

# Fairfield Nature Reserve

## Monitoring of Meadow, Woodland and Arable Margins

### 2018

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, occasional seeding to encourage a more diverse meadow sward and cutting of the grassland each 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 to determine whether these management works are being effective in producing a botanically rich meadow and to guide future management of the plot. The monitoring methodology is outlined in the *Fairfield Association meadow survey training notes* (Skelcher 2012), which was based on guidelines for grassland assessment provided for the Defra Higher Lever Stewardship agri-environment scheme (Natural England 2010). This principally involves recording the presence or absence of a number of key plant species that are indicators of either 'lowland meadow' or 'semi-improved grassland', within ten 2 x 2 m quadrats across the meadow. The ten monitoring points are selected each year to provide broad cover over the full meadow area, while each individual quadrat is 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 are avoided because these are more likely to support vegetation that is not typical of the majority of the meadow.

According to this methodology criteria, 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). 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. Since 2013, monitoring has been undertaken by Graeme Skelcher but has remained open to Fairfield Association members who wished to attend. Only a single survey was carried out in July or early August each year up to 2016, but since 2017 two assessments have been made each year; one within the usual mid-summer period (most often in early July) plus an earlier visit in May. In 2018, these visits were made on 28 May and 5 July.

## **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. This land includes a small area of mature woodland, called Pony Wood, and fields which have subsequently been managed for arable crops, 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 (HLS).

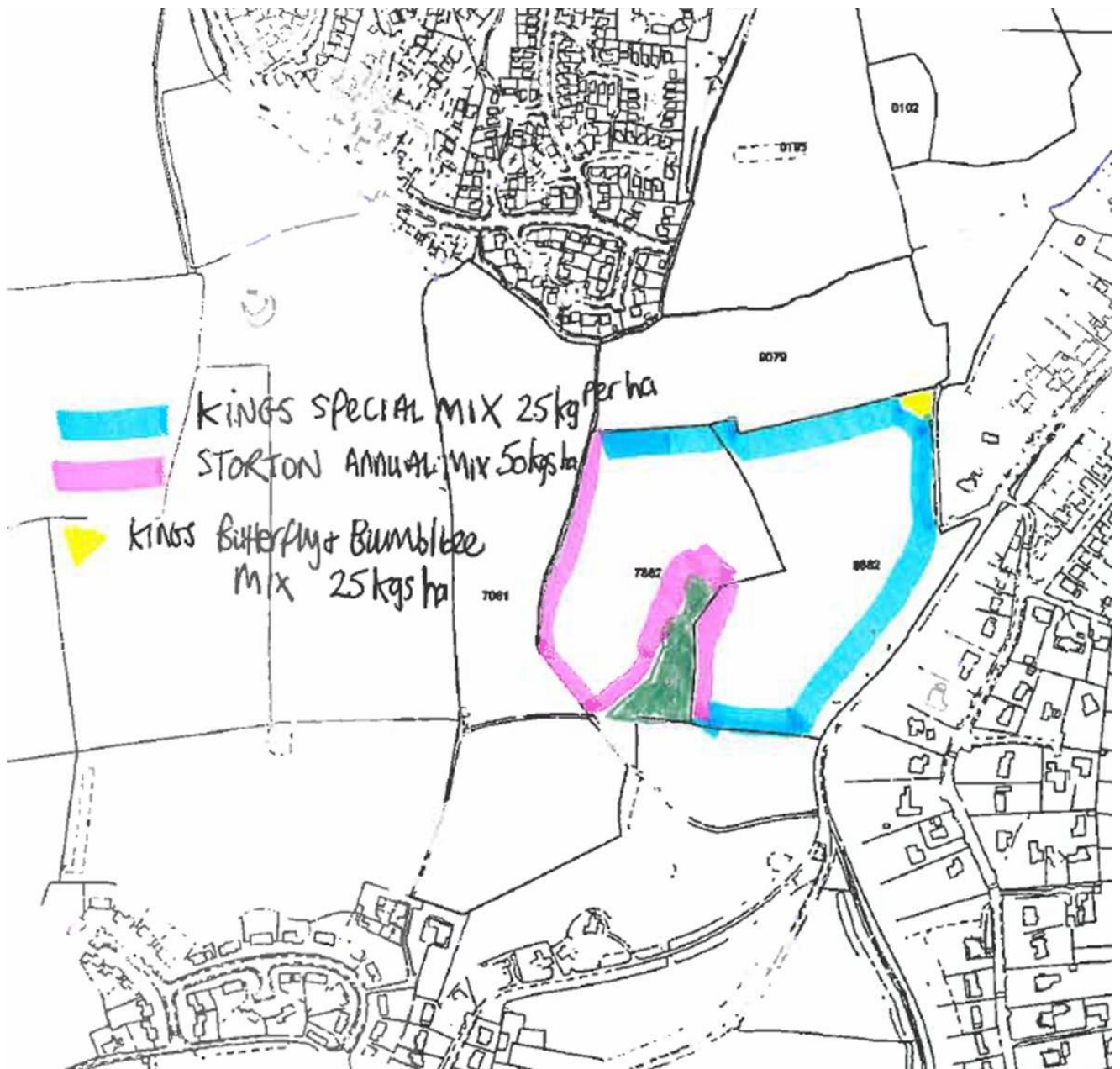
Monitoring of both the woodland and the arable margins was set up in the summer of 2015, following a similar methodology to that used for the meadow. Again, 10 monitoring points were selected to provide broad cover over the full area of each habitat (with, in the case of the arable margins, 10 points each for the two types of seed mix used - see Map 1), with each individual points 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. Since 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 (Little Wood - 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 management. For the woodland, this includes 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 include 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 2018, the woodlands were assessed on 9 May and the arable margins were assessed on 27 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 2018 (see Appendix 1a), one species from the 'lowland meadow' indicator list was recorded as 'dominant' (yellow rattle) and one species was 'occasional' (black knapweed). 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 one was 'rare' (cuckoo flower).

In July 2018 (see Appendix 1b), one species from the 'lowland meadow' indicator list was recorded as 'dominant' (yellow rattle), one was 'frequent' (black knapweed) and three species were 'rare' (ox-eye daisy, 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), one was 'abundant' (common sorrel), one was 'frequent' (red clover) and three were 'rare' (common cat's-ear, self-heal and yarrow).

The mean cover of herbs over the 10 quadrats was 68%, 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 three of the 10 quadrats in July and was absent from the other seven.

The meadow therefore satisfies the target criteria for 'semi-improved grassland' but still falls just short of the 'lowland meadow' criteria due to insufficient abundance of key species (at least two species to be at least frequent is met, but at least two of the currently rare species need to increase cover to at least occasional).

### 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 was sparse. Most of the trees were mature or over-mature, with very few younger trees. However, ash tree regeneration was recorded at four of the ten sample points.

In the field-layer, bluebells were found over large areas of the wood (recorded at seven stops) and two other indicator species were also present; primrose and ramsons. Thus the site does not yet meet the target for two indicator species being occasional within eight years, which will require at least one of the currently rare species to become at least occasional within the next four years in addition to the widespread bluebell. The non-target woodland herb lesser celandine was also abundant (recorded at eight stops).

Undesirable field-species were few, with common nettle and sycamore regeneration being recorded at only one stop each.

Little Wood (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. No undesirable field-species were recorded although, while not listed specifically as an

undesirable species, the presence was noted of a clump of the large, non-native Spanish bluebell *Hyacinthoides hispanica*, which can hybridise with the native bluebells.

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**

Five of the target species for the Storton mix margins were present in 2018, with one exceeding the maximum target cover (fodder radish with recorded cover at sample points of 76%) and the remainder all each at less than 10% cover (gold of pleasure 8%, mustard 3% and spring wheat and poacher white millet both < 1%). 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. While the diversity of species is good (this is only the second occasion in which five of the target species have been recorded, with poacher white millet being found for the first time), the large quantity of fodder radish present exceeded the maximum target of 60% for any of the individual key species and only one other species (gold of pleasure) exceeded the minimum 5% threshold in 2018 (at least three species required to have > 5% cover).

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 2018, though crested dog's-tail was not recorded at any of the sample stops. However their average combined cover in the established drier margins (northern and southern margins; grasses not monitored in the eastern margin this year following reseeding) was just 25% (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 (20%) and Yorkshire-fog (20%), along with the desired common bent (6%) and red fescue (15%). Ryegrass, and meadow foxtail were also present in much smaller amounts.

All five of the HLS-required herb species were present within the HE10 margins, with four of these exceeding the 5% minimum target threshold required for at least three species (yarrow 14%, black knapweed 9%, ribwort plantain 6% and ox-eye daisy 5%). Herb cover, and herb diversity, was bolstered hugely by reseeding of the eastern margin where, in previous years, herbs had been all but absent. The eastern margin accounted for all of the recorded yarrow and red clover, and most of the ribwort plantain and ox-eye daisy, with only black knapweed being more plentiful in the northern and southern margins.

Of the listed 'undesirable' species, common nettle, broad-leaved dock, spear thistle and creeping thistle were found only rarely and at very low cover within HE10 samples, while similarly small quantities of common nettle and creeping thistle were present within the Storton samples.



### 3 Discussion

#### 3.1 The meadow

**Table 1: Abundance of indicator species (Go6 = Lowland meadow; Go2 = Semi-improved grassland) at Fairfield Meadow in July/August 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	2018
		6 August	5 July	19 July	10 July	15 July	5 July	12 July	5 July
overall % herb/sedge cover (target > 20%)		15	15	47	56	59	75	55.5	67.5
overall % undesirable species (target < 5%)		5	<5	1	<1	<1	1	<1	<1
overall % bare ground (target < 10%)		0	0	0	0	0	0	0	0
overall % scrub (target < 5%)		0	0	0	0	0	0	0	0
overall % large sedges, rushes, reeds (< 30%)		0	0	0	0	0	0	<1	0
<b>Species</b>									
yellow rattle	Go6		O	A	A	D	D	D	D
black knapweed	Go6						R	F	F
ox-eye daisy	Go6					R	O	O	R
orchids	Go6					R	R	R	R
greater bird's-foot trefoil	Go6							R	R
meadow buttercup	Go2	R	A	O	A	D	D	D	D
ribwort plantain	Go2	R	O	O	O	A	D	D	D
red clover	Go2	R	O	R	O	O	F	A	F
common sorrel	Go2	O	R	R	R	R	F	A	A
common cat's-ear	Go2	R				R	R	O	R
self-heal	Go2	R	R		R	R	O	R	R
yarrow	Go2	O	R	R	R	R	R	R	R
field wood-rush	Go2	R							
germander speedwell	Go2	R							

Table 1 shows that after a slow but steady improvement each year in the quality and diversity of the meadow up to 2017, the 2018 results showed no further improvement and the meadow still falls just short of being classed as 'Lowland Meadow'.

The percentage herb cover remained very good, being around or above 50% for the sixth year in succession, while the cover of non-desirable species (mainly ragwort) has remained at no more than 1% over the same period, so no significant improvement could be expected in these respects. However, there was no change in the diversity of 'lowland meadow' indicator species (which had increased by two species in 2015 and an additional one species in each of 2016 and 2017) and, while the abundance of yellow rattle, black knapweed, orchids and greater bird's foot trefoil remained the same as recorded in 2016, there was a very small decrease in the abundance of ox-eye daisy compared to 2016 and 2017 levels from occasional to rare.

Similarly, the diversity of 'semi-natural grassland' indicators remained stable from 2017, but there was a small decrease in the abundance of two of these seven species (red clover decreasing from abundant to frequent and common cat's-ear decreasing from occasional to rare).

It was hoped that the diversity and abundance of meadow species would increase over time as the meadow matured, so lack of progress this year is disappointing. However, the weather throughout May,

June and the first half of July of 2018 was unusually dry and this may have limited growth and spread of some species.

**Table 2: Abundance of indicator species (Go6 = Lowland meadow; Go2 = Semi-improved grassland) and values of other indicators of meadow quality at Fairfield Meadow in May 2017 and 2018, together with comparison data for July 2018.**

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

Indicator		2017	2018	2018
		30 May	28 May	5 July
overall % herb/sedge cover (target > 20%)		66	58	67.5
overall % undesirable species (target < 5%)		0.5	0.3	<1
overall % bare ground (target < 10%)		0	0	0
overall % scrub (target < 5%)		0	0	0
overall % large sedges, rushes, reeds (< 30%)		0	0	0
<b>Species</b>				
yellow rattle	Go6	D	D	D
black knapweed	Go6	R	O	F
ox-eye daisy	Go6	R		R
orchids	Go6			R
greater bird's-foot trefoil	Go6			R
cowslip	Go6	R		
meadow buttercup	Go2	D	D	D
ribwort plantain	Go2	D	D	D
red clover	Go2	F	F	F
common sorrel	Go2	A	A	A
common cat's-ear	Go2			R
self-heal	Go2			R
yarrow	Go2	R		R
cuckoo flower	Go2	R	R	
field wood-rush	Go2	R		
germander speedwell	Go2			

From 2017 onwards, monitoring of the meadow has also been carried out in May, and Table 2 above shows a comparison of results both between monitoring results in May 2017 and 2018 and between May and July 2018. This shows a reduction in recorded species diversity between May 2017 and May 2018, though a slight increase in the abundance of black knapweed was noticed. Generally greater species diversity is present in July compared to May, with only the early-flowering cuckoo-flower being found in May 2018 but absent from July 2018 samples.



## 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		Little Wood	
		2015	2016	2017	2018	2017	2018	2017	2018
		10 June	6 May	20 April	9 May	20 April	9 May	20 April	9 May
overall % canopy cover (target 25% - 70%)	<b>HLS</b>	70	68	60	61	1	0	70	45
cover of shrubs hazel, blackthorn, rowan, hawthorn, holly (target 20% - 75%)	<b>HLS</b>	< 1	1.6	2.8	3.6	20	10	25	38
approximate number of age classes		3 early- mature over- mature	4 seedlin g early- mature mature over- mature	5 seedlin g sapling early- mature mature over- mature	5 seedlin g sapling, early- mature mature over- mature	1	1	4	4
areas of undisturbed old-growth or scatter of large trees		✓	✓	✓	✓	✓	✓	✓	✓
fallen or standing deadwood		✓	✓	✓	✓			✓	✓
signs of regeneration		none	O	D	O			✓	✓
<b>Species - trees</b>									
oak	<b>HLS</b>						✓	✓	✓
ash	<b>HLS</b>	O	O	F	F			✓	✓
beech	<b>HLS</b>	O	F	A	F				
birch	<b>HLS</b>					✓	✓		
<b>Species - field-layer</b>									
bluebell	<b>HLS</b>	O	F	F	A			✓	✓
dog's mercury	<b>HLS</b>								
primrose	<b>HLS</b>	R	R	R	R				
ramsons	<b>HLS</b>		R	R	R				
wood anemone	<b>HLS</b>								
wood-sorrel	<b>HLS</b>								
lesser celandine			A	A	A	✓	✓	✓	✓
lords-and ladies			R					✓	✓
<b>Negative species</b>									
common nettle	<b>HLS</b>	R	R	R	R	✓	✓	✓	
sycamore seedlings	<b>HLS</b>	D	O	A	R				

Table 3 shows that there was further steady increase in the abundance of bluebells in Pony Wood 2018, while there has also been a continued increase in shrub cover (albeit it still very low). Diversity and abundance of other species, however, has remained broadly similar in 2018 to that recorded in 2017. The diversity and frequency of woodland herbs appeared to increase in 2016, following cessation of grazing, but has generally remained steady over the subsequent two years, 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 are starting to develop to young sapling stage. There are also continuing signs of natural ash regeneration. The frequency of sycamore regeneration recorded in 2017 was a concern but the abundance of this had reduced considerably in 2018.

### 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	218
		29 July	5 July	28 July	27 July
<b>Desirable species cover (target 5 - 60% of at least 3 species)</b>					
spring triticale	HLS	19.6	0	0	0
poacher white millet	HLS	0	0	0	0.5
fodder radish	HLS	58.7	49.5	61.5	76.5
spring barley	HLS	1.5	3.2	0	0
spring wheat	HLS	6	0	3.5	0.7
gold of pleasure	HLS	0	0	1	8
mustard	HLS	14.3	40.5	18.5	3.1
<i>tansy-leaved Phacelia</i>		2.6	0.9	0.7	0.1
<i>borage</i>		0.5		1	present
<b>Cover of bare ground (target 5 - 10%)</b>	HLS	5	5.5	14	13
<b>Undesirable species (target - no species more than 5% cover)</b>	HLS				
common nettle		0.1	0.2	4.1	0.3
curled dock					
broadleaved dock					
spear thistle		0.1			
creeping thistle,		0.1			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	2018	2018	2018
		29 July	5 July	28 July	27 July	27 July	27 July
<b>Desirable species cover - grasses</b>					a	b	total
crested dog's- tail	HLS	1.5	2	2			
small leaved timothy	HLS	2	2	3	3		
smooth meadow-grass	HLS	0.5		0.5	1		
red fescue	HLS	4.5	6	12.5	15		
common bent	HLS	9.5	3	15	6		
<b>Total cover (target &gt; 75% at end of year 1)</b>		<b>18</b>	<b>13</b>	<b>33</b>	<b>25</b>		
<i>Yorkshire-fog</i>			39	14	20		
<i>creeping bent</i>			31.5	30	20		
<i>ryegrass</i>			2.1	1.5	3		
<i>meadow foxtail</i>			2	5.5	2		
<i>cock's-foot</i>			1.5				
<i>sweet vernal grass</i>			1.7	1			
<i>rough meadow-grass</i>				0.5			
<b>Desirable species cover - herbs (target 5 - 60% of at least 3 species)</b>							
black knapweed	HLS	4.1	14.5	16	14	4.4	9.2
yarrow	HLS	0.5	0.6			28	14
ox-eye daisy	HLS	12	1.6		3	8	5.5
ribwort plantain	HLS	7.5	7.7	12.5	2.8	10	6.4
red clover	HLS	0.1	0.1			0.2	0.1
<i>tansy-leaved Phacelia</i>		1.5					
<i>cut-leaved crane's-bill</i>		0.5			2		1
<i>greater bird's-foot trefoil</i>		0.5					
<i>greater knapweed</i>		3	3	1.1	0.2		0.1
<i>common fumitory</i>		0.5					
<i>borage</i>		1				present	
<i>meadow buttercup</i>					0.6		0.3
<i>redshank</i>						6	3
<i>groundsel</i>						1.4	0.7
<i>bittersweet</i>						3	1.5
<i>cudweed</i>						0.2	0.1
<i>cornflower</i>						1.4	0.7
<i>corn marigold</i>						0.4	0.2
<i>corncockle</i>						0.4	0.2
<i>corn chamomile</i>						0.8	0.4
<i>white campion</i>						0.2	0.1
<b>Cover of bare ground (target 5 - 10%)</b>	HLS	0	0	0	1	3.4	2.2
<b>Undesirable species (target - no species more 5% cover)</b>	HLS						
common nettle		0.5		0.5		0.2	0.1
curled dock							
broadleaved dock		0.6		1		0.2	0.1
spear thistle		1.5	1.2			0.4	0.2
creeping thistle,		1				1	0.5
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, occurring at or towards the upper limit of the required cover parameters in the first three years of monitoring, but exceeding the 60% maximum threshold by an additional 16% in 2018. Mustard has been found at moderate cover in most years, fluctuating from 14% cover in 2015 to just over 40% in 2016, then down to 18% cover in 2017 and just 3% in 2018. Gold of pleasure was noticed for the first time in 2017, though just at 1% cover at just two of the sample points, but in 2018 it was recorded at nine of the ten samples with overall cover increasing to 8%. Poacher white millet was recorded in 2018 for the first time since monitoring began, but only at a single location and with overall cover of only 0.5%. Spring wheat was also recorded at very low cover from just two of the sampled points in 2018. Spring triticale and spring barley were not recorded in 2018; the former had been recorded at moderate levels in 2015 but has not been seen since while small amounts of barley had previously been noted in 2015 and 2016. 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, 2017 and 2018, with excessive abundance of fodder radish also being a concern in the current year.

In the HE10 margin, the cover of desirable grasses has decreased a little in 2018 from 2017. Overall, however, the diversity of herbs increased substantially in 2018 while the total cover of black knapweed, yarrow, ox-eye daisy and ribwort plantain all exceeded the minimum 5% cover threshold required for at least three key herb species; the first occasion ever that this target has been achieved. This improvement is largely due to re-seeding of the eastern margin where, in previous years, almost no herbs had been recorded (possibly due to higher water-levels accumulating along this line at the bottom of the sloping arable field). In the more established drier margins there has been a general decline in key herb species cover. The 14% cover of black knapweed in these margins recorded in 2018 was lower than the overall cover of this species in 2016 and 2017 (which incorporated the damp southern margin where the species was absent) and the 2.8% cover of ribwort plantain was lower than the overall cover of this species in any of the previously monitored years. The 3% cover of ox-eye daisy was higher than in 2017 (when the species was not recorded at all) and in 2016, but much lower than the original 12% cover recorded in 2015.

#### 4 Conclusions

While the diversity and abundance of key species within the meadow improved each year between 2011 and 2017, and is now extremely close to meeting the criteria for herb-rich 'lowland meadow', this progress stalled in 2018; possibly due in part to the particularly dry weather this year.

The potential for Pony Wood to develop into a well-structured woodland with a good and varied cover of native woodland herbs is evidenced by the presence of a moderate diversity of woodland herbs, a steady increase in abundance of bluebell over the last four years, and scattered natural regeneration of ash seedlings. However, this process is likely to take several years for further substantial spread of desired herbs and development of a proper shrub layer, as well as for the areas of planted trees to develop into a recognisable woodland.

The seeded arable margins have generally shown signs of positive development. The Storton margins held a good diversity of the desired bird-forage species but the cover of fodder radish needs to be decreased a little in future years to allow an increase in the cover of other species and present a generally more equal mix of different seed foods. In the HE10 margins, the cover of desired grasses is still substantially less than required (though this target is not consistent with the required herb cover, which is likely to be a better indicator of wildlife value - i.e. 75% grass cover is not consistent with potentially up to 60% cover of a single herb species and at least 5% cover of two others). Due to replanting along the damper, eastern verge (which has been extremely poor for herbs in previous years), the diversity of HE10 herbs has increased significantly, while the overall cover of target herbs has also increased, with four key species now exceeding the required minimum 5% cover. Comparing results just for the established drier HE10 margins (north and south margins), however, there has been a general decrease in the diversity of key species since 2015, while the 2018 cover of individual key herbs in these areas was also mostly lower for each species than in previous years.

#### 5 References

- Natural England (2010) *Higher Level Stewardship Farm Environment Plan manual (3<sup>rd</sup> edition)*. Natural England
- 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 28 May 2018

- 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			Sample quadrat										
Date 30 May 2018			1	2	3	4	5	6	7	8	9	10	Total
% herb/sedge cover excluding white clover & creeping buttercup (target > 20%)			60	50	60	60	70	60	70	40	50	60	58
% undesirable species (target < 5%)			0	0	1	0	0	0	1	1	0	0	0.3
% 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			✓				✓		✓	✓		O
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												
cuckoo flower		Go2											R
devil's-bit scabious	Go6												
dropwort	Go6												
dyer's greenweed	Go6												
eyebright	Go6												
field scabious	Go6												
field wood-rush		Go2											

Site Fairfield Meadow		Sample quadrat										
Date 30 May 2018		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											
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											
yellow rattle	Go6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D

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



## Appendix 1b: Fairfield Meadow Monitoring Form 5 July 2018

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			Sample quadrat										
Date 5 July 2018			1	2	3	4	5	6	7	8	9	10	Total
% herb/sedge cover excluding white clover & creeping buttercup (target > 20%)			60	75	90	40	90	80	60	50	70	60	67.5
% undesirable species (target < 5%)			<1	<1	0	<1	0	0	0	0	0	0	<1
% 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		✓	✓			✓	✓		✓	✓		F
black medick		Go2											
bugle	Go6												
bulbous buttercup		Go2											
burnet saxifrage	Go6												
common bistort	Go6												
common cat's-ear		Go2		✓	✓								R
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			Sample quadrat										
Date 5 July 2018			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						✓						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											R
sneezewort	Go6												
tormentil	Go6												
water avens	Go6												
water mint	Go6												
wood anemone	Go6												
yarrow		Go2											R
yellow rattle	Go6		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D

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

## Appendix 2a: Pony Wood Monitoring Form 2018

Stop number	1	2	3	4	5	6	7	8	9	10	Date: 9 May 2018
<b>1. Area attribute</b>											
no loss of woodland area	✓										
<b>2. Structure and natural processes</b>											
oak											target for HLS - Tree species should be present at irregular spacing
ash			✓	✓	✓	✓	✓				
beech	✓						✓	✓	✓	✓	
birch											
Overall canopy cover of between 25% and 70% of the area	70	60	50	80	50	70	60	40	50	80	target for HLS
Cover of shrubs hazel, blackthorn, rowan, hawthorn and holly should be between 20% and 75%.	2	5	3	2	2	5	2	5	5	5	target for HLS
approximate number of age classes (i.e. seedlings, sapling, young trees, mature trees, over-mature trees, veteran, ancient)	4	4	3	3	3	3	3	3	3	4	desirable features - no target
areas of relatively undisturbed mature/old growth stands or a scatter of large trees allowed to grow to over-maturity/death present	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	desirable features - no target
fallen or standing dead-wood present	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	desirable features - no target
<b>3. Field-layer composition</b>											
bluebells	✓	✓	✓				✓	✓	✓	✓	target for HLS by yr 8 - 2 species should be at least occasional
dog's mercury									✓		
primrose		•								✓	
ramsons							✓	•			
wood anemone											
wood-sorrel											
<b>Other woodland herbs</b>											
lesser celandine	✓	✓	✓	✓			✓	✓	✓	✓	desirable features - no target
lords-and-ladies											
<b>4. Undesirable field species</b>											
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	✓										
<b>5. Regeneration potential</b>											
Signs of seedlings growing through to saplings to young trees	✓ ash	✓ ash			✓ ash					✓ ash	desirable features - no target

**Appendix 2b: Little Wood and New Plantation Monitoring Form 2018**

<i>Stop number</i>	<i>Plantation</i>			<i>Little Wood</i>		<i>Date: 9 May 2018</i>
<b>1. Area attribute</b>						
no loss of woodland area	✓			✓		
<b>2. Structure and natural processes</b>						
oak				✓	✓	<b>target for HLS -</b> Tree species should be present at irregular spacing
ash				✓	✓	
beech						
birch	✓					
Overall canopy cover of between 25% and 70% of the area	0	0	0	50	40	<b>target for HLS</b>
Cover of shrubs hazel, blackthorn, rowan, hawthorn and holly should be between 20% and 75%.	30	40	30	25	50	<b>target for HLS</b>
approximate number of age classes (i.e. seedlings, sapling, young trees, mature trees, over-mature trees, veteran, ancient)	1	1	1	4	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>
<b>3. Field-layer composition</b>						
bluebells				✓	✓	<b>target for HLS by yr 8 -</b> 2 species should be at least occasional
dog's mercury						
primrose						
ramsons						
wood anemone						
wood-sorrel						
<b>Other woodland herbs</b>						
lesser celandine	✓			✓		<i>desirable features - no target</i>
lords-and-ladies				✓		
<b>4. Undesirable field species</b>						
common nettle	✓					<b>target for HLS by yr 8 -</b> no species should be more than occasional
curled dock						
broadleaved dock						
spear thistle						
creeping thistle,						
common ragwort						
sycamore						<i>no target</i>
Spanish bluebell					●	
<b>5. Regeneration potential</b>						
Signs of seedlings growing through to saplings to young trees				✓	✓	<i>desirable features - no target</i>

**Appendix 3a: Fairfield Arable-margin Monitoring Form 2018 - Storton mix**

<i>Stop number</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>Date: 28 July 2018</i>
<b>2. Cover of bare ground</b>											<b>target for HLS</b> - between 5% and 10 % by year 2
bare ground	15	10	10	15	15	10	15	15	10	15	
<b>3. Field-layer composition - Storton mix</b>											<b>target for HLS -</b> between 5% and 60% of at least 3 sown desirable broad-leaf species by year 2
spring triticale (wheat/rye hybrid)											
poacher white millet									5		
fodder radish	70	80	70	70	75	90	90	80	70	70	
spring barley											
spring wheat	2								5		
gold of pleasure	5	5	10	10	10		5	5	15	15	
mustard			1		10	5		5	5	5	
<i>tansy-leaved Phacelia</i>										1	
<i>borage</i>											
<b>4. Undesirable field species</b>											<b>target for HLS - no</b> species should be more than occasional
common nettle	1			1				1			
curled dock											
broadleaved dock											
spear thistle											
creeping thistle,								1			
common ragwort											

### Appendix 3b: Fairfield Arable-margin Monitoring Form 2018 - HE10 mix

<b>Stop number</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<i>Date: 28 July 2018</i>
<b>1. Cover of desirable species - HE10 mix</b>											<b>target for HLS</b> - at least 75% cover of desirable species by year 1
crested dog's- tail											
small leaved timothy		10	5								
smooth meadow-grass			5								
red fescue		50		10	15						
common bent	5	5		5	15						
<i>Yorkshire-fog</i>	10	10	60	15	5						
<i>creeping bent</i>	50	5	20	15	10						
<i>ryegrass</i>	5		5		5						
<i>meadow foxtail</i>				5	5						
<i>cock's-foot</i>											
<i>sweet vernal grass</i>											
<i>rough meadow-grass</i>											
<b>2. Cover of bare ground</b>											<b>target for HLS</b> - between 5% and 10 %
bare ground	0	0	0	5	0				15	2	
<b>3. Field-layer composition - HE10 mix</b>											<b>target for HLS - between 5% and 60% of at least 3 sown desirable broad-leaf species by year 2</b>
black knapweed	15	15		30	20	2	10	5	5		
yarrow						40	25	40	30	5	
ox-eye daisy		10	5			5	5	5	15	10	
ribwort plantain	2		2	5	5	5	15	15	10	5	
red clover						1					
<i>tansy-leaved Phacelia</i>											
<i>cut-leaved crane's-bill</i>			10								
<i>greater bird's-foot trefoil</i>											
<i>greater knapweed</i>					1						
<i>common fumitory</i>											
<i>borage</i>	•										
<i>meadow buttercup</i>	1		1	1							
<i>redshank</i>						10			5	15	
<i>groundsel</i>						2					
<i>bittersweet</i>						15					
<i>cudweed</i>										1	
<i>cornflower</i>							5	2			
<i>corn marigold</i>							2				
<i>corncockle</i>							2				
<i>corn chamomile</i>							2	2			
<i>white campion</i>								1			
<b>4. Undesirable field species</b>											<b>target for HLS - no species should be more than occasional</b>
common nettle											
curled dock											
broadleaved dock											
spear thistle											
creeping thistle, common ragwort											