwort plantain, red clover and common sorrel), common cat's-ear now 'occasional' and a further two species present (yarrow and self-heal). The site continues to comfortably satisfy the criteria required for description as 'semi-improved grassland' (two species at least frequent and two at least occasional from either of the lowland meadow or semi-improved grassland indicator lists).

Table 2: Abundance of indicator species (Go6 = Lowland meadow; Go2 = Semi-improved grassland) at Fairfield Meadow in May and July 2017, together with values of other indicators of meadow quality.
 D = Dominant; A = Abundant; F = Frequent; O = Occasional; Rare = Rare

Indicator		2017	2017
		30 May	12 July
overall % herb/sedge cover (target > 20%)		66	55.5
overall % undesirable species (target < 5%)		0.5	<0.4
overall % bare ground (target < 10%)		0	0
overall % scrub (target < 5%)		0	0
overall % large sedges, rushes, reeds (< 30%)		0	<0.2
Species			
yellow rattle	Go6	D	D
black knapweed	Go6	R	F
ox-eye daisy	Go6	R	O
orchids	Go6		R
greater bird's-foot trefoil	Go6		R
cowslip	Go6	R	
meadow buttercup	Go2	D	D
ribwort plantain	Go2	D	D
red clover	Go2	F	A
common sorrel	Go2	A	A
common cat's-ear	Go2		O
self-heal	Go2		R
yarrow	Go2	R	R
cuckoo flower	Go2	R	
field wood-rush	Go2	R	
germander speedwell	Go2		

Table 2, above, shows a comparison of results between monitoring carried out in May and July 2017. From this it can be seen that greater diversity and cover of indicator species was found in the July assessment than that carried out in May, although one additional 'lowland meadow' indicator (cowslip) and two additional 'semi-improved grassland' indicators (cuckoo flower and field wood-rush) were recorded in May that were not apparent in July.

3.2 Pony Wood

Table 3: Woodland indicators at Pony Wood in each year since 2015.

HLS indicates HLS targets need to be met

D = Dominant; A = Abundant; F = Frequent; O = Occasional; Rare = Rare

Indicator		Pony Wood			Plantation	Copse
		2015	2016	2017	2017	2017
		10 June	6 May	20 April	20 April	20 April
overall % canopy cover (target 25% - 70%)	HLS	70	68	60	1	70
cover of shrubs hazel, blackthorn, rowan, hawthorn, holly (target 20% - 75%)	HLS	< 1	1.6	2.8	20	25
approximate number of age classes		3 (early-mature, mature, over-mature)	4 (seedling, early-mature, mature, over-mature)	5 (seedling, sapling, early-mature, mature, over-mature)	1	4
areas of undisturbed old-growth or scatter of large trees		✓	✓	✓		✓
fallen or standing deadwood		✓	✓	✓		✓
signs of regeneration		none	O	D		✓
Species - trees						
oak	HLS					✓
ash	HLS	O	O	F		✓
beech	HLS	O	F	A		
birch	HLS				✓	
Species - field-layer						
bluebell	HLS	O	F	F		✓
dog's mercury	HLS					
primrose	HLS	R	R	R		
ramsons	HLS		R	R		
wood anemone	HLS					
wood-sorrel	HLS					
lesser celandine			A	A	✓	✓
lords-and ladies			R			✓
Negative species						
common nettle	HLS	R	R	R	✓	✓
sycamore seedlings	HLS	D	O	A		

Table 3 shows some general and steady improvement in the condition of Pony Wood. The diversity and frequency of woodland herbs appeared to increase in 2016, following cessation of grazing, but has simply remained steady in 2017 with no further progress towards the target of there being at least two target herb species at least 'occasional'. The canopy cover has always been acceptable but it will take many years for the structure of the woodland to improve and develop any significant understorey cover. This is being hastened by planting of shrubs and some of these were starting to develop to young sapling stage in 2017. There are also increasing signs of natural regeneration, which were reasonably widespread in 2017, after being recorded from four sample points in 2016 and none at all in 2015. Development of the field-layer, shrub-layer and regeneration should all improve now that grazing has been excluded from the woodland. However, the frequency of sycamore regeneration recorded suggests that this may become a problem as the field-layer opens up and some control of young sycamore may be necessary in later years in order to allow native trees and shrubs to flourish and to reduce shading to the woodland herbs.

3.3 Arable margin

Table 4: Arable-margin Storton-mix indicators at the Flora fields in each year since 2015.

HLS indicates HLS targets need to be met

D = Dominant; A = Abundant; F = Frequent; O = Occasional; Rare = Rare

Indicator		2015	2016	2017
		29 July	5 July	28 July
Desirable species cover (target 5 - 60% of at least 3 species)				
spring triticale	HLS	19.6	0	0
poacher white millet	HLS	0	0	0
fodder radish	HLS	58.7	49.5	61.5
spring barley	HLS	1.5	3.2	0
spring wheat	HLS	6	0	3.5
gold of pleasure	HLS	0	0	1
mustard	HLS	14.3	40.5	18.5
<i>tansy-leaved Phacelia</i>		2.6	0.9	0.7
<i>borage</i>		0.5		1
Cover of bare ground (target 5 - 10%)	HLS	5	5.5	14
Undesirable species (target - no species more than 5% cover)	HLS			
common nettle		0.1	0.2	4.1
curled dock				
broadleaved dock				
spear thistle		0.1		
creeping thistle,		0.1		
common ragwort				

Table 5: Arable-margin HE10-mix indicators at the Flora fields in each year since 2015.

HLS indicates HLS targets need to be met

D = Dominant; A = Abundant; F = Frequent; O = Occasional; Rare = Rare

Indicator		2015	2016	2017
		29 July	5 July	28 July
Desirable species cover - grasses				
crested dog's- tail	HLS	1.5	2	2
small leaved timothy	HLS	2	2	3
smooth meadow-grass	HLS	0.5		0.5
red fescue	HLS	4.5	6	12.5
common bent	HLS	9.5	3	15
Total cover (target > 75% at end of year 1)		18	13	33
<i>Yorkshire-fog</i>				
			39	14
<i>creeping bent</i>				
			31.5	30
<i>ryegrass</i>				
			2.1	1.5
<i>meadow foxtail</i>				
			2	5.5
<i>cock's-foot</i>				
			1.5	
<i>sweet vernal grass</i>				
			1.7	1
<i>rough meadow-grass</i>				
				0.5
Desirable species cover - herbs (target 5 - 60% of at least 3 species)				
black knapweed	HLS	4.1	14.5	16
yarrow	HLS	0.5	0.6	
ox-eye daisy	HLS	12	1.6	
ribwort plantain	HLS	7.5	7.7	12.5
red clover	HLS	0.1	0.1	
<i>tansy-leaved Phacelia</i>				
		1.5		
<i>cut-leaved crane's-bill</i>				
		0.5		
<i>greater bird's-foot trefoil</i>				
		0.5		
<i>greater knapweed</i>				
		3	3	1.1
<i>common fumitory</i>				
		0.5		
<i>borage</i>				
		1		
Cover of bare ground (target 5 - 10%)	HLS	0	0	0
Undesirable species (target - no species more 5% cover)				
common nettle		0.5		0.5
curled dock				
broadleaved dock		0.6		1
spear thistle		1.5	1.2	
creeping thistle,		1		
common ragwort		0.1		

Tables 4 and 5 show the development, respectively, of the Storton and HE10 mix arable margins over the last three years.

In the Storton-mix margins, fodder radish has been the most consistently abundant species over the three years, occurring at or towards the upper limit of the required cover parameters. Mustard has been found at moderate cover in each year, though fluctuating from 14% cover in 2015 to just over 40% in 2016 and down to 18% cover in 2017. Gold of pleasure was noticed for the first time in 2017, though just at very low cover at just two of the sample points. This latter species appeared to occur within the edge of the arable crop more commonly than in the monitored seeded margins. Spring triticale was recorded at moderate levels in 2015 but has not been seen since. Small amounts of barley in 2015 and 2016 and of wheat in 2015 and 2017 have also been recorded in the seeded margins, though the occurrence of these species may sometimes reflect the planted arable crop in each year. Millet has not yet been recorded in any year. The HLS target, that at least three of these species should occur within 5 to 60% cover, was actually achieved in 2015 (with sufficient cover of spring triticale and spring wheat, as well as fodder radish and mustard), but has fallen short of this target in 2016 and 2017. In 2017 also there was a recorded increase in the distribution of the undesirable common nettle, which was found in seven of the ten sample points after occurring only rarely in 2015 and 2016.

In the HE10 margin, the cover of desirable grasses has increased appreciably in 2017, being roughly double the cover recorded in 2015 and 2016 but still less than half of the target 75% cover. The cover of black knapweed and ribwort plantain have both continued to increase in successive years and both fall within the limits of target cover for these species. However, the only other target herb species observed in 2017 was a small amount of yarrow and no plants of this species were recorded at any of the sample points. In previous years, very low cover of yarrow and red clover was recorded, while ox-eye daisy has declined from 12% cover in 2015 to 1.6% in 2016 and appeared to be absent in 2017.

As in previous years, while the cover of HE10 desired species was reasonable along the northern margin and locally along the southern margin, the eastern margin was very poor. Ribwort plantain was recorded at each of the sample points along the eastern margin (though generally at lower cover than elsewhere) but otherwise herbs were extremely sparse and the ground was dominated by creeping bent and Yorkshire fog. This margin lies along the lower edge of the sloping arable field, which rises to the west, and above a wetland area of rushes and ponds that extends eastward to the roadside. It appears that most of the water falling on the arable field will drain into this wetland area and, presumably, flushes through this length of seeded margin; hence the prevalence of creeping bent and Yorkshire-fog which together are indicative of damper grasslands. It may be that this margin is too damp for many of the desired HE10 species to thrive in.

4 Conclusions

The meadow has continued to improve each year and is now extremely close to meeting the criteria for herb-rich 'lowland meadow'.

It is likely to take several years for Pony Wood to develop a natural woodland structure and for the planted trees to form a recognisable woodland, but the presence of a number of woodland herbs and some natural regeneration of ash seedlings suggest good potential.

The seeded arable margins have generally shown signs of positive development. The Storton margins were extremely close to meeting the required cover for at least three desired species but, as in 2016, again fell just short after previously meeting the criteria in 2015. Common nettle has also increased in distribution in the Storton margins and may require control if this spread continues. The cover of desired grasses in the HE10 margins is still substantially less than required, while the diversity of desired herbs has actually declined since 2015 and 2016. Consideration will also need to be given to the eastern HE10 margin, where the desired species have not colonised and existing vegetation suggests this margin may be too damp for many of these species to thrive.

5 References

Skelcher G (2004) *A vegetation survey of Fairfield Urban Nature Reserve*. Unpublished report for the Fairfield Association.

Skelcher G (2012) *Fairfield Association meadow survey training, 5 July 2012*. Unpublished report for the Fairfield Association.

Appendix 1a: Fairfield Meadow Monitoring Form 30 May 2017

- Choose sampling points to provide a wide coverage over the whole field and which, at a glance, appear representative of the wider vegetation. Field edges and small stands of atypical vegetation should be avoided.
- Sample sizes of approximately 2 x 2 m should be used. Where appropriate, the shape of sampled quadrats can be adapted from the standard square to cover a plot of the same total area.
- Tick presence of indicator species at each sampled stop.
- Record % cover of listed features at each stop (including combined cover of 'undesirable species': creeping thistle, spear thistle, curled dock, broad-leaved dock, common ragwort, common nettle, marsh ragwort, cow parsley and bracken) and calculate average (mean) cover at all stops in the 'Total' column.
- Count up the number of stops at which each indicator species is present and record in the 'Total' column:
 D (*dominant*) = occurrence at 9 or 10 stops out of 10,
 A (*abundant*) = occurrence at 7 or 8 stops,
 F (*frequent*) = occurrence at 5 or 6 stops,
 O (*occasional*) = occurrence at 3 or 4 stops and
 R (*rare*) = occurrence at 1 or 2 stops.
 Also record species as rare if they were observed on site but not at any of the sampled stops.
- Note other important habitats present in the field, though these do not need to be monitored.

Site	Fairfield Meadow												
Date	30 May 2017												
			1	2	3	4	5	6	7	8	9	10	Total
% herb/sedge cover excluding white clover & creeping buttercup (target > 20%)			72	70	75	75	50	90	60	45	60	60	65.7
% undesirable species (target < 5%)			1	1	0	1	1	0	1	0	0	0	0.5
% bare ground (target < 10%)			0	0	0	0	0	0	0	0	0	0	0
% scrub (target < 5%)			0	0	0	0	0	0	0	0	0	0	0
% large sedges, rushes, reeds (< 30%)			0	0	0	0	0	0	0	0	0	0	0
agrimony	Go6												
autumn hawkbit	Go6	Go2											
betony	Go6												
bird's-foot-trefoil	Go6												
bitter-vetch	Go6												
black knapweed	Go6		✓								✓		R
black medick		Go2											
bugle	Go6												
bulbous buttercup		Go2											
burnet saxifrage	Go6												
common bistort	Go6												
common cat's-ear		Go2											
common meadow-rue	Go6												
common sorrel		Go2	✓		✓	✓		✓	✓	✓	✓	✓	A
cowslip	Go6												R
cuckoo flower		Go2										✓	R
devil's-bit scabious	Go6												
dropwort	Go6												
dyer's greenweed	Go6												
eyebright	Go6												
field scabious	Go6												
field wood-rush		Go2					✓						R

Site Fairfield Meadow													
Date	30 May 2017												
			1	2	3	4	5	6	7	8	9	10	Total
germander speedwell		Go2											
glaucous/common/carnation sedge	Go6												
goat's-beard	Go6												
great burnet	Go6												
greater bird's-foot-trefoil	Go6												
lady's bedstraw	Go6												
lady's-mantles	Go6												
lesser trefoil		Go2											
marsh marigold	Go6												
marsh valarian	Go6												
marsh/fen bedstraw	Go6												
meadow buttercup		Go2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D
meadow vetchling	Go6												
meadowsweet	Go6												
milkworts	Go6												
narrow-leaved water-dropwort	Go6												
orchids	Go6												
ox-eye daisy	Go6						✓						R
pepper-saxifrage	Go6												
pignut	Go6												
ragged robin	Go6												
red clover		Go2	✓		✓	✓		✓	✓				F
ribwort plantain		Go2	✓	✓	✓	✓	✓	✓	✓	✓	✓		D
rough hawkbit	Go6												
salad burnet	Go6												
saw-wort	Go6												
selfheal		Go2											
sneezewort	Go6												
tormentil	Go6												
water avens	Go6												
water mint	Go6												
wood anemone	Go6												
yarrow		Go2											R
yellow rattle	Go6		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D

Lowland Meadow	at least 2 Go6 species <i>Frequent</i> and at least 2 Go6 species <i>Occasional</i>
Semi-improved Grassland	at least 4 Go2 or Go6 species <i>Occasional</i>

Appendix 1b: Fairfield Meadow Monitoring Form 12 July 2017

1. Choose sampling points to provide a wide coverage over the whole field and which, at a glance, appear representative of the wider vegetation. Field edges and small stands of atypical vegetation should be avoided.
2. Sample sizes of approximately 2 x 2 m should be used. Where appropriate, the shape of sampled quadrats can be adapted from the standard square to cover a plot of the same total area.
3. Tick presence of indicator species at each sampled stop.
4. Record % cover of listed features at each stop (including combined cover of 'undesirable species': creeping thistle, spear thistle, curled dock, broad-leaved dock, common ragwort, common nettle, marsh ragwort, cow parsley and bracken) and calculate average (mean) cover at all stops in the 'Total' column.
5. Count up the number of stops at which each indicator species is present and record in the 'Total' column:
 D (*dominant*) = occurrence at 9 or 10 stops out of 10,
 A (*abundant*) = occurrence at 7 or 8 stops,
 F (*frequent*) = occurrence at 5 or 6 stops,
 O (*occasional*) = occurrence at 3 or 4 stops and
 R (*rare*) = occurrence at 1 or 2 stops.
 Also record species as rare if they were observed on site but not at any of the sampled stops.
6. Note other important habitats present in the field, though these do not need to be monitored.

Site	Fairfield Meadow												
Date	12 July 2017												
			1	2	3	4	5	6	7	8	9	10	Total
% herb/sedge cover excluding white clover & creeping buttercup (target > 20%)			50	90	90	65	40	90	40	30	30	30	55.5
% undesirable species (target < 5%)			<1	0	<1	0	0	0	<1	<1	0	0	<0.4
% bare ground (target < 10%)			0	0	0	0	0	0	0	0	0	0	0
% scrub (target < 5%)			0	0	0	0	0	0	0	0	0	0	0
% large sedges, rushes, reeds (< 30%)			<1	0	0	0	0	0	0	1	0	0	<0.2
agrimony	Go6												
autumn hawkbit	Go6	Go2											
betony	Go6												
bird's-foot-trefoil	Go6												
bitter-vetch	Go6												
black knapweed	Go6			✓	✓			✓	✓	✓	✓		F
black medick		Go2											
bugle	Go6												
bulbous buttercup		Go2											
burnet saxifrage	Go6												
common bistort	Go6												
common cat's-ear		Go2			✓	✓		✓	✓				O
common meadow-rue	Go6												
common sorrel		Go2	✓		✓		✓	✓	✓	✓	✓		A
cowslip	Go6												
cuckoo flower		Go2											
devil's-bit scabious	Go6												
dropwort	Go6												
dyer's greenweed	Go6												

Site Fairfield Meadow													
Date	12 July 2017												
		1	2	3	4	5	6	7	8	9	10	Total	
eyebright	Go6												
field scabious	Go6												
field wood-rush		Go2											
germander speedwell		Go2											
glaucous/common/carnation sedge	Go6												
goat's-beard	Go6												
great burnet	Go6												
greater bird's-foot-trefoil	Go6												R
lady's bedstraw	Go6												
lady's-mantles	Go6												
lesser trefoil		Go2											
marsh marigold	Go6												
marsh valarian	Go6												
marsh/fen bedstraw	Go6												
meadow buttercup		Go2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D
meadow vetchling	Go6												
meadowsweet	Go6												
milkworts	Go6												
narrow-leaved water-dropwort	Go6												
orchids	Go6			✓									R
ox-eye daisy	Go6			✓		✓	✓	✓					O
pepper-saxifrage	Go6												
pignut	Go6												
ragged robin	Go6												
red clover		Go2	✓	✓	✓	✓	✓	✓				✓	A
ribwort plantain		Go2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D
rough hawkbit	Go6												
salad burnet	Go6												
saw-wort	Go6												
selfheal		Go2					✓				✓		R
sneezewort	Go6												
tormentil	Go6												
water avens	Go6												
water mint	Go6												
wood anemone	Go6												
yarrow		Go2											R
yellow rattle	Go6		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D

Lowland Meadow	at least 2 Go6 species <i>Frequent</i> and at least 2 Go6 species <i>Occasional</i>
Semi-improved Grassland	at least 4 Go2 or Go6 species <i>Occasional</i>

Appendix 2a: Pony Wood Monitoring Form 2017

Stop number	1	2	3	4	5	6	7	8	9	10	<i>Date: 20 April 2017</i>
1. Area attribute											
no loss of woodland area	✓										
2. Structure and natural processes											
Tree species should be present at irregular spacings											
oak											target for HLS
ash			✓	✓	✓	✓	✓				
beech	✓	✓	✓	✓			✓	✓	✓	✓	
birch											
Overall canopy cover of between 25% and 70% of the area	50	80	60	60	60	25	80	70	70	40	target for HLS
Cover of shrubs hazel, blackthorn, rowan, hawthorn and holly should be between 20% and 75%.	1	3	2	3	3	5	2	3	3	3	target for HLS
approximate number of age classes (i.e. seedlings, sapling, young trees, mature trees, over-mature trees, veteran, ancient)	4	4	4	3	4	2	3	3	3	4	<i>desirable features - no target</i>
areas of relatively undisturbed mature/old growth stands or a scatter of large trees allowed to grow to over-maturity/death present	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<i>desirable features - no target</i>
fallen or standing dead-wood present	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<i>desirable features - no target</i>
3. Field-layer composition											
bluebells	✓	✓	✓	✓				✓		✓	target for HLS by yr 8 - 2 species should be at least occasional
dog's mercury											
primrose		•		•						✓	
ramsons							✓				
wood anemone											
wood-sorrel											
4. Undesirable field species											
common nettle					✓	✓					target for HLS by yr 8 - no species should be more than occasional
curled dock											
broadleaved dock											
spear thistle											
creeping thistle,											
common ragwort											
sycamore		✓	✓	✓	✓		✓	✓	✓	✓	
5. Regeneration potential											
Signs of seedlings growing through to saplings to young trees	✓	✓	✓	✓	✓		✓	✓	✓	✓	<i>desirable features - no target</i>
Other woodland herbs											
lesser celandine	✓	✓	✓	✓			✓	✓	✓	✓	
lords-and-ladies											

Appendix 2b: Little Wood and New Plantation Monitoring Form 2017

<i>Stop number</i>	<i>Plantation</i>	<i>Little Wood 1</i>	<i>Little Wood 2</i>	<i>Date: 20 April 2017</i>
1. Area attribute				
no loss of woodland area	✓		✓	
2. Structure and natural processes				
Tree species should be present at irregular spacings				
oak		✓	✓	target for HLS
ash		✓	✓	
beech				
birch	✓			
Overall canopy cover of between 25% and 70% of the area	1	80	60	target for HLS
Cover of shrubs hazel, blackthorn, rowan, hawthorn and holly should be between 20% and 75%.	20	20	30	target for HLS
approximate number of age classes (i.e. seedlings, sapling, young trees, mature trees, over-mature trees, veteran, ancient)	1	4	3	<i>desirable features - no target</i>
areas of relatively undisturbed mature/old growth stands or a scatter of large trees allowed to grow to over-maturity/death present		✓	✓	<i>desirable features - no target</i>
fallen or standing dead-wood present		✓	✓	<i>desirable features - no target</i>
3. Field-layer composition				
bluebells		✓	✓	target for HLS by yr 8 - 2 species should be at least occasional
dog's mercury				
primrose				
ramsons				
wood anemone				
wood-sorrel				
4. Undesirable field species				
common nettle	✓	✓		target for HLS by yr 8 - no species should be more than occasional
curled dock				
broadleaved dock				
spear thistle				
creeping thistle,				
common ragwort				
sycamore				
5. Regeneration potential				
Signs of seedlings growing through to saplings to young trees		✓	✓	<i>desirable features - no target</i>
Other woodland herbs				
lesser celandine	✓	✓		
lords-and-ladies		✓		

Appendix 3a: Fairfield Arable-margin Monitoring Form 2017 - Storton mix

<i>Stop number</i>	1	2	3	4	5	6	7	8	9	10	<i>Date: 28 July 2017</i>
2. Cover of bare ground											target for HLS - between 5% and 10 % by year 2
bare ground	10	15	20	20	10	25	10	10	10	10	
3. Field-layer composition - Storton mix											target for HLS - between 5% and 60% of at least 3 sown desirable broad-leaf species by year 2
spring triticale (wheat/rye hybrid)											
poacher white millet											
fodder radish	80	40	60	70	50	90	60	55	50	60	
spring barley											
spring wheat		5	10	5	5		5		5		
gold of pleasure								5	5		
mustard	10	35	25	15	15	5	20	30	25	5	
<i>tansy-leaved Phacelia</i>				1					1	5	
<i>borage</i>					10						
4. Undesirable field species											target for HLS - no species should be more than occasional
common nettle	5	5		1			5	5	15	5	
curled dock											
broadleaved dock											
spear thistle											
creeping thistle, common ragwort											

Appendix 3b: Fairfield Arable-margin Monitoring Form 2017 - HE10 mix

<i>Stop number</i>	1	2	3	4	5	6	7	8	9	10	<i>Date: 28 July 2017</i>
1. Cover of desirable species - HE10 mix											
crested dog's- tail		10	5	5							target for HLS - at least 75% cover of desirable species by year 1
small leaved timothy	10	10	5							5	
smooth meadow-grass										5	
red fescue	20	5	30	10		5		15	10	30	
common bent	5	15	20	40	30	30	10				
<i>Yorkshire-fog</i>	10			20	25	20	10	15	20	20	
<i>creeping bent</i>	30	15	5	10	15	15	70	40	60	40	
<i>ryegrass</i>		10								5	
<i>meadow foxtail</i>	25				5			15	10		
<i>cock's-foot</i>											
<i>sweet vernal grass</i>		10									
<i>rough meadow-grass</i>										5	
2. Cover of bare ground											
bare ground	0	0	0	0	0	0	0	0	0	0	target for HLS - between 5% and 10 % by year 2
3. Field-layer composition - HE10 mix											
black knapweed	20	10	25	30	20	35		20			target for HLS - between 5% and 60% of at least 3 sown desirable broad-leaf species by year 2
yarrow		•									
ox-eye daisy											
ribwort plantain	15	10	10	15	20	20	15	10	5	5	
red clover											
<i>tansy-leaved Phacelia</i>											
<i>cut-leaved crane's-bill</i>											
<i>greater bird's-foot trefoil</i>											
<i>greater knapweed</i>			10	1							
<i>common fumitory</i>											
<i>borage</i>											
4. Undesirable field species											
common nettle											target for HLS - no species should be more than occasional
curled dock	5										
broadleaved dock		5						5			
spear thistle											
creeping thistle, common ragwort											