

Fairfield Nature Reserve

Monitoring of Meadow, Woodland and Arable Margins

2020

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, Little Wood and the connecting plantation; 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 (c 2.4 acres/ 1 ha) 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 crop 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 the 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; progressing to 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 2020, these visits were made on 28 May and 2 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 woodland (Pony Wood, Little Wood and a small intervening area that has since been planted with trees and shrubs to connect the two) 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 tier Countryside Stewardship.

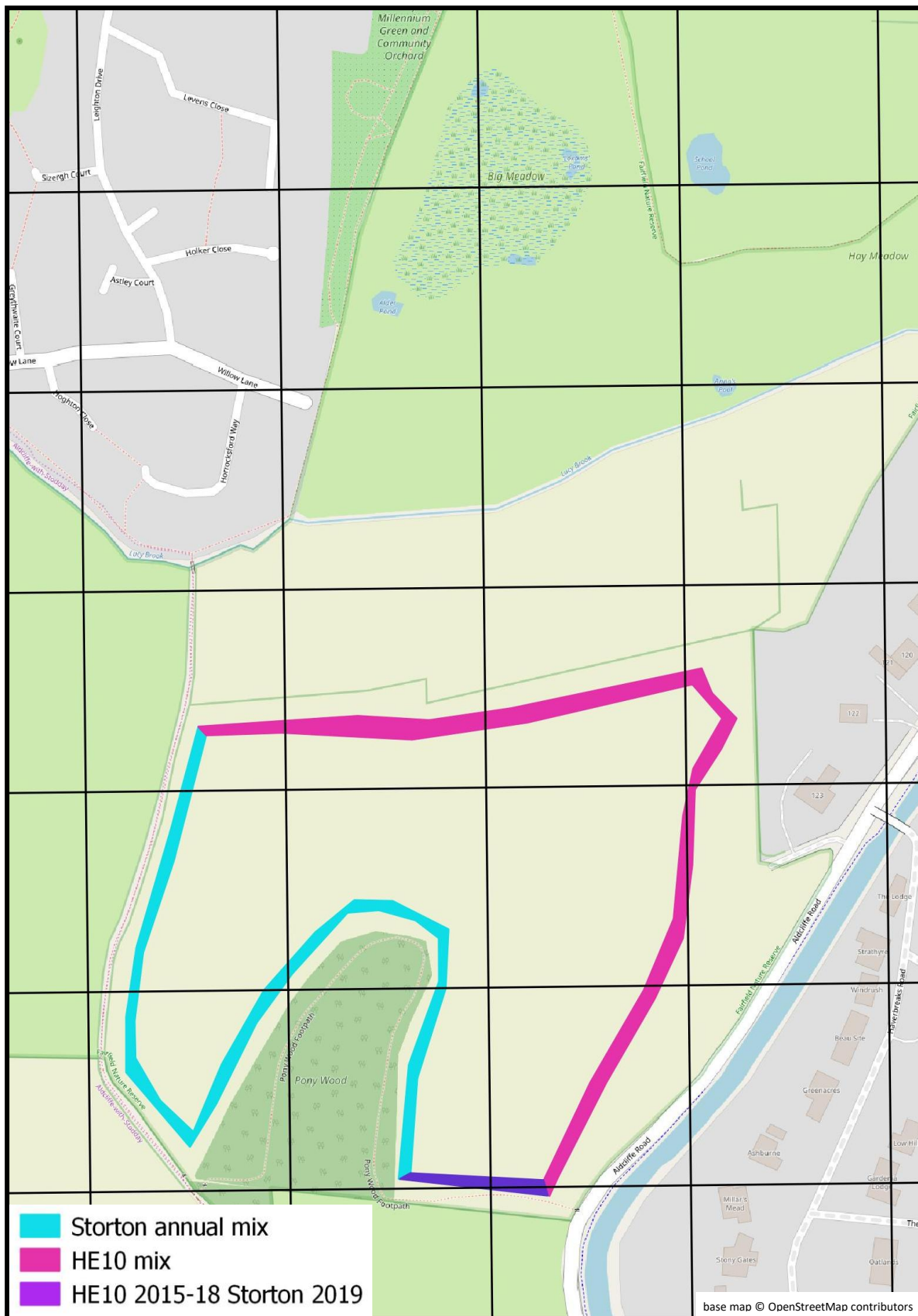
Monitoring of both the woodland and the arable margins commenced in the summer of 2015, following a similar methodology to that used for the meadow. Again, 10 monitoring points were selected to provide broad cover over the full area of each habitat (with, in the case of the arable margins, 10 points each for the two types of seed mix used - see Map 1), with 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 within 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 the adjacent recently planted area (c 0.6 acres/ 0.23 ha) and the 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 which are indicative of a healthy woodland. 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.

The woodland is monitored in April or early May to coincide with the flowering of most woodland herbs (though assessment in 2019 was made later than usual because the wood was closed due to tree safety concerns during this period), while the arable margins are monitored in late July when, again, most of the target herb species are in flower. In 2020, the woodland was assessed on 22 April and the arable margins on 22 July.

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



2 Results

2.1 The Meadow

In May 2020 (see Appendix 1a), one species from the 'lowland meadow' indicator list was recorded as 'dominant' (yellow rattle), one species was 'frequent' (black knapweed) and one was rare (ox-eye daisy). From the 'semi-improved grassland' indicator list, three species were 'dominant' (meadow buttercup, ribwort plantain and common sorrel), one was 'abundant' (red clover) and three were 'rare' (common cat's-ear, cuckoo flower and yarrow).

In July 2020 (see Appendix 1b), one species from the 'lowland meadow' indicator list was recorded as 'dominant' (yellow rattle), one was 'abundant' (black knapweed), one was occasional (ox-eye daisy) and one species was 'rare' (common spotted-orchid). From the 'semi-improved grassland' indicator list, four species were 'dominant' (common sorrel, meadow buttercup, ribwort plantain and red clover), and three were 'rare' (common cat's-ear, self-heal and yarrow).

The mean cover of herbs over the 10 quadrats in July was 70%, with no quadrat having less than 60% cover. Potentially negative meadow features were mostly absent; the only negative feature recorded being 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 easily satisfies the target criteria for 'semi-improved grassland' and was extremely close to meeting the 'lowland meadow' criteria; with several indicator species continuing to increase their cover each year. With yellow rattle and knapweed both being at least 'frequent' and ox-eye daisy 'occasional', just one more 'lowland meadow' species achieving 'occasional' cover would be sufficient for the criteria to be met.

2.2 Pony Wood, Little Wood and Plantation

Pony Wood comprised mature trees over a sparse understorey with a mostly grassy field-layer. Of the trees required to be present at regular intervals, mature ash and beech were respectively abundant and occasional while young birch were also occasional. The estimated c 63% canopy cover falls within the Countryside Stewardship target but the 5% shrub-layer remains short of the 20% minimum target. Regeneration of native tree species was recorded at seven of the ten sample points in 2020.

In the field-layer, bluebell was abundant while three other indicator species, primrose, ramsons and wood anemone were also present. Thus the site does not yet meet the target for two indicator species being occasional within eight years, which would require at least one of the currently rare species to become at least occasional within the next two years in addition to the widespread bluebell.

Undesirable field-species were not excessive (target for no species being more than occasional), with common nettle being recorded at three stops (occasional). Sycamore regeneration was widespread, being recorded at seven of the ten sample points (abundant), though only sparsely scattered.

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 Countryside Stewardship target extents. Evidence of tree regeneration was also present. Of the target woodland field species, only bluebell was recorded, but these were numerous, while non-target woodland herbs lesser celandine and lords-and-ladies were also present. No designated undesirable field-species were recorded, though small clumps of non-native Spanish bluebells had returned after previously being removed in 2018.

No mature trees were present within the plantation (Appendix 2b), though tree saplings were developing well and shrubs planted in recent years are forming an increasingly substantial shrub-layer. Oak and birch were frequent components of this developing woodland and regeneration of tree and shrub seedlings was observed. None of the target woodland herbs were present, though the non-target woodland herb lesser celandine was present at two of the three sampled locations. The undesirable field-species common nettle was also widely recorded and broad-leaved dock was also present.

2.3 Arable Margins

Five of the target species for the Storton mix margins were present in 2020; three of which being within the desired target cover of 5 - 60% (fodder radish 49.5%, mustard 19.1% and spring barley 5.5%, with gold of pleasure having 4% cover and spring wheat < 1%) and thus satisfying the Countryside Stewardship target. Borage and tansy-leaved Phacelia were also found occasionally within these margins, which added to the diversity and value for insects, but these are not listed as part of the Storton mix. The clump of purple rampion-fumitory (Biodiversity 'Priority' species; listed on S41 of the 2006 NERC Act as a 'species of principal importance' for the conservation of biodiversity in England; nationally scarce; and found nowhere in the world outside the British Isles) recorded in the southern margin on the eastern side of Pony Wood in 2019 was not seen during monitoring in 2020 but it is understood that it is still present.

In the HE10 margins, all of the desired seeded grass species were present in 2020 (crested dog's-tail, timothy, smooth meadow-grass, red fescue and common bent). However their average combined cover was just 29.2% (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 Yorkshire-fog (24.5%) and creeping bent (8%) along with the desired common bent (15.5%) and timothy (9.5%). Ryegrass, meadow foxtail, cocks'-foot, sweet vernal-grass, rough meadow-grass, marsh foxtail and false oat-grass were also present in much smaller amounts.

Five Countryside Stewardship required herb species were present within the HE10 margins; four of which exceeded the 5% minimum target threshold required for at least three species (black knapweed 24%, ribwort plantain 15.5%, yarrow 10.1% and ox-eye daisy 9.3%). Red clover had only 3% cover while other desirable species, meadow vetchling and common bird's foot trefoil, were not recorded at any of the stops.

Of the listed 'undesirable' species, common nettle, curled dock, broad-leaved dock, spear thistle and creeping thistle were found frequently but at low cover within HE10 samples, while common nettle and creeping thistle were both frequent at low cover within the Storton samples.

3 Discussion

3.1 The Meadow

Table 1 shows that the slow but steady improvement in most years in the quality and diversity of the meadow recorded each July has continued in 2020, with the overall results being extremely close to meeting the criteria for classification as 'Lowland Meadow'.

Table 1: Abundance of indicator species (G06 = Lowland meadow; G02 = 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	2019	2020
		6 Aug	5 July	19 July	10 July	15 July	5 July	12 July	5 July	5 July	2 July
overall % herb/sedge cover (target > 20%)		15	15	47	56	59	75	55.5	67.5	70	70
overall % undesirable species (target < 5%)		5	<5	1	<1	<1	1	<1	<1	<1	<1
overall % bare ground (target < 10%)		0	0	0	0	0	0	0	0	<1	0
overall % scrub (target < 5%)		0	0	0	0	0	0	0	0	0	0
overall % large sedges, rushes, reeds (< 30%)		0	0	0	0	0	0	<1	0	0	0
Species											
yellow rattle	G06		O	A	A	D	D	D	D	D	D
black knapweed	G06						R	F	F	F	A
ox-eye daisy	G06					R	O	O	R	O	O
orchids	G06					R	R	R	R	R	R
greater bird's-foot trefoil	G06							R	R		
betony	G06									R	
meadow buttercup	G02	R	A	O	A	D	D	D	D	D	D
ribwort plantain	G02	R	O	O	O	A	D	D	D	D	D
common sorrel	G02	O	R	R	R	R	F	A	A	D	D
red clover	G02	R	O	R	O	O	F	A	F	F	D
common cat's-ear	G02	R				R	R	O	R	R	R
self-heal	G02	R	R		R	R	O	R	R	R	R
yarrow	G02	O	R	R	R	R	R	R	R	R	R
field wood-rush	G02	R									
germander speedwell	G02	R									

The percentage herb cover has remained very good, being around or above 50% for the eighth 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 further significant improvement could be expected in these respects.

Of the 'lowland meadow' indicator species, yellow rattle remained present throughout the sward for the sixth successive year, while black knapweed (which appeared for the first time only in 2016) increased from 'frequent' over the previous three years to 'abundant' in 2020. Ox-eye daisy was recorded as 'occasional' for the fourth time in the last five years, but common spotted orchid remained only 'rare' despite being present in the meadow for six successive years.

The diversity of 'semi-natural grassland' indicators in July has remained constant over the last six years, with the only change in abundance from last year being the increase in distribution of red clover from 'frequent' in 2019 to 'abundant' in 2020.

From 2017 onwards, monitoring of the meadow has also been carried out in May, and Table 2 shows a comparison of results each May from 2017 to 2020, and between May and July 2020. The May results also show a general steady improvement in the overall abundance of indicator species from year to year. Several species appear to be a little less abundant in May compared to the July survey, due to being earlier in their seasonal growth development, but a few spring-flowering species are seen in May that have not been apparent in the later summer surveys (notably cowslip and cuckoo flower). Greater bird's-foot trefoil and ragged-robin were both recorded in May 2020 but both were in damper parts of the meadow bordering the rush which fringes Lucy Brook.

Table 2: Abundance of indicator species (G06 = Lowland meadow; G02 = Semi-improved grassland) and values of other indicators of meadow quality at Fairfield Meadow in May 2017, 2018 and 2019, together with comparison data for July 2019.

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

Indicator		2017	2018	2019	2020	2020
		30 May	28 May	31 May	28 May	2 July
overall % herb/sedge cover (target > 20%)		66	58	73.5	68.5	70
overall % undesirable species (target < 5%)		0.5	0.3	0	0.2	<1
overall % bare ground (target < 10%)		0	0	1.3	0.9	0
overall % scrub (target < 5%)		0	0	0	0	0
overall % large sedges, rushes, reeds (< 30%)		0	0	0	0	0
Species						
yellow rattle	G06	D	D	D	D	D
black knapweed	G06	R	O	O	F	A
ox-eye daisy	G06	R		R	R	O
orchids	G06					R
greater bird's-foot trefoil	G06				R	
cowslip	G06	R				
ragged robin	G06				R	
betony	G06					
meadow buttercup	G02	D	D	D	D	D
ribwort plantain	G02	D	D	D	D	D
common sorrel	G02	A	A	A	D	D
red clover	G02	F	F	F	A	D
common cat's-ear	G02				R	R
self-heal	G02					R
yarrow	G02	R			R	R
cuckoo flower	G02	R	R		R	
field wood-rush	G02	R				
germander speedwell	G02					

3.2 Pony Wood, Little Wood and Plantation

Table 3 shows that the estimated canopy cover of mature trees in Pony Wood has remained roughly constant over the five-year monitoring period. However, effort made to plant shrubs has had a steady impact in enhancing the understorey with an increase from less than 1% in 2015 to almost 5% cover in 2019 and 2020; though still well short of the target minimum of 20%.

In the field-layer, bluebell was again 'abundant' (recorded at seven stops in 2020), having been 'frequent' or 'abundant' in each year since 2016. Other required indicator species primrose and ramsons remained rare, while wood anemone was recorded in 2020 for the first time.

Table 3.1: 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					
		2015	2016	2017	2018	2019	2020
		10 June	6 May	20 April	9 May	31 May	22 April
overall % canopy cover (target 25%-70%)	HLS	70	68	60	61	62	63
cover of shrubs hazel, blackthorn, rowan, hawthorn, holly (target 20% - 75%; 10 - 40% by yr 8 in plantation)	HLS	< 1	1.6	2.8	3.6	4.7	4.7
approximate number of age classes (<i>seedling, sapling, young, early-mature, mature, over-mature</i>)		3	4	5	5	5	5
areas of undisturbed old-growth or scatter of large trees		✓	✓	✓	✓	✓	✓
fallen or standing deadwood		✓	✓	✓	✓	✓	✓
signs of regeneration		none	O	D	O	F	A
Species - trees							
oak	HLS					O	
ash	HLS	O	O	F	F	A	A
beech	HLS	O	F	A	F	O	O
birch	HLS						O
Species - field-layer							
bluebell	HLS	O	F	F	A	F	A
dog's mercury	HLS						
primrose	HLS	R	R	R	R	R	R
ramsons	HLS		R	R	R	R	R
wood anemone	HLS						R
wood-sorrel	HLS						
lesser celandine			A	A	A		A
lords-and ladies			R				R
Negative species							
common nettle	HLS	R	R	R	R	R	O
sycamore seedlings	HLS	D	O	A	R	O	A

Table 3.2: Woodland indicators in Little Wood and Plantation since 2017.

HLS indicates HLS targets need to be met

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

Indicator		Plantation				Little Wood			
		2017	2018	2019	2020	2017	2018	2019	2020
		20 April	9 May	31 May	22 April	20 April	9 May	31 May	22 April
overall % canopy cover (target 25%-70%)	HLS	1	0	0	13	70	45	70	70
cover of shrubs hazel, blackthorn, rowan, hawthorn, holly (target 20% - 75%; 10 - 40% by yr 8 in plantation)	HLS	20	10	20	40	25	38	45	40
approximate number of age classes (<i>seedling, sapling, young, early-mature, mature, over-mature</i>)		2	4	3		4	4	3	4
areas of undisturbed old-growth or scatter of large trees						✓	✓	✓	✓
fallen or standing deadwood						✓	✓	✓	✓
signs of regeneration				✓		✓	✓		✓
Species - trees									
oak	HLS		✓	✓	✓	✓	✓	✓	✓
ash	HLS					✓	✓	✓	✓
beech	HLS				✓				
birch	HLS	✓	✓	✓	✓				
Species - field-layer									
bluebell	HLS					✓	✓	✓	✓
dog's mercury	HLS								
primrose	HLS								
ramsons	HLS								
wood anemone	HLS								
wood-sorrel	HLS								
lesser celandine		✓	✓		✓	✓	✓	✓	✓
lords-and ladies						✓	✓	✓	✓
Negative species									
common nettle	HLS	✓	✓	✓	✓	✓		✓	
sycamore seedlings	HLS				✓				

No significant changes have been recorded over the last four years at Little Wood, which already comprises mature woodland with a reasonable structure and a good ground cover of bluebell. The plantation continues to develop, with some young trees and a substantial shrub layer, but with none of the target woodland herbs within the field-layer which remains a fairly dense grass sward.

3.3 Arable Margins

Tables 4 and 5 show the development, respectively, of the Storton and HE10 mix arable margins since 2015.

In the Storton-mix margins, fodder radish has been the most consistently abundant species. This occurred at or towards the upper limit of the required cover parameters in the first three years of monitoring and exceeding the 60% maximum threshold by an additional 16% in 2018, but has returned about 50% cover in the last two years. Other target species have fluctuated in cover over the years, presumably dependent at least in part upon the proportion of seeds in each annual mix, but in 2020 mustard, barley, gold of pleasure and wheat were present with mustard and barley both exceeding 5% cover. Thus, the Countryside Stewardship target of at least three key species occurring with 5 to 60% cover was achieved for the second successive year. Spring triticale and poacher white millet were not recorded in 2020; the former had been recorded at moderate levels in 2015 but has not been seen since, while the latter was recorded only in 2018.

The presence of purple ramping-fumitory in the Storton margin, first recorded in 2019 but understood still to be present, is also significant. This is a nationally scarce species of disturbed ground that can thrive in arable margins, with Lancashire being one of the few strongholds for this species. The plant used to be widespread on abandoned ground in Lancaster in the 1980s and, while it has declined in the district since then, it is still present at a few places locally. The arable margins provide a typical habitat for the species within its established historical range, so its continued presence should be encouraged.

In the HE10 margin, all five desirable grass species (common bent, timothy, crested dog's-tail, red fescue and smooth meadow-grass) were present in 2020. Collectively these comprised almost a third of the sward, which is consistent with results from the last four years (20 -33%). Yorkshire-fog was the single largest grass component, as has been the case in four of the last five years, forming about a quarter of the sward.

The total cover of key herb species in the HE10 mix was similar to last year, at more than 60%, which was appreciably higher than the total cover in the four previous years (24 - 35%). The individual cover of black knapweed, ribwort plantain, yarrow and ox-eye daisy each exceeded 5% cover for the third successive year; satisfying the target of minimum 5% cover for at least three key herb species for the third successive year.

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	2018	2019	2020
		29 July	5 July	28 July	27 July	22 July	22 July
Desirable species cover (target 5 - 60% of at least 3 species)							
spring triticale	HLS	19.6	0	0	0	0	0
poacher white millet	HLS	0	0	0	0.5	0	0
fodder radish	HLS	58.7	49.5	61.5	76.5	50.5	49.5
spring barley	HLS	1.5	3.2	0	0	0	5.5
spring wheat	HLS	6	0	3.5	0.7	0.7	0.8
gold of pleasure	HLS	0	0	1	8	23.5	4
mustard	HLS	14.3	40.5	18.5	3.1	20.5	19.1
<i>purple ramping-fumitory</i>						2	0
<i>tansy-leaved Phacelia</i>		2.6	0.9	0.7	0.1	0.2	2.1
<i>borage</i>		0.5		1	present	0.1	1
<i>common fumitory</i>						0.1	0
Cover of bare ground (target 5 - 10%)	HLS	5	5.5	14	13	11	4.7
Undesirable species (target - no species more than 5% cover)	HLS						
common nettle		0.1	0.2	4.1	0.3	0.4	3.4
curled dock							
broadleaved dock							
spear thistle		0.1					
creeping thistle,		0.1			0.1	1	4.5
common ragwort							9

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	2019	2020
		29 July	5 July	28 July	27 July	22 July	22 July
Desirable species cover - grasses							
crested dog's- tail	HLS	1.5	2	2		2	2
small leaved timothy	HLS	2	2	3	3	2.5	9.5
smooth meadow-grass	HLS	0.5		0.5	1		0.2
red fescue	HLS	4.5	6	12.5	15	1	2
common bent	HLS	9.5	3	15	6	15	15.5
Total cover (target > 75% at end of year 1)		18	13	33	25	20.5	29.2
<i>Yorkshire-fog</i>			39	14	20	25.5	24.5
<i>creeping bent</i>			31.5	30	20	12	8
<i>ryegrass</i>			2.1	1.5	3	3	2.7
<i>meadow foxtail</i>			2	5.5	2	1.5	2
<i>cock's-foot</i>			1.5			0.5	0.5
<i>sweet vernal grass</i>			1.7	1		0.5	0.5
<i>rough meadow-grass</i>				0.5		12	2.5
<i>marsh foxtail</i>						0.7	0.2
<i>false oat-grass</i>						2.5	3
Desirable species cover - herbs (target 5 - 60% of at least 3 species)							
black knapweed	HLS	4.1	14.5	16	9.2	17	24
yarrow	HLS	0.5	0.6		14	24.4	10.1
ox-eye daisy	HLS	12	1.6		5.5	19.5	9.3
ribwort plantain	HLS	7.5	7.7	12.5	6.4	7.5	15.5
red clover	HLS	0.1	0.1		0.1		3
meadow vetchling	HLS						0
common bird's-foot trefoil	HLS						
Cover of bare ground (target 5 - 10%)	HLS	0	0	0	2.2	0.8	0
Undesirable species (target - no species more 5% cover)	HLS						
common nettle		0.5		0.5	0.1	0.1	1.4
curled dock						0.5	0
broadleaved dock		0.6		1	0.1	0.8	3.1
spear thistle		1.5	1.2		0.2	0.5	1
creeping thistle,		1			0.5	1	1.6
common ragwort		0.1					

4 Conclusions

The steady increase in diversity and abundance of key species within the meadow continued into July 2020, and for the fourth successive year fell only fractionally short of meeting the criteria for herb-rich 'lowland meadow'.

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 good cover of bluebell over the last five years, and scattered natural regeneration of 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. Some local control of the grass, particularly in areas where the sward is especially dense, may be beneficial in encouraging further woodland herb growth; perhaps an autumn or winter cut (with removal of cuttings) to provide a more open sward in the spring or some creation of bare ground around existing key herb plants to encourage their natural spread through seeding.

The seeded arable margins have generally shown signs of positive development and, for the second successive year, both the Storton margins and the HE10 margins met the HLS targets for cover of key species. The continued presence of purple ramping-fumitory within the Storton mix margins also adds to the site's biodiversity value.

5 References

- Natural England (2010) *Higher Level Stewardship Farm Environment Plan manual (3rd 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 2020

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 28 May 2019			1	2	3	4	5	6	7	8	9	10	Total
% herb/sedge cover excluding white clover & creeping buttercup (target > 20%)			70	80	80	50	70	70	80	75	60	50	68.5
% undesirable species (target < 5%)			0	0	0	0	1	0	0	0	0	1	0.2
% bare ground (target < 10%)			0	1	0	0	1	1	1	1	2	2	0.9
% 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	G06												
autumn hawkbit	G06	G02											
betony	G06												
bird's-foot-trefoil	G06												
bitter-vetch	G06												
black knapweed	G06				✓	✓	✓	✓		✓			F
black medick		G02											
bugle	G06												
bulbous buttercup		G02											
burnet saxifrage	G06												
common bistort	G06												
common cat's-ear		G02											R
common meadow-rue	G06												
common sorrel		G02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D
cowslip	G06												
cuckoo flower		G02											R
devil's-bit scabious	G06												
dropwort	G06												
dyer's greenweed	G06												
eyebright	G06												
field scabious	G06												
field wood-rush		G02											

Site Fairfield Meadow		Sample quadrat											
Date 28 May 2019		1	2	3	4	5	6	7	8	9	10	Total	
germander speedwell	G02												
glaucous/common/carnation sedge	G06												
goat's-beard	G06												
great burnet	G06												
greater bird's-foot-trefoil	G06											R	
lady's bedstraw	G06												
lady's-mantles	G06												
lesser trefoil	G02												
marsh marigold	G06												
marsh valarian	G06												
marsh/fen bedstraw	G06												
meadow buttercup	G02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D	
meadow vetchling	G06												
meadowsweet	G06												
milkworts	G06												
narrow-leaved water-dropwort	G06												
orchids	G06												
ox-eye daisy	G06		✓									R	
pepper-saxifrage	G06												
pignut	G06												
ragged robin	G06											R	
red clover	G02	✓	✓	✓		✓	✓	✓	✓		✓	A	
ribwort plantain	G02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D	
rough hawkbit	G06												
salad burnet	G06												
saw-wort	G06												
selfheal	G02												
sneezewort	G06												
tormentil	G06												
water avens	G06												
water mint	G06												
wood anemone	G06												
yarrow	G02						✓					R	
yellow rattle	G06	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D	

Lowland Meadow	at least 2 G06 species <i>Frequent</i> and at least 2 G06 species <i>Occasional</i>
Semi-improved Grassland	at least 4 G02 or G06 species <i>Occasional</i>

Appendix 1b: Fairfield Meadow Monitoring Form 2 July 2020

- 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 2 July 2020			1	2	3	4	5	6	7	8	9	10	Total
% herb/sedge cover excluding white clover & creeping buttercup (target > 20%)			80	60	70	60	60	80	80	80	70	60	70
% undesirable species (target < 5%)			<1	<1	<1	0	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	G06												
autumn hawkbit	G06	G02											
betony	G06												
bird's-foot-trefoil	G06												
bitter-vetch	G06												
black knapweed	G06		✓	✓	✓		✓	✓	✓	✓			A
black medick		G02											
bugle	G06												
bulbous buttercup		G02											
burnet saxifrage	G06												
common bistort	G06												
common cat's-ear		G02						✓	✓				R
common meadow-rue	G06												
common sorrel		G02	✓	✓	✓	✓	✓	✓	✓	✓	✓		D
cowslip	G06												
cuckoo flower		G02											
devil's-bit scabious	G06												
dropwort	G06												
dyer's greenweed	G06												

Site Fairfield Meadow		Sample quadrat											
Date 2 July 2020			1	2	3	4	5	6	7	8	9	10	Total
eyebright	G06												
field scabious	G06												
field wood-rush		G02											
germander speedwell		G02											
glaucous/common/carnation sedge	G06												
goat's-beard	G06												
great burnet	G06												
greater bird's-foot-trefoil	G06												
lady's bedstraw	G06												
lady's-mantles	G06												
lesser trefoil		G02											
marsh marigold	G06												
marsh valarian	G06												
marsh/fen bedstraw	G06												
meadow buttercup		G02		✓	✓	✓	✓	✓	✓	✓	✓	✓	D
meadow vetchling	G06												
meadowsweet	G06												
milkworts	G06												
narrow-leaved water-dropwort	G06												
orchids	G06					✓							R
ox-eye daisy	G06			✓			✓	✓			✓		O
pepper-saxifrage	G06												
pignut	G06												
ragged robin	G06												
red clover		G02	✓	✓	✓	✓	✓	✓	✓	✓	✓		D
ribwort plantain		G02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D
rough hawkbit	G06												
salad burnet	G06												
saw-wort	G06												
selfheal		G02							✓				R
sneezewort	G06												
tormentil	G06												
water avens	G06												
water mint	G06												
wood anemone	G06												
yarrow		G02	●										R
yellow rattle	G06		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	D

meadow cranes's-bill present in 2 quadrats

Lowland Meadow	at least 2 G06 species <i>Frequent</i> and at least 2 G06 species <i>Occasional</i>
Semi-improved Grassland	at least 4 G02 or G06 species <i>Occasional</i>

Appendix 1c: Grasses present in Fairfield Meadow, 5 July 2019

Site Fairfield Meadow						
Date 5 July 2019	1	2	3	4	5	Total
% herb/sedge cover excluding white clover & creeping buttercup (target > 20%)	80	50	80	40	80	
% undesirable species (target < 5%)	0	<1	0	0	0	
% bare ground (target < 10%)	1	<1	<1	<1	0	
% scrub (target < 5%)	0	0	0	0	0	
% large sedges, rushes, reeds (< 30%)	0	0	0	0	0	
common bent	✓	✓	✓	✓	✓	D
crested dog's-tail	✓	✓	✓	✓	✓	D
meadow foxtail		✓	✓	✓	✓	A
perennial ryegrass	✓	✓	✓		✓	A
red fescue			✓			R
rough meadow-grass		✓				R
smooth meadow-grass				✓		R
sweet vernal-grass	✓	✓	✓	✓	✓	D
Yorkshire-fog	✓	✓	✓	✓	✓	D

Appendix 2a: Pony Wood Monitoring Form 2020

Stop number	1	2	3	4	5	6	7	8	9	10	Date: 22 April 2020
1. Area attribute											
no loss of woodland area	✓										
2. Structure and natural processes											
oak											target for HLS - Tree species should be present at irregular spacing
ash					✓	✓	✓	✓			
beech	✓						✓		✓	✓	
birch											
Overall canopy cover	70	70	70	60	50	60	60	50	70	70	target for HLS between 25% and 70% of the area
Cover of shrubs	3	3	5	5	5	3	5	5	3	10	target for HLS hazel, blackthorn, rowan, hawthorn and holly 20% to 75%.
approximate number of age classes	4	4	4	4	3	5	4	4	4	3	desirable features - no target
seedlings	✓	✓	✓	✓		✓	✓	✓	✓	✓	
sapling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
young trees						✓					
mature trees	✓	✓	✓	✓	✓	✓	✓	✓	✓		
over- mature trees,	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
veteran/ancient											
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
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											
Other woodland herbs											
lesser celandine	✓	✓	✓	✓				✓	✓	✓	desirable features - no target
lords-and-ladies										●	
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 seedling	✓	✓		✓			✓	✓	✓	✓	
5. Regeneration potential											
Signs of seedlings growing through to saplings to young trees	✓	✓	✓	✓		✓			✓	✓	desirable features - no target ash, hawthorn, birch, blackthorn, cherry

Appendix 2b: Little Wood and New Plantation Monitoring Form 2020

Stop number	Plantation			Little Wood			Date: 22 April 2020
1. Area attribute							
no loss of woodland area		✓			✓		
2. Structure and natural processes							
oak	✓	✓	✓			✓	target for HLS - Tree species should be present at irregular spacing
ash				✓	✓	✓	
beech		✓					
birch		✓	✓				
Overall canopy cover	0	20	20	70	70	70	target for HLS between 25% and 70% of the area
Cover of shrubs	30	50	40	40	30	50	target for HLS hazel, blackthorn, rowan, hawthorn & holly 20 - 75%.
approximate number of age classes	2	4	3	4	4	3	<i>desirable features - no target</i>
seedlings		✓	✓	✓	✓		<i>desirable features - no target</i>
sapling	✓	✓	✓	✓	✓	✓	
young trees	✓	✓	✓	✓	✓	✓	
mature trees				✓	✓	✓	
over- mature trees,							
veteran/ancient							
areas of relatively undisturbed mature/old growth stands or a scatter of large trees allowed to grow to over-maturity/death present				✓	✓	✓	
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							
Other woodland herbs							
lesser celandine		✓	✓	✓	✓	✓	<i>desirable features - no target</i>
lords-and-ladies						●	
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		✓	✓				<i>no target</i>
Spanish bluebell				✓			
5. Regeneration potential							
Signs of seedlings growing through to saplings to young trees		✓	✓	✓	✓		<i>desirable features - no target</i> <i>blackthorn/ holly, field maple, hawthorn</i>

Appendix 3a: Fairfield Arable-margin Monitoring Form 2020 - 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: 22 July 2020</i>
2. Cover of bare ground											target for HLS - between 5% and 10 % by year 2
bare ground	5	5	5	5	5	5	5	2	5	5	
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	50	40	80	80	50	40	60	30	40	25	
spring barley	5		5	15	5		5	15		5	
spring wheat		5			2		1				
gold of pleasure	5							20	5	10	
mustard	20	25	20	10	20	1	15	25	30	25	
<i>purple ramping-fumitory</i>											
<i>tansy-leaved Phacelia</i>	5	2	1		1		5	2	5		
<i>borage</i>	2				1		1	1	5		
<i>common fumitory</i>											
<i>corn marigold</i>						25	20				
<i>cornflower</i>						1	1				
<i>corn camomile</i>						1					
redshank		1	5			1	5	2			
groundsel		5					1	1			
chickweed								15			
fat hen					5	5		2		2	
shepherd's purse											
4. Undesirable field species											target for HLS - no species should be more than occasional
common nettle		1	5	1					2	25	
curled dock											
broadleaved dock											
spear thistle											
creeping thistle, common ragwort					5	10		10	15	5	

Appendix 3b: Fairfield Arable-margin Monitoring Form 2020 - HE10 mix

Stop number	1	2	3	4	5	6	7	8	9	10	<i>Date: 22 July 2020</i>
1. Cover of desirable species - HE10 mix											
crested dog's- tail		5						5	5	5	target for HLS - at least 75% cover of desirable species by year 1
small leaved timothy	5	5	5	5	5		10	40	20		
smooth meadow-grass				2							
red fescue			10		10						
common bent	5	10	15	20	50	25	20		5	5	
<i>Yorkshire-fog</i>	20	15	15	50	20	25	60	5	20	15	Other non-target grass species present
<i>creeping bent</i>		10		5	5			20	10	30	
<i>ryegrass</i>	20			2			5				
<i>meadow foxtail</i>		10	5				5				
<i>cock's-foot</i>							5				
<i>sweet vernal grass</i>			5								
<i>rough meadow-grass</i>	20	5									
<i>marsh foxtail</i>	2										
<i>false oat-grass</i>		30									
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
3. Field-layer composition - HE10 mix											
black knapweed	25	15	30	30	20	40	5	35	5	35	target for HLS - between 5% and 60% of at least 3 sown desirable broad-leaf species by year 2
yarrow		10	40		15			1	5	30	
ox-eye daisy	10		1	5	2	10		40	15	10	
ribwort plantain	5	5	25	10	10	15	5	30	20	30	
red clover			5						25		
meadow vetchling											
common bird's-foot trefoil											
<i>meadowsweet</i>	2										
<i>tansy-leaved Phacelia</i>											
<i>cut-leaved crane's-bill</i>					1						
<i>greater bird's-foot trefoil</i>											
<i>greater knapweed</i>											
<i>common fumitory</i>											
<i>borage</i>				1							
<i>meadow buttercup</i>	1										
<i>redshank</i>		5		1							
<i>cudweed</i>											
<i>cornflower</i>											
<i>corn marigold</i>											
<i>corncockle</i>											
<i>corn chamomile</i>											
<i>white campion</i>											
<i>self heal</i>		1									
<i>lady's bedstraw</i>			1							5	
4. Undesirable field species											
common nettle		1		1	1	2	5	1	2	1	target for HLS - no species should be more than occasional
curled dock											
broadleaved dock		1	5	5					15	5	
spear thistle							10				
creeping thistle,		2	5	1		1		1	5	1	
common ragwort											