

Monitoring of Fairfield Association meadow, woodland and arable margins Lancaster, 2015

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 an area of meadow in the Association's Fauna nature reserve;
- establish a monitoring protocol for Pony Wood and the seeded margins of the adjacent 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 mid 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; 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, at 10 points (i.e. a 2 x 2 m quadrat) within the meadow, the presence or absence of a number of key plant species which are indicators of either 'lowland meadow' or of 'semi-improved grassland'. The 10 monitoring points were selected to provide broad cover over the full meadow area, while each individual point 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.

According to the criteria outlined in Skelcher (2012), a successfully managed meadow should support at least two 'lowland meadow' indicator species in 5 or more quadrats (frequent) and at least two species in 3 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; though this could take a number of years to achieve.

In 2011 and 2012, monitoring took the form of a training event with a number of Fairfield Association members in attendance. In 2013, 2014 and 2015 monitoring was undertaken by Graeme Skelcher, but has remained open to Fairfield Association members who wished to attend. 2015 monitoring was carried out on 15 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. The land includes a small area of mature woodland, called Pony Wood, and fields which have subsequently been managed for arable crops (wheat in 2015), 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 Appendix 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.

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. Pony Wood was assessed on 10 June and the arable margins were assessed on 29 July.

2 Results

2.1 The meadow

In 2015, one species from the 'lowland meadow' indicator list was recorded as 'dominant' (yellow rattle) and two species were 'rare' (common spotted-orchid and ox-eye daisy), while one 'semi-improved grassland' indicator species was 'dominant' (meadow buttercup), one was abundant (ribwort plantain), one was 'occasional' (red clover) and four were 'rare' (cat's-ear, common sorrel, self-heal and yarrow - see Appendix 2 for details). This falls short of the criteria for 'lowland meadow', but comfortably satisfies 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).

The mean cover of herbs over the 10 quadrats was 59%, with only one quadrat having less than 40% 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 at each of just two points.

2.2 Pony Wood

Pony Wood currently covers an area of around 1 acre (0.4 ha) and mostly comprised mature trees over an almost absent understorey and a tall-grass field-layer. Its area has recently been extended beyond this by planting whips of oak, birch, rowan and other species, but only the mature woodland was assessed in 2015. The extended area should be included within future monitoring once woodland characteristics begin to develop.

Of the trees required to be present at regular intervals, mature ash and beech were both at least occasional through the established woodland stand (see Appendix 3). Oak and birch were not present within the mature woodland but have been planted frequently within the new area. Canopy cover in the established woodland area meets the HLS target, but the shrub-layer is almost non-existent. Most of the trees are mature or over-mature, with no signs of regeneration or saplings and very few younger trees. These aspects should improve now that grazing has been excluded.

The presence of herbs within the field-layer was difficult to assess in June due to the dense cover of tall grasses; particularly cock's-foot and rough meadow-grass. However, bluebell was found occasionally (recorded at 3 stops) and primrose was also present, so the target for 2 indicator species being occasional within 8 years seems likely to be achieved once the woodland layers develop and the grasses become less dominant in the field-layer. Survey work carried out by members of the Fairfield Association in April also recorded occasional presence of two further indicator woodland herb species - wood anemone and

ramsons - which further suggest promising woodland development.

Undesirable field-species were few, with only sycamore being more frequent than the required HLS target (and, in fact, recorded present at each of the 10 monitoring points).

2.3 Arable margin

The target for the 'HE10' mix, along the northern and eastern margins of the field, is that there should be 75% cover of certain fine-leaved grasses after the first year of seeding and, by the eighth year, there should be at least three of the desirable sown herb species each with cover of between 5 and 60%. All of the desired grass species (crested dog's-tail, timothy, smooth meadow-grass, red fescue and common bent) were present in 2015, but their average cover per quadrat was just 18% (see Appendix 4). The coarser Yorkshire-fog was typically the most common grass type, while ryegrass, creeping bent and meadow foxtail were also common.

All of the required herb species were also present within the HE10 margins. Overall, cover of ox-eye daisy averaged 12%, ribwort plantain averaged 7.5% and black knapweed averaged 4.1%, while only very small amounts of yarrow and red clover were present. Thus, the results fell fractionally short of the herb target. However, it should be noted that almost all of the herbs were recorded in the five quadrats assessed along the northern boundary while (bar one small patch next to Pony Wood which was not recorded in the sampling) only very small and scattered amounts of ribwort plantain were found amongst dense grass along the eastern side. The northern margin, therefore, would comfortably meet the required target for herb cover but very few of the seeded plants have established along the eastern margin.

Other desirable herb species recorded within the northern-margin, but not listed as part of the HE10 mix, were greater knapweed, greater bird's-foot trefoil, cut-leaved crane's-bill, common fumitory and the non-native (but still attractive to insects) borage and tansy-leaved Phacelia.

The 'Storton' mix, along the western and southern margins was a more typically 'arable' rather than 'grass/herb' mix. The seeded fodder radish (average of 58.7% cover per quadrat), spring triticale (19.6%), mustard (14.3%) and wheat (6%) were all found in high cover around the length of the margin. These species ensured that the target was met of three species each with between 5% and 60% cover (although fodder radish fell only just below the 60% upper limit and was, perhaps, overwhelmingly dominant in parts). The seeded barley was also present in smaller quantities but white millet and gold-of-pleasure were not found. Again 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.

None of the listed 'undesirable' species were found, individually, in more than two of the samples of either the ME10 margins or the Storton margins and are, therefore, not a problem at their current extent.

3 Discussion

3.1 The meadow

The table below shows that there has been a distinct improvement in the quality of the meadow since 2011. Most striking is the percentage herb cover, which has now reached 59% compared to just 15% in 2011 and 2012. The decrease in cover of non-desirable species is also encouraging, with the cover of (mainly) ragwort decreasing from 5% cover over the whole site to less than 1% in the last two years.

The 'lowland meadow' indicator species yellow rattle has continued to increase, and this year was found present at every one of the sampled stops. Significantly, two new lowland-meadow indicator species were recorded for the first time this year; ox-eye daisy and common spotted orchid. The 'semi-natural grassland' indicators meadow buttercup and ribwort plantain have also become more frequent this year, while red clover has remained as an occasional, common sorrel, yarrow and self-heal remain rare within the sward and cat's-ear has returned after being absent since the first survey in 2011.

Table: Abundance of indicator species at Fairfield Meadow in each year 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
	6 August	5 July	19 July	10 July	15 July
overall % herb/sedge cover (target > 20%)	15	15	47	56	59
overall % undesirable species (target < 5%)	5	<5	1	<1	<1
overall % bare ground (target < 10%)	0	0	0	0	0
overall % scrub (target < 5%)	0	0	0	0	0
overall % large sedges, rushes, reeds (< 30%)	0	0	0	0	0
Species					
common cat's-ear	R				R
common sorrel	O	R	R	R	R
field wood-rush	R				
germander speedwell	R				
meadow buttercup	R	A	O	A	D
orchids					R
ox-eye daisy					R
red clover	R	O	R	O	O
ribwort plantain	R	O	O	O	A
self-heal	R	R		R	R
yarrow	O	R	R	R	R
yellow rattle		O	A	A	D

3.2 Pony Wood

Due to past management, which has retained mostly mature or over-mature trees with no significant understorey or regeneration and a dense-grass rather than more open woodland-herb field-layer, it is likely to be several years before Pony Wood develops a natural structure. In this time, some thinning of the younger trees, especially sycamore, may be necessary to create gaps in which regeneration of trees and shrubs can flourish. Cessation of grazing together with summer shading should allow an increase of

woodland-herbs at the expense of the grasses and the growth of the planted trees will allow an associated development of shrubs and woodland herbs beneath.

While much of the existing established woodland comprised non-native trees, from the native trees and herbs present it appeared that the woodland would naturally develop into an ash-dominated wood. It is understood that ash was not planted in the extension area due to the current risk of ash dieback (*Chalara*, caused by introduction of the fungus *Hymenoscyphus fraxineus*). It is, however, likely that ash will naturally regenerate from existing mature trees as the woodland continues to develop.

Amongst the target tree species listed in the HLS, beech would not normally be considered desirable for nature conservation purposes as it is not native this far north and it provides a long, shady canopy cover that inhibits growth of shrubs and herbs below. However, the species is included as a feature here for its contribution to the local landscape.

Nevertheless, most of the beech trees in Pony Wood do actually have some conservation interest, due to their maturity; having developed features such as decaying limbs, flaking bark and natural holes and crevices, which make them very valuable to wildlife (e.g. for roosting bats, nesting and foraging birds and a wide range of invertebrates). This is also the case for other non-native tree species present in the wood, including horse chestnut, lime and sycamore. In contrast to beech, however, sycamore is classified as a negative feature under HLS requirements, with a target that this should be no more than occasional throughout the wood. While younger sycamore should certainly be progressively thinned, to allow development of more woodland diversity, retention of all over-mature trees would be desirable: beech, chestnut, lime and sycamore. Equally regeneration of all of these species should be monitored and removed where these species are out-competing native species, including beech which would have no impact upon the existing landscape trees.

Enough woodland-herb diversity is present within Pony Wood to expect these species to become more prevalent over the forthcoming years. Visibility of herbs was undoubtedly inhibited by the tall grasses in June and future monitoring would be better timed for April or early May.

3.3 Arable margin

The results for the arable margins along the north, west and south-west field boundaries were very positive for both seed-mix types. The eastern margin, however, was very poor. Whether this is related to seeds used, methods of seeding, pre-seed ground treatment, a natural resistance to seeding in this area or some other factor will need to be considered.

The grass/herb margins are, according to HLS targets, presumably expected to develop a fine-leaved grassy sward first, followed by establishment of herbs. Given the abundance of Yorkshire-fog and other coarser grasses, together with the relatively low cover of fine-leaved grasses, this first phase appears not to have occurred but, in the northern margin at least, the herb phase is very well developed.

Future monitoring will need to give greater consideration to the HLS requirement for between 5 and 10% bare ground. No bare ground was noted within the grass/herb sections and bare ground to this extent would seem inappropriate in this type of habitat. In the Storton margins, bare ground was not recorded because of the abundant cover of vegetation, but would have been present at ground level, beneath the stems and foliage, and probably this should have been recorded.

4 Conclusions

The meadow has continued to improve each year and is showing positive signs of developing into herb-rich lowland meadow within the next few years.

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

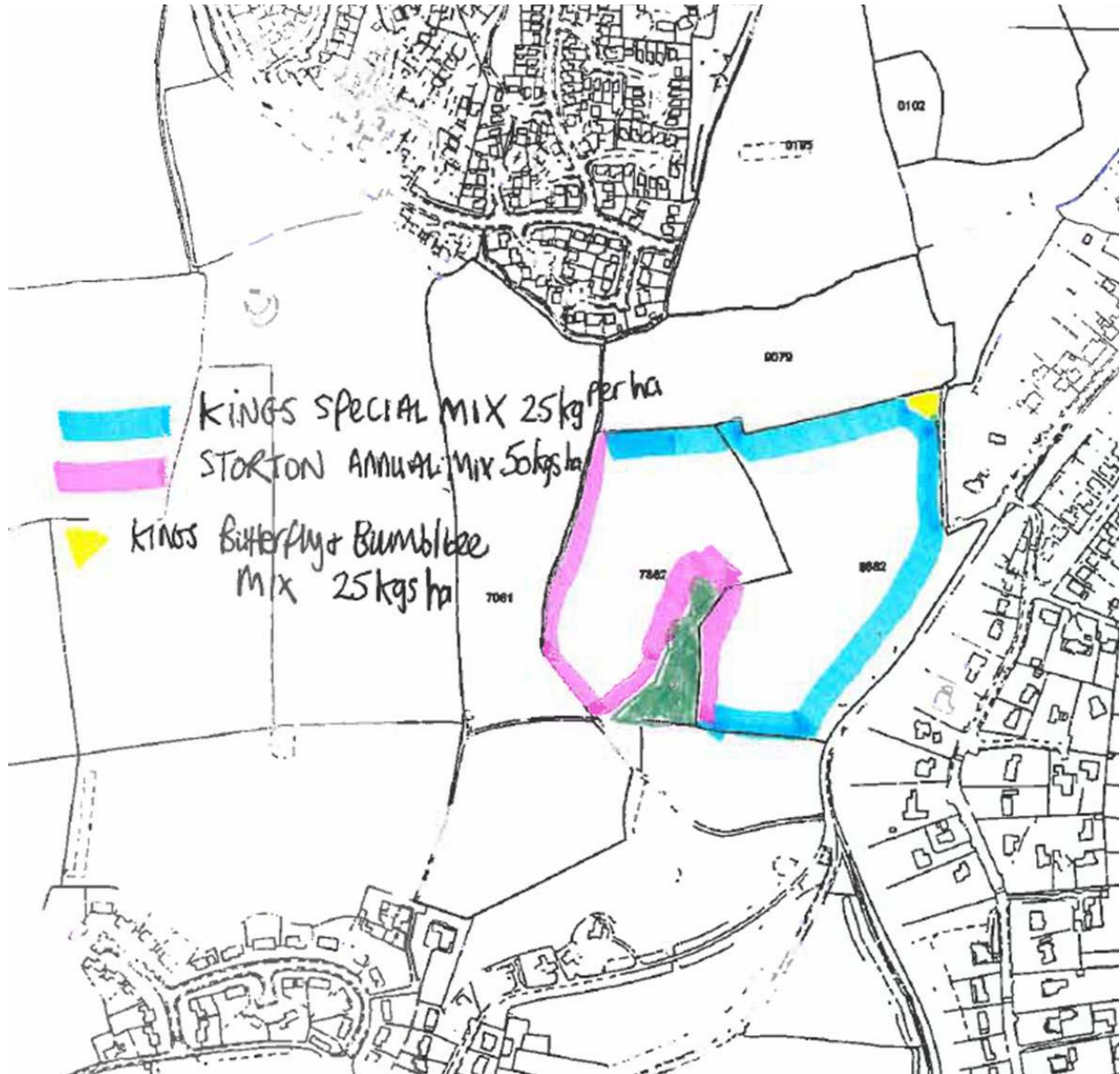
The seeded arable margins have mostly developed very well and are likely to improve as plants become established. However, the reasons for a near absence of herbs along the eastern field margin need to be investigated.

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 1: Location of Seed Mixes applied to Arable Margins
Map provided by the Fairfield Association, 2015



Appendix 2: Fairfield Meadow Monitoring Form 2015

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	15 July 2015												
			1	2	3	4	5	6	7	8	9	10	Total
% herb/sedge cover (target > 20%)			70	80	70	70	55	60	30	70	45	40	59
% undesirable species (target < 5%)			0	0	0	0	0	1	1	0	0	1	<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												
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	✓	✓									R
cowslip	Go6												
cuckoo flower		Go2											
devil's-bit scabious	Go6												
dropwort	Go6												
dyer's greenweed	Go6												

Site Fairfield Meadow														
Date 15 July 2015			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													
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			✓	✓						✓	O	
ribwort plantain		Go2		✓	✓	✓	✓	✓		✓	✓	✓	A	
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 3: Pony Wood Monitoring Form 2014

Site - Pony Wood			Date - 10 June 2015								Surveyed by - Graeme Skelcher	
Stop number	1	2	3	4	5	6	7	8	9	10		
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	70										target for HLS	
Cover of shrubs hazel, blackthorn, rowan, hawthorn and holly should be between 20% and 75%.	< 1										target for HLS	
approximate number of age classes (i.e. seedlings, sapling, young trees, mature trees, over-mature trees, veteran, ancient)	3 - early mature, mature, over mature										<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	✓ - some very old sycamore and horse chestnut present										<i>desirable features - no target</i>	
fallen or standing dead-wood present	✓ - including stumps and fallen branches										<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 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	none apparent - grass cover is currently too tall and dense										<i>desirable features - no target</i>	

Appendix 4: Arable Margins Monitoring Form 2015

<i>Stop number</i>	<i>Tot al</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: 29 July 2015</i>
A1. Cover of desirable species - HE10 mix												
crested dog's- tail	1.5						10		5			target for HLS - at least 75% cover of desirable species by year 1
small leaved timothy	2						5		5	5	5	
smooth meadow-grass	0.5									5		
red fescue	4.5		5					15	15	5	5	
common bent	9.5	15	5	5	5	5	5	5	20	20	10	
Yorkshire-fog												
creeping bent												
ryegrass												
meadow foxtail												
A2. Cover of bare ground												
bare ground		0	0	0	0	0	0	0	0	0	0	target for HLS
A3. Field-layer composition - HE10 mix												
black knapweed	4.1						1	5	25	5	5	target for HLS by yr 8 - between 5% and 60% of at least 3 sown desirable broad-leaf species by year 2
yarrow	0.5						1			2	2	
ox-eye daisy	12							40	40	20	20	
ribwort plantain	7.5		5	5			5	20	20	10	10	
red clover	0.1						1					
tansy-leaved Phacelia	1.5									10	5	
cut-leaved crane's-bill	0.5						5					
greater bird's-foot trefoil	0.5						1			2	2	
greater knapweed	3							10	5	15		
common fumitory	0.5										5	
borage	1										10	
B3. Field-layer composition - Storton mix												
spring triticale	19.6	30	10	2	25	25	5	25	45	5	1	target for HLS by yr 8 - between 5% and 60% of at least 3 sown desirable broad-leaf species by year 2
poacher white millet	0											
fodder radish	58.7	50	60	6	80	45	90	70	20	70	42	
spring barley	1.5						5	5	5			
spring wheat	6		5	5		10		5	20		15	
gold of pleasure	0											
mustard	14.3	15	10	2	1	20		5	35	15	40	
tansy-leaved Phacelia	2.6					10		5	5	5	1	
borage	0.5									5		
A4. Undesirable field species (HE10)												
common nettle	R							5				target for HLS by yr 8 - no species should be more than occasional
curled dock												
broadleaved dock	R						1				5	
spear thistle	R									10	5	
creeping thistle, common ragwort	R							10				
B4. Undesirable field species (Storton)												
common nettle	R											target for HLS by yr 8 - no species should be more than occasional
curled dock												
broadleaved dock												
spear thistle	R					1						
creeping thistle, common ragwort	R					1						