



## **CAMPAIGN FOR THE FARMED ENVIRONMENT**

### **ANNUAL REPORT – QUALITY ASSESSMENTS AND VERIFICATION MONITORING**

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## EXECUTIVE SUMMARY

### Introduction

1. The objective of the Campaign for the Farmed Environment is to maintain and exceed the environmental benefits of set-aside in terms of farmland birds, resource protection and wider biodiversity. To achieve this the Campaign partners are encouraging farmers to:
  - Enter or renew Entry Level Stewardship (ELS) agreements.
  - Include in-field or 'target' options in ELS agreements.
  - Maintain uncropped land and improve the environmental management of this land.
  - Undertake voluntary measures as part of the Campaign.
2. The objectives of this field monitoring programme are to assess farmer attitudes and awareness of the Campaign and to monitor the implementation, management and environmental benefits of the Campaign's **voluntary measures**. This report details findings from the condition assessments of habitat quality undertaken between July 2010 and March 2011. In order to provide a comprehensive overview of the first year of monitoring of the Campaign voluntary measures, **this summary also includes information from the spring 2010 visits**, which assessed farmers' attitudes to the Campaign and the management of features, including 'red box' requirements.

### Methods

3. In February 2010, Defra conducted a postal survey of a sample of farmers to identify those that were undertaking voluntary management. The results of this survey were used to identify a sample of farmers who reported that they were undertaking voluntary management as part of the Campaign, termed '**participants**' for the purposes of this report, and a sample that were not undertaking voluntary management in response to the Campaign – termed '**non-participants**'. In order to include measures less commonly implemented, half the sample was selected by targeting farms where less common measures were apparently present.
4. Telephone and interview surveys revealed that there were inconsistencies in the way in which farmers interpreted and responded to the postal questionnaire, probably because, at this early stage, the Campaign had not been running for long enough for farmers to have a clear understanding of what it entailed, or to implement new measures<sup>1</sup>. Many 'participant' farmers had included any existing uncropped land as management undertaken 'explicitly as part of the Campaign' and one third of the 'non-participant' sample had uncropped land on the farm that they had not recorded as voluntary management under the Campaign.
5. A total of 97 visits to 'participant' farmers and 57 'non-participant' telephone interviews were undertaken. Interviews explored the farmers' knowledge of and attitude to the Campaign in general terms, including their current and potential future engagement with the Campaign. Participant interviews included specific questions regarding the management of any uncropped land or cropped land that corresponded to Campaign measures on the farm. Field surveys were carried out to verify the presence of these features and to assess the environmental management being undertaken.
6. A total of 100 visits were undertaken during the summer, autumn and winter on subsets of these 97 farms to assess the condition of features being managed under the Campaign.

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<sup>1</sup> The Campaign was launched in November 2009, and the Defra survey was carried out in February 2010, however guidelines were not sent out until after the launch so farmers had had little time to implement new voluntary measures.

Visits were timed to maximise the value of assessments against the aims of the measures with respect to: farmland birds, wider biodiversity and resource protection.

7. Summer visits assessed the botanical composition and flower abundance for pollinators of measures that aim to provide wider biodiversity benefits and in-crop measures designed to benefit farmland birds. Autumn visits monitored the food resources (largely for birds) provided by game and wild bird cover and by overwintered stubbles. Winter visits aimed to establish the likely benefits for resource protection, through assessment of attributes such as location and size of feature, vegetation cover and soil texture. In addition, a subsample of farms visited in autumn was also re-surveyed in February, to estimate the provision of bird food at this critical time of year. Habitat condition data were analysed at the feature level.

## **Results – Attitudes to the Campaign (from interviews during spring visits)**

8. Most participants and non-participants (79% for both populations) considered themselves to be contributing to the Campaign. Participants considered themselves to be contributing largely through voluntary management (77%) and (O)ELS agreements (57%). Of those non-participants that thought they were contributing to the Campaign (n=45), 91% considered they were contributing through an existing (O)ELS agreement. In addition, telephone interviews revealed that 35% of all 'non-participants' did, in fact, have voluntary environmental management on their farms. Non-participants who were not intending to implement voluntary measures often thought that they were already doing enough environmental management either through an AE agreement or voluntarily.
9. Farmers were largely supportive of the aims (92% of participants; 91% of non-participants) and approach (87% of participants; 84% of non-participants) of the Campaign.
10. Positive aspects of the Campaign for both samples were the fact that it is voluntary and that it provides environmental benefits. However, eight farmers were concerned that being a voluntary scheme would allow some farmers to contribute nothing and one specified that a compulsory scheme would be favourable.
11. A large proportion of both participants and non-participants were aware of the three Campaign themes, although generally awareness was slightly higher amongst participants than non-participants and lower for resource protection than for farmland birds or wildlife. Similarly most farmers were aware of the routes of implementation, although non-participants were less aware than participants. However, less than half of both participants and non-participants were aware of most aspects of: targets, sources of information/advice and regional issues.
12. The voluntary measures booklet and the farming press were the most common sources of information. A small number of both participants and non-participants had received no information about the Campaign. Analysis of the overall awareness suggested that meetings or farm events were more effective in communicating the message than the farming press, booklet or agronomists, although differences were small.
13. Most participants (75%) and non-participants (84%) had an (O)ELS agreement on the farm. On 51 farms, where sufficient information was available for analysis, 61% exceeded their points total by at least 5%. Around 90% intended to renew their agreement although the loss of management plans meant that around one third would have to make changes. No (O)ELS agreements would be affected by the choice of Campaign voluntary measures, however, two thirds of farmers indicated that voluntary measures would simply be any uncropped land in excess of the (O)ELS points requirement.
14. Reasons given by participants for implementing voluntary measures were: the measures were already present (32%), environmental benefits (32%), supporting the Campaign and avoiding compulsory action (15%) and wanting to encourage farmland birds (11%).

However, only eight farms had implemented measures specifically in response to the Campaign.

15. Reverted arable areas (C3a), grass buffers along watercourses (C1), overwintered stubbles (C7a), pollen and nectar mix (C12a), wild bird seed mixture (C9) and game strips (C10) were the most common Campaign voluntary measures implemented on farms.

## Results - Management

16. Most farmers were not clear about the management requirements for the measures and only 46% of features assessed met the 'red box' requirements<sup>2</sup>. However, most new features – i.e. those introduced specifically in response to the Campaign – did meet these management requirements.
17. The proportion of land under voluntary management similar to Campaign measures was calculated as a proportion of arable land for 84 farms for which sufficient information was available. Voluntary measures were separated into 'cropped' (overwinter stubbles, skylark plots and selective use of spring herbicides) and 'uncropped' (uncropped for the entire year). *On farms where uncropped measures were present* (n = 79), a mean of 4.7% of arable land was under these measures (mean of proportions calculated at the individual farm level), although on three farms with small arable areas the proportion of arable land under voluntary management was very high, hence the percentage is lower when calculated on the basis of total land areas (see below). Similar calculations for cropped measures indicated that, *on those farms where this type of measure was present* (n = 18) a mean of 16% of arable land was under voluntary management. However, cropped measures were only present on one fifth of farms. The proportion of land under these measures is much lower when averaged across all farms in the survey.
18. If the proportion of voluntarily managed land in the sample as a whole (n = 84) is calculated, a total of 5.3% of arable land (3.6% uncropped; 1.7% cropped measures) was under voluntary management similar to Campaign measures. However, it must be remembered that this represents only those farms that have voluntary management. Also, only 46% of the features assessed met the red box essential management requirements. Therefore, half of the features assessed could not be considered to be contributing to Campaign targets. When calculated on an area basis (based on the average size and the proportion of each measure that met the red box requirements on features assessed) only 38% of the land under voluntary measures met the essential Campaign requirements.
19. Information on management of overwinter stubbles was collected in autumn in relation to the specific areas in stubble over the 2010/11 winter. Although when originally questioned nearly 70% indicated that they would not cultivate stubbles until 1 March, only 20% of those questioned in the autumn were certain to leave stubbles until this date. In addition, nearly 60% of stubbles failed to meet the red box requirements because pre-harvest desiccants or post harvest herbicides had been applied.
20. Where possible, features were assessed against green box management considerations. For most measures, particularly the common ones only a small proportion of features met any 'green box' additional management recommendations.

## Results - Condition assessments of habitat quality

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<sup>2</sup> These are management specifications set out in the CFE farmer guidelines that must be followed if the voluntary measure is to count towards the Campaign target related to the area of voluntary measures. There are also 'green box' guidelines, which are advisory only and provide recommendations to further enhance the environmental value of the measure if desired by the farmer or land manager.



21. Botanical assessments carried out during the summer indicated that most features (sample largely C1 and C3a) were dominated by perennial (usually) grass species typical of uncropped areas on fertile farmland; relatively few species were indicators of habitat quality (axiophytes). Classification by the Countryside Vegetation System placed the majority of features in 'tall grassland/herb' or 'fertile grassland' aggregate classes. Detrended Correspondence Analysis of uncropped measures assessed during the summer distinguished between communities under C1, C3a and C3b (optional scrub management, which had largely been established for some years) and those under sown measures (C12a, C13, sown wildflower headlands) which were usually more recently established, although sample sizes of the latter group were small.
22. Species richness of all species, axiophytes, butterfly larval food plants and bird food species were generally highest on long established and sown swards and lower on short-term measures more closely associated with the cropping cycle.
23. Cover of bare ground or litter was low for measures C1 and C3a which had usually been established for some years, but higher on cropped measures.
24. Flower abundance of species that may represent a pollen and nectar resource was generally higher on sown than unsown measures, although live flower counts were similar on C3a and C13. Not surprisingly, live flower abundance was highest on C12a (12,000 flowers per 300 m<sup>2</sup>), where *Phacelia tanacetifolia* represented 80% of the flower resources on features under this measure. Very few flowers were present on features under C1. Of the 108 features that were assessed for flower abundance, 24 (largely C1 and C3a) had no live flowers present.
25. Autumn assessments of sown wild and game bird mixtures indicated that there was considerable variability in provision of food through sown species for birds across different features. A small number of features supported high numbers of seeds. However, overall less than half of features represented a significant food resource for birds in terms of either seed number or seed weight, although those under wild bird cover provided more food on average. Very few features retained any seed through until late winter.
26. Some weed species were a potential food source on both sown mixtures and stubbles if seeds are produced. Weed cover of relevant species that were seeding or were likely to produce seed was between 5 and 8% on the different measures in autumn. However, seeding plants of these species represented less than 1% cover when reassessed in late winter.
27. Assessments of the value of the range of measures intended to benefit resource protection indicated that most (84%) features were located adjacent to features that would benefit from a buffer strip or block. For features configured as strips, mean width was between 4.5 and 14.7 m for the different measures, but many features did not meet the minimum width red box requirements.
28. One third of features were situated at the bottom of a slope, where the average incline was 2.8°. Nearly half features assessed had evidence of compaction (vehicles, footpaths, animals) however measurements suggested that compaction was not severe on most features. Percent cover of bare ground was around 10% on established swards, but around 30% on sown wildflower margins. There was evidence of erosion or run-off in 15% of adjacent fields and 18% of the features themselves. However, only two features failed to intercept the erosion.

## Discussion – Farmer engagement

29. Most farmers thought they were contributing to the Campaign through voluntary measures or agri-environment agreements. However, at this early stage of the Campaign, there was considerable confusion about what constituted participation. In addition, on further investigation, in many cases where farmers had reported in the survey that they were

undertaking Campaign voluntary measures, these were often existing uncropped land that did not meet the red box requirements and, many (O)ELS agreements did not include in-field options. A recommendation was made in the report on the spring assessments that clearer messages about the importance of in-field ELS options and voluntary measures in addition to ELS agreements were required. Although most farmers were supportive of the aims and approach of the Campaign, it was thought that there might be less support if there was a greater understanding of what was required.

30. Although this report relates to a relatively small sample of farmers, it has been important in understanding the Defra postal survey. At this early stage in the Campaign, only eight of the 97 participant farmers visited had implemented voluntary management specifically in response to the Campaign, despite responding positively to the Defra survey regarding voluntary management. Of the 219 'participant' farmers contacted, many were not visited because the initial telephone interview revealed that there were in fact no voluntary measures on the ground, or because there was the likelihood that any existing voluntary management would be included in future (O)ELS agreements. Therefore the proportion of all farmers responding to the Campaign with new management was significantly lower than the Defra survey results indicate.
31. Although there was a high level of awareness, there was less understanding of the detail of the Campaign, reflected by the fact that most measures assessed did not meet the red box requirements. Most farmers apparently thought the management of uncropped features was environmentally beneficial, however they had rarely considered changing the management of existing features to meet the red box requirements. This may, in part, be a reflection of the lack of knowledge of the details of the Campaign management, but is probably more a result of the fact that land was often left uncropped because it suited the overall farm management – for example, margins were often left to allow access and game/wild bird mixes were common where there was a shooting interest.
32. In this survey, the proportion of arable land under management similar to Campaign measures (cropped and uncropped) is similar to the targets set out under alternative proposals to the CFE. However, 'participants' surveyed in this study were a subset of farmers with voluntarily uncropped land, therefore the overall average proportion of arable land under Campaign measures will be significantly lower than reported here.
33. The voluntary nature of the Campaign, although seen to be positive, was also considered by some to be a negative aspect since it is likely to allow some farmers to contribute nothing. The lack of area targets for individual farmers was also considered to be a problem by some. However, this work suggests those that are undertaking some form of voluntary management are managing a suitable proportion of their land that would meet national CFE targets if all farms participated at similar levels of voluntary management. The challenge is therefore to encourage wider commitment to voluntary measures and persuade a much greater number of farmers to accommodate more challenging environmental management, which adheres to the Campaign measures' red box requirements.

## **Discussion – Habitat quality**

34. The Campaign aims to mitigate the loss of set-aside through replacing the environmental benefits of rotational and non-rotational set-aside via a more diverse range of voluntary management. Many of the features assessed in the first year of the Campaign under voluntary management represent management similar to non-rotational set-aside, largely as uncropped field margins. The range of voluntary measures under the Campaign has the potential to provide benefits to a wider range of species and to provide equivalent benefits on a smaller area of land, however the range of measures currently being managed voluntarily as part of the Campaign is limited.
35. In drawing conclusions from this work, it must be remembered that many of the areas assessed were already in place before the start of the Campaign, and few areas had at that

stage been established specifically as contributions to the CFE. Also, the sample size for the majority of measures was small, limiting the amount of generalisation that is possible from the results.

36. Botanical composition of swards developed on areas that had been established for some time was similar to set-aside. Generally the vegetation was typical of fertile grasslands or tall grassland/herb vegetation types. More recently established areas (e.g. pollen and nectar mixtures, wildflower headlands) had a more ruderal character.
37. Analysis of plant species that provide a pollen and nectar source indicated that measures can provide significant resources for wider biodiversity, but further increases in flower abundance could result in increased densities of pollinators. On C1 and C3a areas, the proportions of plant species that were butterfly larval food plants exceeded 30%, however numbers of butterfly food plant species were small, and making recommendations for inclusion of butterfly food plants in seed mixtures could increase benefits for butterflies. A higher proportion of plants were potential food sources for birds, but in well established areas the swards may have been too dense to provide good foraging habitat.
38. Wild bird seed mixtures provided food resources for seed-eating birds, but results were highly variable and few seeds remained at the end of winter. Advice on how to achieve successful establishment and manage these crops could help to increase success rates. Management of stubbles often did not follow the guidelines and there was much room for improvement here.
39. Many of the measures of potential benefit for resource protection were positioned in appropriate locations and appeared to be effective in reducing entry of sediment into watercourses. In some cases however, locations were not ideal.
40. In the coming year it should be possible to link the definition of measures much more closely to farmer intentions, as the CFE is more firmly established and farmers have had much more time to gain awareness and understanding of its aims. There are already indications that a wider range of measures have been adopted, and it will be interesting to see whether compliance with the management guidance and condition of the resulting features has improved.

## **1. INTRODUCTION**

### **1.1 BACKGROUND**

The Campaign for the Farmed Environment (CFE) is an industry-led scheme to offset the environmental impacts of the abolition of set-aside. It is hoped that by encouraging uptake of Environmental Stewardship and relevant options within this scheme, and also the voluntary implementation of a range of measures, the environmental benefits of set aside will be recaptured and even exceeded. The Campaign has three themes; farmland birds, other biodiversity and resource protection. National targets for the CFE have been set, and if these are not met by 2012 the voluntary approach could be replaced with a regulatory scheme. These targets are:

- To double the uptake of the agri–environment Entry Level Scheme 'in-field' options
- To increase uncropped land by 20,000 hectares from January 2008 levels (with improved environmental management on 60,000 hectares)
- To introduce voluntary measures on other land covering at least 30,000 hectares and up to 50,000 hectares.

There are 15 voluntary measures (some with variants) that farmers are encouraged to implement (Table 1), with guidance on how they should be managed. Guidance is split into 'essential' management requirements ('red box') and additional considerations ('green box'). Uptake of voluntary measures is monitored through an annual postal survey carried out by Defra Agri-Environment Statistics Team in February. Field verification and assessment of quality of habitat is undertaken on a sample of farms that responded to the Defra questionnaire.

The objectives of the field monitoring programme include assessing farmer attitudes and awareness, and future intentions, verifying the implementation of voluntary measures, assessing environmental quality of features managed under voluntary measures, and estimating levels of environmental benefits accruing from these measures.

Results from farmer interviews and verification monitoring were reported in September with analysis against red box requirements (see Appendix 2). This report documents the findings of the condition field assessments undertaken between July 2010 and March 2011. However, in order to present a comprehensive account of the first year of monitoring, results of all field verification and condition assessments are included in the summary.

### **1.2 MONITORING OF VOLUNTARY MEASURES**

The objectives of the field monitoring programme are as follows:

- To assess farmer attitudes and awareness of the Campaign, including monitoring farmer intentions for subsequent years to assess future potential of the Campaign (Appendix 2);
- To verify that farmers have put in place the measures they claim they have (Appendix 2),
- As far as possible, to assess the quality of the environmental management and resulting habitats and features, for measures implemented as part of the Campaign and also those that were already present in the baseline,
- To estimate the extent of delivery of environmental benefits from measures, both those already put in place and those intended, based on literature review and expert opinion.

This report presents the results of the July 2010 to March 2011 monitoring, which assessed the final two objectives. In relation to the third objective, the main aim was to assess management of the measures and to establish whether this met the 'red box' requirements and additional 'green

box' management. Preliminary information on quality of the habitat or feature was obtained during the initial visit in spring 2010. This information was used to assess features against red box requirements (Appendix 2). For some measures, the spring assessments were not sufficient to fully assess features against red box criteria. Hence the red box criteria have been re-assessed for C7a, C6, C9 and C10, using data collected in the follow up visits in summer, autumn or winter. All measures were assessed in relation to the specific environmental issues that they were designed to benefit (Table 1) (for further information, see Boatman, 2010).

**Table 1 CFE Voluntary measures with target environmental benefits**

| Code | Measure  | Target benefits |                    |                     |
|------|--|-----------------|--------------------|---------------------|
|      |  | Farmland birds  | Wider biodiversity | Resource protection |
| C1   | Grass buffers alongside temporary and permanent watercourses   |                 | √                  | √                   |
| C2   | Grass areas to prevent erosion and run-off                     |                 |                    | √                   |
| C3a  | Reverted arable areas  |                 | √                  | √                   |
| C3b  | Optional scrub management                                      |                 | √                  | √                   |
| C4   | Skylark plots  | √               |                    |                     |
| C5   | Fallow plots for ground-nesting birds on arable land           | √               | √                  |                     |
| C6   | Overwinter stubble followed by spring/summer fallow            | √               | √                  |                     |
| C7a  | Overwintered stubble   | √               | √                  |                     |
| C7b  | Optional measure for vulnerable soil – cover crop/green manure |                 | √                  | √                   |
| C8   | Uncropped cultivated margins                                   | √               | √                  |                     |
| C9   | Wild bird seed mixture – arable/grassland areas                | √               |                    |                     |
| C10  | Game strips  | √               |                    |                     |
| C11  | GWCT unharvested cereal headlands                              | √               | √                  |                     |
| C12a | Pollen & nectar mixtures for arable or grassland areas         | √               | √                  |                     |
| C12b | Optional flower mix for use with horticultural crops           | √               | √                  |                     |
| C13  | Sown wildflower headlands                                      | √               | √                  | √                   |
| C14  | Selective use of spring herbicides                             | √               | √                  |                     |
| C15  | Enhanced management of short rotation coppice                  |                 | √                  |                     |

## 2. METHODS

### 2.1 SELECTION OF FARMS

Farms were initially selected for monitoring from the 939 respondents to Defra's postal questionnaire in February 2010). This sample was made up of 468 'participant' farms (those undertaking voluntary management as part of the Campaign) and 471 'non participant' farms. The latter group could be participating in the Campaign through an ES agreement or other uncropped land, but which were not undertaking voluntary measures as part of the Campaign. From this sample, 97 'participant' farms were visited during the spring of 2010. Half of this sample was selected at random and half was selected to target uncommon voluntary measures. In addition 57 telephone interviews were conducted with 'non participants'. Farms were selected for condition monitoring from the 97 'participant' farms that were visited in spring. Selection aimed to maximise the number of less common measures assessed, however some measures were recorded in very low numbers in the spring sample, therefore the sample for condition assessments was low for a number of measures. A total of 100 farms were visited; 34 during the summer, 33 in autumn and 33 in late winter. The number of measures re-visited for the condition samples are listed in Table 2.

**Table 2 Summary of measures revisited during the condition assessments**

| Summer   | C1 | C3a | C3b | C4  | C5 | C8  | C12a | C13 | C14 |     |     | Total |    |
|----------|----|-----|-----|-----|----|-----|------|-----|-----|-----|-----|-------|----|
| Farms    | 14 | 23  | 3   | 3   | 1  | 1   | 6    | 4   | 1   |     |     | 34    |    |
| Measures | 37 | 59  | 3   | 9   | 1  | 1   | 8    | 4   | 3   |     |     | 125   |    |
| Autumn   | C6 | C7a | C9  | C10 |    |     |      |     |     |     |     |       |    |
| Farms    | 2  | 13  | 12  | 14  |    |     |      |     |     |     |     |       | 33 |
| Measures | 4  | 24  | 22  | 34  |    |     |      |     |     |     |     |       | 84 |
| Winter   | C1 | C2  | C3a | C3b | C6 | C7a | C7b  | C9  | C10 | C13 |     |       |    |
| Farms    | 13 | 4   | 17  | 2   | 1  | 8   | 0    | 7   | 3   | 4   | 33  |       |    |
| Measures | 32 | 6   | 49  | 2   | 3  | 11  | 0    | 16  | 5   | 4   | 146 |       |    |

### 2.2 CONDITION ASSESMENTS

Condition assessments were carried out at the optimum time to assess the intended benefits of the different measures, hence most measures were monitored twice because they are designed to have multiple benefits. Summer assessments were undertaken on measures that aim to provide benefits largely to wider biodiversity, but also to farmland birds. Autumn visits were targeted at measures providing benefits to birds in terms of food availability and winter assessments concentrated on benefits to resource protection, but also re-assessed provision of food for birds on measures assessed in the autumn, because food availability is important at this time of year. Details of assessments and timings are summarised in (Table 3).

**Table 3 Condition assessments and timing undertaken for each measure (Boatman, 2010 - scoping report)**

| Code | Short description                | Farmland birds   |   | Wider biodiversity   |                          | Resource protection  |             |
|------|----------------------------------|--|---|--|--------------------------|--|-------------|
|      |                                  | Attribute  | Timing                                    | Attribute  | Timing                   | Attribute  | Timing      |
| C1   | Grass buffers along watercourses |  |   | Height of vegetation<br>Botanical composition<br>Flower abundance                                    | Summer                   | Ground cover<br>Location (slope etc.)<br>Evidence of runoff interception<br>Soil texture, compaction | Late Winter |
| C2   | Grass areas to prevent erosion   |  |   |  |                          | As for C1  | Late Winter |
| C3a  | Reverted arable areas            |  |   | Height of vegetation (& variability)<br>Botanical composition<br>Flower density<br>% grass and scrub | Summer                   | As for C1  | Late Winter |
| C3b  | Optional scrub management        |  |   | Plant & bare ground cover<br>Botanical composition (inc. scrub)<br>Flower density in grass           | Summer                   | As for C1  | Late Winter |
| C4   | Skylark plots                    | Botanical composition<br>Height of vegetation  | Summer                                    |  |                          |  |             |
| C5   | Fallow plots for birds           | Botanical composition<br>Height of vegetation  | Summer                                    | As for birds   | Summer                   |  |             |
| C6   | Stubble + fallow                 | Botanical composition<br>Plant & bare ground cover<br>Height of vegetation<br>Growth stage (evidence of flowering/seed production) | Late autumn/early winter (+ late winter)* | Botanical composition<br>Growth stage (evidence of flowering/seed production)                        | Late autumn/early winter |  |             |
| C7a  | Stubble                          | As for C6  | Late autumn/early winter (+ late winter)* | As for C6  | Late autumn/early winter |  |             |
| C7b  | Cover crop/ green manure         |  |   |  |                          | Location (slope etc.)<br>Cover of crop and non-crop vegetation<br>Soil texture                       | Late winter |
| C8   | Uncropped cultivated margins     | Botanical composition<br>Height of vegetation  | Summer                                    | As for birds   | Summer                   |  |             |
| C9   | Wild bird seed mix               | Crop & weed species<br>Plant & bare ground cover<br>Height of vegetation<br>Seed production/plant                                  | Late autumn (+ late winter if possible)   |  |                          |  |             |

| Code | Short description                       | Farmland birds                 |             | Wider biodiversity  |              | Resource protection  |        |
|------|---|--------------------------------|-------------|---|--------------|--|--------|
|      |   | Attribute                      | Timing      | Attribute   | Timing       | Attribute  | Timing |
| C10  | Game strips                             | Plant density                  |             |   |              |  |        |
|      |   | Game-bird feeding              |             |   |              |  |        |
| C10  | Game strips                             | As for C9                      | Late autumn |   |              |  |        |
| C11  | GWCT<br>Unharvested<br>cereal headlands | Botanical composition          |             |   |              |  |        |
|      |   | Crop, weed & bare ground cover | Summer      |   |              |  |        |
|      |   | Height of vegetation           |             | As for birds  | As for birds |  |        |
|      |   | Seed production/plant density  | Late autumn |   |              |  |        |
| C12a | Pollen/nectar mixes                     | Height of vegetation           | Summer      | Botanical composition<br>Height<br>Flower abundance   | Summer       |  |        |
| C12b | Flower mix for horticulture             | As for C12a                    | Summer      | As for C12a   | Summer       |  |        |
| C13  | Sown wildflower headlands               | Height of vegetation           | Summer      | Botanical composition<br>Flower abundance   | Summer       | Ground cover<br>Location (slope etc.)<br>Evidence of runoff interception<br>Soil texture, compaction | Winter |
| C14  | Selective herbicide                     | Botanical composition          | Summer      | Botanical composition   | Summer       |  |        |
| C15  | Short rotation coppice                  |                                |             | Margin strips only:<br>Plant & bare ground cover<br>Height of vegetation<br>Botanical composition<br>Flower abundance | Summer       |  |        |



### 2.2.1 Summer condition assessment

Summer condition assessments were undertaken on a subsample of 34 of the farms from the original set of the 97 visited 'participant' farms. The purpose of the visits was to establish the condition of those measures that are intended to have benefits to wider biodiversity during the summer. These measures are listed below with relevant assessments (Table 4).

**Table 4 Range of summer assessments for each measure**

| Measure | Height            | Botanical composition | Flower abundance  | % grass & scrub |
|---------|-------------------|-----------------------|-------------------|-----------------|
| C1      | Yes               | Yes                   | Yes               |                 |
| C3a     | Yes               | Yes                   | Yes               |                 |
| C3b*    | Yes (incl. Scrub) | Yes (incl. Scrub)     | Yes (excl. scrub) | Yes             |
| C4      | Yes               | Yes                   |                   |                 |
| C5      | Yes               | Yes                   |                   |                 |
| C8      | Yes               | Yes                   |                   |                 |
| C11     | Yes               | Yes                   |                   |                 |
| C12a    | Yes               | Yes                   | Yes               |                 |
| C12b    | Yes               | Yes                   | Yes               |                 |
| C13     | Yes               | Yes                   | Yes               |                 |
| C14     |                   | Yes                   |                   |                 |
| C15**   | Yes               | Yes                   | Yes               |                 |

\*Single overall assessment of proportion of area that includes scrub. Flower abundance in the area without scrub (assuming this exists). Height and botanical composition across the whole area.

\*\* Margin strips only.

Botanical composition was assessed for all measures listed in Table 4. This was done through the sampling of 20 small quadrats (0.1 m<sup>2</sup>) distributed randomly throughout the measure. The information recorded in each quadrat was:

- Height of the vegetation in the centre of the quadrat (cm)
- Top cover – pin hit was recorded
- All species present in the quadrat, plus bare ground, bryophyte and litter were recorded (presence or absence)

Flower/inflorescence abundance was recorded in 40 large quadrats (1 m<sup>2</sup>) on 108 features. The number of flowers of each species that were potentially valuable as a pollen and nectar source was recorded. Because assessments were undertaken over a period of months, abundance of dead flowers was also recorded on a subset of 16 farms (62 features) to provide a more comparable estimate of the total potential resource available. A flower unit was identified (*cf. Carvell et al., 2004*) as: an umbel (e.g. *Heracleum sphondylium*), head (e.g. *Trifolium pratense*), spike (e.g. *Lotus corniculatus*) or capitulum (e.g. *Tripleurospermum inodorum*).

### 2.2.2 Autumn condition assessment

Autumn assessments were carried out on measures **C6, C7a, C9 & C10**. Most stubbles were not present during the spring visits and in many cases the landowner was uncertain of the location of the stubble for the 2010/2011 cropping year, therefore these visits could only collect retrospective information on stubbles present in the previous autumn/winter. It was, therefore important to assess the management of the stubbles present during the 2010/2011 cropping season. Information collected during the autumn visit from the landowner for the C6 & C7a measures included:

- Area of C7a & C6
- Number of fields
- Details of any pre-harvest desiccants and post-harvest herbicides
- Details of any compaction removal
- Any fertilisers, manure, lime applied
- Information on grazing or cutting of the stubble
- Intended cultivation date, and any autumn cultivation carried out

For the field survey of the C6 & C7a areas, 20 quadrats of 0.25 m<sup>2</sup> were assessed. Within each quadrat the percentage cover of bare ground, litter, volunteer crop and individual weed species was recorded. The growth stage of the weed species was also recorded to one of the following categories: Vegetative, Flower buds present, Flowering, Seeds/fruit present, Seeds dehiscent, Dead. The height of the vegetation in the centre of the quadrat was also recorded.

Wild bird seed mix (C9) and game strips (C10) were assessed in the autumn sample to evaluate the resource that these measures were providing for farmland birds, from both sown and weed species. Percent cover of bare ground, bryophyte, litter, individual crop species and individual weed species was recorded in 10 quadrats 0.25 m<sup>2</sup>, which were randomly located across the area. The growth stage of both the weed and crop species were recorded using the same categories as for the stubble.

A second set of ten quadrats (1 m<sup>2</sup>) were sampled to evaluate the seed production of the sown crop species. The number of plants of each crop species was recorded and a randomly selected plant was sampled for each crop species in the quadrat. This would result in a maximum of ten seed heads per crop species, if the crop occurred in all ten quadrats within that given measure. In the laboratory, seeds were separated from these plants and counted to evaluate the number of seeds of each crop present within the area of the relevant measure.

### 2.2.3 Winter condition assessment

Winter condition assessments were carried out between February and March 2011 on a subset of 33 farms selected from the original spring sample. Measures were assessed for their contribution to resource protection and benefits to farmland birds. The measures assessed for their resource protection attributes were; **C1, C2, C3a, C3b, C7b, C13**. For each of these measures visited in the winter sample the following information was recorded;

- Adjacent feature;
- Position on slope;
- Angle of slope;
- Likelihood of benefits to resource protection in terms of location;
- Evidence of compaction including penetrometer readings;
- Soil type- soil sample taken using 'cork borer', diameter 3 cm, depth 5 cm;

- Ground cover (vegetation, litter & bare ground) in 10 quadrats of 0.25 m<sup>2</sup>;
- Evidence of run off or erosion.

Soil was hand textured (RPA, 2010) and textural classes were grouped into: light, medium and heavy (Table 5).

**Table 5 Soil texture groupings**

| Group                       | Textural class  |
|-----------------------------|-----------------|
| Sandy and light silty soils | Sand            |
|                             | Loamy sand      |
|                             | Sandy loam      |
|                             | Silt loam       |
| Medium soils                | Sandy clay loam |
|                             | Silty clay loam |
|                             | Clay loam       |
| Heavy soils                 | Sandy clay      |
|                             | Silty clay      |
|                             | Clay            |

Food provision for farmland birds was assessed on measures **C6, C7a, C7b, C9 and C10**. Assessments made in the autumn were repeated to provide an assessment of the resources remaining at this time.

## 2.3 ANALYSIS

Data for all assessments were summarised for each measure and analysed at the feature level, although different numbers of each measure were assessed on each farm.

Botanical composition data from the summer assessments were used to calculate species richness, or species richness as a proportion of the total number of species present, for various plant groupings in order to assess the quality of measures in terms of vegetation itself and as value for wider biodiversity. These groupings were: all species, axiophytes, species with the potential to provide food for birds and butterfly larval food plants (Table 23). Axiophytes are 'worthy plants' (<http://www.bsbi.org.uk/axiophytes.html>); they represent about 40% of species and are considered interesting, although they are not rare. They can be used as indicator species to assess the value of sites. Species were classed as axiophytes (Appendix 1, Table 23) if they appeared in any of the 21 county lists that have currently been compiled for the British Isles.

### 2.3.1 Vegetation Community Analysis

There are various ways to characterise vegetation communities and these were used to help understand what type of plant communities had developed on this group of measures. Community analysis was used to classify the groups of plants found within measures. The species present in each measure and their frequency within each measure (the proportion of quadrats where each species was present) were analysed with MAVIS software (Modular Analysis of Vegetation Information System). This was developed by the Institute of Terrestrial Ecology and based on the 'Countryside Survey' of the vegetation and land cover of Great Britain, carried out in 1978 and 1990. It provided a classification of plant communities via the Countryside Vegetation System (CVS) (Bunce *et al.*, 1999), the environmental conditions characterising each community *via* Ellenberg's indicator values (light, moisture, pH and fertility) (Ellenberg, 1974) and the type of plants and their life strategy through the functional strategy theory (Competitor, Stress-tolerator,

Ruderal characterisation (CSR)) (Grime *et al.*, 1988). Similar analysis was carried out on data from the survey of set-aside vegetation carried out in 2008 (Boatman *et al.*, 2009).

### Countryside Vegetation System (CVS)

CVS was considered an appropriate structure for classifying the measures as it was developed on through the study of widespread, relatively disturbed habitats (Bunce *et al.*, 1999). The system describes 100 classes of vegetation which are grouped into eight aggregate classes. This programme allocates each plot (vegetation communities were assessed for each measure) to the closest vegetation class within its classification hierarchy, although no information is given about the level of similarity between the observed and test communities.

### Ellenberg's Indicator Values

Each species is assigned a score that represents the behaviour of that species with respect to the main environmental factors (1 - 9 for light, pH and fertility and 1 - 12 for moisture) (Ellenberg 1974). The program combines the scores for all the plants recorded within each community (analysed here for each measure) and provides a mean score for each of the environmental factors. This characterises the levels of the factors that are expected to be present for each measure and have helped to shape the community that has developed.

### Competitor, Stress-tolerator, Ruderal characterisation (CSR)

Plant strategy theory postulates that there are two main determinants of plant distribution in most habitats (Grime *et al.*, 1988). The first factor is stress, which constrains growth, and the second is disturbance, which destroys biomass. If both these factors are absent and conditions are optimal for plant growth then the plant community composition is determined by competition between the species. It is possible to classify each plant species into functional types based on their responses to competition (C), stress (S) and disturbance (R). Each species is given a score for each of these factors and these are combined to provide a characterisation of each plant community and the environment in which it exists.

### Community composition

Multivariate analysis of community composition was undertaken with detrended correspondence analysis (DCA)<sup>3</sup> using Canoco V4.5. Analysis of uncropped habitats (C1, C3a, C3b, C12a and C13) was carried out using the proportion of quadrats in which a species was recorded as a measure of abundance.

## 2.3.2 Value for other species

In order to estimate the importance of voluntary measures for butterflies, a list of 20 species of butterflies, chosen because of their broad distributions was identified (Smart *et al.*, 2000). The number of butterfly species with the potential to utilise the flora within Campaign features was determined through a search of online databases for food plants, both primary and secondary, using the Biological Records Centre Database of Insects and their Food Plants, and the Postcode Plant database of Natural History Museum together with information on the Butterfly Conservation

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<sup>3</sup> DCA is a multivariate [statistical](#) technique used to find the main factors or gradients in large datasets typical of [ecological community](#) data. The main axes of variation are plotted against each other to indicate degrees of similarity or difference between different data sets. Values that are close together within the plot area represent similar communities.

website. The number of food plant species valuable for butterflies present during summer assessments was calculated as a proportion of the total number of species present for each area under voluntary management. The butterfly species included in the analysis and their food plants are listed in Appendix 1 (Table 24).

A list of 14 species of birds was used to determine the presence of their food plants within the areas under voluntary management. The list was based on the species used by Holland *et al.* (2006), but excluded released gamebirds, non-resident summer visitors, those with restricted ranges and Corvidae. The food plants for each of the chosen species present during summer assessments were determined using Wilson *et al.* (1996) and Holland *et al.* (2006) (Appendix 1, Table 24). The number of plant species with value for birds was calculated as a proportion of the total number of species present within each voluntary feature.

Autumn crop plant counts and seed samples were combined to provide estimates of seed number and mass of species of value for birds.

### **3. RESULTS**

#### **3.1 OVERWINTER STUBBLES (C7A) THAT MEET RED BOX AND GREEN BOX.**

In the September report (appendix 2) overwinter stubbles (C7a) were assessed as fully as they could be through farmer interviews. However the information collected was retrospective and due to the timing of the interviews the management applied to the previous overwinter stubble was not necessarily the same as that of the upcoming overwinter stubbles.

To account for this, the overwinter stubbles (C7a and C6) were re-assessed from data collected in the autumn and winter visits. Farmers were reinterviewed as to the management they would apply to the overwinter stubbles. A total of 24 fields in C7a were visited on 13 separate farms. Of the 24 visited, only 4 met the red box requirements fully. As expected from the original survey, the main reasons for failing to meet red box requirements was the application of either a post harvest herbicide or a pre harvest desiccant. This occurred on 58% of the overwinter stubbles assessed. In addition, fertiliser, lime or manure was/would be applied to 25% of areas under C7a.

One interesting difference from the results of the original survey reported in September 2010 is the number of stubbles that will be (or had been) cultivated before the 1<sup>st</sup> March. When questioned about their intentions or previous management in the initial spring visit 2010, 69% of the respondents indicated that the stubble would remain in situ until at least the 1<sup>st</sup> of March. Information collected during the autumn and winter visits however indicated that only 20% of the fields under C7a would definitely remain in place until March 1<sup>st</sup>. A further 25% would possibly be left until the 1<sup>st</sup> March. In general the landowners who were unsure as to when they would cultivate the stubble (the 25%) indicated that it would depend upon the weather and the crop that was to follow the stubble. Thus it was not the red box requirement of the CFE that was influencing their decision.

On a positive note, with respect to the additional green box management considerations (Table 6), features under C7a visited in the autumn and winter had no severe weed infestations undesirable weed species such as black grass, wild oats or sterile brome, and one landowner cultivated the stubble in late autumn. This management will potentially have provided additional environmental benefits (this particular C7a also met all the red box requirements).

#### **3.2 GREEN BOX CONSIDERATIONS**

In addition to the red box requirements, there are green box management considerations that can be implemented to boost the measures' benefit to the environment/wildlife/biodiversity. The conformation to red box requirements was reported in depth in the first report (see appendix 2) so this report will focus on the additional benefits incurred through any green box management also undertaken (information to assess green box management considerations was collated across all visits). The green box guidance varies between measures. In most cases it is possible to quantify those green box management actions that have been implemented, however some green box management considerations are subjective or unmeasurable and it is not possible to quantify the number of farms/measures meeting these.

Those green box considerations that are measurable are detailed in Table 6.

**Table 6            Measurable green box considerations (adapted from CFEFarmer's Guide)**

| <b>MEASURE</b> | <b>GREEN BOX CONSIDERATIONS</b>   |
|----------------|---|
| C1             | <ul style="list-style-type: none"> <li>• If established more than 1 year, cut 3 m near crop annually after July 31<sup>st</sup>, other 3 m cut no more than every two years &amp; Ideally remove cuttings</li> <li>• If prone to erosion do not use more than 10% cocksfoot in seed mix</li> </ul>  |
| C2             | <ul style="list-style-type: none"> <li>• Seed mix no more than 10% cocksfoot in seed mix (if sown)</li> <li>• Remove compaction in topsoil and subsoil</li> <li>• Cut regularly in first 12-24 month</li> </ul> <p>After first year 12-24 months: Cut outer 3 m annually after July and remaining area no more than every 2 year</p>  |
| C3             | <ul style="list-style-type: none"> <li>• Storage OK but avoid compaction of areas that could lead to erosion and run off</li> <li>• Regular cutting in first 2 year &amp; ideally remove cuttings</li> <li>• Sow grass if lots of bare ground</li> <li>• Light cultivation can be beneficial</li> <li>• Beneficial to move around farm every 3 year and locate next to watercourse and hedgerow/woodland</li> </ul>   |
| C5             | <ul style="list-style-type: none"> <li>• Avoid fields with pernicious weeds</li> <li>• Areas of severe compaction should be subsoiled</li> <li>• Don't place in field surrounded by tree lines or adjacent to woods unless larger than 10ha field</li> <li>• Ideally locate where curlew and lapwing have nested before</li> <li>• Locate next to intensively grazed field will provide improved habitat for chick rearing</li> <li>• Control undesirable weeds before creating the fallow</li> </ul> |
| C6             | <ul style="list-style-type: none"> <li>• Should not cultivate before 31 July unless organic</li> <li>• In exceptional circumstances can apply herbicide to destroy the green cover before May</li> <li>• Other agric operations that may harm biodiversity should be avoided</li> <li>• Can store organic manure but not more than the volume that will be applied to the field</li> <li>• Temp storage ok but should avoid compaction and track storage</li> </ul>                                   |
| C7             | <ul style="list-style-type: none"> <li>• Avoid fields with undesirable weed infestations?</li> <li>• Light cultivation on a clean stubble after harvest may be beneficial to encourage weed germination</li> </ul>  |
| C8             | <ul style="list-style-type: none"> <li>• Can be beneficial to cultivate some margins in the spring and some in Autumn</li> <li>• Can use targeted broad spectrum herbicides to prevent build up of pernicious weeds once the seeds have set.</li> <li>• Can leave in place over winter</li> <li>• Can relocate in new field or relocate in same field following year to avoid build up of pernicious weeds</li> <li>• Can be beneficial to vary time and depth of cultivation</li> </ul>              |
| C9             | <ul style="list-style-type: none"> <li>• Either: sow balanced combination of at least three small seed bearing crops from wheat, barley, triticale, kale, quinoa, linseed, millet, mustard, fodder radish, dwarf grain sorghum</li> </ul>   |

|     |  |
|-----|--|
|     | <p>and sunflower. If sown as a mixture no single species should make up more than 70% weight of the mix.</p> <p>OR: if establishing several blocks/strips across your holding can use one small seed bearing crop but ensure you vary the crops used between blocks</p> <ul style="list-style-type: none"> <li>• Can seek advice from local wildlife advisor</li> <li>• Sow at optimum time for chosen mixture</li> <li>• Remove compaction before sowing</li> <li>• Sow either annually or every other year if biennial crops are included</li> <li>• Tramlines and sever compaction should be removed after harvest where there is risk of run-off and erosion</li> <li>• Avoid sowing too early in spring</li> <li>• Can use non selective herbicides prior to sowing</li> <li>• Can use fertiliser and manure but not within 10m of a watercourse</li> </ul> |
| C10 | <ul style="list-style-type: none"> <li>• Either un-harvested cereal crop or sown</li> <li>• More benefit if more at least 6m wide, edge of field and 0.4ha</li> <li>• Distribute across farm</li> <li>• Remove severe compaction pre drilling if erosion is likely</li> <li>• Fertiliser and manure not within 6m of watercourse</li> <li>• Can use non residual, non selective herbicides</li> <li>• Avoid sowing too early in spring</li> <li>• If seed still present leave crop later than mid Feb</li> </ul>   |
| C12 | <ul style="list-style-type: none"> <li>• Re-establish mix as necessary</li> <li>• Cut half area to 20cm between mid June and end of first week in July</li> <li>• Don't cut if know ground nesting birds present</li> <li>• Late Autumn/ early winter grazing is allowed but avoid poaching</li> <li>• Avoid adding lime</li> </ul>  |
| C13 | <ul style="list-style-type: none"> <li>• Seek advice on best wildflower mix</li> <li>• Cutting- regular in first 12 months may be needed to control weeds- ideally remove cuttings</li> <li>• Leave 2 m near boundary, such as hedge uncut</li> <li>• If excess vegetation may suppress flowers cut again before April</li> </ul>  |
| C14 | <ul style="list-style-type: none"> <li>• From SAFFIE most beneficial treatment was single application of amidosulfuron in March</li> <li>• To avoid build up of severe weed populations, not recommended to be located in the same location in consecutive years</li> </ul>  |

C1 - 64 measures were considered in total. On no occasion did a single measure meet all the red box and green box additional considerations. However, there were instances where the management did provide additional benefits. On ten of the visited measures the inner and outer 3 m were cut at differing intervals, 3 of these also meeting red box requirements. On 3 occasions the cuttings would be removed providing additional benefits from the measure.



C2 - of the 7 measures assessed on only one occasion was compaction removed before the measure was established, cuttings were removed on the same measure. One landowner used two yearly cutting cycle as recommended by the green box management considerations, whilst the remainder cut every year.

C3a – a total of 115 examples of C3a were assessed in the original visits, with 67 of these meeting the red box requirements. Overall around 10% of these measures had their cuttings removed, and approximately 5% indicated that they would move this measure to an alternative location on a three year cycle. Around 95% the C3a sites that were visited were located next to either a watercourse, woodland or a hedge that would provide additional benefits.

C4 – despite all failing the red box requirements, green box management considerations were met in all instances. Plots were managed in the same way as the rest of the field and plots were not kept weed free.

C5 - two C5s were recorded. In both cases the landowners said they had noticed either lapwing or stone curlew in the vicinity of the location of the measure, enhancing the likely benefit to arise from this measure. Neither of the measures showed existence of pernicious weeds.

C6 – none of the nine C6s assessed met the red box requirements. In general however the green box considerations were met. On only one of the measures did the landowner intend to store organic manure but it was not clear whether this would be storage for the manure to be applied to that single field or a larger storage volume. No other storage was intended on the C6 measures, and no agricultural operations were planned for the areas. All of the landowners intended to use herbicides on the area, which is permitted after the end of May. This time specification was met in all but one case. The green box management consideration that was met most infrequently was the recommendation not to cultivate before 31<sup>st</sup> July. This was only met on around 50% of the measures. The main reason for failure to meet red box requirements was the failure to create a fallow in spring/summer<sup>4</sup>. However in the main the green box management considerations were met and so this measure is likely to provide similar environmental benefit to those seen in the first year of the C3a measure.

C7a - see section 3.1

C8 – three out of the six measures met the red box requirements. The green box management considerations suggest that severe pernicious weed infestations can be treated with a broad-spectrum target herbicide and this was used by one landowner to manage the weeds. No landowner suggested that they would vary the cultivation depth. There was also a mixture of intentions with regard to the duration of the measure, with some intending to leave the margin over winter whilst others would relocate the measure.

C9 - in most cases the seed mix used was as suggested by green box management, and it contained at least three small seed bearing species when it was sown. However there was an occasion where the landowner reported that the species sown was Oilseed rape, and a further instance where the sown mix was phacelia, sainfoin and mustard. Three of the farmers landowners visited (out of 16) did speak to an advisor about the most appropriate mix to use on their land.

C10 - in all cases farmers opted to sow the game cover strips as opposed to the other option of leaving unharvested cereal crop strips. In the majority of cases the areas that were cropped with game cover were in excess of the minimum 0.4ha advised under the green measures as well as exceeding the advised minimum 6m in width. In around 75% of cases the area to be sown was cultivated to remove compaction. Fertiliser and manure were applied on numerous occasions but

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<sup>4</sup> NB this requirement has now been removed from the prescription for 2011.

this was on measures that were not adjacent to a watercourse. Information collected at interviews in 2010 also indicated that in all cases the landowner intended to leave the crop in place until at least March. Of the farms selected to be revisited in the autumn and winter that had C10 sites in the initial visit, one farm had destroyed the vegetation before mid February and therefore could not meet the red box requirement of retaining the crop beyond mid February. However, it was not possible to assess whether seeds remained on the plants, since the crop had been destroyed prior to the field visit.

C12a – seven of the eight C12 examples surveyed assessed met the red box specifications. In addition to this two key green box management considerations were also met by all the measures - on no occasion was lime added, and the area under the measure was not poached (no landowner had, or intended to graze the area). Three of the landowners said that they would re-establish the measure, one would re-establish after two years and the other two would do so after one year. From the information obtained through the initial interview no landowner intended to cut half the area between mid June and the first week in July.

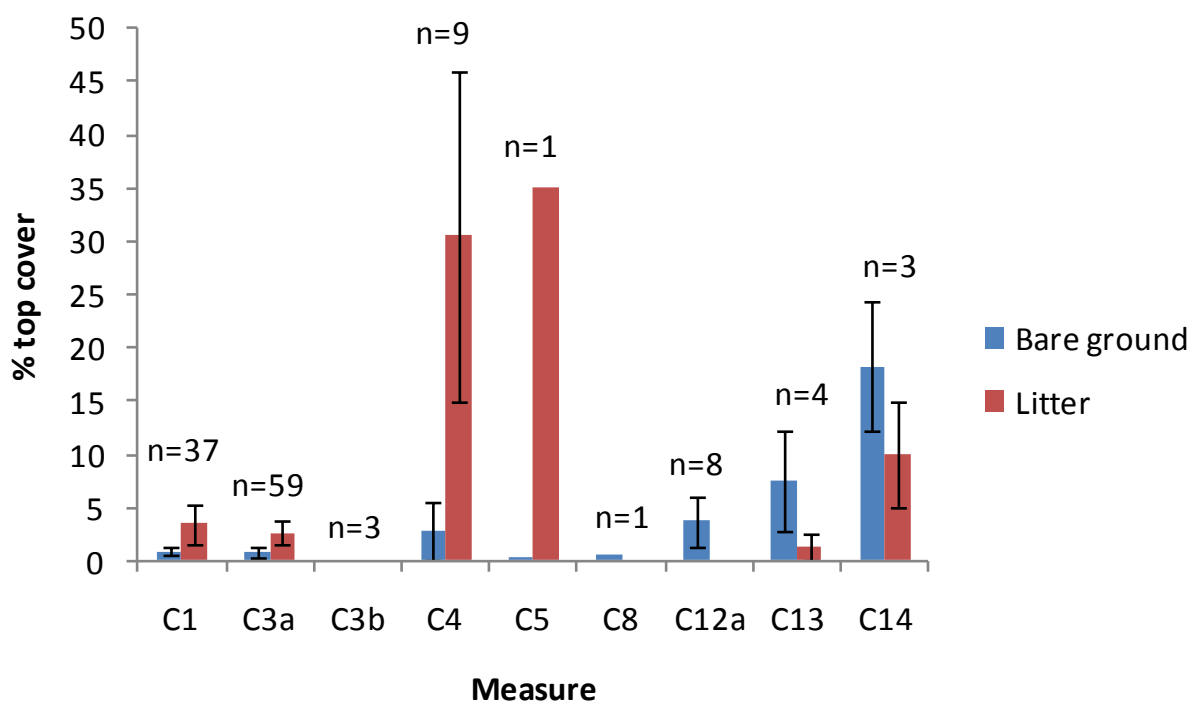
C13 - three examples of C13 were assessed in total, with one meeting all the red box requirements. The main reason for failing to meet the red box requirements was that the width of the strip was not sufficient or the cutting frequency was not appropriate. In addition, with respect to the green box management, none of the landowners intended to remove the cuttings. However biodiversity is likely to have been improved by one landowner who opted leave the 2 metres nearest the boundary uncut whilst the measure was in place. One landowner also took advice from FWAG on the most appropriate seed mix to use on the measure.

C14 – it was unclear as to whether the green box management considerations would be met on the three C14s.

### **3.3 SUMMER CONDITION ASSESSMENT**

A total of 281 plant species (or groups of species, where identification to species could not be achieved) were recorded on the 125 areas surveyed under C1, C3a, C3b, C4, C5, C8, C12a, C13 and C14. However, some plants that could not be identified to species were probably species already recorded. Of all species recorded, 127 were axiophytes, 71 were potential bird food and 28 were potential food for butterfly larvae. However, most species were uncommon, with over half of species recorded on only one (96 species) or two (55 species) features.

A measure of percent top cover was derived from the pin hit data. Mean cover of bare ground and litter (representing gaps in the sward) was low (<5% in total) for measures that had generally been established for a number of years (C1, C3a, C3b), whereas cover of bare ground was higher on predominantly recently sown margins (C12a, C13) (Figure 1). For those measures within the crop (C4, C5, C14) around one third of the cover was either bare ground or litter. Cover of bare ground was highest on C14 (the only measure where the area assessed was cropped). Uncropped areas within crops to benefit birds (C4, C5) had highest cover of litter.



**Figure 1** Percentage cover of bare ground and litter in summer, with standard errors.

### 3.3.1 Common species

A total of 42 individual species were recorded on more than 10% of features (Table 7). Within-site abundance was generally low, with only 12 species recorded in more than 50% of quadrats where the species was found and these species were generally recorded on only a very small number of features. Only five of these 42 species were axiophytes, and none of these were present on more than 17% of features.

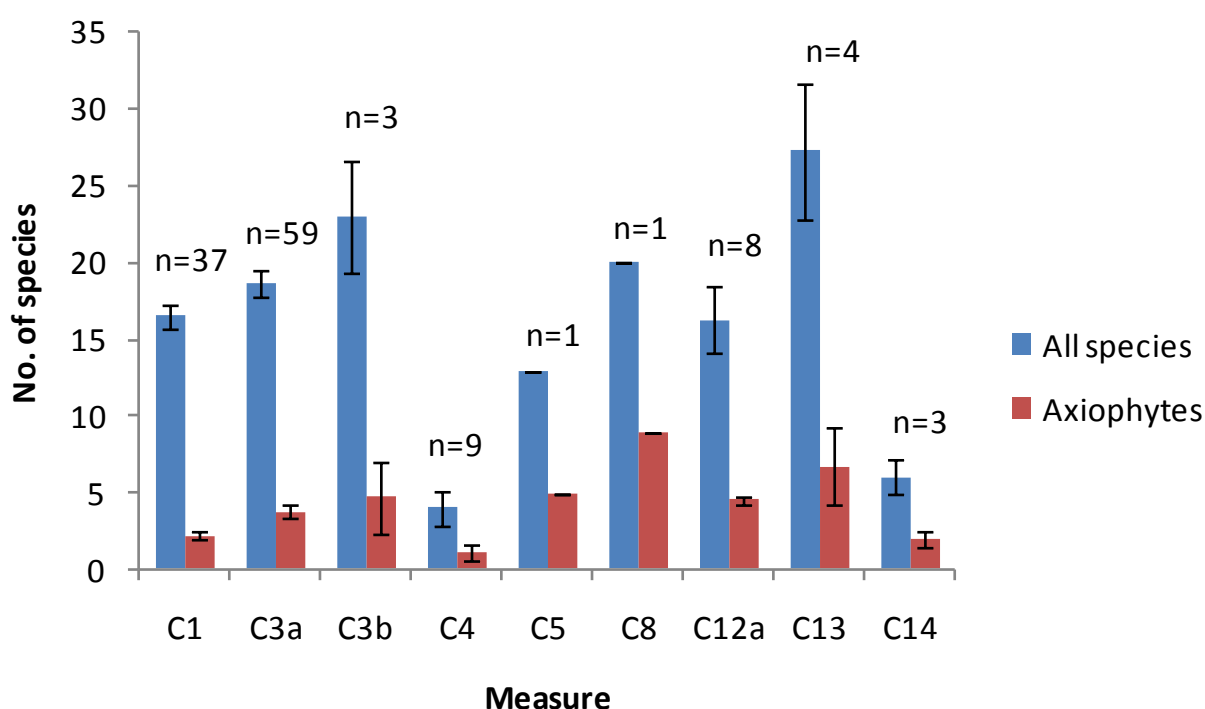
The most common species (in terms of frequency of recording across sites) were generally perennial grasses, although creeping thistle (*Cirsium arvense*) was the second most commonly recorded species (Table 7). Generally, the most frequently recorded species were common species associated with uncropped farmland habitats. The pin hit measure of top cover indicated that three perennial grasses (*Holcus lanatus*, *Lolium perenne* and *Arrhenatherum elatius*) each represented nearly 10% of cover across all features assessed.

**Table 7** Most frequently recorded species and groupings with % frequency of sites at which they were recorded, % abundance within sites at which they occurred and % top cover across all features. Shaded species are axiophytes.

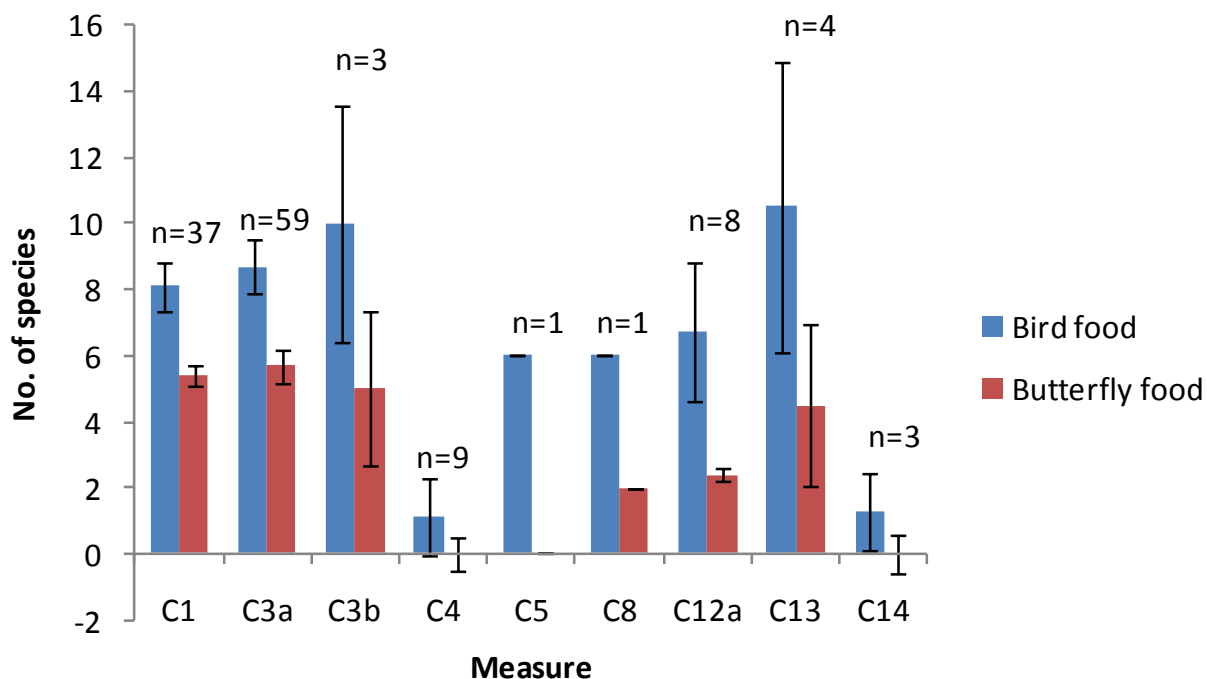
| Common name                  | Latin name                      | % frequency | Mean % abundance when present | Mean % top cover |
|------------------------------|---------------------------------|-------------|-------------------------------|------------------|
| Yorkshire fog                | <i>Holcus lanatus</i>           | 66.4        | 46.5                          | 9.8              |
| Creeping thistle             | <i>Cirsium arvense</i>          | 64.0        | 23.8                          | 3.1              |
| Perennial rye-grass          | <i>Lolium perenne</i>           | 60.0        | 42.6                          | 9.0              |
| Cock's-foot                  | <i>Dactylis glomerata</i>       | 57.6        | 31.3                          | 5.1              |
| Creeping bent                | <i>Agrostis stolonifera</i>     | 52.0        | 29.8                          | 4.2              |
| Rough-stalked meadow-grass   | <i>Poa trivialis</i>            | 50.4        | 30.0                          | 0.9              |
| Creeping buttercup           | <i>Ranunculus repens</i>        | 49.6        | 25.5                          | 2.3              |
| False oat-grass              | <i>Arrhenatherum elatius</i>    | 48.0        | 40.3                          | 9.0              |
| Red fescue                   | <i>Festuca rubra</i> agg.       | 42.4        | 48.6                          | 4.4              |
| White clover                 | <i>Trifolium repens</i>         | 40.8        | 35.2                          | 3.3              |
| Dandelion                    | <i>Taraxacum officinale</i>     | 39.2        | 23.8                          | 0.6              |
| Couch                        | <i>Elytrigia repens</i>         | 36.8        | 31.5                          | 1.7              |
| Hogweed                      | <i>Heracleum sphondylium</i>    | 30.4        | 10.9                          | 0.4              |
| Common nettle                | <i>Urtica dioica</i>            | 29.6        | 26.6                          | 2.7              |
| Timothy                      | <i>Phleum pratense</i>          | 28.0        | 39.9                          | 1.9              |
| Broad-leaved dock            | <i>Rumex obtusifolius</i>       | 26.4        | 12.4                          | 0.6              |
| Annual meadow-grass          | <i>Poa annua</i>                | 24.0        | 19.8                          | 0.2              |
| Common bent                  | <i>Agrostis capillaris</i>      | 20.0        | 30.2                          | 1.9              |
| Prickly sowthistle           | <i>Sonchus asper</i>            | 20.0        | 21.4                          | 0.5              |
| Unidentified broad-leaf spp. | Broad-leaf seedling spp.        | 20.0        | 13.8                          | 0                |
| Common mouse-ear             | <i>Cerastium fontanum</i>       | 18.4        | 14.3                          | 0.1              |
| Dove's-foot crane's-bill     | <i>Geranium molle</i>           | 16.8        | 12.9                          | 0.2              |
| Spear thistle                | <i>Cirsium vulgare</i>          | 16.8        | 12.6                          | 0.2              |
| Meadow fescue                | <i>Festuca pratensis</i>        | 16.0        | 51.0                          | 2.6              |
| Red clover                   | <i>Trifolium pratense</i>       | 16.0        | 31.8                          | 1.3              |
| Cleavers                     | <i>Galium aparine</i>           | 16.0        | 18.5                          | 0.9              |
| Greater plantain             | <i>Plantago major</i>           | 16.0        | 18.3                          | 0.2              |
| Field horsetail              | <i>Equisetum arvense</i>        | 16.0        | 17.8                          | 0.2              |
| Ragwort                      | <i>Senecio jacobaea</i>         | 14.4        | 8.6                           | 0.1              |
| Field speedwell              | <i>Veronica persica</i>         | 13.6        | 15.9                          | 0.4              |
| Fat hen                      | <i>Chenopodium album</i>        | 12.8        | 27.5                          | 0.7              |
| Cut-leaved cranesbill        | <i>Geranium dissectum</i>       | 12.8        | 13.1                          | 0                |
| Soft-brome                   | <i>Bromus hordeaceus</i>        | 12.0        | 25.7                          | 0.3              |
| Ash                          | <i>Fraxinus excelsior</i>       | 12.0        | 16.7                          | 0                |
| Knotgrass                    | <i>Polygonum aviculare</i> agg. | 11.2        | 25.1                          | 0.7              |
| Soft-rush                    | <i>Juncus effusus</i>           | 11.2        | 15.7                          | 0.6              |
| Crested dog's-tail           | <i>Cynosurus cristatus</i>      | 11.2        | 14.6                          | 0                |
| Blackberry                   | <i>Rubus fruticosus</i> agg.    | 11.2        | 13.2                          | 0.4              |
| Unidentified grass spp.      | Grass seedling                  | 11.2        | 10.7                          | 0                |
| Cow parsley                  | <i>Anthriscus sylvestris</i>    | 11.2        | 5.7                           | 0                |
| Smooth meadow-grass          | <i>Poa pratensis</i>            | 10.4        | 30.4                          | 0.3              |
| Chickweed                    | <i>Stellaria media</i>          | 10.4        | 14.2                          | 0                |

### 3.3.2 Species richness

Species richness in total and for each of the groupings, generally followed the same pattern across measures, although low replication for some measures meant that comparisons should be considered with caution. Data are presented for all measures where assessments were made, for comparison, however measures were not necessarily targeted at the specific environmental benefits assessed. Species richness was highest on sown wildflower headlands (C13) and lowest on skylark plots (C4) and selective use of spring herbicides (C14) (Figure 2). However, in many fields under skylark plots, only a single plot was present, which did not represent sufficient area to sample 20 quadrats. Therefore species richness for C4 represents a smaller sampled area than for other measures, which will of course affect species counts. Only a small proportion of the species present were axiophytes, and these species were generally recorded at low abundance (Table 7). Similar to the results for all plant species, uncropped measures generally supported a greater number of plant species of value for birds than cropped measures (Figure 3).

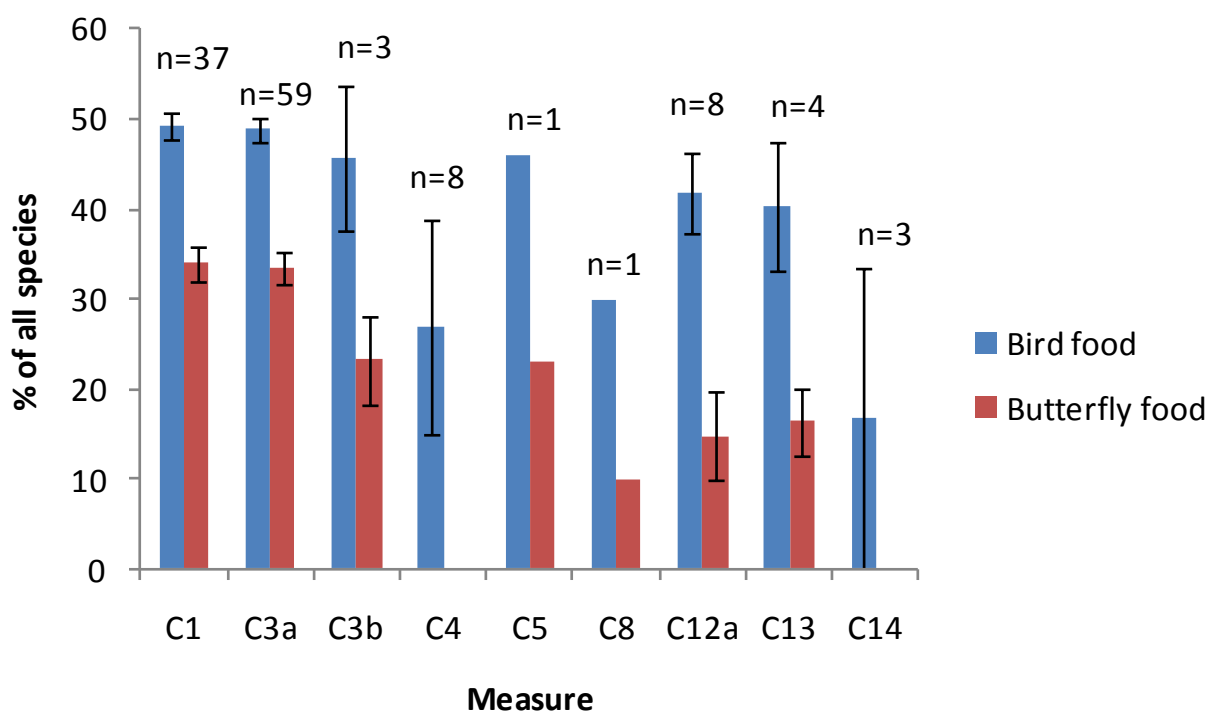


**Figure 2** Number of species and number of axiophytes present on different measures, with standard errors.



**Figure 3** Number of plant species of value as bird and butterfly larval food on different measures, with standard errors.

When calculated as a proportion of the total number of species present in each feature, 40 to 50% of species present would potentially provide food for birds for most measures (Figure 4). Only around a quarter of species present in skylark plots (C4) and less than 20% of those recorded under selective use of herbicides (C14) had potential value for birds, although sample numbers were small and there was considerable variability between features. Butterfly larval food plants represented a smaller proportion of total species on sown measures (C12a, C13) than on measures that had generally been established several years previously through natural regeneration.



**Figure 4** Percentage of species on each feature that were potentially beneficial to birds and butterflies, with standard errors. .

### 3.3.3 Vegetation community analysis

The breakdown of the vegetation classes as classified by the CVS is shown in Table 8. C1 and C3a were by far the most numerous of the measures used by the most farms and therefore gave the most accurate representation of the vegetation communities that had developed. Overall, most features represented communities from the tall grassland/herb and fertile grassland aggregate classes. There was no apparent relationship between the type of habitat and the quality of management in terms of red box requirements.

Features under C1 and C3a had been established for several years as only 3% of each were still in Aggregate Class I: Crops/Weeds, the initial stage of community development after cropping particularly if natural regeneration is allowed to occur. This is further supported by high proportions of these measures that had already developed into Aggregate Class III: Fertile Grasslands, with 57 and 59% of C1 and C3a respectively in this category. 44% of C3a were within the Vegetation Class 30: Fertile mixed grassland within this Aggregate Class. Areas under C1 were generally younger as only 1% had developed further into Aggregate Class IV: Infertile Grasslands, whereas 20% of C3a were in this Class. This is further emphasised by the presence of 38% of this category within Aggregate Class II: Tall Grassland/Herbs, evidence of the residual fertility of previous arable areas.

The numbers of the other measures were low and therefore it is hard to draw many conclusions from them. However C4 and C14 were predominately in Class I as would be expected from in-field measures, with 67 and 100% respectively. However many of the examples of C12a and C13 showed that they were recently established and therefore put in place for the Campaign, as 63 and 50% respectively were still in Aggregate Class I.

**Table 8      The number of features of each type within each vegetation class after analysis by the Countryside Vegetation System**

| Number of features:                       | Measure   |           |          |          |          |          |          |          |          |
|---|-----------|-----------|----------|----------|----------|----------|----------|----------|----------|
|   | 37        | 59        | 3        | 9        | 1        | 1        | 8        | 4        | 3        |
| Aggregate Class/Vegetation Class          | C1        | C3a       | C3b      | C4       | C5       | C8       | C12a     | C13      | C14      |
| <b>I: Crops/Weeds</b>                     |           |           |          |          |          |          |          |          |          |
| 1 Almost weed-free wheat/other crops      |           |           |          | 1        |          |          |          |          | 2        |
| 2 Various crops with scattered weeds      |           |           |          | 2        |          | 1        |          |          |          |
| 3 Cereal crops with scattered grass weeds |           | 1         |          |          |          |          | 2        |          | 1        |
| 5 Cereal crops with mixed weeds           |           |           |          | 2        |          |          |          |          |          |
| 6 Weedy leys/Undersown cereals            | 1         | 1         |          | 1        | 1        |          | 3        | 2        |          |
| <b>Total</b>                              | <b>1</b>  | <b>2</b>  | <b>0</b> | <b>6</b> | <b>1</b> | <b>1</b> | <b>5</b> | <b>2</b> | <b>3</b> |
| <b>II: Tall grassland/Herb</b>            |           |           |          |          |          |          |          |          |          |
| 10 Tall grassland/herb boundaries         | 1         |           |          |          |          |          |          |          |          |
| 11 Streamsides within crops               | 2         | 2         | 1        |          |          |          |          |          |          |
| 13 Lowland neutral roadsides              |           |           |          |          |          |          |          | 1        |          |
| 14 Lowland roadsides/crop boundaries      | 4         | 2         |          |          |          |          |          |          |          |
| 15 Lowland streamsides                    | 1         |           |          |          |          |          |          |          |          |
| 25 Shaded grassland/hedges                | 1         | 2         |          |          |          |          |          |          |          |
| 28 Fertile tall herb/grassland            | 5         | 4         |          |          |          |          |          |          |          |
| <b>Total</b>                              | <b>14</b> | <b>10</b> | <b>1</b> |          |          |          |          | <b>1</b> |          |
| <b>III: Fertile Grassland:</b>            |           |           |          |          |          |          |          |          |          |
| 23 Fertile grassland                      | 2         |           |          |          |          |          |          |          |          |
| 27 Rye-grass roadsides                    | 7         | 9         | 1        |          |          |          |          |          |          |
| 29 Rye-grass grassland                    |           |           |          |          |          |          |          |          |          |
| 30 Fertile mixed grassland                | 12        | 26        |          |          |          |          | 1        |          |          |
| 31 Rye-grass/clover grassland             |           |           |          |          |          |          | 2        |          |          |
| <b>Total</b>                              | <b>21</b> | <b>35</b> | <b>1</b> |          |          |          | <b>3</b> |          |          |
| <b>IV: Infertile Grassland:</b>           |           |           |          |          |          |          |          |          |          |
| 34 Mixed grassland/scrub/hedges           |           | 1         | 1        |          |          |          |          |          |          |
| 38 Fertile/neutral grassland on roadsides |           | 3         |          |          |          |          |          |          |          |
| 40 Rye-grass/Yorkshire-fog grassland      |           | 7         |          |          |          |          |          | 1        |          |
| 43 Rye-grass/bent grass grassland         | 1         |           |          |          |          |          |          |          |          |
| 44 Calcareous grassland                   |           | 1         |          |          |          |          |          |          |          |
| <b>Total</b>                              | <b>1</b>  | <b>12</b> | <b>1</b> |          |          |          |          | <b>1</b> |          |
| <b>V: Lowland Wooded:</b>                 |           |           |          |          |          |          |          |          |          |
| 8 Fertile hedges/boundaries               |           |           |          | 1        |          |          |          |          |          |
| <b>Total</b>                              |           |           |          | <b>1</b> |          |          |          |          |          |
| <b>Failures</b>                           |           |           |          | <b>2</b> |          |          |          |          |          |

### 3.3.3.1 Ellenberg's Indicator Values

The values from this analysis show that the communities that have developed on these measures are derived from agricultural soils as would be expected. Most are reasonably fertile, with moderate pH and moisture and generally good light levels. The mean values are very similar for all measures and all are within a range of 0.9 except the Wetness category where this is increased



to 1.1 but only due to the low value for C14 (Table 9). The ranges are generally small, though larger for C3a where the fertility of some was starting to decrease, an indication of maturity and long establishment.

**Table 9 Mean, maximum and minimum Ellenberg's Indicator Values for the different measures**

| Measure | Number | Light |     |     | Wetness |     |     | pH    |     |     | Fertility |     |     |
|---------|--------|-------|-----|-----|---------|-----|-----|-------|-----|-----|-----------|-----|-----|
|         |        | Mean  | Max | Min | Mean    | Max | Min | Mean  | Max | Min | Mean      | Max | Min |
| C1      | 37     | 7.0   | 7.4 | 6.5 | 5.5     | 6.2 | 5.1 | 6.5   | 6.8 | 5.8 | 6.1       | 6.8 | 5.3 |
| C3a     | 59     | 7.0   | 7.4 | 6.0 | 5.4     | 6.2 | 4.9 | 6.3   | 6.9 | 5.1 | 5.7       | 6.9 | 4.4 |
| C3b     | 3      | 6.8   | 6.8 | 6.8 | 5.4     | 5.6 | 5.0 | 6.6   | 6.9 | 6.2 | 5.9       | 6.8 | 5.3 |
| C4      | 7      | 7.0   | 7.5 | 6.0 | 5.2     | 6.0 | 4.8 | 6.7   | 7.0 | 6.2 | 6.6       | 8.0 | 6.3 |
| C5      | 1      | (7.1) | -   | -   | (5.0)   | -   | -   | (6.5) | -   | -   | (6.3)     | -   | -   |
| C8      | 1      | (7.0) | -   | -   | (4.8)   | -   | -   | (6.7) | -   | -   | (6.1)     | -   | -   |
| C12a    | 8      | 7.1   | 7.4 | 7.0 | 5.1     | 5.5 | 4.8 | 6.5   | 6.8 | 5.8 | 6.0       | 6.5 | 5.1 |
| C13     | 4      | 7.1   | 7.2 | 6.9 | 5.2     | 5.4 | 5.1 | 6.5   | 6.5 | 6.4 | 6.0       | 6.3 | 5.6 |
| C14     | 3      | 7.3   | 7.5 | 7.0 | 4.4     | 4.9 | 4.0 | 6.9   | 7.0 | 6.8 | 5.9       | 6.5 | 5.5 |

### 3.3.4 Competitor, Stress-tolerator, Ruderal characterisation (CSR)

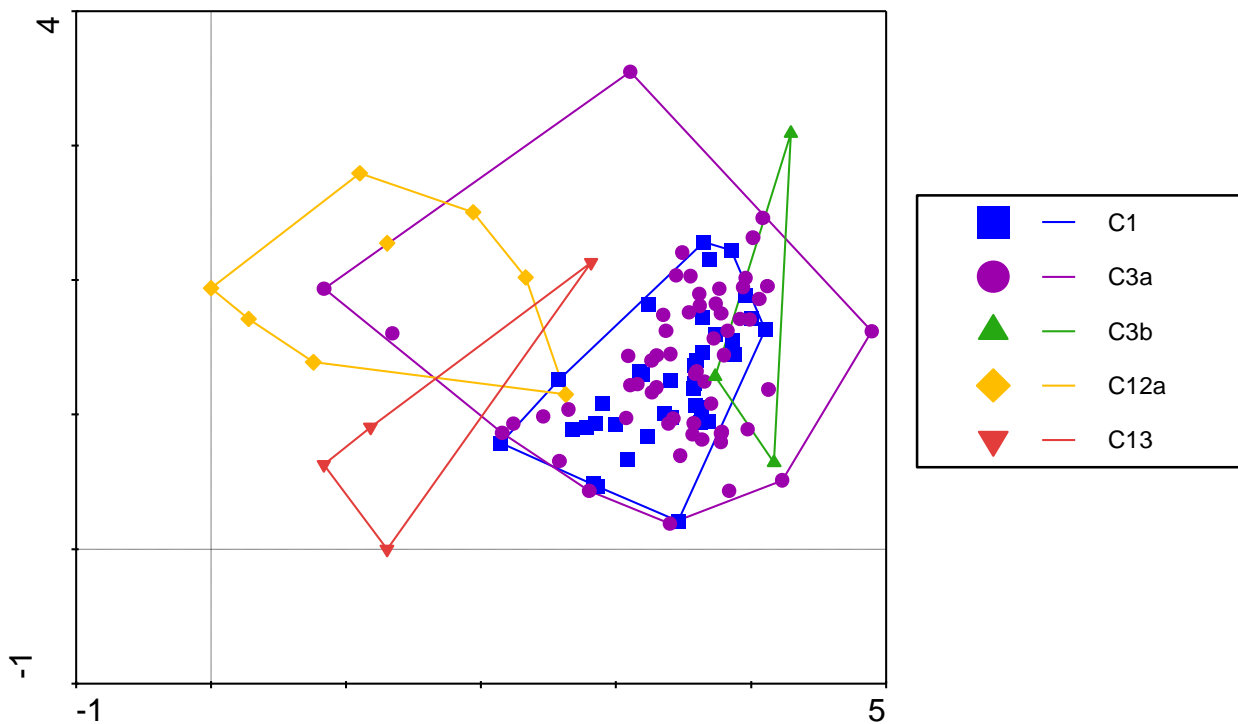
C4, C12a, C13 and C14 were largely ruderal communities characterised by fast growing plants with short life cycles and high seed production (Table 10). These are characteristics of annuals that form communities on ground with high levels of disturbance and low intensity stress indicative of the agricultural environment. These ruderal communities are good for farmland birds, with an abundant food source from the high levels of seed production and also bare areas of ground on which the birds can forage readily. However, it would be expected that long-term measures such as C13 would become more closed communities dominated by perennials over time as succession progressed.

C1 and C3a are formed from competitors, plants that have rapid growth rates, with high productivity and efficient uptake of resources. These are more stable environments that develop later in the vegetation succession once disturbance is lost. The increased range of C3a, especially its minimum value, shows that fertility is reducing and allowing more stress-tolerators to appear.

**Table 10** Mean, maximum and minimum values for Competitor, Stress-tolerator, Ruderal characteristics for the different measures.

| Measure | Number | Competitor |     |     | Stress-tolerator |     |     | Ruderal |     |     |
|---------|--------|------------|-----|-----|------------------|-----|-----|---------|-----|-----|
|         |        | Mean       | Max | Min | Mean             | Max | Min | Mean    | Max | Min |
| C1      | 37     | 3.1        | 3.6 | 2.1 | 1.7              | 2.4 | 1.3 | 2.8     | 3.7 | 2.1 |
| C3a     | 59     | 3.0        | 3.8 | 2.0 | 1.9              | 3.0 | 1.3 | 2.8     | 3.9 | 1.8 |
| C3b     | 3      | 3.3        | 3.6 | 3.1 | 1.9              | 2.5 | 1.5 | 2.4     | 2.4 | 2.3 |
| C4      | 7      | 1.9        | 3.0 | 1.0 | 1.2              | 1.5 | 1.0 | 4.0     | 5.0 | 3.0 |
| C5      | 1      | (2.1)      | -   | -   | (1.3)            | -   | -   | (3.8)   | -   | -   |
| C8      | 1      | (2.1)      | -   | -   | (1.2)            | -   | -   | (3.9)   | -   | -   |
| C12a    | 8      | 2.1        | 3.3 | 1.3 | 1.6              | 2.1 | 1.2 | 3.7     | 4.6 | 2.7 |
| C13     | 4      | 2.4        | 3.1 | 1.9 | 1.6              | 2.1 | 1.3 | 3.5     | 4.1 | 2.8 |
| C14     | 3      | 2.0        | 2.0 | 2.0 | 1.0              | 1.0 | 1.0 | 4.0     | 4.0 | 4.0 |

Detrended correspondence analysis, carried out on uncropped measures, indicated that community composition of sown measures (C12a, C13) was somewhat different to that of unsown measures (Figure 5) although species that occurred in unsown measures were also present on sown features. Vegetation communities on C1 and C3a were generally very similar.



**Figure 5** DCA plot of axis 1 (horizontal) against axis 2 (vertical) of vegetation community composition for summer botanical assessments

### 3.3.5 Flower abundance

The number of live flowers present was recorded on 108 features (across C1, C3a, C3b, C12a, C13), although no flowers were recorded on 24 of these. Mean abundance was calculated for an area 300 m<sup>2</sup> to allow comparisons with Carvell *et al.*, 2007. Pollination method was determined from Grime *et al.*, 1988).

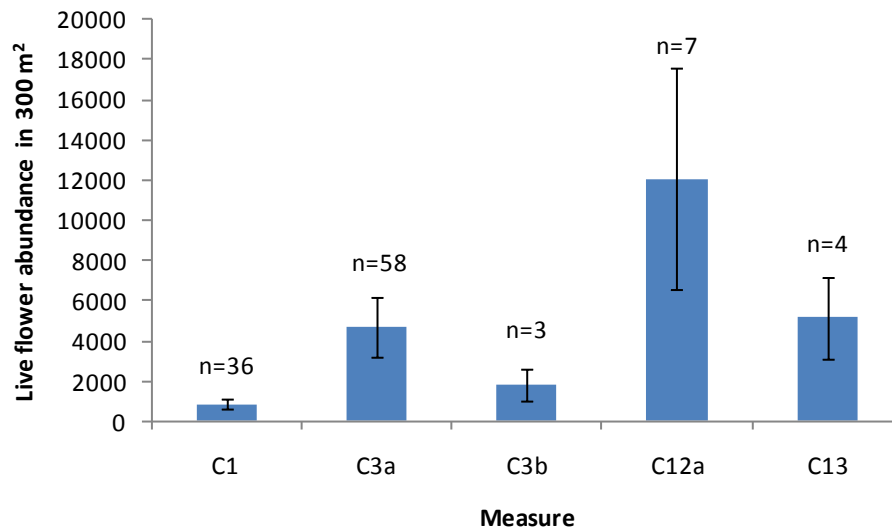
**Table 11** Most abundant flower species with total abundance per 300 m<sup>2</sup> across all features assessed

| Species                          | Total live flowers<br>per 300 m <sup>2</sup> | Pollination* |
|----------------------------------|--|--------------|
| <i>Tripleurospermum inodorum</i> | 803  | I            |
| <i>Phacelia tanacetifolia</i>    | 631  | I            |
| <i>Epilobium hirsutum</i>        | 470  | I            |
| <i>Cirsium arvense</i>           | 333  | I            |
| <i>Trifolium repens</i>          | 302  | I            |
| <i>Matricaria recutita</i>       | 160  | S/I          |
| <i>Lotus pedunculatus</i>        | 107  | I            |
| <i>Senecio jacobaea</i>          | 105  | I            |
| <i>Trifolium pratense</i>        | 70   | I            |
| <i>Epilobium ciliatum</i>        | 63   | S            |
| <i>Euphrasia nemorosa</i>        | 61   | S/I          |
| <i>Picris echioides</i>          | 50   | S/I          |
| <i>Centaurea nigra</i>           | 49   | I            |
| <i>Persicaria maculosa</i>       | 46   | S/I          |
| <i>Lotus corniculatus</i>        | 43   | I            |
| <i>Persicaria lapathifolia</i>   | 43   | S/I          |
| <i>Plantago lanceolata</i>       | 41   | W/I          |
| <i>Sonchus asper</i>             | 39   | I/S          |
| <i>Pulicaria dysenterica</i>     | 37   | I            |
| <i>Melilotus</i> spp.            | 33   | I            |
| <i>Heracleum sphondylium</i>     | 29   | I            |
| <i>Pimpinella major</i>          | 26   | I            |
| <i>Odontites vernus</i>          | 20   | I            |
| <i>Hypochaeris radicata</i>      | 19   | I            |
| <i>Prunella vulgaris</i>         | 19   | I            |
| <i>Crepis capillaris</i>         | 16   | I            |
| <i>Medicago lupulina</i>         | 16   | S/I          |
| <i>Origanum vulgare</i>          | 15   | I            |
| <i>Brassica napus</i>            | 14   | I            |
| <i>Cerastium fontanum</i>        | 13   | S/I          |
| <i>Clinopodium vulgare</i>       | 13   | I            |
| <i>Cirsium vulgare</i>           | 12   | I            |
| <i>Senecio erucifolius</i>       | 11   | I            |

\* I = insect; S = self; W = wind

A total of 101 species were recorded as flowering, 22 of which were present at a density of at least 25 flowers per 300 m<sup>2</sup> averaged across all features assessed (Table 11). Shaded species are those that are included in the ten species most commonly visited by bees in a study by Pywell *et al.* (2005).

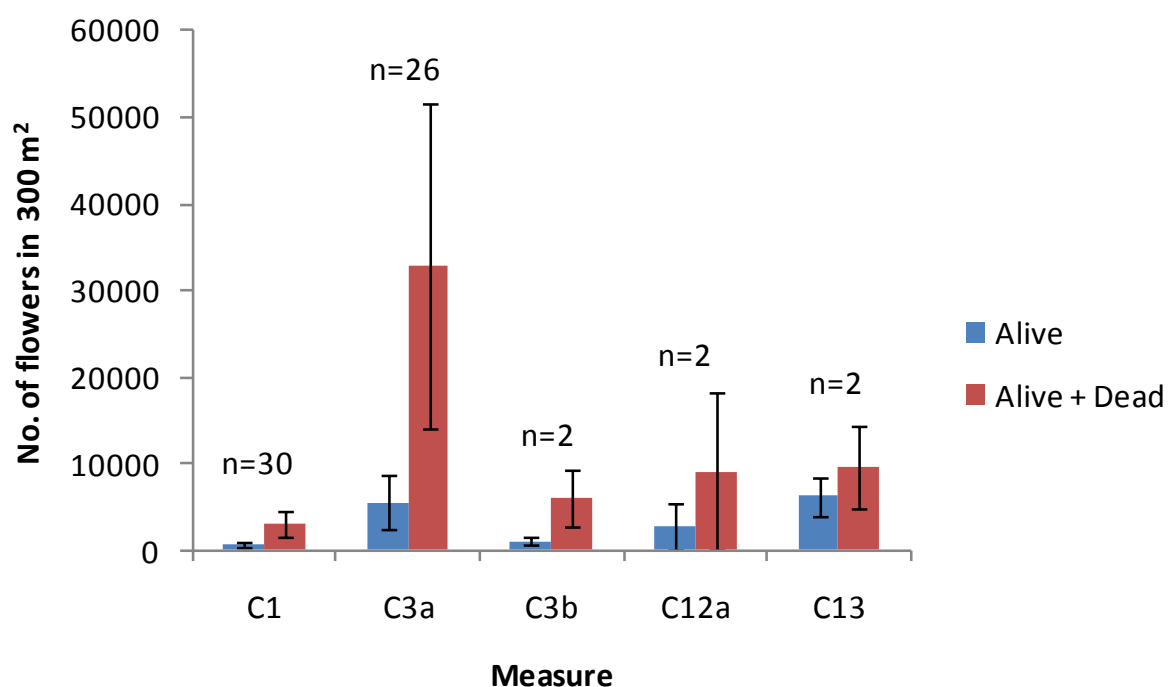
Flower abundance for live flowers was highest on C12a (12 092 flowers per 300 m<sup>2</sup>) and lowest on C1 (Figure 6). Species with the most abundant flowers for each measure are presented in Table 12. Counts of dead flowers were particularly high for C3a (Figure 7).



**Figure 6** Live flower abundance (per 300 m<sup>2</sup>) across relevant measures, with standard errors.

**Table 12** Species with the most abundant flowers

| Measure | N  | Species                          | Live flower abundance per 300 m <sup>2</sup> |
|---------|----|----------------------------------|--|
| C1      | 36 | <i>Cirsium arvense</i>           | 227  |
| C3a     | 58 | <i>Tripleurospermum inodorum</i> | 1284   |
| C3b     | 3  | <i>Clinopodium vulgare</i>       | 463  |
| C12a    | 7  | <i>Phacelia tanacetifolia</i>    | 9732   |
| C13     | 4  | <i>Tripleurospermum inodorum</i> | 1481   |



**Figure 7** Total flower abundance (per 300 m<sup>2</sup>) across relevant measures, with standard errors.

### 3.4 AUTUMN CONDITION ASSESSMENT RESULTS

A total of 84 features (stubbles C6 and C7a, wild bird seed mix C9 and game strips C10) on 33 farms were assessed during the autumn. A subset of 19 features were re-assessed in late winter to estimate the remaining food resources on these measures. These occurred on farms that were visited primarily to assess criteria related to resource protection.

#### 3.4.1 Crop species composition and food resource in sown wild and game bird mixes

There were 20 unique crop species sown across all of the C9 sites assessed, and a total of 19 across the C10 sites assessed. The species recorded in each of the two measures, C9 and C10 are shown in Table 13, ranked by the percentage of features in which each species was recorded. The average number of plants per m<sup>2</sup> for each crop species is also shown, along with the number of features in which the species was recorded.

**Table 13 Crop species most frequently recorded under C9 and C10**

| <b>C9</b>   | <b>n</b> | <b>%of features</b> | <b>Plants<br/>per 10 m<sup>2</sup></b> | <b>C10</b>                              | <b>n</b> | <b>%of features</b> | <b>Plants<br/>per 10 m<sup>2</sup></b> |
|---|----------|---------------------|--|---|----------|---------------------|--|
| <i>Brassica oleracea</i> (kale)                         | 11       | 50                  | 124.5                                  | <i>Sorghum bicolor</i>                  | 11       | 34.38               | 116.2                                  |
| <i>Chenopodium quinoa</i> (quinoa)                      | 8        | 36.36               | 75.0                                   | <i>Chenopodium quinoa</i>               | 10       | 31.25               | 219.3                                  |
| <i>Fagopyrum esculentum</i> (buckwheat)                 | 8        | 36.36               | 32.8                                   | <i>Panicum miliaceum</i>                | 8        | 25.00               | 85.7                                   |
| <i>Sinapsis alba</i> (mustard)                          | 8        | 36.36               | 46.9                                   | <i>Panicum ramosum</i>                  | 5        | 15.63               | 27.5                                   |
| <i>Panicum miliaceum</i> (common millet)                | 7        | 31.82               | 111.6                                  | <i>Sinapsis alba</i>                    | 5        | 15.63               | 299.0                                  |
| <i>Raphanus sativus</i> (radish)                        | 7        | 31.82               | 27.4                                   | <i>Brassica oleracea</i>                | 3        | 9.38                | 31.0                                   |
| <i>Linum usitatissimum</i> (linseed)                    | 6        | 27.27               | 49.2                                   | <i>Cichorium intybus</i>                | 3        | 9.38                | 631.7                                  |
| <i>Panicum ramosum</i> (browntop millet)                | 6        | 27.27               | 43.0                                   | <i>Echinochloa frumentacea</i>          | 3        | 9.38                | 458.3                                  |
| <i>Camelina sativa</i> (gold of pleasure)               | 4        | 18.18               | 11.3                                   | <i>Fagopyrum esculentum</i>             | 3        | 9.38                | 217.0                                  |
| <i>Phacelia tanacetifolia</i> (phacelia)                | 4        | 18.18               | 37.3                                   | <i>Helianthus annuus</i>                | 3        | 9.38                | 8.3                                    |
| <i>Sorghum bicolor</i> (sorghum)                        | 4        | 18.18               | 68.0                                   | <i>Melilotus</i> sp.                    | 3        | 9.38                | 22.0                                   |
| <i>Triticale hexaploide</i> (triticale)                 | 4        | 18.18               | 53.5                                   | <i>Phacelia tanacetifolia</i>           | 3        | 9.38                | 65.7                                   |
| <i>Cichorium intybus</i> (chicory)                      | 3        | 13.64               | 168.0                                  | <i>Amaranthus</i> (amaranth)            | 2        | 6.25                | 3.5                                    |
| <i>Helianthus annuus</i> (sunflower)                    | 3        | 13.64               | 40.7                                   | <i>Linum usitatissimum</i>              | 2        | 6.25                | 96.8                                   |
| <i>Brassica rapa</i> ssp. <i>rapa</i> (turnip rape)     | 2        | 9.09                | 65.0                                   | <i>Triticale hexaploide</i>             | 2        | 6.25                | 178.0                                  |
| <i>Brassica</i> sp.                                     | 3        | 13.64               | 7.0                                    | <i>Brassica oleracea</i> x <i>napus</i> | 1        | 3.13                | 101.0                                  |
| <i>Melilotus</i> sp. (sweet clover)                     | 2        | 9.09                | 4.0                                    | <i>Brassica</i> sp.                     | 1        | 3.13                | 56.0                                   |
| <i>Beta vulgaris</i> ssp. <i>vulgaris</i> (beet)        | 1        | 4.55                | 6.0                                    | <i>Raphanus sativus</i>                 | 1        | 3.13                | 5.0                                    |
| <i>Brassica napus</i> (rape)                            | 1        | 4.55                | 11.0                                   | <i>Setaria viridis</i> (foxtail millet) | 1        | 3.13                | 76.0                                   |
| <i>Echinochloa frumentacea</i> (Indian barnyard millet) | 1        | 4.55                | 554.0                                  |   |          |                     |  |

The seed resource provided by each of the sown species is variable due to the size of the seed and the number of seeds provided by each seeding plant. The average number of seeds per sown crop species is shown in Table 14. In this table 'n' represents the number of measures in which each of the crop species was recorded. This average takes into account those that were not seeding (the plant was selected at random from the quadrat so it was not always seeding) to give an average number of seeds per plant.

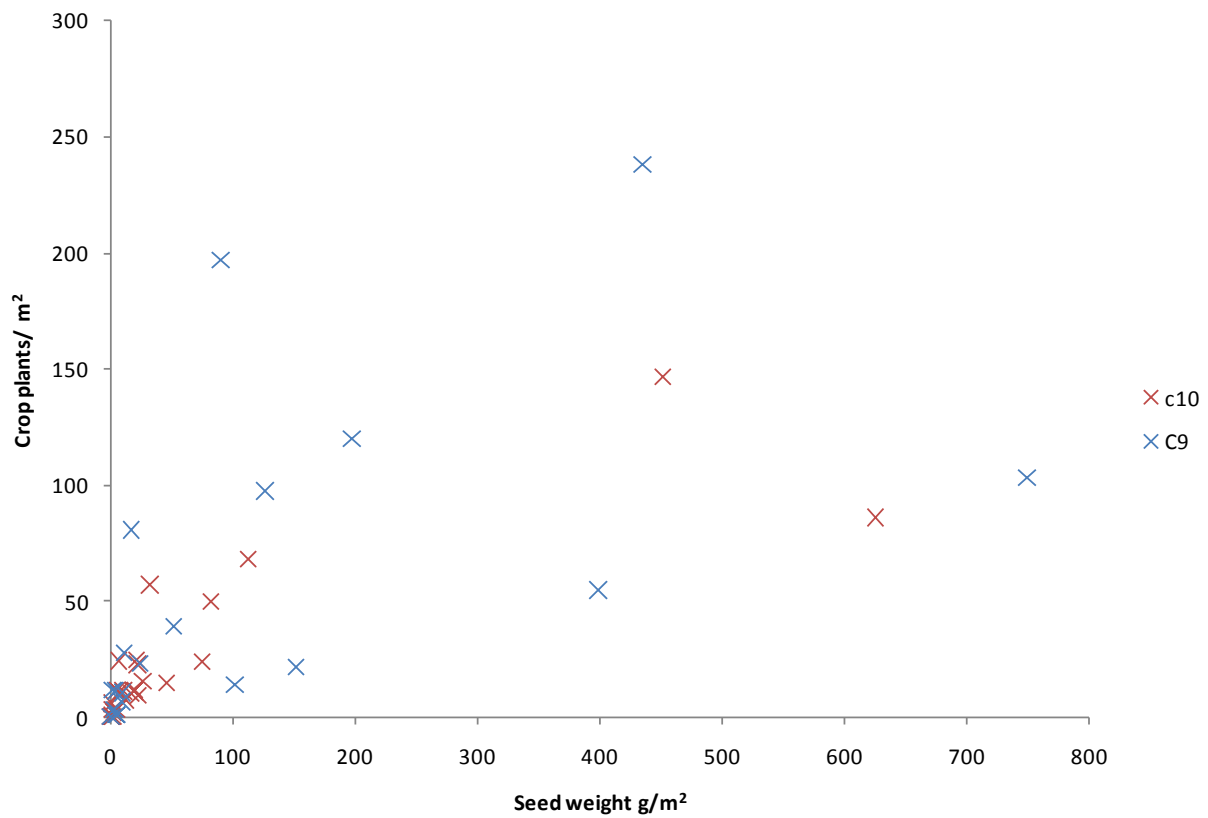
**Table 14**      **Number of seeds recorded in C9 and C10**

| Species                        | n  | Mean seeds per plant | SE      | Mean seed weight (mg) |
|--------------------------------|----|----------------------|---------|-----------------------|
| <i>Amaranthus</i>              | 1  | 15119                | 0       | 0.4                   |
| <i>Brassica oleracea</i>       | 4  | 454.5                | 108.93  | 4.8                   |
| <i>Brassica</i> sp.            | 3  | 271.3                | 4.47    | 4.8                   |
| <i>Camelina sativa</i>         | 2  | 49.1                 | 37.11   | 1.4                   |
| <i>Chenopodium quinoa</i>      | 17 | 4167.1               | 1307.42 | 1.7                   |
| <i>Chenopodium</i> sp.         | 1  | 145.8                | 0       | 1.7                   |
| <i>Cichorium intybus</i>       | 3  | 137.2                | 61.27   | 13.3                  |
| <i>Echinochloa frumentacea</i> | 4  | 349.4                | 131.40  | 1.3                   |
| <i>Fagopyrum esculentum</i>    | 8  | 48.2                 | 18.302  | 2.2                   |
| <i>Helianthus annuus</i>       | 3  | 146.2                | 146.21  | 16.4                  |
| <i>Linum usitatissimum</i>     | 6  | 9.7                  | 5.09    | 6.1                   |
| <i>Melilotus</i> sp.           | 1  | 384.5                | 0       | 3.3                   |
| <i>Panicum miliaceum</i>       | 13 | 555.8                | 180.40  | 3.0                   |
| <i>Panicum ramosum</i>         | 11 | 449.2                | 177.77  | 1.9                   |
| <i>Phacelia tanacetifolia</i>  | 5  | 181.4                | 78.48   | 1.9                   |
| <i>Raphanus sativus</i>        | 8  | 170.5                | 104.90  | 3.8                   |
| <i>Setaria viridis</i>         | 1  | 81                   | 0       | 1.5                   |
| <i>Sinapsis alba</i>           | 11 | 311.2                | 119.84  | 9.9                   |
| <i>Sorghum bicolor</i>         | 13 | 899.1                | 243.70  | 1.8                   |
| <i>Triticale hexaploide</i>    | 6  | 36.6                 | 13.89   | 15.1                  |

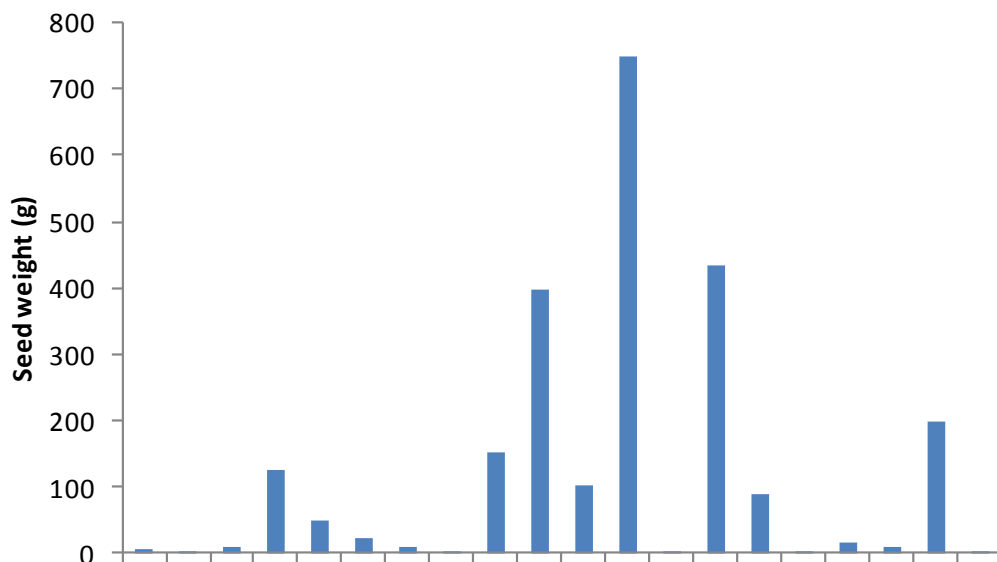
The seed resource provided for each measure was calculated using the individual crop plant densities within each measure, the average weight of the seed and the average number of seeds per plant. This was done for each crop species within each measure, then a total seed weight was calculated for each measure (unit is grams per m<sup>2</sup>).

There was a large variation between each of the C9 and C10 measures that were assessed (Figure 8). As expected, the seed weight per unit area increased with the number of crop plants per unit area. Most individual features (particularly areas under C10) represented little food resource in terms of seed mass (Figure 9 and Figure 10) or seed number (Figure 11 and Figure

12). One third of C9 features assessed contained more than 100 g seed m<sup>-2</sup> or 50,000 seeds m<sup>-2</sup>. Fewer than 10% of features under C10 exceeded these thresholds.

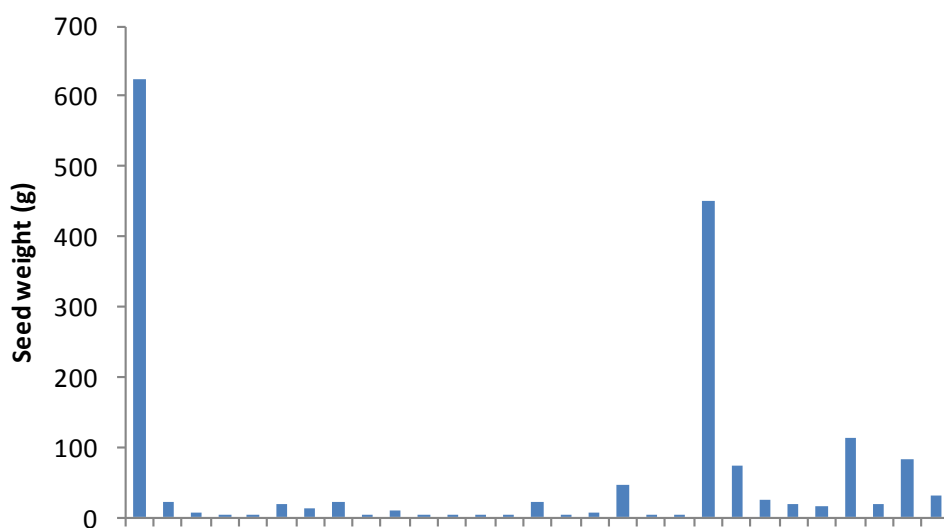


**Figure 8** Seed resource and crop plant density

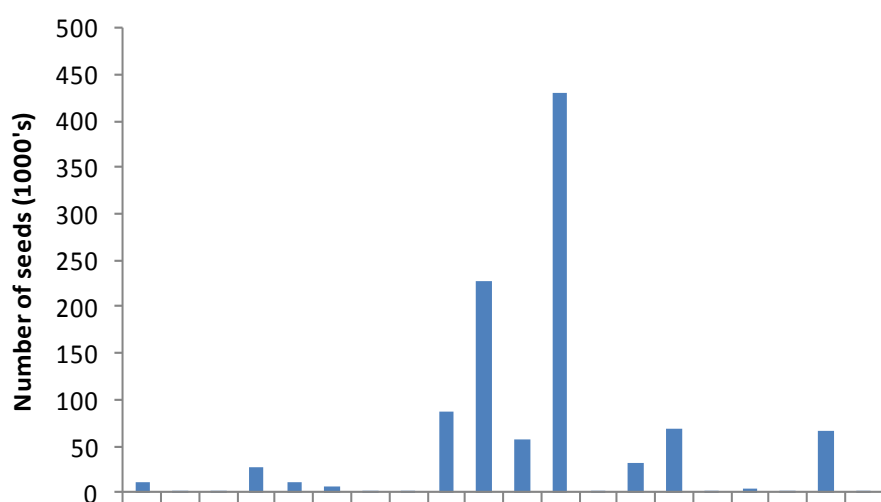


**Figure 9** Seed weight per m<sup>2</sup> for C9 areas assessed

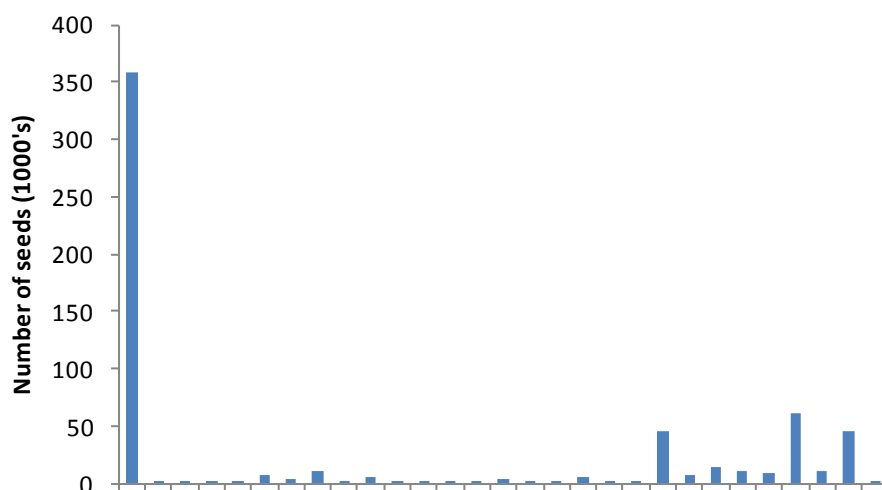




**Figure 10** Seed weight per m<sup>2</sup> for C10 areas assessed



**Figure 11** Number of seeds per m<sup>2</sup> in C9 areas



**Table 15 Most common weed species and associated bird species found in C9 areas**

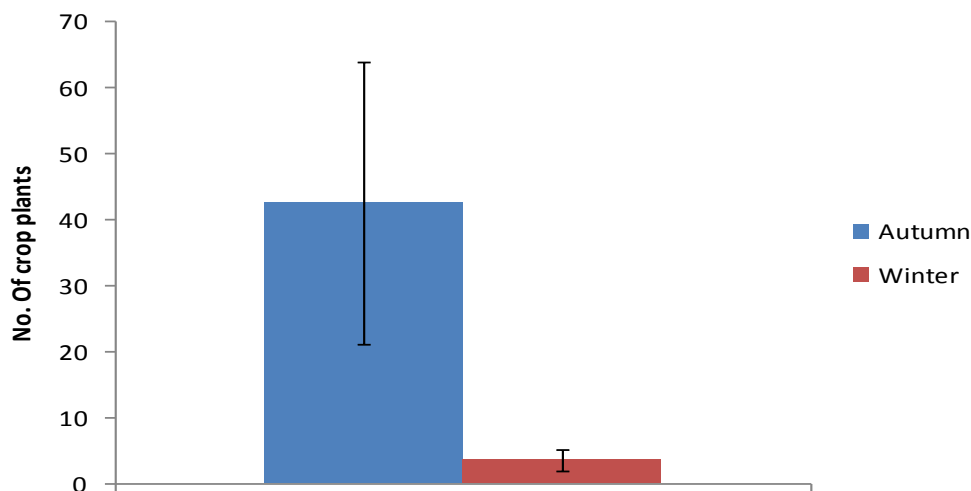
| Weed species                     | n  | Mean % cover | Bird species  |
|----------------------------------|----|--------------|---|
| <i>Poa annua</i>                 | 23 | 5.3          | Collared Dove, Corn Bunting, Grey Partridge, House Sparrow, Reed Bunting, Skylark, Tree Sparrow, Yellowhammer |
| <i>Stellaria media</i>           | 23 | 2.8          | Chaffinch, Grey Partridge, House Sparrow, Reed Bunting, Skylark, Stock Dove, Tree Sparrow, Woodpigeon         |
| <i>Veronica persica</i>          | 23 | 1.3          |   |
| <i>Viola arvensis</i>            | 18 | 1.2          | Skylark   |
| <i>Galium aparine</i>            | 16 | 1.3          |   |
| <i>Taraxacum officinale</i>      | 16 | 1.2          | Goldfinch, Linnet   |
| <i>Geranium spp.</i>             | 14 | 0.9          |   |
| <i>Rumex obtusifolius</i>        | 14 | 2.6          | Chaffinch, Corn Bunting, Skylark  |
| <i>Tripleurospermum inodorum</i> | 12 | 1.6          |   |
| <i>Cirsium arvense</i>           | 11 | 4.9          | Goldfinch   |
| <i>Plantago major</i>            | 11 | 3.6          |   |
| <i>Epilobium spp</i>             | 10 | 1.7          |   |
| <i>Sonchus spp</i>               | 10 | 0.5          | Goldfinch   |
| <i>Trifolium repens</i>          | 10 | 0.7          | Greenfinch, Grey Partridge, Reed Bunting, Stock Dove, Woodpigeon  |
| <i>Anisantha sterilis</i>        | 8  | 9.0          |   |

**Table 16 Most common weed species and associated bird species found in C10 areas**

| Weed species                | n  | Mean % cover | Bird  |
|-----------------------------|----|--------------|---|
| <i>Veronica persica</i>     | 28 | 2.9          |   |
| <i>Poa annua</i>            | 23 | 5.6          | Collared Dove, Corn Bunting, Grey Partridge, House Sparrow, Reed Bunting, Skylark, Tree Sparrow, Yellowhammer |
| <i>Galium aparine</i>       | 19 | 0.7          |   |
| <i>Stellaria media</i>      | 18 | 1.6          | Chaffinch, Grey Partridge, House Sparrow, Reed Bunting, Skylark, Stock Dove, Tree Sparrow, Woodpigeon         |
| <i>Rumex obtusifolius</i>   | 17 | 1.6          | Chaffinch, Corn Bunting, Skylark  |
| <i>Urtica dioica</i>        | 13 | 3.2          | Corn Bunting  |
| <i>Cirsium arvense</i>      | 12 | 4.2          | Goldfinch   |
| <i>Chenopodium album</i>    | 11 | 6.6          | Chaffinch, House Sparrow,   |
| <i>Lamium purpureum</i>     | 11 | 0.9          | Chaffinch, Reed Bunting, Skylark  |
| <i>Sonchus asper</i>        | 10 | 1.4          | Goldfinch   |
| <i>Viola arvensis</i>       | 10 | 1.0          | Skylark   |
| <i>Anisantha sterilis</i>   | 9  | 2.6          |   |
| <i>Solanum nigrum</i>       | 8  | 3.3          |   |
| <i>Senecio vulgaris</i>     | 8  | 0.6          | Chaffinch, Goldfinch, Greenfinch  |
| <i>Taraxacum officinale</i> | 8  | 0.6          | Goldfinch, Linnet   |

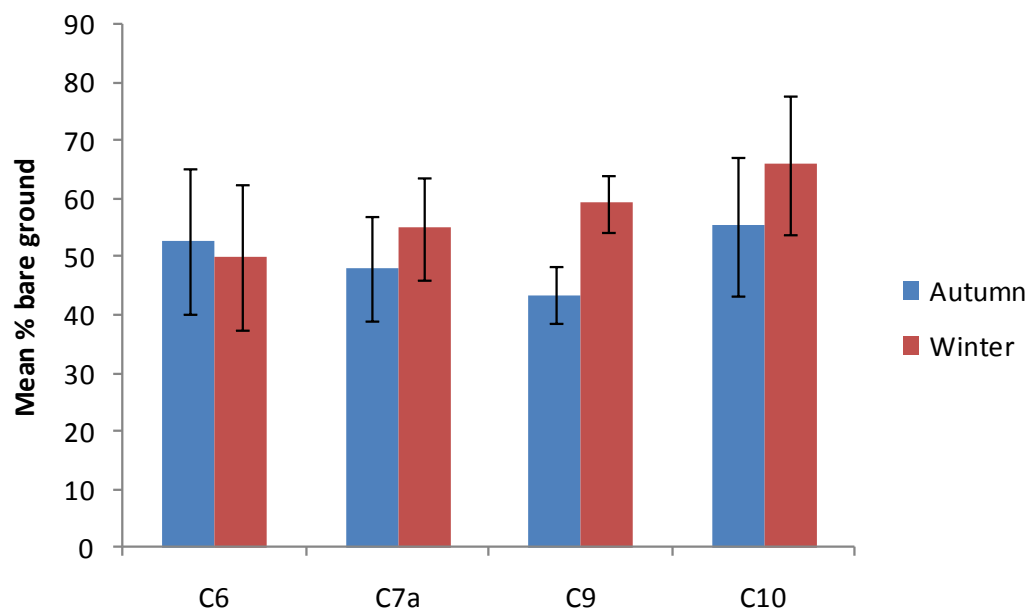
### 3.4.3 Farmland birds and wider biodiversity

As can be seen from Figure 16, the average height of both C9s and C10s decreased significantly between the autumn and winter visit. In addition the number of seeding plants decreased with very few seeds being recorded on the plants in the winter as most of them had shed their seeds, although only plants still standing were counted and no attempt was made to sample seeds shed that remained on the soil surface. No crop species were recorded as present and retaining seed in the C10 areas that were revisited in winter. Of the C9 areas that were revisited, the number of crop plants recorded as providing a resource for birds had also declined significantly from the autumn visit (Figure 13), and where seeds were retained on the plant, numbers were very small.

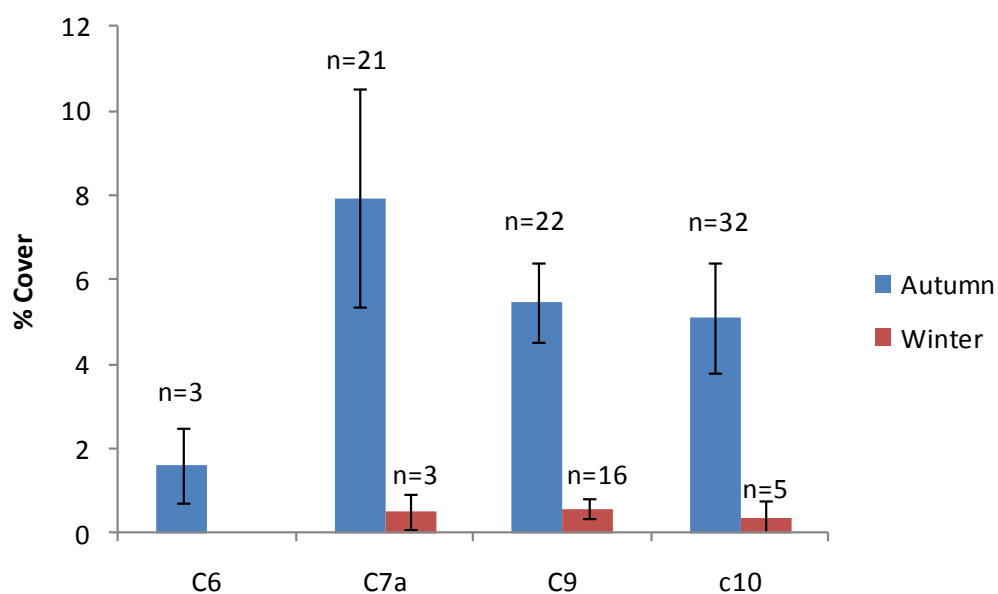


**Figure 13 Crop plants present in C9, with standard errors.**

Measures visited in the autumn and winter had large areas of bare ground present, this in general increased from autumn to winter (Figure 14) with the exception of C6, in which it decreased. In all measures bare ground covered at least 40 percent of the area. For the remaining cover the weed species that are of potential use to birds were selected (using Holland *et al.*, 1996). These were then filtered to contain only the plants that were recorded as seeding, dehiscent or flowering in summer, and seeding and flowering for the winter visits. The mean ground cover (as percentage) for each measure is shown in Figure 15.



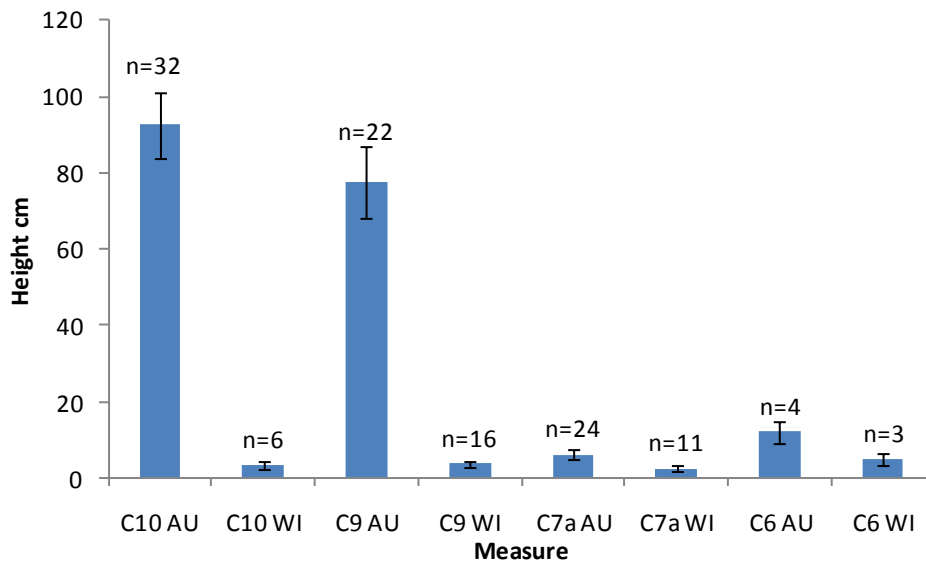
**Figure 14** Mean bare ground present on measures, with standard errors.



**Figure 15** Mean percent weed cover of measure providing potential food for birds (i.e. evidence of flowering or seeding), with standard errors.

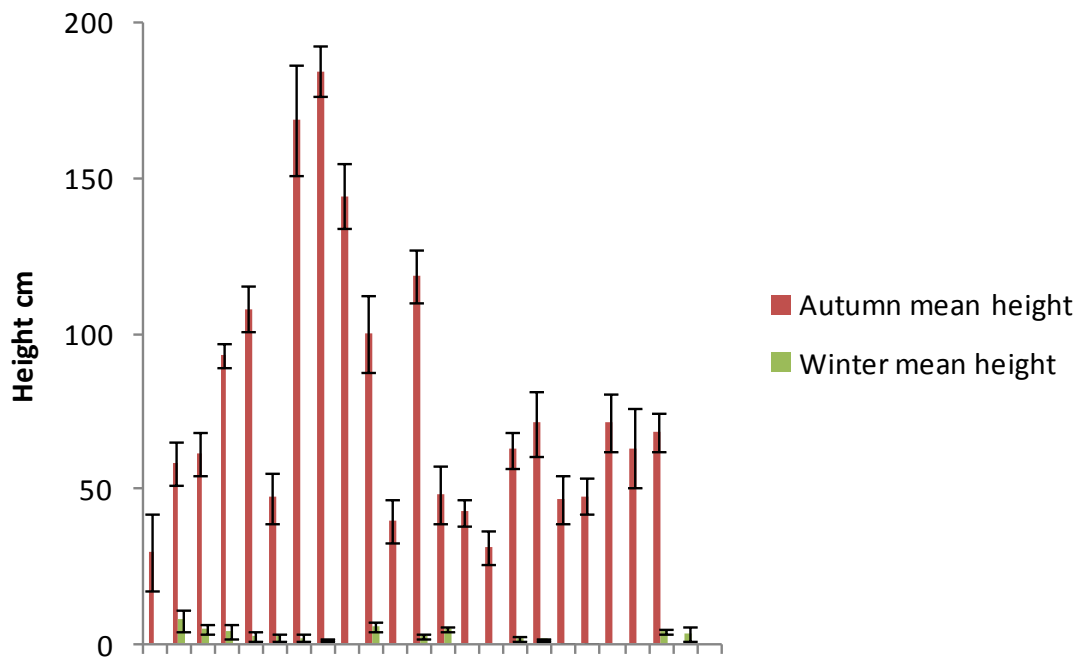
#### 3.4.4 Height of vegetation

The height of vegetation in sown mixes was around 80 to 90 cm at the autumn visits, but only a few cm when assessed in winter because few crop plants were left standing (Figure 16).

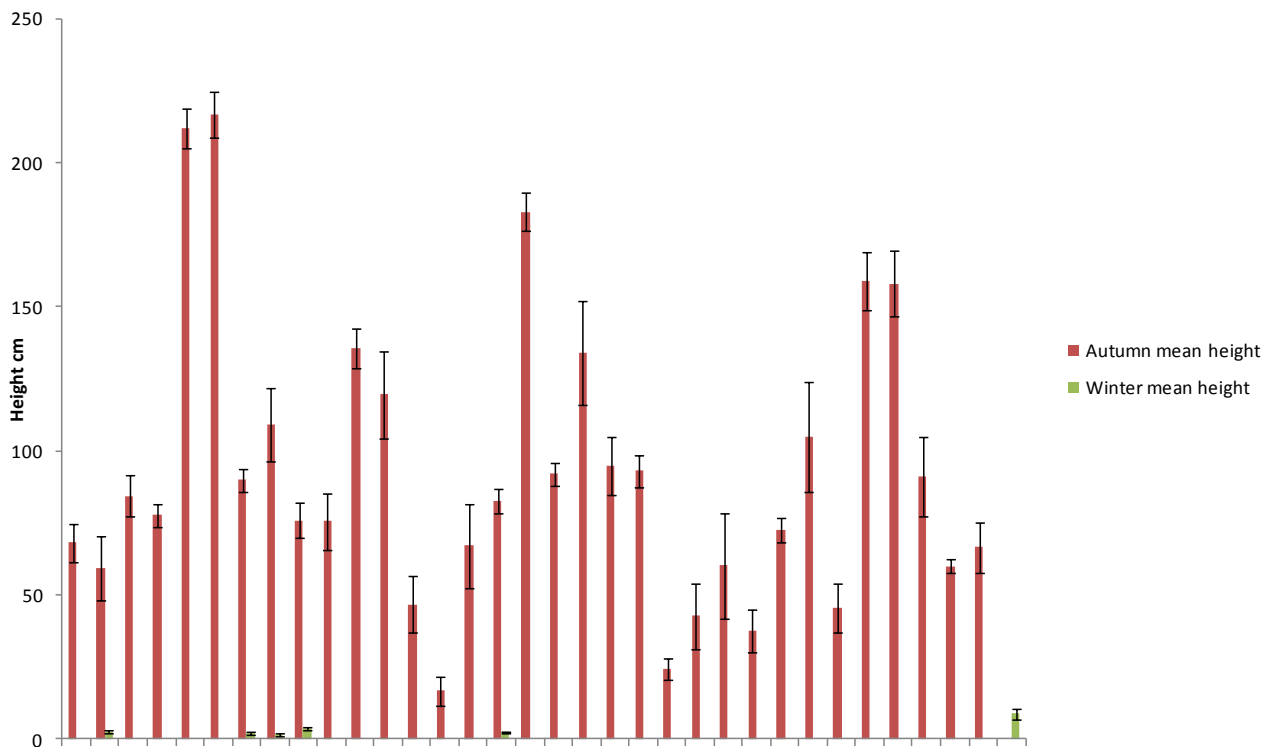


**Figure 16 Mean height of vegetation within measure, with standard errors.**

It is worth noting there were large variations in height both within a single measure and between the average heights of different examples of a measure. This is highlighted in Figure 17 for C9 areas and in Figure 18 for C10 areas. These figures display the mean height of each example of the measures visited, illustrating the large variation.

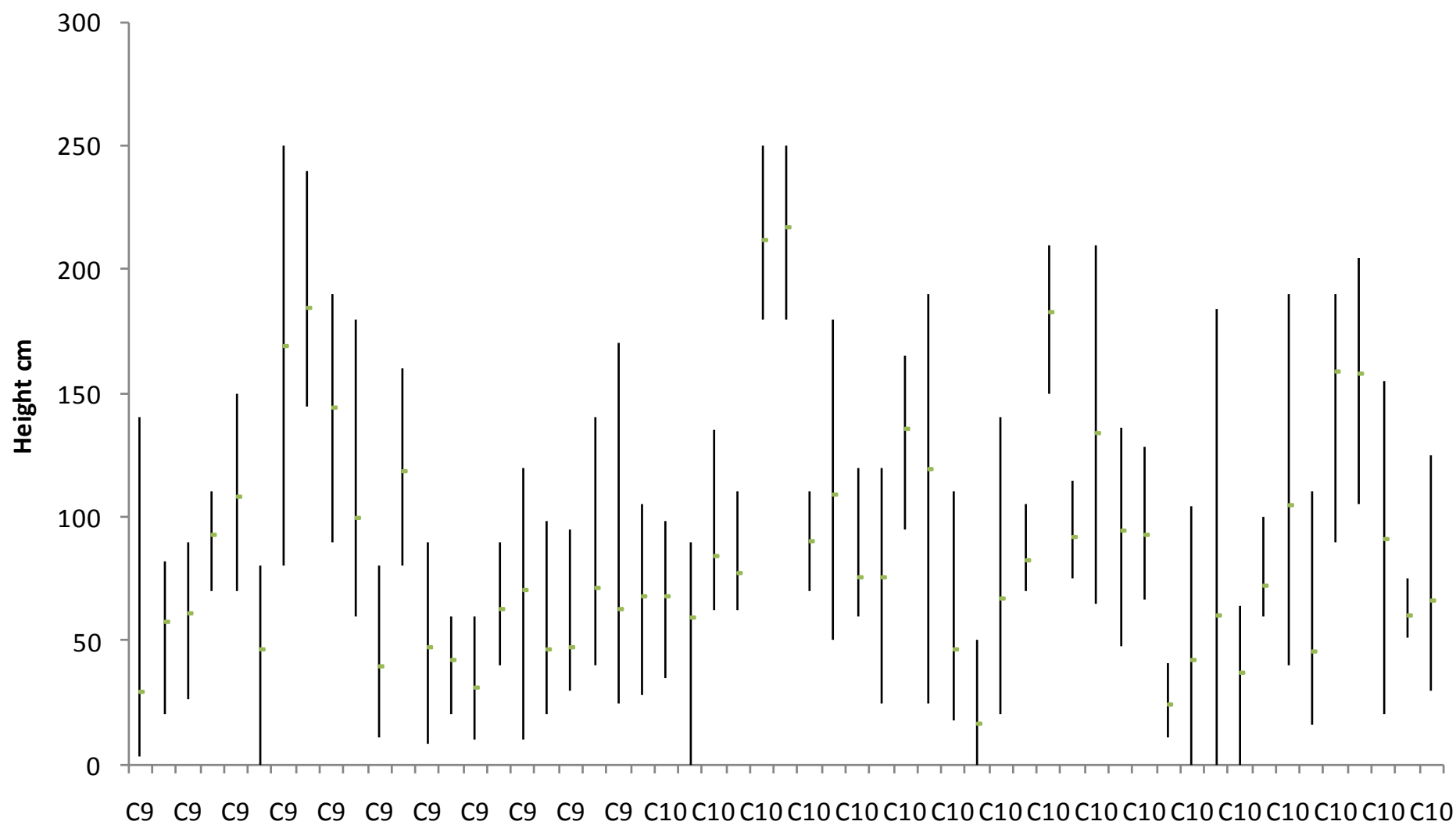


**Figure 17 Variation in mean height for C9, with standard errors.**



**Figure 18 Variation in mean height for C10, with standard errors.**

In addition to this each individual measure exhibits a varied range of heights, as highlighted in Figure 19. This figure shows the average height of the ten measurements taken in addition to the range of heights recorded (minimum and maximum height in each individual measure).



**Figure 19** Variation in height within each example of measures C9 and C10



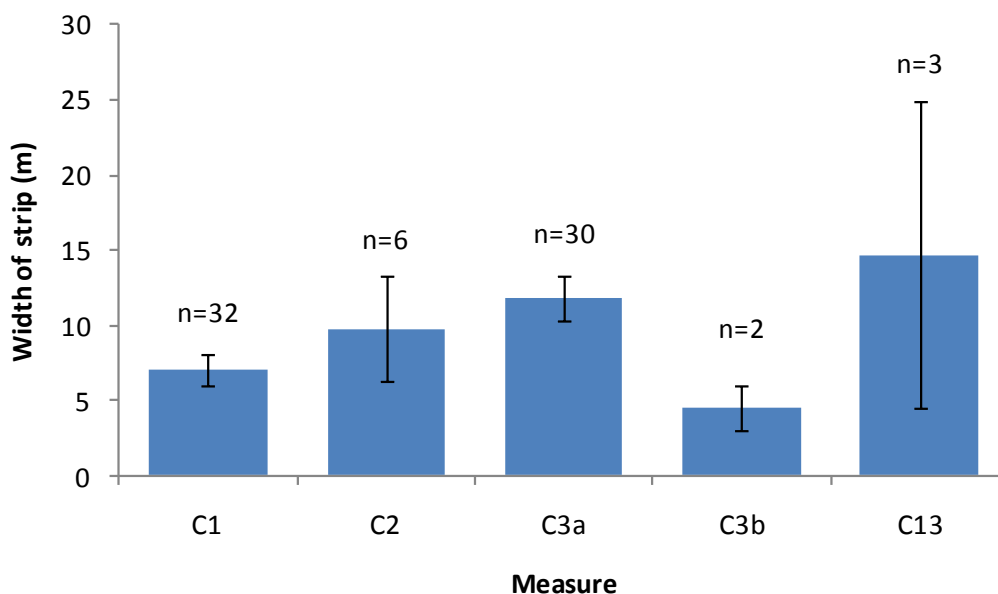
### 3.5 WINTER CONDITION ASSESSMENT RESULTS

#### 3.5.1 Resource protection

A total of 93 features under measures C1, C2, C3a, C3b, C7b and C13 were assessed in late winter to estimate their value in terms of resource protection.

Half of the features assessed were adjacent to watercourses (51%, largely C1 areas). Other features were also buffered from pollution including hedges (28%) and woods (20%). However, 16% of the measures assessed were adjacent to a road or farmyard. Only one of the six areas under C2 (grass areas to prevent erosion and run-off) were adjacent to a watercourse and one was adjacent to a track. However, one was buffering a SSSI.

Of the 93 features assessed across these measures, 80% were strips compared to 20% which were implemented as blocks. Mean strip width was between 4.5 and 14.7 m, however there was a lot of variation within measures (Figure 20) and many were below the minimum red box requirements (see Appendix 2). Overall, C3a strips were wider than C1 strips although the range of values was very similar. Only a small number of C2 strips (grass areas to prevent erosion and run-off) were surveyed. These were wider than C1 strips, but on average did not meet the red box management requirements.



**Figure 20** Width of buffer strips (measures present as blocks are excluded), with standard errors.

Nearly one third of measures assessed were located at the bottom of a slope and a similar number were on flat fields (Table 17). One quarter of measures ran along a slope or were in the middle of an incline. Of the measures assessed, 10% (largely C3a) were located at the top of a slope. Mean slope for different measures ranged from 1.5 to 5.5°

**Table 17**      **Number of measures assessed in relation to their position on a slope and mean slope for each measure**

| Measure | Bottom | Middle/along slope | Top | Flat field | Mean slope (°) | SEM  |
|---------|--------|--------------------|-----|------------|----------------|------|
| C1      | 17     | 4                  | 0   | 11         | 1.7            | 0.38 |
| C2      | 2      | 2                  | 1   | 1          | 2.7            | 0.96 |
| C3a     | 8      | 18                 | 7   | 16         | 3.2            | 0.58 |
| C3b     | 1      | 1                  | 0   | 0          | 5.5            | 3.50 |
| C13     | 1      | 0                  | 1   | 2          | 1.5            | 1.19 |
| Total   | 29     | 25                 | 9   | 30         | 2.7            | 0.36 |

Those situated at the bottom of a slope would have greatest benefits for resource protection and the greater the slope the greater the potential benefits. The mean slope for these features was 2.8° (Table 18). Only small numbers of measures were recorded at the bottom of a slope for C2, C3b and C13. The slope of fields was similar where areas under C1 and C3a were located at the bottom of the slope.

**Table 18**      **Slope of the field for measures situated at the bottom of a slope**

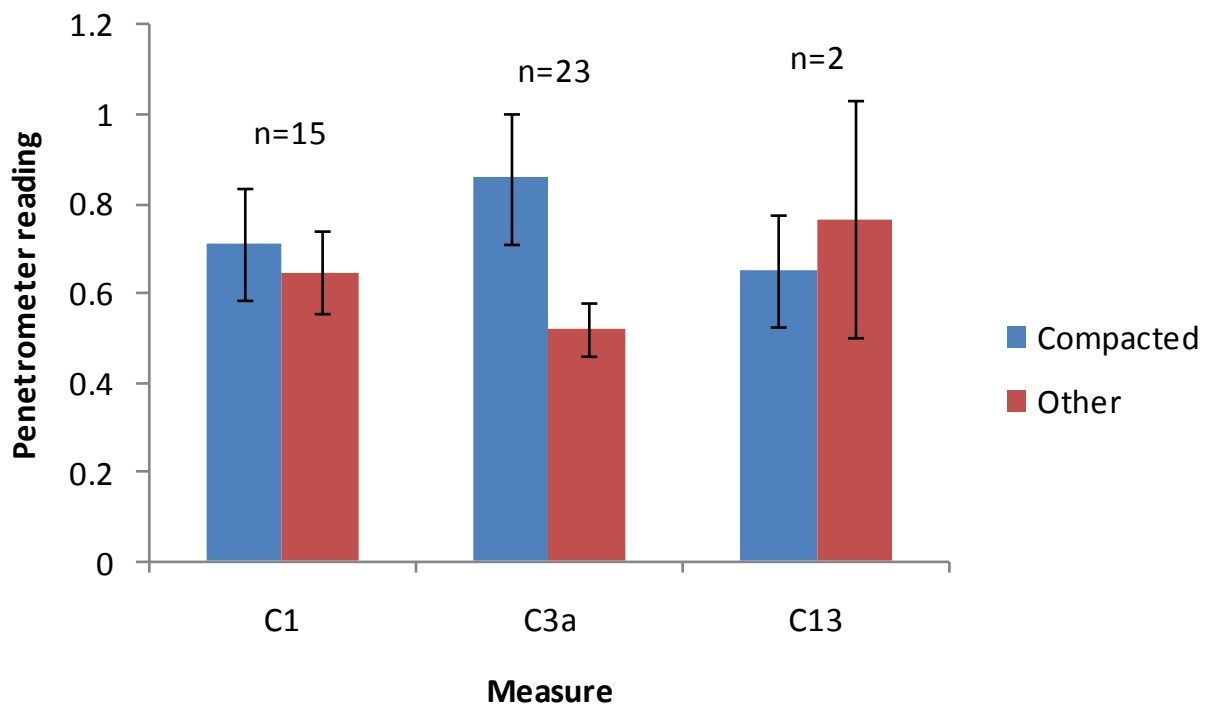
| Measure | N  | Mean | Min | Max | SEM  |
|---------|----|------|-----|-----|------|
| C1      | 17 | 2.8  | 0   | 8   | 0.56 |
| C2      | 2  | 3.5  | 1   | 6   | 2.50 |
| C3a     | 8  | 2.5  | 1   | 7   | 0.73 |
| C3b     | 1  | 2.0  | 2   | 2   | *    |
| C13     | 1  | 5.0  | 5   | 5   | *    |
| Total   | 29 | 2.8  | 0   | 8   | 0.41 |

There was evidence of compaction on 44% of all features assessed, but no compaction was recorded on C2 or C3b (Table 19). A slightly higher proportion (55%) than average of features situated at the bottom of a slope were compacted to some degree.

**Table 19 Numbers of measures where compaction was recorded in relation to the location of measures**

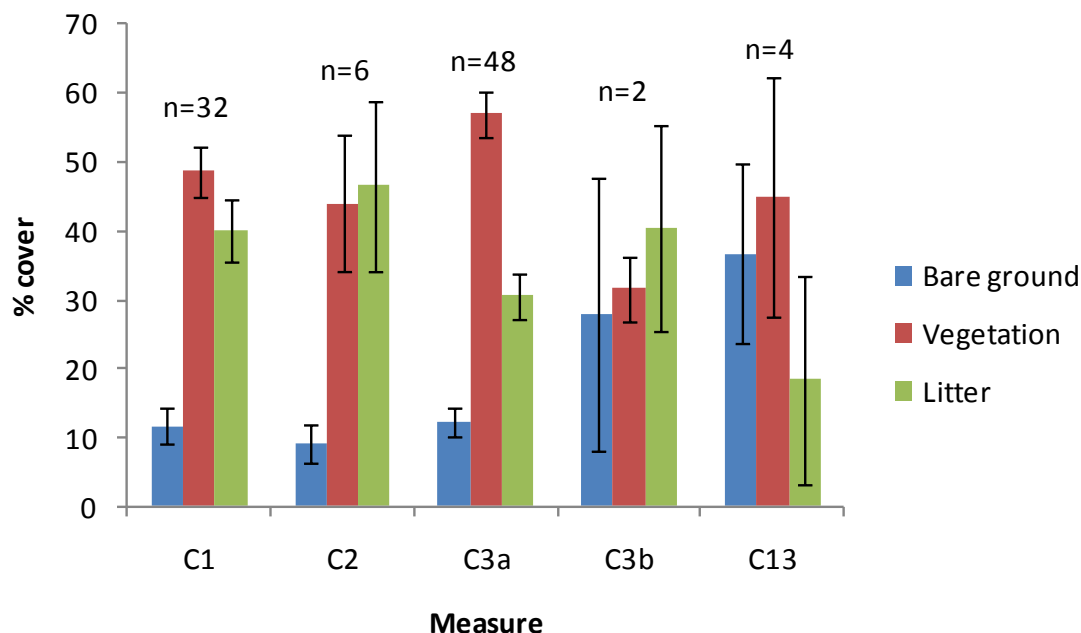
| Measure           | N  | Bottom | Middle/along slope | Top | Flat field | Total with compaction |
|-------------------|----|--------|--------------------|-----|------------|-----------------------|
| C1                | 32 | 12     | 0                  | 0   | 3          | 15                    |
| C3a               | 49 | 3      | 6                  | 4   | 11         | 24                    |
| C13               | 4  | 1      | 0                  | 0   | 1          | 2                     |
| Features assessed |    | 29     | 25                 | 9   | 30         | 93                    |

Where observation suggested that compaction was present, hand held penetrometers were used to assess the degree of compaction by comparing compacted and uncompacted areas. There were relatively small differences between these areas, suggesting that compaction was generally limited, although differences were greatest on C3a. Half the measures were compacted by vehicle access, one third by footpaths and one third by various animals. Areas under C3a were more likely to have been compacted by vehicle access.



**Figure 21 Penetrometer readings from compacted and uncompacted areas (from measures where compaction was present), with standard errors.**

For most features assessed, bare ground represented only around 10% of the area in late winter, although litter was an important component, particularly on C1 and C2 (Figure 22). Bare ground represented a much greater proportion of ground cover on sown wildflower headlands (C13), however a greater proportion of areas in this measure had been recently established compared to other measures.



**Figure 22** Cover of vegetation, bare ground and litter in February/March, with standard errors.

The value of buffer strips is determined by their location. Ideally they should be situated adjacent to a watercourse at the lowest point to intercept runoff, or intercept a natural drainage channel. In addition, an uncropped strip that crosses a slope could also reduce erosion and runoff. Visual assessment of measures indicated that areas under C1 were always beneficial because they were adjacent to a watercourse (Table 20). 28% of areas under other measures were also adjacent to a watercourse, however only 11% of areas were placed beneficially for other reasons.

**Table 20** Number of areas likely to benefit resource protection with respect to location

| Measure | N  | Adjacent to a watercourse | Intercept a slope | Intercept a natural drainage channel |
|---------|----|---------------------------|-------------------|--------------------------------------|
| C1      | 32 | 32                        | 0                 | 0                                    |
| C2      | 6  | 2                         | 1                 | 0                                    |
| C3a     | 49 | 14                        | 4                 | 2                                    |
| C3b     | 2  | 1                         | 0                 | 0                                    |
| C13     | 4  | 0                         | 0                 | 0                                    |

Erosion in the adjacent field and on the measure itself, were recorded on 14% and 18% respectively of measures assessed (Table 21). Where erosion was apparent on the uncropped

area, the strip was usually effective in intercepting erosion and run-off. However, on two areas, both adjacent to watercourses, erosion extended across the strip. One of these areas was on a heavy soil type. Where erosion was observed on either the field or strip, three were on light soils, eight on medium soils and seven on heavy soil types.

**Table 21**      **Number of areas where erosion was visible and effectiveness of strip in intercepting run-off**

| Measure | N  | Erosion in adjacent crop | Erosion on strip | Is the strip intercepting run-off? |
|---------|----|--------------------------|------------------|------------------------------------|
| C1      | 32 | 5                        | 8                | 6                                  |
| C2      | 6  | 2                        | 2                | 2                                  |
| C3a     | 49 | 6                        | 7                | 7                                  |
| C3b     | 2  | 0                        | 0                | na                                 |
| C13     | 4  | 0                        | 0                | na                                 |

Areas assessed were on a range of soil types, relatively evenly split between light (28%), medium (31%) and heavy (41%) textural classes. Of the features assessed here, those present at the bottom of a slope are most likely to benefit resource protection. Although features that cross the middle of a slope may also be valuable, very few features surveyed were located in this way. Those in the 'middle/along slope' category usually followed the incline. Half of the features located at the bottom of a slope were on heavy soil types and only 15% were on light soils. Features at the top of a slope (with little impact on erosion or run-off) were predominantly on light soils (Table 22).

**Table 22**      **Number of areas on different soil types in relation to position on slope**

| Measure            | N  | Light | Medium | Heavy |
|--------------------|----|-------|--------|-------|
| Bottom             | 26 | 4     | 9      | 13    |
| Middle/along slope | 25 | 8     | 7      | 10    |
| Top                | 9  | 5     | 2      | 2     |
| Flat field         | 30 | 8     | 10     | 12    |
| Total              | 93 | 25    | 28     | 37    |

## 4. DISCUSSION

In considering the results it must be borne in mind that few of the areas assessed were created or managed specifically as voluntary measures according to the farmer guidelines, because at the time of the Defra survey from which the sample was derived, the CFE had only just started and farmers had had little time to establish new habitats. Therefore, the majority of areas assessed were already present on farms prior to the Campaign, and were allocated to the measure type most similar to the habitat observed. The second year (2011-2012) will be a much better test of the effectiveness of the scheme, since farmers will have had sufficient time to absorb the details of what is required, and create new areas or change the management of existing areas according to the guidelines provided.

Another caveat that will be obvious to readers of this report is that there were very few examples of most of the types of habitat represented in the list of voluntary measures, so that only sample sizes were adequate for very few measures. Only for those with an adequate sample size can the assessments be considered representative. Early indications from the 2011 Defra survey data provided for drawing the 2011/12 sample are that there are higher numbers of farms with most voluntary measures available, so that it should be possible to achieve more satisfactory samples for most measures. Numbers are still skewed however in favour of the most popular types of measure.

### 4.1 WIDER BIODIVERSITY

Plant species most commonly recorded on measures assessed in summer were largely perennial species and usually grasses. These results are very similar to a survey of set-aside in 2008, where the most common species were: rough-stalked meadow-grass (*Poa trivialis*), Yorkshire fog (*Holcus lanatus*) and false oat-grass (*Arrhenatherum elatius*), recorded on 82, 68 and 55% of transects respectively, and the most common forb species were: creeping thistle (*Cirsium arvense*), dandelion (*Taraxacum officinale*) and common nettle (*Urtica dioica*) (44, 39 and 38% of transects respectively) (Boatman *et al.*, 2009). The voluntary measures assessed in the summer of 2010 were largely similar to set-aside land. The sample was dominated by areas under C1 and C3a which had been uncropped for a number of years; few features in the sample had been established specifically in response to the Campaign. The swards present, particularly under C1 and C3a, are therefore likely to have similar benefits to non-rotational set-aside for wider biodiversity. Indeed, it is likely that many of the areas assessed were formerly set-aside land. However, because most of these features represent margins at field edges rather than the larger blocks often present under set-aside, overall benefits are likely to be lower for some species.

A number of species that are potential butterfly larval and bird food species were present on all features assessed during the summer, also similar to assessments of set-aside. The number of plant species that were butterfly food plants was highest on C1, C3a, C3b and C13 (between around four and six plant species). On C1 and C3a areas, the proportions of plant species that were butterfly larval food plants exceeded 30%. There may be scope for increasing benefits for butterflies by providing guidance on suitable plant species to include in seed mixtures.

Flower abundance was limited on some measures, but high under C12a (pollen and nectar mixtures). However, abundance did not exceed the levels within which bee species abundance is related to flower abundance (Carvell *et al.*, 2006), therefore resource provision for pollinators could be further improved, even measures designed specifically to benefit pollinators. Areas sown to wildflower mixtures (C13) were still in the early stages of development and would not be expected to have achieved their potential after such a short period.

## 4.2 FARMLAND BIRDS

Measures C9 and C10, specifically designed to provide food resources for birds during the autumn and winter were highly variable in the provision of food. Many features had few crop plants and the seed number and weight were often low, however a small number of features were providing significant food resources, illustrating that if a suitable range of species are sown and establishment is good, then sown bird mixes can be effective in delivering resources in the autumn. Weed species will contribute to bird food resources, but cover of seeding species was limited. Both wild and game bird mixes will also provide shelter. However, very few of the features assessed retained any resource into late winter, when bird food is particularly important (Siriwardena *et al.*, 2008). Advice on how to achieve successful establishment and manage these crops could help to increase success rates.

The management of stubbles was often not ideal in terms of providing seed resources for birds. Over half of those assessed had received a pre-harvest desiccant or a post-harvest herbicide, which is likely to mean that few weed seeds would be present on the surface during winter. Average ground cover of weeds with evidence of flowering or seeding was just under 8% for C7a, but less than 2% for C6. In addition, farmer interviews indicated that only 20% of stubbles would definitely be left uncultivated until the end of March. Greater emphasis on the reasons for avoiding herbicide use where the stubble is intended to make a contribution to the CFE could help improve levels of correct management.

A considerable proportion of plant species present in other measures were potentially capable of providing food for bird species. Where the vegetation was relatively open, for example in recently sown pollen and nectar or wildflower mixtures, these may provide valuable foraging opportunities. However, there were few gaps in the swards on many features that had been established for a number of years (commonly C1 and C3a), which may limit their suitability for foraging birds Douglas *et al* (2009).

## 4.3 RESOURCE PROTECTION

In most situations, a buffer strip of sufficient width will adequately protect adjacent features from pollution through the movement of sediment, nutrients and fertilisers. The fact that 80% of features assessed for resource protection benefits were implemented as strips rather than blocks of land suggests that, overall, these measures would have a high benefit in relation to the area of uncropped land. Unfortunately, however, around half of these features did not meet the minimum width requirements (see Appendix 2).

All C1 areas (grass buffers alongside watercourses) and nearly 40% of other measures were sited in locations that should benefit resource protection. Only half of the areas under C2 (grass areas to prevent erosion and run-off) were apparently sited in locations most likely to control erosion and runoff, therefore it is possible that the aims of this measure may have been misunderstood by some farmers, or that the areas assessed were originally established for a different purpose.

Buffer strips are less effective on heavy soil types (RPA, 2010), hence it is not surprising that evidence of a buffer strip not fully intercepting erosion was found on a heavy soil type. The greatest risk of run-off and erosion is on light soil types, however only a small proportion of buffer strips located at the bottom of slopes were on light soils.

## 4.4 CONCLUSION

The assessments reported here indicate that a number of the measures established are providing benefits similar to those arising on set-aside, particularly the measures that are similar to former set-aside (C1 and C3a). Some wild bird seed mixes and game crops provided good levels of seed food for birds in the autumn, but success was highly variable. However, by February little food resource was left. A large proportion of stubbles were managed unfavourably, and there is scope

for considerable improvement in relation to these measures. Many of the measures with potential to reduce erosion and runoff were appropriately located and where evidence of erosion was seen, the measures were generally effective in preventing sediment entering watercourses. However, some measures were inappropriately positioned, not wide enough or ineffective in buffering runoff.

Overall, considering the early stage in the development of the CFE, it is encouraging that good examples of habitat management were already being seen, but probably the most important result to emerge is the range of variation in the condition of the habitats and features assessed. In the coming year, the Campaign messages will have received a lot more publicity and farmers will have had time to establish voluntary measures under the Campaign. Assessments will be linked to the farmer's definition of which measure was intended, which was not possible in the previous year as most of the areas assessed were 'baseline' habitats (i.e. present before the CFE started and not specifically managed as voluntary measures). It is hoped that a considerable improvement in the range of measures undertaken, the quality of management and the condition of the resulting habitats will be seen.



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## APPENDIX 1. SPECIES LISTS

**Table 23**      **Plant species groupings (1=yes, 0=no).**

|                                | Axiophyte | Bird<br>food<br>plant | Butterfly<br>larval<br>food<br>plant |                                 | Axiophyte | Bird<br>food<br>plant | Butterfly<br>larval<br>food<br>plant |
|--------------------------------|-----------|-----------------------|--------------------------------------|---------------------------------|-----------|-----------------------|--------------------------------------|
| <i>Aethusa cynapium</i>        | 1         | 0                     | 0                                    | <i>Leontodon</i> spp            | 0         | 1                     | 0                                    |
| <i>Agrimonia eupatoria</i>     | 1         | 0                     | 1                                    | <i>Leucanthemum vulgare</i>     | 1         | 0                     | 0                                    |
| <i>Agrostis capillaries</i>    | 0         | 0                     | 1                                    | <i>Linum catharticum</i>        | 1         | 0                     | 0                                    |
| <i>Agrostis gigantea</i>       | 0         | 0                     | 1                                    | <i>Lotus corniculatus</i>       | 1         | 0                     | 1                                    |
| <i>Agrostis stolonifera</i>    | 0         | 0                     | 1                                    | <i>Lotus pedunculatus</i>       | 1         | 0                     | 1                                    |
| <i>Alliaria petiolata</i>      | 1         | 0                     | 1                                    | <i>Luzula campestris</i>        | 1         | 0                     | 0                                    |
| <i>Alopecurus geniculatus</i>  | 1         | 0                     | 0                                    | <i>Medicago lupulina</i>        | 1         | 0                     | 0                                    |
| <i>Anagallis arvensis</i>      | 1         | 0                     | 0                                    | <i>Mentha aquatica</i>          | 1         | 0                     | 0                                    |
| <i>Angelica sylvestris</i>     | 1         | 0                     | 0                                    | <i>Mentha arvensis</i>          | 1         | 0                     | 0                                    |
| <i>Anisantha sterilis</i>      | 1         | 0                     | 0                                    | <i>Myosotis arvensis</i>        | 0         | 1                     | 0                                    |
| <i>Anthoxanthum odoratum</i>   | 0         | 0                     | 1                                    | <i>Myosotis discolor</i>        | 1         | 0                     | 0                                    |
| <i>Aphanes arvensis</i> agg.   | 1         | 0                     | 0                                    | <i>Odontites vernus</i>         | 1         | 0                     | 0                                    |
| <i>Arctium lappa</i>           | 0         | 1                     | 0                                    | <i>Onobrychis viciifolia</i>    | 1         | 0                     | 0                                    |
| <i>Arctium minus</i>           | 0         | 1                     | 0                                    | <i>Origanum vulgare</i>         | 1         | 0                     | 0                                    |
| <i>Artemisia vulgaris</i>      | 1         | 1                     | 0                                    | <i>Persicaria lapathifolia</i>  | 1         | 0                     | 0                                    |
| <i>Atriplex patula</i>         | 1         | 0                     | 0                                    | <i>Phalaris arundinacea</i>     | 1         | 0                     | 0                                    |
| <i>Atriplex prostrata</i>      | 1         | 0                     | 0                                    | <i>Phleum bertolonii</i>        | 1         | 0                     | 0                                    |
| <i>Brachypodium sylvaticum</i> | 1         | 0                     | 1                                    | <i>pimpinella major</i>         | 1         | 0                     | 0                                    |
| <i>Briza media</i>             | 1         | 0                     | 0                                    | <i>Pimpinella saxifraga</i>     | 1         | 0                     | 0                                    |
| <i>Bromus commutatus</i>       | 1         | 0                     | 0                                    | <i>Plantago media</i>           | 1         | 0                     | 0                                    |
| <i>Bromus erectus</i>          | 1         | 0                     | 0                                    | <i>Poa angustifolia</i>         | 1         | 1                     | 1                                    |
| <i>Bromus hordeaceus</i>       | 1         | 0                     | 0                                    | <i>Poa annua</i>                | 0         | 1                     | 1                                    |
| <i>Capsella bursa-pastoris</i> | 0         | 1                     | 0                                    | <i>Poa humilis</i>              | 1         | 0                     | 0                                    |
| <i>Carex flacca</i>            | 1         | 0                     | 0                                    | <i>Poa pratensis</i>            | 1         | 1                     | 1                                    |
| <i>Carex hirta</i>             | 1         | 0                     | 0                                    | <i>Poa spp</i>                  | 0         | 1                     | 1                                    |
| <i>Carex otrubae</i>           | 1         | 0                     | 0                                    | <i>Poa trivialis</i>            | 0         | 1                     | 1                                    |
| <i>Centaurea nigra</i>         | 1         | 1                     | 0                                    | <i>Polygonum aviculare</i> agg. | 0         | 1                     | 0                                    |
| <i>Centaureum erythraea</i>    | 1         | 0                     | 0                                    | <i>Polygonum spp</i>            | 0         | 1                     | 0                                    |
| <i>Cerastium fontanum</i>      | 0         | 1                     | 0                                    | <i>Potentilla reptans</i>       | 0         | 0                     | 1                                    |
| <i>Chenopodium album</i>       | 1         | 0                     | 0                                    | <i>Primula veris</i>            | 1         | 0                     | 0                                    |
| <i>Chenopodium polyspermum</i> | 1         | 0                     | 0                                    | <i>Pulicaria dysenterica</i>    | 1         | 0                     | 0                                    |
| <i>Cirsium acaule</i>          | 1         | 0                     | 0                                    | <i>Ranunculus acris</i>         | 1         | 1                     | 0                                    |
| <i>Cirsium arvense</i>         | 0         | 1                     | 0                                    | <i>Ranunculus auricomus</i>     | 1         | 0                     | 0                                    |
| <i>Cirsium palustre</i>        | 0         | 1                     | 0                                    | <i>Ranunculus bulbosus</i>      | 1         | 1                     | 0                                    |
| <i>Cirsium vulgare</i>         | 0         | 1                     | 0                                    | <i>Ranunculus ficaria</i>       | 0         | 1                     | 0                                    |
| <i>Clinopodium vulgare</i>     | 1         | 0                     | 0                                    | <i>Ranunculus repens</i>        | 0         | 1                     | 0                                    |
| <i>Conium maculatum</i>        | 1         | 0                     | 0                                    | <i>Ranunculus sceleratus</i>    | 1         | 1                     | 0                                    |
| <i>Convolvulus arvensis</i>    | 1         | 1                     | 0                                    | <i>Ranunculus seedling/spp.</i> | 0         | 1                     | 0                                    |
| <i>Coronula squamatus</i>      | 1         | 0                     | 0                                    | <i>Rosa arvensis</i>            | 1         | 0                     | 0                                    |
| <i>Crepis capillaris</i>       | 1         | 1                     | 0                                    | <i>Rubus fruticosus</i> agg.    | 0         | 1                     | 0                                    |
| <i>Cruciata laevipes</i>       | 1         | 0                     | 0                                    | <i>Rumex acetosa</i>            | 0         | 1                     | 1                                    |
| <i>Cynosurus cristatus</i>     | 0         | 0                     | 1                                    | <i>Rumex acetosella</i>         | 1         | 1                     | 1                                    |
| <i>Dactylis glomerata</i>      | 0         | 1                     | 1                                    | <i>Rumex conglomeratus</i>      | 1         | 0                     | 0                                    |
| <i>Deschampsia cespitosa</i>   | 0         | 0                     | 1                                    | <i>Rumex crispus</i>            | 0         | 1                     | 0                                    |
| <i>Dipsacus fullonum</i>       | 0         | 1                     | 0                                    | <i>Rumex obtusifolius</i>       | 0         | 1                     | 0                                    |
| <i>Elytrigia repens</i>        | 0         | 1                     | 1                                    | <i>Rumex sanguineus</i>         | 1         | 1                     | 0                                    |
| <i>Epilobium hirsutum</i>      | 1         | 0                     | 0                                    | <i>Rumex seedling/spp.</i>      | 0         | 1                     | 0                                    |
| <i>Epilobium palustre</i>      | 1         | 0                     | 0                                    | <i>Sagina apetala</i>           | 1         | 0                     | 0                                    |
| <i>Epilobium parviflorum</i>   | 1         | 0                     | 0                                    | <i>Salix aurita</i>             | 1         | 0                     | 0                                    |
| <i>Epilobium tetragonum</i>    | 1         | 0                     | 0                                    | <i>Salix caprea</i>             | 1         | 0                     | 0                                    |
| <i>Equisetum palustre</i>      | 1         | 0                     | 0                                    | <i>Scabiosa columbaria</i>      | 1         | 0                     | 0                                    |
| <i>Erodium cicutarium</i> agg. | 1         | 0                     | 0                                    | <i>Senecio erucifolius</i>      | 1         | 1                     | 0                                    |
| <i>Euphorbia exigua</i>        | 1         | 0                     | 0                                    | <i>Senecio jacobaea</i>         | 0         | 1                     | 0                                    |
| <i>Euphorbia helioscopia</i>   | 1         | 0                     | 0                                    | <i>Senecio vulgaris</i>         | 0         | 1                     | 0                                    |
| <i>Euphorbia peplus</i>        | 1         | 0                     | 0                                    | <i>Silene latifolia</i>         | 1         | 0                     | 0                                    |

| <i>Euphrasia nemorosa</i>        | 1         | 0                     | 0                                    | <i>Sinapis arvensis</i>        | 0         | 1                     | 0                                    |
|----------------------------------|-----------|-----------------------|--------------------------------------|--------------------------------|-----------|-----------------------|--------------------------------------|
|                                  | Axiophyte | Bird<br>food<br>plant | Butterfly<br>larval<br>food<br>plant |                                | Axiophyte | Bird<br>food<br>plant | Butterfly<br>larval<br>food<br>plant |
| <i>Fallopia convolvulus</i>      | 1         | 0                     | 0                                    | <i>Sisymbrium officinale</i>   | 1         | 0                     | 0                                    |
| <i>Festuca arundinacea</i>       | 0         | 1                     | 0                                    | <i>Solanum dulcamara</i>       | 1         | 0                     | 0                                    |
| <i>Festuca Lolium Hybrid</i>     | 1         | 1                     | 0                                    | <i>Sonchus arvensis</i>        | 0         | 1                     | 0                                    |
| <i>Festuca ovina agg.</i>        | 1         | 1                     | 1                                    | <i>Sonchus asper</i>           | 0         | 1                     | 0                                    |
| <i>Festuca pratensis</i>         | 0         | 1                     | 1                                    | <i>Sonchus oleraceus</i>       | 1         | 1                     | 0                                    |
| <i>Festuca rubra agg.</i>        | 0         | 1                     | 1                                    | <i>Sonchus spp.</i>            | 0         | 1                     | 0                                    |
| <i>Filipendula ulmaria</i>       | 1         | 0                     | 0                                    | <i>Stachys arvensis</i>        | 1         | 1                     | 0                                    |
| <i>Fumaria officinalis</i>       | 1         | 0                     | 0                                    | <i>Stachys palustris</i>       | 1         | 0                     | 0                                    |
| <i>Galeopsis tetrahit agg.</i>   | 1         | 1                     | 0                                    | <i>Stellaria graminea</i>      | 1         | 1                     | 0                                    |
| <i>Galium mollugo</i>            | 1         | 0                     | 0                                    | <i>Stellaria media</i>         | 0         | 1                     | 0                                    |
| <i>Galium palustre</i>           | 1         | 0                     | 0                                    | <i>stellaria uliginosa</i>     | 1         | 0                     | 0                                    |
| <i>Galium saxatile</i>           | 1         | 0                     | 0                                    | <i>Symphytum officinale</i>    | 1         | 0                     | 0                                    |
| <i>Geranium dissectum</i>        | 1         | 0                     | 0                                    | <i>Taraxacum polyodon</i>      | 0         | 1                     | 0                                    |
| <i>Geranium molle</i>            | 1         | 0                     | 0                                    | <i>Torilia japonica</i>        | 1         | 0                     | 0                                    |
| <i>Geranium pusillum</i>         | 1         | 0                     | 0                                    | <i>Trifolium campestre</i>     | 1         | 1                     | 0                                    |
| <i>Geum urbanum</i>              | 1         | 1                     | 0                                    | <i>Trifolium dubium</i>        | 0         | 1                     | 0                                    |
| <i>Helictotrichon pratense</i>   | 1         | 0                     | 0                                    | <i>Trifolium medium</i>        | 1         | 0                     | 0                                    |
| <i>Helictotrichon pubescens</i>  | 1         | 0                     | 0                                    | <i>Trifolium pratense</i>      | 0         | 1                     | 0                                    |
| <i>Holcus lanatus</i>            | 0         | 1                     | 1                                    | <i>Trifolium repens</i>        | 0         | 1                     | 0                                    |
| <i>Holcus mollis</i>             | 1         | 1                     | 0                                    | <i>Trifolium seedling/spp.</i> | 0         | 1                     | 0                                    |
| <i>Hyacinthoides non-scripta</i> | 1         | 0                     | 0                                    | <i>Trisetum flavescens</i>     | 1         | 0                     | 0                                    |
| <i>Hypericum humilusum</i>       | 1         | 0                     | 0                                    | <i>Urtica dioica</i>           | 0         | 1                     | 1                                    |
| <i>Hypericum perforatum</i>      | 1         | 0                     | 0                                    | <i>Veronica montana</i>        | 1         | 0                     | 0                                    |
| <i>Hypochaeris radicata</i>      | 1         | 0                     | 0                                    | <i>Veronica serpyllifolia</i>  | 1         | 0                     | 0                                    |
| <i>Juncus articulatus</i>        | 1         | 0                     | 0                                    | <i>Vicia cracca</i>            | 1         | 1                     | 1                                    |
| <i>Juncus inflexus</i>           | 1         | 0                     | 0                                    | <i>Vicia hirsuta</i>           | 1         | 0                     | 0                                    |
| <i>Kickxia elatine</i>           | 1         | 0                     | 0                                    | <i>Vicia sativa</i>            | 1         | 1                     | 0                                    |
| <i>Kickxia spuria</i>            | 1         | 0                     | 0                                    | <i>Vicia seedling/spp.</i>     | 0         | 1                     | 0                                    |
| <i>Knautia arvensis</i>          | 1         | 0                     | 0                                    | <i>Vicia sepium</i>            | 1         | 1                     | 0                                    |
| <i>Lamium album</i>              | 0         | 1                     | 0                                    | <i>Vicia tetrasperma</i>       | 1         | 1                     | 0                                    |
| <i>Lamium purpureum</i>          | 0         | 1                     | 0                                    | <i>Viola arvensis</i>          | 1         | 0                     | 0                                    |
| <i>Lathyrus nissolia</i>         | 1         | 0                     | 0                                    | <i>Viola hirta</i>             | 1         | 0                     | 0                                    |
| <i>Lathyrus pratensis</i>        | 1         | 0                     | 1                                    | <i>Vulpia bromoides</i>        | 1         | 0                     | 0                                    |
| <i>Leontodon autumnalis</i>      | 0         | 1                     | 0                                    | <i>Vulpia myuros</i>           | 1         | 0                     | 0                                    |

**Table 24** Butterfly species for which presence of larval food plants was analysed

| English name        | Latin name                    |
|---------------------|-------------------------------|
| Comma               | <i>Polygonia c-album</i>      |
| Common Blue         | <i>Polyommatus icarus</i>     |
| Dingy Skipper       | <i>Erynnis tages</i>          |
| Essex Skipper       | <i>Thymelicus lineola</i>     |
| Gatekeeper          | <i>Pyronia tithonus</i>       |
| Green Hairstreak    | <i>Callophrys rubi</i>        |
| Grizzled Skipper    | <i>Pyrgus malvae</i>          |
| Large Skipper       | <i>Ochlodes venata</i>        |
| Marbled White       | <i>Melanargia galathea</i>    |
| Meadow Brown        | <i>Maniola jurtina</i>        |
| Orange-tip          | <i>Anthocharis cardamines</i> |
| Peacock             | <i>Inachis io</i>             |
| Ringlet             | <i>Aphantopus hyperantus</i>  |
| Small Copper        | <i>Lycaena phlaeas</i>        |
| Small Heath         | <i>Coenonympha pamphilus</i>  |
| Small Skipper       | <i>Thymelicus sylvestris</i>  |
| Small Tortoiseshell | <i>Aglais urticae</i>         |
| Speckled Wood       | <i>Pararge aegeria</i>        |
| Wall                | <i>Lasiommata megera</i>      |
| Wood White          | <i>Leptidea sinapsis</i>      |

**Table 25** Bird species for which presence of food plants was analysed

| English name   | Latin name                   |
|----------------|------------------------------|
| Chaffinch      | <i>Fringilla coelebs</i>     |
| Collared Dove  | <i>Streptopelia decaocto</i> |
| Corn Bunting   | <i>Miliaria calandra</i>     |
| Goldfinch      | <i>Carduelis carduelis</i>   |
| Greenfinch     | <i>Carduelis chloris</i>     |
| Grey Partridge | <i>Perdix perdix</i>         |
| House sparrow  | <i>Passer domesticus</i>     |
| Linnet         | <i>Carduelis cannabina</i>   |
| Reed Bunting   | <i>Emberiza schoeniclus</i>  |
| Skylark        | <i>Alauda arvensis</i>       |
| Stock Dove     | <i>Columba oenas</i>         |
| Tree Sparrow   | <i>Passer montanus</i>       |
| Woodpigeon     | <i>Columba palumbus</i>      |
| Yellowhammer   | <i>Emberiza citrinella</i>   |

**Table 26**      **Species recorded in summer botanical assessments**

| Species                         | % of features<br>found on | % mean of abundance<br>when present |
|---------------------------------|---------------------------|-------------------------------------|
| <i>Holcus lanatus</i>           | 66.4                      | 46.5                                |
| <i>Cirsium arvense</i>          | 64.0                      | 23.8                                |
| <i>Lolium perenne</i>           | 60.0                      | 42.6                                |
| <i>Dactylis glomerata</i>       | 57.6                      | 31.3                                |
| <i>Agrostis stolonifera</i>     | 52.0                      | 29.8                                |
| <i>Poa trivialis</i>            | 50.4                      | 30.0                                |
| <i>Ranunculus repens</i>        | 49.6                      | 25.5                                |
| <i>Arrhenatherum elatius</i>    | 48.0                      | 40.3                                |
| <i>Festuca rubra</i> agg.       | 42.4                      | 48.6                                |
| <i>Trifolium repens</i>         | 40.8                      | 35.2                                |
| <i>Taraxacum officinale</i>     | 39.2                      | 23.8                                |
| <i>Elytrigia repens</i>         | 36.8                      | 31.5                                |
| <i>Heracleum sphondylium</i>    | 30.4                      | 10.9                                |
| <i>Urtica dioica</i>            | 29.6                      | 26.6                                |
| <i>Phleum pratense</i>          | 28.0                      | 39.9                                |
| <i>Rumex obtusifolius</i>       | 26.4                      | 12.4                                |
| <i>Poa annua</i>                | 24.0                      | 19.8                                |
| Broad-leaf Seedling             | 20.0                      | 13.8                                |
| <i>Sonchus asper</i>            | 20.0                      | 21.4                                |
| <i>Agrostis capillaris</i>      | 20.0                      | 30.2                                |
| <i>Cerastium fontanum</i>       | 18.4                      | 14.3                                |
| <i>Cirsium vulgare</i>          | 16.8                      | 12.6                                |
| <i>Geranium molle</i>           | 16.8                      | 12.9                                |
| <i>Equisetum arvense</i>        | 16.0                      | 17.8                                |
| <i>Plantago major</i>           | 16.0                      | 18.3                                |
| <i>Galium aparine</i>           | 16.0                      | 18.5                                |
| <i>Trifolium pratense</i>       | 16.0                      | 31.8                                |
| <i>Festuca pratensis</i>        | 16.0                      | 51.0                                |
| <i>Senecio jacobaea</i>         | 14.4                      | 8.6                                 |
| <i>Veronica persica</i>         | 13.6                      | 15.9                                |
| <i>Geranium dissectum</i>       | 12.8                      | 13.1                                |
| <i>Chenopodium album</i>        | 12.8                      | 27.5                                |
| <i>Fraxinus excelsior</i>       | 12.0                      | 16.7                                |
| <i>Bromus hordeaceus</i>        | 12.0                      | 25.7                                |
| <i>Anthriscus sylvestris</i>    | 11.2                      | 5.7                                 |
| Grass seedling                  | 11.2                      | 10.7                                |
| <i>Rubus fruticosus</i> agg.    | 11.2                      | 13.2                                |
| <i>Cynosurus cristatus</i>      | 11.2                      | 14.6                                |
| <i>Juncus effusus</i>           | 11.2                      | 15.7                                |
| <i>Polygonum aviculare</i> agg. | 11.2                      | 25.1                                |
| <i>Stellaria media</i>          | 10.4                      | 14.2                                |
| <i>Poa pratensis</i>            | 10.4                      | 30.4                                |
| <i>Senecio vulgaris</i>         | 9.6                       | 12.9                                |
| <i>Alopecurus myosuroides</i>   | 9.6                       | 21.3                                |

| Species                          | % of features<br>found on | % mean of abundance<br>when present |
|----------------------------------|---------------------------|-------------------------------------|
| <i>Anagallis arvensis</i>        | 9.6                       | 23.3                                |
| <i>Convolvulus arvensis</i>      | 8.8                       | 14.1                                |
| <i>Epilobium hirsutum</i>        | 8.8                       | 16.8                                |
| <i>Persicaria maculosa</i>       | 8.8                       | 28.0                                |
| <i>Triticum aestivum</i>         | 8.8                       | 48.2                                |
| <i>Plantago lanceolata</i>       | 8.0                       | 19.0                                |
| <i>Agrostis gigantea</i>         | 8.0                       | 20.0                                |
| <i>Glechoma hederacea</i>        | 8.0                       | 23.5                                |
| <i>Picris echioides</i>          | 8.0                       | 32.0                                |
| <i>Deschampsia cespitosa</i>     | 7.2                       | 12.2                                |
| <i>Rumex crispus</i>             | 7.2                       | 14.4                                |
| <i>Viola arvensis</i>            | 7.2                       | 14.6                                |
| <i>Holcus mollis</i>             | 7.2                       | 15.0                                |
| <i>Angelica sylvestris</i>       | 7.2                       | 16.1                                |
| <i>Calystegia sepium</i>         | 7.2                       | 17.8                                |
| <i>Tripleurospermum inodorum</i> | 7.2                       | 27.8                                |
| <i>Bromus mollis</i>             | 7.2                       | 36.7                                |
| <i>Geranium</i> spp.             | 6.4                       | 9.4                                 |
| <i>Hypochaeris radicata</i>      | 6.4                       | 12.5                                |
| <i>Vicia sepium</i>              | 6.4                       | 14.4                                |
| <i>Medicago lupulina</i>         | 6.4                       | 17.5                                |
| <i>Prunus spinosa</i>            | 6.4                       | 18.1                                |
| <i>Lathyrus pratensis</i>        | 5.6                       | 5.7                                 |
| <i>Myosotis arvensis</i>         | 5.6                       | 9.3                                 |
| <i>Anisantha sterilis</i>        | 5.6                       | 9.3                                 |
| <i>Fallopia convolvulus</i>      | 5.6                       | 10.7                                |
| <i>Anthoxanthum odoratum</i>     | 5.6                       | 10.7                                |
| <i>Vicia sativa</i>              | 5.6                       | 14.3                                |
| <i>Potentilla reptans</i>        | 5.6                       | 20.0                                |
| <i>Festuca arundinacea</i>       | 5.6                       | 27.9                                |
| <i>Lotus corniculatus</i>        | 5.6                       | 37.1                                |
| <i>Crepis capillaris</i>         | 4.8                       | 6.7                                 |
| <i>Pulicaria dysenterica</i>     | 4.8                       | 8.3                                 |
| <i>Crataegus monogyna</i>        | 4.8                       | 8.3                                 |
| <i>Sonchus arvensis</i>          | 4.8                       | 9.2                                 |
| <i>Avena fatua</i>               | 4.8                       | 13.3                                |
| <i>Veronica chamaedrys</i>       | 4.8                       | 15.0                                |
| <i>Achillea millefolium</i>      | 4.8                       | 19.2                                |
| <i>Hedera helix</i>              | 4.0                       | 6.0                                 |
| <i>Trifolium dubium</i>          | 4.0                       | 7.0                                 |
| <i>Lamium album</i>              | 4.0                       | 8.0                                 |
| <i>Ranunculus acris</i>          | 4.0                       | 10.0                                |
| <i>Veronica serpyllifolia</i>    | 4.0                       | 10.0                                |
| <i>Odontites vernus</i>          | 4.0                       | 14.0                                |
| <i>Alopecurus pratensis</i>      | 4.0                       | 14.0                                |
| <i>Lotus pedunculatus</i>        | 4.0                       | 19.0                                |

| Species                        | % of features<br>found on | % mean of abundance<br>when present |
|--------------------------------|---------------------------|-------------------------------------|
| <i>Rumex acetosa</i>           | 4.0                       | 23.0                                |
| <i>Epilobium montanum</i>      | 4.0                       | 27.0                                |
| <i>Rumex conglomeratus</i>     | 3.2                       | 5.0                                 |
| <i>Stachys sylvatica</i>       | 3.2                       | 5.0                                 |
| <i>Geum urbanum</i>            | 3.2                       | 7.5                                 |
| <i>Filipendula ulmaria</i>     | 3.2                       | 7.5                                 |
| <i>Cruciata laevipes</i>       | 3.2                       | 7.5                                 |
| <i>Conium maculatum</i>        | 3.2                       | 7.5                                 |
| <i>Phalaris arundinacea</i>    | 3.2                       | 8.8                                 |
| <i>Lamium purpureum</i>        | 3.2                       | 11.3                                |
| <i>Rumex acetosella</i>        | 3.2                       | 13.8                                |
| <i>Centaurea nigra</i>         | 3.2                       | 15.0                                |
| <i>Sonchus oleraceus</i>       | 3.2                       | 15.0                                |
| <i>Sinapis arvensis</i>        | 3.2                       | 15.0                                |
| <i>Epilobium spp</i>           | 3.2                       | 15.0                                |
| <i>Vicia hirsuta</i>           | 3.2                       | 16.3                                |
| <i>Brassica napus</i>          | 3.2                       | 17.5                                |
| <i>Vicia cracca</i>            | 3.2                       | 18.8                                |
| <i>Vicia seedling/spp.</i>     | 3.2                       | 27.5                                |
| <i>Prunella vulgaris</i>       | 3.2                       | 32.5                                |
| <i>Phacelia tanacetifolia</i>  | 3.2                       | 76.3                                |
| <i>Quercus robur</i>           | 2.4                       | 5.0                                 |
| <i>Sambucus nigra</i>          | 2.4                       | 5.0                                 |
| <i>Arctium lappa</i>           | 2.4                       | 8.3                                 |
| <i>Clematis vitalba</i>        | 2.4                       | 8.3                                 |
| <i>Lapsana communis</i>        | 2.4                       | 8.3                                 |
| <i>Galium palustre</i>         | 2.4                       | 10.0                                |
| <i>Hypericum perforatum</i>    | 2.4                       | 10.0                                |
| <i>Erodium cicutarium agg.</i> | 2.4                       | 10.0                                |
| <i>Sinapis alba</i>            | 2.4                       | 10.0                                |
| <i>Sisymbrium officinale</i>   | 2.4                       | 10.0                                |
| <i>Papaver rhoeas</i>          | 2.4                       | 11.7                                |
| <i>Bromus erectus</i>          | 2.4                       | 13.3                                |
| <i>pimpinella major</i>        | 2.4                       | 16.7                                |
| <i>Persicaria lapathifolia</i> | 2.4                       | 20.0                                |
| <i>Atriplex prostrata</i>      | 2.4                       | 23.3                                |
| <i>Leucanthemum vulgare</i>    | 2.4                       | 28.3                                |
| <i>Chenopodium ficifolium</i>  | 2.4                       | 28.3                                |
| <i>Bromus spp.</i>             | 2.4                       | 30.0                                |
| <i>Atriplex patula</i>         | 2.4                       | 33.3                                |
| <i>Arctium minus</i>           | 1.6                       | 5.0                                 |
| <i>Sonchus spp</i>             | 1.6                       | 5.0                                 |
| <i>Salix caprea</i>            | 1.6                       | 5.0                                 |
| <i>Carex hirta</i>             | 1.6                       | 5.0                                 |
| <i>Solanum dulcamara</i>       | 1.6                       | 5.0                                 |
| <i>Bromus commutatus</i>       | 1.6                       | 5.0                                 |

| Species                        | % of features<br>found on | % mean of abundance<br>when present |
|--------------------------------|---------------------------|-------------------------------------|
| <i>Ranunculus auricomus</i>    | 1.6                       | 5.0                                 |
| <i>Carex</i> seedling/sp.      | 1.6                       | 5.0                                 |
| <i>Lolium multiflorum</i>      | 1.6                       | 5.0                                 |
| <i>Matricaria matricioides</i> | 1.6                       | 5.0                                 |
| Unidentified Dicotyledon       | 1.6                       | 5.0                                 |
| <i>Silene latifolia</i>        | 1.6                       | 7.5                                 |
| <i>Onobrychis viciifolia</i>   | 1.6                       | 7.5                                 |
| <i>Mentha arvensis</i>         | 1.6                       | 7.5                                 |
| <i>Acer pseudoplatanus</i>     | 1.6                       | 7.5                                 |
| <i>Lactuca serriola</i>        | 1.6                       | 7.5                                 |
| <i>Pteridium aquilinum</i>     | 1.6                       | 7.5                                 |
| <i>Rosa canina</i> agg.        | 1.6                       | 7.5                                 |
| <i>Capsella bursa-pastoris</i> | 1.6                       | 10.0                                |
| <i>Leontodon autumnalis</i>    | 1.6                       | 10.0                                |
| <i>Euphorbia helioscopia</i>   | 1.6                       | 10.0                                |
| <i>Salix aurita</i>            | 1.6                       | 10.0                                |
| <i>Trifolium medium</i>        | 1.6                       | 10.0                                |
| <i>Veronica montana</i>        | 1.6                       | 10.0                                |
| <i>Artemisia vulgaris</i>      | 1.6                       | 12.5                                |
| <i>Coronus squamatus</i>       | 1.6                       | 12.5                                |
| <i>Symphytum officinale</i>    | 1.6                       | 12.5                                |
| <i>Kickxia spuria</i>          | 1.6                       | 12.5                                |
| <i>Lathyrus nissolia</i>       | 1.6                       | 12.5                                |
| <i>Brasica</i> sp/seedling     | 1.6                       | 12.5                                |
| <i>Fumaria officinalis</i>     | 1.6                       | 15.0                                |
| <i>Galium mollugo</i>          | 1.6                       | 15.0                                |
| <i>Origanum vulgare</i>        | 1.6                       | 15.0                                |
| <i>Bellis perennis</i>         | 1.6                       | 15.0                                |
| <i>Carex</i> sp.1              | 1.6                       | 15.0                                |
| <i>Conyza canadensis</i>       | 1.6                       | 15.0                                |
| <i>Matricaria</i> spp.         | 1.6                       | 15.0                                |
| <i>Pilosella aurantiaca</i>    | 1.6                       | 17.5                                |
| <i>Chenopodium polyspermum</i> | 1.6                       | 20.0                                |
| Sedge 1                        | 1.6                       | 20.0                                |
| <i>Solanum nigrum</i>          | 1.6                       | 20.0                                |
| <i>Hordeum murinum</i>         | 1.6                       | 22.5                                |
| <i>Brachypodium sylvaticum</i> | 1.6                       | 22.5                                |
| <i>Vulpia myuros</i>           | 1.6                       | 22.5                                |
| <i>Poa</i> spp.                | 1.6                       | 25.0                                |
| <i>Veronica arvensis</i>       | 1.6                       | 29.2                                |
| <i>Trifolium campestre</i>     | 1.6                       | 30.0                                |
| <i>Carex flacca</i>            | 1.6                       | 32.5                                |
| <i>Vicia tetrasperma</i>       | 1.6                       | 35.0                                |
| <i>Alnus glutinosa</i>         | 1.6                       | 35.0                                |
| <i>Stachys</i> spp.            | 1.6                       | 45.0                                |
| <i>Avena sativa</i>            | 1.6                       | 45.8                                |



| Species                         | % of features<br>found on | % mean of abundance<br>when present |
|---------------------------------|---------------------------|-------------------------------------|
| <i>Festuca ovina</i> agg.       | 1.6                       | 47.5                                |
| <i>Trifolium</i> seedling/sp.   | 1.6                       | 52.5                                |
| <i>Aethusa cynapium</i>         | 1.6                       | 57.5                                |
| <i>Festuca Lolium</i> Hybrid    | 0.8                       | 5.0                                 |
| <i>Rumex sanguineus</i>         | 0.8                       | 5.0                                 |
| <i>Stellaria graminea</i>       | 0.8                       | 5.0                                 |
| <i>Stachys arvensis</i>         | 0.8                       | 5.0                                 |
| <i>Dipsacus fullonum</i>        | 0.8                       | 5.0                                 |
| <i>Ranunculus</i> seedling/sp.  | 0.8                       | 5.0                                 |
| <i>Rumex</i> seedling/sp.       | 0.8                       | 5.0                                 |
| <i>Epilobium parviflorum</i>    | 0.8                       | 5.0                                 |
| <i>Luzula campestris</i>        | 0.8                       | 5.0                                 |
| <i>Torilia japonica</i>         | 0.8                       | 5.0                                 |
| <i>Mentha aquatica</i>          | 0.8                       | 5.0                                 |
| <i>Rosa arvensis</i>            | 0.8                       | 5.0                                 |
| <i>Sagina apetala</i>           | 0.8                       | 5.0                                 |
| <i>Euphorbia exigua</i>         | 0.8                       | 5.0                                 |
| <i>Kickxia elatine</i>          | 0.8                       | 5.0                                 |
| <i>Centaureum erythraea</i>     | 0.8                       | 5.0                                 |
| <i>Epilobium palustre</i>       | 0.8                       | 5.0                                 |
| <i>Myosotis discolor</i>        | 0.8                       | 5.0                                 |
| <i>Trisetum flavescens</i>      | 0.8                       | 5.0                                 |
| <i>Carex otrubae</i>            | 0.8                       | 5.0                                 |
| <i>Hypericum humilusum</i>      | 0.8                       | 5.0                                 |
| <i>Knautia arvensis</i>         | 0.8                       | 5.0                                 |
| <i>Primula veris</i>            | 0.8                       | 5.0                                 |
| <i>Helictotrichon pubescens</i> | 0.8                       | 5.0                                 |
| <i>Arctium</i> spp.             | 0.8                       | 5.0                                 |
| <i>Cardamine</i> spp.           | 0.8                       | 5.0                                 |
| <i>Carduus acanthoides</i>      | 0.8                       | 5.0                                 |
| <i>Chamerion angustifolium</i>  | 0.8                       | 5.0                                 |
| <i>Fagus sylvatica</i>          | 0.8                       | 5.0                                 |
| <i>Glyceria fluitans</i>        | 0.8                       | 5.0                                 |
| <i>Glyceria</i> seedling/sp.    | 0.8                       | 5.0                                 |
| <i>Gnaphalium uliginosum</i>    | 0.8                       | 5.0                                 |
| <i>Hordeum</i> sp.              | 0.8                       | 5.0                                 |
| <i>Juncus</i> spp.              | 0.8                       | 5.0                                 |
| <i>Linaria vulgaris</i>         | 0.8                       | 5.0                                 |
| <i>Potentilla anserina</i>      | 0.8                       | 5.0                                 |
| <i>Sagina procumbens</i>        | 0.8                       | 5.0                                 |
| <i>Salix cinerea</i>            | 0.8                       | 5.0                                 |
| <i>Sanguisorba minor</i>        | 0.8                       | 5.0                                 |
| <i>Setaria viridis</i>          | 0.8                       | 5.0                                 |
| <i>Silene</i> spp.              | 0.8                       | 5.0                                 |
| <i>Thymus praecox</i>           | 0.8                       | 5.0                                 |
| <i>Veronica</i> seedling/sp.    | 0.8                       | 5.0                                 |

| Species                          | % of features<br>found on | % mean of abundance<br>when present |
|----------------------------------|---------------------------|-------------------------------------|
| <i>Zea mays</i>                  | 0.8                       | 5.0                                 |
| <i>Alliaria petiolata</i>        | 0.8                       | 5.0                                 |
| <i>Agrimonia eupatoria</i>       | 0.8                       | 5.0                                 |
| <i>Galeopsis tetrahit</i> agg.   | 0.8                       | 10.0                                |
| <i>Senecio erucifolius</i>       | 0.8                       | 10.0                                |
| <i>Ranunculus bulbosus</i>       | 0.8                       | 10.0                                |
| <i>Cirsium palustre</i>          | 0.8                       | 10.0                                |
| <i>Leontodon</i> spp.            | 0.8                       | 10.0                                |
| <i>Ranunculus ficaria</i>        | 0.8                       | 10.0                                |
| <i>Aphanes arvensis</i> agg.     | 0.8                       | 10.0                                |
| <i>Juncus articulatus</i>        | 0.8                       | 10.0                                |
| <i>Juncus inflexus</i>           | 0.8                       | 10.0                                |
| <i>stellaria uliginosa</i>       | 0.8                       | 10.0                                |
| <i>Phleum bertolonii</i>         | 0.8                       | 10.0                                |
| <i>Stachys palustris</i>         | 0.8                       | 10.0                                |
| <i>Equisetum palustre</i>        | 0.8                       | 10.0                                |
| <i>Scabiosa columbaria</i>       | 0.8                       | 10.0                                |
| <i>Clinopodium vulgare</i>       | 0.8                       | 10.0                                |
| <i>Epilobium ciliatum</i>        | 0.8                       | 10.0                                |
| <i>Juncus bufoniu.</i>           | 0.8                       | 10.0                                |
| <i>Juncus conglomeratus</i>      | 0.8                       | 10.0                                |
| <i>Solanum tuberosum</i>         | 0.8                       | 10.0                                |
| <i>Polygonum</i> spp.            | 0.8                       | 15.0                                |
| <i>Taraxacum polyodon</i>        | 0.8                       | 15.0                                |
| <i>Geranium pusillum</i>         | 0.8                       | 15.0                                |
| <i>Galium saxatile</i>           | 0.8                       | 15.0                                |
| <i>Vulpia bromoides</i>          | 0.8                       | 15.0                                |
| <i>Viola hirta</i>               | 0.8                       | 15.0                                |
| <i>Hyacinthoides non-scripta</i> | 0.8                       | 15.0                                |
| <i>Briza media</i>               | 0.8                       | 15.0                                |
| <i>Pimpinella saxifraga</i>      | 0.8                       | 15.0                                |
| <i>Epilobium tetragonum</i>      | 0.8                       | 20.0                                |
| <i>Euphorbia peplus</i>          | 0.8                       | 20.0                                |
| <i>Cirsium acaule</i>            | 0.8                       | 20.0                                |
| <i>Carex</i> sp2                 | 0.8                       | 20.0                                |
| Unidentified Brassicaceae        | 0.8                       | 20.0                                |
| Unidentified grass               | 0.8                       | 20.0                                |
| <i>Plantago media</i>            | 0.8                       | 25.0                                |
| <i>Helictotrichon pratense</i>   | 0.8                       | 25.0                                |
| <i>Linum catharticum</i>         | 0.8                       | 25.0                                |
| <i>Chenopodium</i> sp.           | 0.8                       | 25.0                                |
| <i>Alopecurus geniculatus</i>    | 0.8                       | 30.0                                |
| <i>Panicum</i> sp.               | 0.8                       | 30.0                                |
| <i>Poa humilis</i>               | 0.8                       | 40.0                                |
| <i>Rosa</i> seedling/sp.         | 0.8                       | 40.0                                |
| <i>Hordeum vulgare</i>           | 0.8                       | 50.0                                |

| Species                      | % of features<br>found on | % mean of abundance<br>when present |
|------------------------------|---------------------------|-------------------------------------|
| <i>Trifolium hybridum</i>    | 0.8                       | 60.0                                |
| <i>Lonicera periclymenum</i> | 0.8                       | 70.0                                |
| <i>Matricaria recutita</i>   | 0.8                       | 70.0                                |
| <i>Euphrasia nemorosa</i>    | 0.8                       | 80.0                                |
| <i>Ranunculus sceleratus</i> | 0.8                       | 100.0                               |
| <i>Melilotus</i> sp.         | 0.8                       | 100.0                               |
| <i>Poa angustifolia</i>      | 0.8                       | 100.0                               |

## APPENDIX 2. REPORT OF SPRING ASSESSMENTS, SEPTEMBER 2010

### KEY MESSAGES

This report summarises the initial verification work for the Campaign for the Farmed Environment undertaken in spring 2010 assessing farmer awareness and attitudes and, where possible, the quality of voluntary environmental management. It builds on the previous interim report submitted to Defra and the other Campaign partners in June 2010, which was based on a subset of the information presented here. More detailed analysis has been carried out for the current report, however the overall messages remain unchanged.

Despite the fact that the Defra postal survey and Fera's visits and interviews were carried out only a few months after the Campaign's launch, **awareness of the Campaign was high**. However, **many farmers lacked a more detailed understanding of the purpose of the Campaign and what they need to do in order to contribute**. Many thought that having an agri-environment agreement in place was sufficient, even though agreements often did not include in-field options. In response to recommendations in Fera's interim report, the Campaign's communications work is putting greater emphasis on the implementation of voluntary management in addition to Entry Level Stewardship (ELS) and on the uptake of in-field options in these agreements. However, conversations with farmers during subsequent field visits suggest that this **renewed effort on communications and publicity should continue** to ensure the messages are understood.

Although this report relates to a small sample of farmers, it has been valuable in interpreting the results of the Defra postal survey. Through face-to-face and telephone interviews, a much better understanding of the progress of the Campaign has been gained and suggestions for future communications, which should improve both the level of participation and the quality of management, can be made.

Interviews revealed that most of the voluntary management reported in the Defra survey represented management that was already in place before the Campaign was launched. The Campaign is therefore an important vehicle for **recognising the environmentally beneficial management that is already being undertaken on many farms**, and potentially for **encouraging farmers to 'step up' the management of this land** to bring it in line with the Campaign measures' red box requirements in order to bring greater environmental benefits. However, less than 10% of farmers visited had implemented voluntary management specifically in response to the Campaign. A similar number had changed the management of existing uncropped land.

Land which was reported in the survey as being under Campaign voluntary measures often did not meet the red box management requirements, particularly for some measures such as C1 (grass buffers alongside watercourses), C4 (skylark plots) and C10 (game strips). Because most features surveyed were already present on farms before the Campaign, it is perhaps not surprising that red box management requirements were not met. Few had changed the management of these features, although even where changes had been made, management was still often short of the red box requirements.

Overall 46% of features assessed did meet the red box requirements (Table 27), and most of the measures that had been undertaken in response to the Campaign did meet these requirements. This suggests that, if farmers are fully engaged with the Campaign, then voluntary management can be effective.

**On those farms that were undertaking some form of voluntary management**, a significant area (5.3% of arable land) was under voluntary management similar to Campaign measures. If all farmers could be persuaded to participate in the Campaign to a similar degree, significant environmental benefits would be possible. However, because the management often did not meet the red box requirements, many would need to change the management of uncropped areas to realise significant environmental gains.

Most farmers were unaware that their management was falling short of the red box requirements. The degree of change required to improve the environmental management may be relatively small for some features. Therefore **emphasis should be placed on communicating the importance of the red box requirements** and the detail of what is necessary, particularly for those aspects that were common reasons for failure in this survey. In cases where farmers are 'almost but not quite' meeting the red box requirements, there is clearly **potential for the partners to encourage farmers to make the necessary changes so that this land contributes towards the Campaign and brings greater environmental benefits.**

The **Campaign booklet and the farming press** were the most commonly quoted sources of advice. However, those that had attended a meeting or farm event appeared to be slightly better informed. Many had not read the booklet in any detail, reflecting the large volume of literature that farmers receive. However, the booklet is important in raising awareness and detailing management requirements. In future, the farming press is likely to be the most appropriate vehicle for engaging farmers with the Campaign, however **more detailed advice is required to encourage farmers to undertake more environmentally beneficial management**, and to ensure that they understand what is required under the red box requirements.

**Table 27 Summary of the number of features on visited farms, the number of features assessed and those meeting red box management requirements.**

| Measure      | No. of farms | Number of measures present on farms visited |                                  |                                 |            | Number of measures assessed <sup>1</sup> (those meeting red box requirements are displayed in brackets) |            |                                  |            |                                 |              |            |              |
|--------------|--------------|---|----------------------------------|---------------------------------|------------|---|------------|----------------------------------|------------|---------------------------------|--------------|------------|--------------|
|              |              | New For Campaign                            | Baseline with changed management | Baseline (no management change) | Total      | New For Campaign  |            | Baseline with changed management |            | Baseline (no management change) |              | Total      |              |
| C1           | 32           |   |                                  | 109                             | 109        |   |            |                                  |            | 64                              | (20)         | 64         | (20)         |
| C2           | 5            | 1   |                                  | 11                              | 12         | 1   | (1)        |                                  |            | 6                               | (2)          | 7          | (3)          |
| C3a          | 52           |   | 5                                | 130                             | 135        |   |            | 5                                | (2)        | 110                             | (65)         | 115        | (67)         |
| C3b          | 3            |   |                                  | 4                               | 4          |   |            |                                  |            | 3                               | (3)          | 3          | (3)          |
| C4           | 3            | 1   |                                  | 12                              | 13         | 1   | (0)        |                                  |            | 12                              | (0)          | 13         | (0)          |
| C5           | 3            |   |                                  | 11                              | 11         |   |            |                                  |            | 2                               | (0)          | 2          | (0)          |
| C6           | 7            |   | 1                                | 13                              | 14         |   |            |                                  |            | 8                               | (0)          | 9          | (0)          |
| C7a          | 20           | 2   | 5                                | 7                               | 14         |   |            | 1                                | (0)        | 4                               | (1)          | 4          | (1)          |
| C7b          | 1            | 1   |                                  | 0                               | 1          | 1   | (1)        |                                  |            |                                 |              | 1          | (1)          |
| C8           | 5            | 1   |                                  | 7                               | 8          | 1   | (1)        |                                  |            | 5                               | (2)          | 6          | (3)          |
| C9           | 16           | 4   |                                  | 56                              | 60         | 3   | (3)        |                                  |            | 17                              | (12)         | 20         | (15)         |
| C10          | 17           |   | 13                               | 38                              | 51         |   |            | 9                                | (0)        | 14                              | (6)          | 23         | (6)          |
| C11          | 1            |   |                                  | 0                               | 0          |   |            |                                  |            |                                 |              | 0          | (0)          |
| C12a         | 12           |   |                                  | 16                              | 16         |   |            |                                  |            | 8                               | (7)          | 8          | (7)          |
| C12b         | 0            |   |                                  | 0                               | 0          |   |            |                                  |            |                                 |              | 0          | (0)          |
| C13          | 5            | 1   |                                  | 4                               | 5          | 1   | (1)        |                                  |            | 2                               | (0)          | 3          | (1)          |
| C14          | 2            |   |                                  | 3                               | 3          |   |            |                                  |            | 3                               | (1)          | 3          | (1)          |
| C15          | 0            |   |                                  | 0                               | 0          |   |            |                                  |            |                                 |              | 0          | (0)          |
| <b>Total</b> | <b>184</b>   | <b>11</b>                                   | <b>24</b>                        | <b>418</b>                      | <b>456</b> | <b>8</b>  | <b>(7)</b> | <b>15</b>                        | <b>(2)</b> | <b>258</b>                      | <b>(119)</b> | <b>281</b> | <b>(128)</b> |

<sup>1</sup> Up to five examples of each measure were assessed per farm, therefore these figures are a subset of the total measures present.

## 1. INTRODUCTION

### 1.1 BACKGROUND

The Campaign for the Farmed Environment (CFE) is an industry-led scheme to offset the environmental impacts of the abolition of set-aside. It is hoped that by encouraging uptake of Environmental Stewardship and relevant options within this scheme, and also the voluntary implementation of a range of measures the environmental benefits of set aside will be recaptured and even exceeded. The Campaign has three themes; farmland birds, other biodiversity and resource protection. National targets for the CFE have been set, and if these are not met by 2012 the voluntary approach could be replaced with a regulatory scheme. These targets are:

- To double the uptake of the agri–environment Entry Level Scheme 'in-field' options
- To increase uncropped land by 20,000 hectares from January 2008 levels (with improved environmental management on 60,000 hectares)
- To introduce voluntary measures on other land covering at least 30,000 hectares and up to 50,000 hectares.

To promote and support the CFE a farmer's guide has been produced that describes 15 voluntary measures (some with variants) that farmers are encouraged to implement (Table 1), with guidance on how they should be managed. Guidance is split into 'essential' management requirements ('red box') and additional considerations ('green box'). Monitoring of CFE outcomes is the responsibility of the CFE Evidence and Monitoring Group and the National Steering Group is responsible for ensuring CFE targets are met. For the voluntary measures, this includes an annual postal survey, to be carried out by Defra Agri-Environment Statistics Team in February and field monitoring by the Food and Environment Research Agency (Fera).

The objectives of the field monitoring programme include assessing farmer attitudes and awareness, and future intentions, verifying the implementation of voluntary measures, assessing environmental quality of features managed under voluntary measures (including baseline measurement of existing features), and estimating levels of environmental benefits accruing from these measures.

This report documents the findings of the first assessments of farmer attitudes and quality of management of voluntary measures undertaken between April and July 2010.

### 1.2 MONITORING OF VOLUNTARY MEASURES

The Evidence and Monitoring Group has set out a plan for monitoring the various elements of the Campaign. For the voluntary measures, this includes an annual postal survey, to be carried out by Defra Agri-Environment Statistics Team in February and field monitoring by the Food and Environment Research Agency (Fera). The postal survey was sent to 5500 farmers with 10 ha or more of cultivated land in February to determine the proportion of farmers taking action under the Campaign, and the voluntary measures that they are undertaking. The survey form is appended as **Error! Reference source not found..**

#### 1.2.1 The Field Monitoring Programme

The objectives of the field monitoring programme are as follows:

- To assess farmer attitudes and awareness of the Campaign, including monitoring farmer intentions for subsequent years to assess future potential of the Campaign;
- To verify that farmers have put in place the measures they claim they have,

- As far as possible, to assess the quality of the environmental management and resulting habitats and features, for measures implemented as part of the Campaign and also those that were already present in the baseline,
- To estimate the extent of delivery of environmental benefits from measures, both those already put in place and those intended, based on literature review and expert opinion.

This report presents the results of the April-July monitoring, which assessed the first three objectives. In relation to the third objective, the main aim was to assess management of the measures and to establish whether this met the 'red box' requirements and additional 'green box' management. Preliminary information was obtained where possible on quality of the habitat or feature, bearing in mind that the time of year was not optimal for this purpose. Follow-up visits were planned to take place in summer, autumn or winter, according to the measures implemented, to make more detailed assessments targeted towards the specific benefits likely to accrue from the measure concerned in relation to one or more of the three Campaign themes (for further information, see Boatman, 2010). The results of these visits will be reported in the full annual report in March 2011.

**Table 28 List of CFE Voluntary measures**

| Code | Measure  | Target benefits |                    |                     |
|------|--|-----------------|--------------------|---------------------|
|      |  | Farmland birds  | Wider biodiversity | Resource protection |
| C1   | Grass buffers alongside temporary and permanent watercourses   |                 | √                  | √                   |
| C2   | Grass areas to prevent erosion and run-off                     |                 |                    | √                   |
| C3a  | Reverted arable areas  |                 | √                  | √                   |
| C3b  | Optional scrub management                                      |                 | √                  | √                   |
| C4   | Skylark plots  | √               |                    |                     |
| C5   | Fallow plots for ground-nesting birds on arable land           | √               | √                  |                     |
| C6   | Overwinter stubble followed by spring/summer fallow            | √               | √                  |                     |
| C7a  | Overwintered stubble   | √               | √                  |                     |
| C7b  | Optional measure for vulnerable soil – cover crop/green manure |                 | √                  | √                   |
| C8   | Uncropped cultivated margins                                   | √               | √                  |                     |
| C9   | Wild bird seed mixture – arable/grassland areas                | √               |                    |                     |
| C10  | Game strips  | √               |                    |                     |
| C11  | GWCT unharvested cereal headlands                              | √               | √                  |                     |
| C12a | Pollen & nectar mixtures for arable or grassland areas         | √               | √                  |                     |
| C12b | Optional flower mix for use with horticultural crops           | √               | √                  |                     |
| C13  | Sown wildflower headlands                                      | √               | √                  | √                   |
| C14  | Selective use of spring herbicides                             | √               | √                  |                     |
| C15  | Enhanced management of Short Rotation Coppice                  |                 | √                  |                     |



## 2. METHODS

### 2.1 SELECTION OF FARMS:

Farms were selected for monitoring from the 939 respondents to the postal questionnaire mailed by Defra in February 2010, who did not indicate that they did not wish to be contacted by Fera (see **Error! Reference source not found.**).

This work was designed to evaluate the response to the Campaign specifically in terms of voluntary measures, therefore this population was divided into '**participants**' and '**non-participants**' on the basis of whether they indicated on the postal returns if they were implementing voluntary measures. However, it became clear during telephone calls and interviews that farmers had interpreted the postal questionnaire differently. Although the question regarding voluntary management was phrased 'explicitly as part of the Campaign', most farmers had included all uncropped land that resembled Campaign measures.

Farmers were not recategorised on the basis of additional information, however initial telephone calls aimed to exclude some from the participants that were visited. Those that had mistakenly included uncropped land under an agri-environment agreement on the postal questionnaire were not visited and these individuals are therefore not included in either the participant or the non-participant surveys. However, others that considered participation in an agri-environment scheme was contributing to the Campaign and had completed the postal questionnaire correctly were present in the 'non-participant' sample. In addition, those that were in the process of renewing an agreement who were not clear what uncropped land would remain once the new agreement was in place were not visited.

One third of those that reported no voluntary management undertaken 'explicitly as part of the Campaign' on the postal returns, and therefore classed as 'non-participants', were found to have uncropped land on their holding with management similar to Campaign measures. These individuals had presumably not indicated this on their postal returns because the management had not been undertaken explicitly in response to the Campaign. Hence, the two populations were not accurately defined by the postal returns.

A sample of 100 'participant' farms was selected from a population of 468. Fifty percent were selected at random and 50% targeted to include the 10 least common measures. Uncommon measures were those that were represented by only 25 farms in the total sample. Targeted farms were selected at random from those entering each of the less common measures, until a target of eight farms was reached for each measure, unless the total sample included less than eight farms for the measure. A reserve sample of 86 randomly selected and 26 targeted farms was also identified. Towards the end of the monitoring period, it was necessary to randomly select a further 100 farms.

The work aimed to complete 100 farm visits during April-June. However, difficulties in contacting farmers and arranging visits, and the high 'drop-out' rate for a variety of reasons, meant that this work continued into September. This report is based on data from 97 visits completed by mid September.

The sample of 'non-participant' farms was selected at random from the 471 responses to the Defra questionnaire which indicated that they were not undertaking voluntary measures as part of the Campaign. In total, 57 telephone interviews were conducted. Respondents were sent a copy of the questionnaire in advance.

## 2.2 ASSESSMENTS

Visit and telephone interviews assessed farmers' awareness of, and attitudes to, the Campaign plus details of participation in agri-environment schemes and advice received on implementing measures. In addition, details of existing features and new features implemented in response to the Campaign were recorded on 'participant' farms, and management of these features was assessed. Full details of the 'participant' and 'non-participant' general questionnaires can be found in **Error! Reference source not found.** and **Error! Reference source not found.**

Field work was carried out to assess the extent to which measures had been correctly put in place. Timing of implementation was noted to allow distinction between baseline (i.e. measures implemented before the farmer was aware of the Campaign) and subsequent delivery (i.e. measures established in response to the Campaign).

Field work also assessed the environmental management of new measures and baseline features. In particular, monitoring assessed as far as possible, whether management met the 'red box' requirements and additional 'green box' management. Details of interview and field assessments are presented in **Error! Reference source not found.**

## 2.3 ANALYSIS

Data are generally presented at a national scale, because sample sizes were relatively small. However, in order to assess regional differences, where appropriate, target counties were grouped in amalgamations of Government Office Regions:

**East Anglia (EA):** Norfolk, Suffolk, Cambridgeshire, Bedfordshire, Hertfordshire, Essex,

**South (SO):** Gloucestershire, Wiltshire, Dorset, Oxfordshire, Berkshire, Hampshire, Buckinghamshire, Kent,

**Midlands (MI):** Warwickshire, Northamptonshire, Leicestershire, Nottinghamshire, Lincolnshire,

**Yorkshire (YO):** North Yorkshire, South Yorkshire, East Riding, North Lincolnshire,

All non-target counties were grouped together **(NT)**.

### 3. RESULTS

#### 3.1 OVERVIEW AND ENGAGEMENT WITH THE CAMPAIGN

##### 3.1.1 Summary of contact

A total of 219 'participant' (those that indicated in the Defra postal survey that they were undertaking voluntary management) farmers had been contacted by the end of August. Of these 97 agreed to a visit, and 122 either refused or felt they were not appropriate for a visit. Of those that were contacted but not visited 18% were currently renewing or intending to renew their ES agreement within the next year. Their participation in voluntary measures depended on the options required for their agreement, since agreements were often likely to change significantly, particularly as a result of the loss of management plans. Voluntary measures would effectively be those uncropped features on the farm that would remain once the requirements of an ES agreement had been met.

A further 7% of those not visited indicated that they felt that participation in agri-environment schemes constituted participation in the Campaign and said that there were no additional voluntary measures on the farm. However, it was not always clear whether these agreements included arable options promoted by the Campaign. Indeed, one farmer responded that to undertake voluntary measures in addition to his ELS agreement would require him to include in-field measures, which he felt would put him at a disadvantage.

In addition 34% of those not visited were happy to be interviewed in the future (often because measures would be established in autumn) but 25% did not want to be interviewed for a variety of reasons. A proportion of the latter group were not undertaking any voluntary measures, however it was not possible to give precise numbers.

Visits to those on the 'participant' list revealed that responses to Defra's questionnaire (**Error! Reference source not found.**) indicating participation in voluntary measures had included:

- farms implementing or intending to implement voluntary measures in response to the Campaign (8 farms),
- farms who had existing uncropped land, some of which was classed as being managed to meet the requirements of the voluntary measures (86)
- farms that had included ELS options in the list of 'voluntary measures' (3 farms).

Overall, a greater proportion of those who indicated they were undertaking voluntary management on the Defra questionnaire may have included ELS options, but this could not be quantified. Access to Genesis data would enable comparison between survey returns and ELS agreements, in order to establish whether those that were not visited were more likely to have recorded ELS options. This is being pursued currently through Natural England.

Telephone interviews with 'non-participants' (those that indicated in the Defra postal survey that they were not undertaking any voluntary management) indicated that one third had additional uncropped land or land management similar to Campaign measures. These farmers may not have included this uncropped land on the Defra questionnaire because it did not represent measures implemented in response to the Campaign.

## 3.2 KEY FINDINGS FROM NON-PARTICIPANT FORMS<sup>5</sup>

### 3.2.1 Participation

A total of 57 'non-participants' were contacted via telephone in July 2010. Of these 79% considered themselves to be participating in the Campaign, 12% did not consider themselves to be participating and the remaining 9% were unsure. Of the 79% that felt they were contributing to the Campaign, most considered that they were participating through existing AE schemes followed by voluntary measures (Table 29).

**Table 29 Participation method of those considered 'non-participants' from the Defra questionnaire returns**

| Method                        | % (n=45) |
|-------------------------------|----------|
| Existing AE schemes           | 91       |
| Additional voluntary measures | 42       |
| Extra AE measures/points      | 8        |
| Other                         | 4        |

However, when the whole sample of 57 were asked directly if 'implementing or intending to implement any voluntary measures as part of the Campaign' only 21% said they would be implementing voluntary measures despite a higher percentage (33% of the total sample n=57) mentioning voluntary measures as a way they were participating in the Campaign in the previous question. A further 68% said they were not intending to implement measures whilst the remainder were unsure. This inconsistency highlights the poor understanding that farmers and landowners had of what the voluntary measures within the Campaign are, and confusion about whether they were contributing to the Campaign.

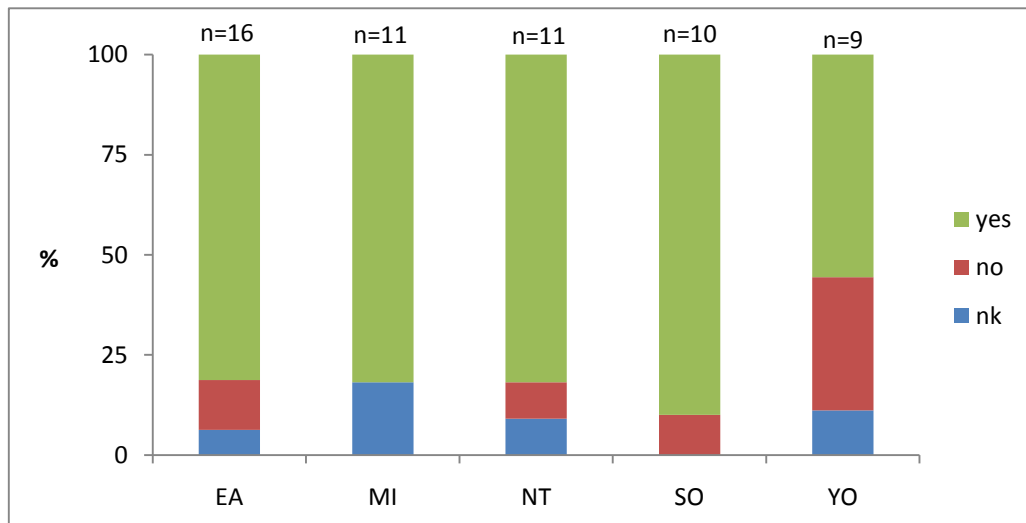
Of the 68% of respondents who were not intending to implement measures (n=39) the main reason for this was the feeling they were doing enough without implementing voluntary measures (36%). Interestingly 22% of these have measures in place that could be considered voluntary but the farmers themselves did not consider them to be so in CFE terms. This may be because they were not implemented specifically for the Campaign, although others would consider such 'baseline' features as contributing to the Campaign. Comments included '*Already have 10% not in ELS & not in production - due to size of machinery. Not done to support Campaign*' and '*Already done - not in response to CFE*'. This grey area surrounding the perception of what constitutes a voluntary measure, i.e. do areas that existed before CFE came into force (baseline) count as voluntary, could explain the difference in the number who stated voluntary measures as a participation method (33%) and those intending to implement voluntary measures as part of the Campaign (21%). Clarification of what constitutes a voluntary measure is needed to eliminate this apparent inconsistency. Other notable reasons for not implementing voluntary measures included duplication of ELS (n=2), measures not suitable for farm (n=3) and ELS renewal (n=2).

In regional terms, Yorkshire and Humber had the fewest farmers who considered themselves to be participating (Figure 23)<sup>6</sup>. Similarly, fewest farmers were intending to implement voluntary

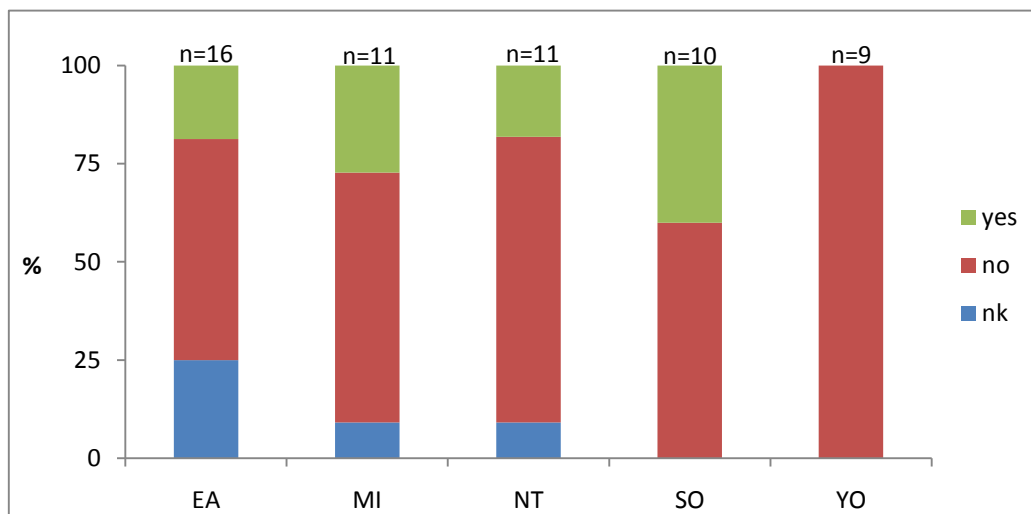
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<sup>5</sup> It is important to note that the non-participants were sent a copy of the questionnaire before they were contacted by the surveyor

measures in the future in Yorkshire (Figure 24). These regional differences are reflected the in overall awareness of the Campaign (Section 3.2.3) with those in Yorkshire least aware, although it must be noted that the sample size within each regions was small.



**Figure 23 Regional breakdown of 'non-participants'- "do you consider yourself to be participating in the Campaign?"** EA = Eastern, MI = Midlands, NT = Non Target, SO = South, YO = Yorkshire and Humberside; nk = not known.



**Figure 24 Regional breakdown of 'non-participants'- "Are you implementing/intending to implement any voluntary measures as part of the Campaign?"**

When asked what would encourage them to implement voluntary measures, only 15 non-participants commented, with four of these saying they were either unsure or nothing would encourage them to implement voluntary measures. The most common response from six non-participants was based loosely around a financial incentive. Two said nothing other than direct

<sup>6</sup> In all cases regional findings can only be considered as emerging trends due to the small sample numbers involved

payment/financial reward for voluntary measures would encourage implementation with another saying that they *'would need additional funding to put in wild flower and pollen mixes'*. Two of the remaining four indicated that if the profitability of agriculture improved they would be willing to implement voluntary measures, saying that *'A good financial return on crops produced – price at the farm gate'* and *'Greater overall profitability'* would encourage implementation of voluntary measures. The final non participant said that due to farm size, ELS agreement and current income they could not afford to take any more land out of production.

### 3.2.2 Attitude

Most farmers were supportive of both the aims (91%) and the approach (84%) of the Campaign. Only 12 non-participants made comment on aspects of the Campaign that farmers particularly liked; three of these were on the potential to avoid compulsory measures including enforced set-aside. One respondent felt it showed a proactive and positive approach towards the environment from the farming industry. It was also mentioned that it provides an alternative way to show support for the environment for those farms that are not well suited to ELS/HLS, or perhaps will struggle to accrue sufficient points with the recent loss of management plans. Four people said there were no aspects of the Campaign they particularly liked.

In total 18 farmers made comments on aspects of the Campaign that they particularly disliked, six of these said there were no aspects they disliked. A further four made reference to how it fitted in with ELS/HLS with the feeling that it resulted in *'Unnecessary duplication of existing schemes'* and some confusion as to how it related to existing ELS/HLS options and the creation of more paperwork. Two farmers inferred that some farmers would contribute to the scheme whilst others would not do their bit and that this was unfair. One thought that it would be better to have a compulsory scheme, suggesting a 5% area as a suitable target. This individual said he was *'concerned about how this is going to be monitored - feel that Government has already decided that CFE won't work. Loss of trust between Government and farmers. May be easier to implement 5% set-aside across the board'*.

The overall attitude towards the Campaign seemed to be positive, though there was some concern that, as a voluntary scheme, the responsibility would not be universally applied and some farmers would not contribute.

### 3.2.3 Awareness

To ascertain farmers' awareness of the Campaign, the 'non-participants' were questioned about the themes, implementation methods, targets, sources of advice and regional issues related to the Campaign. This covered a total of 16 'aspects' that were grouped into 6 categories (Table 30). To gauge the levels of awareness of the Campaign the 'non-participants' were asked which of the 16 aspects they were aware of, this was recorded as Yes (aware of aspect) or No (unaware of aspect). The results are presented in Table 30 and summarised below. Overall, awareness of themes and methods of implementation was high, whereas knowledge of sources of advice and particularly regional issues was lower. Considering awareness as a whole, with a possible maximum for each 'non-participant' of 16 'Yes' responses (representing 100% awareness of the aspects included in the survey) the Midlands (63%) followed by East Anglia (62%) and the South (59%) scored highest. Farmers in Yorkshire were least aware (34%) overall, somewhat lower than the Non-Target Counties (48%), although again it should be noted that numbers within regions are small. Taken in context with the results shown in Figure 23 and Figure 24, it is conceivable that if the 'non-participants' surveyed in Yorkshire had a greater awareness of the Campaign, then the numbers that considered themselves to be participating in the Campaign, and the number intending to implement voluntary measures might rise. This is reinforced by the regional variation in awareness of 'Implementation' shown in Figure 25. Less than 50% of respondents in YO were aware of methods of implementation, when they may in fact unknowingly be carrying out management that would contribute to the Campaign.

### 3.2.3.1 Purpose/theme

The highest levels of awareness were shown for the three themes of the Campaign, ranging from 79% to 84%. Of the three themes non-participants were most aware that the Campaign promoted action to support farmland birds, and least aware of resource protection, although differences were small. On a regional scale, there was little variation in awareness of the three Campaign themes.

### 3.2.3.2 Implementation

High levels of awareness are reported for ELS renewal, Promoting ELS infield options, Maintaining uncropped land and Voluntary measures (ranging from 77% to 70%). Awareness of nutrient management was somewhat lower at 61%. However, both the CFE Handbook, (<http://www.cfeonline.org.uk/News/How-to-take-part/>) and smaller leaflet focus on the first four methods of implementation, whereas encouraging farmers to undertake nutrient management planning is less prominent, possibly leading to the lower levels of awareness. Regionally, Yorkshire exhibited lowest awareness of Implementation, with the other four areas showing relatively similar levels of awareness (Figure 25).

**Table 30 Overall awareness and regional variations of ‘non-participants’ (numbers of farms)**

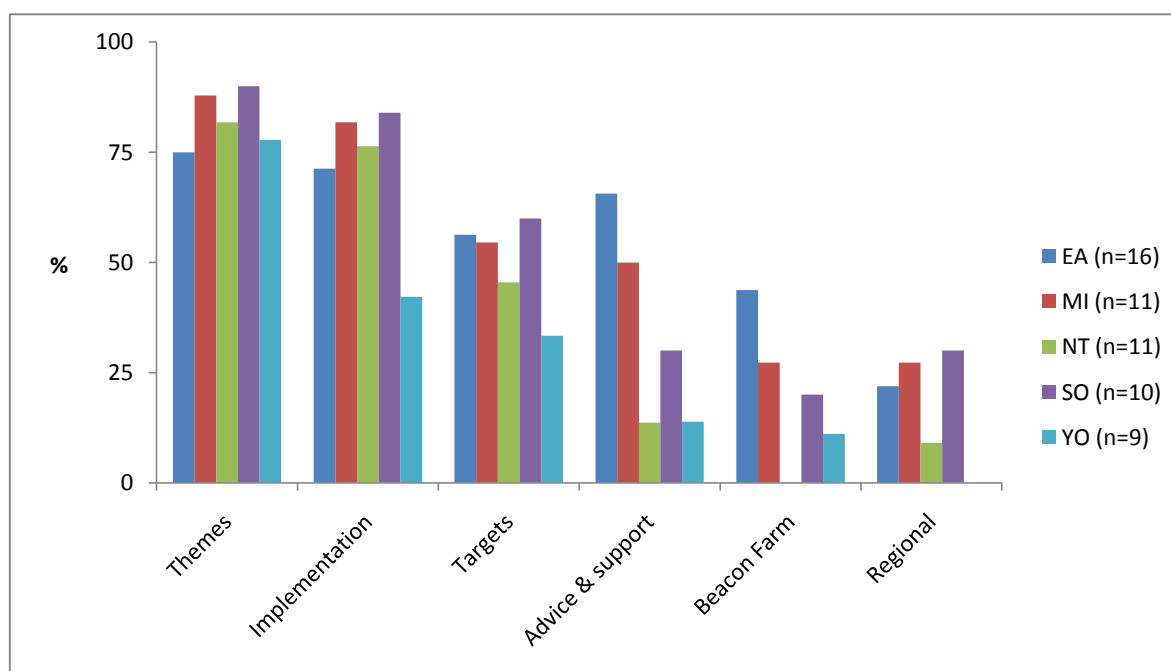
|  | Regional breakdown |                |               |               |               | TOTAL          |
|--|--------------------|----------------|---------------|---------------|---------------|----------------|
|  | EA<br>(n=16)       | MI<br>(n=11)   | NT<br>(n=11)  | SO<br>(n=10)  | YO<br>(n=9)   | %<br>(n=57)    |
| <b>Purpose/theme</b>                       |                    |                |               |               |               |                |
| Resource protection                        | 11                 | 9              | 9             | 9             | 7             | 79             |
| Farmland birds                             | 13                 | 10             | 9             | 9             | 7             | 84             |
| Farmland wildlife                          | 12                 | 10             | 9             | 9             | 7             | 82             |
| <b>Implementation</b>                      |                    |                |               |               |               |                |
| ELS renewal                                | 12                 | 9              | 10            | 9             | 4             | 77             |
| Promoting ELS in field options             | 12                 | 9              | 10            | 9             | 4             | 77             |
| Maintaining uncropped land                 | 12                 | 9              | 10            | 9             | 4             | 74             |
| Voluntary measures                         | 11                 | 9              | 8             | 8             | 4             | 70             |
| Nutrient management                        | 10                 | 9              | 6             | 7             | 3             | 61             |
| <b>Aware of targets for Implementation</b> | 9                  | 6              | 5             | 6             | 3             | 51             |
| <b>Advice and support</b>                  |                    |                |               |               |               |                |
| Local liason group                         | 12                 | 6              | 2             | 2             | 1             | 40             |
| Beacon farm                                | 10                 | 6              | 2             | 2             | 2             | 39             |
| Leaflets for themes                        | 9                  | 5              | 1             | 5             | 1             | 37             |
| County co-ordinator                        | 11                 | 5              | 1             | 3             | 1             | 37             |
| <b>Know where Beacon Farm is</b>           | 7                  | 3              | 0             | 2             | 1             | 23             |
| <b>Regional issues</b>                     |                    |                |               |               |               |                |
| Target counties                            | 4                  | 3              | 1             | 3             | 0             | 19             |
| Regional priorities                        | 3                  | 3              | 1             | 3             | 0             | 18             |
| <b>Total ‘Yes’ responses</b>               | <b>158/256</b>     | <b>111/176</b> | <b>84/176</b> | <b>95/160</b> | <b>49/144</b> | <b>495/912</b> |
| <b>%</b>                                   | <b>62</b>          | <b>63</b>      | <b>48</b>     | <b>59</b>     | <b>34</b>     | <b>54</b>      |

### 3.2.3.3 Advice and support

Overall less than 40% of non-participants were aware of the various sources of advice. However, awareness was higher in EA (in particular) and MI.YO and the Non Target areas showed lowest awareness of available advice.

### 3.2.3.4 Awareness of other aspects

Overall only 23% of non-participants knew where their nearest Beacon Farm was located, although this included nearly half of those in EA. When questioned about the awareness of both regional priorities and target counties, awareness was poor in all areas.



**Figure 25 Regional variation in awareness (measured as percentage) of Campaign aspects.**

### 3.2.4 Information sources

Information regarding the Campaign had been received from various sources in various media with the results comparable to the information sources stated by the participants (Table 36). The two most common sources of information, with more than 50% of respondents mentioning them in each case, were the farming press and the booklet 'A farmers guide to voluntary measures'. Just short of a third of respondents mentioned receiving information from farm events or meetings they had attended. These farm events were not always specific to the Campaign, with many respondents mentioning that they had heard about it alongside ELS meetings they had attended, or at NFU regional meetings. Specific organisations that were mentioned as delivering information on the CFE were Natural England, the National Farmers Union, the RSPB, GWCT and the CLA. Three respondents said that they had received no information about the Campaign.



### 3.3 AGRI-ENVIRONMENT SCHEMES – PARTICIPANTS AND NON-PARTICIPANTS

Most participants (79%) and non-participants (86%) had one or more agri-environment agreements on the holding. In both groups the majority were ELS agreements (Table 31) although a slightly higher proportion of 'non-participants' were in the ELS, whereas, more 'participants' had CSS agreements.

**Table 31 Percentage of non-participants/participants with various agri-environment schemes**

| Agreement | Non-participant %<br>(n=57) | Participant %<br>(n=97) |
|-----------|-----------------------------|-------------------------|
| ELS       | 82                          | 72                      |
| OELS      | 2                           | 4                       |
| HLS       | 7                           | 8                       |
| CCS       | 7                           | 21                      |
| ESA       | 4                           | 4                       |
| Other     | 2                           | 1                       |
| None      | 14                          | 21                      |

All of those who indicated they had an ELS agreement were then asked further details about their agreement. This included the size of the area covered by their agreement and the total number of points that their agreement contained. The objective was to ascertain the proportion by which the minimum points target for the area within the ELS agreement (at 30 points per ha) was significantly exceeded, since this could be regarded as voluntary management. It was clear from analysis of the data obtained from these questions that it was often incorrect (indicated by an apparent deficit of points required) or incomplete, and in such cases these respondents were excluded from the analysis. Elimination of the respondents with obviously incorrect/missing data resulted in a total of 51 respondents (18 participants and 33 non-participants) with information on their ELS agreement that was considered accurate<sup>7</sup>. The greater number of non-participants considered to have accurate information is a likely result of the questionnaire being sent out in advance.

All but one of the 33 non-participants had an excess of points, ranging from as little as 0.2% to 50% in excess, with 20 of these (61%) exceeding their points target significantly ( $\geq 5\%$  excess). On average the non-participant farms were 9.2% in excess of their points target. From the 18 participants that were considered to have correct ELS information, two only had sufficient points to meet their target, with the excess for the remainder ranging from 0.07% to 156%. On average the participants had 24% more points than required for their ELS agreement, with 11 of them (61%) significantly in excess, comparable to the non-participants.

Around two thirds of farmers who were interviewed gave sufficient detail about the options in their ES agreements to make an assessment of those undertaking in-field options. However, some assumptions had to be made about the specific options, therefore this probably represents an overestimate of the contribution to in-field options. Also, there is no detail about the proportion of

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<sup>7</sup> This will be verified using information from GENESIS if this becomes available

points gained by the different types of options, therefore, in-field options may contribute only a small number of points.

A larger number of 'participants' (31%) than non-participants (16%) had no in-field options in their ES agreements (Table 32). Buffer strips were in place on over half of all farms, however, this is likely to be an overestimate of options that would qualify as 'in-field' under CFE guidelines since information on the width and placement was not always available. Other common 'in-field' options were field corners, wild bird and pollen & nectar mixes.

**Table 32 Proportion of ES farms with 'in-field' options.**

| <b>Agreement</b>      | <b>Non-participant %<br/>(n=45)</b> | <b>Participant %<br/>(n=64)</b> |
|-----------------------|-------------------------------------|---------------------------------|
| No 'in-field'         | 16                                  | 31                              |
| Pollen & nectar mix   | 18                                  | 20                              |
| Wild bird             | 13                                  | 35                              |
| Buffer strips         | 60                                  | 56                              |
| Field corner          | 44                                  | 48                              |
| Skylark/lapwing plots | 11                                  | 13                              |
| Stubbles (not EF6)    | 4                                   | 4                               |
| Other                 | 2                                   | 13                              |

The majority of both participants (92%) and non-participants (88%) intend to renew their existing agri-environment agreement. For those unsure, or not intending to renew it was largely due to approaching retirement age, or renewal of leases for tenant farms. The recent loss of management plans was the main reason that around a third of both participants and non-participants were likely to make changes to their agreements when they were due for renewal. The participants were questioned further about the impact/interaction of the voluntary measures upon their agri-environment scheme. In all cases the measures selected for the Campaign did not affect the choice of measures within the agri-environment scheme. On the other hand, 31% of those in an AE scheme said the AE scheme would affect their choice of voluntary measures. 24 participants commented further as to how the AE scheme would affect their choice of voluntary measures with three main reasons being stated:

- 63%- voluntary measures will be what is left after AE scheme targets are met
- 20%- voluntary measures will be an extension of the AE options
- 13%-voluntary measures that complement the AE options will be selected

### 3.4 KEY FINDINGS FROM PARTICIPANTS - GENERAL QUESTIONNAIRE

#### 3.4.1 Participation & attitude

Of the 97 participants visited between April and September 2010, 79% considered themselves to be participating in the Campaign, 14% were unsure and 6% did not consider themselves to be participating (despite indicating earlier in the Defra postal returns that they were implementing voluntary measures in response to the Campaign). The two prime methods of participation were reversed for the 'participants' when compared to those of the non-participants (Table 29) with the most common method given by participants being voluntary measures as opposed to existing agri-environment schemes (Table 33). These measures were mainly uncropped land managed in a variety of ways that had been in place for some time previous to the Campaign and are classed as 'baseline'. As highlighted later (3.5.2) very few participants intended to do anything new directly as a result of the Campaign.

**Table 33 Participation method**

|                               | % (n=77) |
|-------------------------------|----------|
| Existing AE schemes           | 57       |
| Additional voluntary measures | 77       |
| Extra AE measures             | 5        |
| Other                         | 5        |

The majority of participants (92%) were supportive of the aims of the Campaign, the remainder were unsure. Slightly fewer (87%) supported the approach of the Campaign, with 11% unsure. Two participants did not support the approach, one of these commenting that it was '*Better not on good arable land, OK where not such productive land*'.

A total of 76 responses were recorded for aspects of the Campaign that participants particularly liked (Table 34). The most popular responses were that the approach was voluntary and that it would provide environmental/wildlife benefits. Two participants commented specifically on the positive way it had brought different bodies within the farming industry together '*Glad everyone inputting NFU/CLA etc*' and '*like the way it has brought together various organisations (GC, NFU) etc.*'.

**Table 34 Aspects of Campaign particularly a) liked & b) disliked by participants (as percentage)**

| <b>a) Aspect liked</b>                  | <b>% (n=76)</b> |
|---|-----------------|
| Voluntary                               | 21              |
| Provides environmental/wildlife benefit | 14              |
| None/unsure                             | 22              |
| Good range of measures                  | 5               |
| Flexible & easy to follow               | 7               |
| Use of unproductive land                | 7               |
| Unites farming industry                 | 3               |
| <b>b) Aspect disliked</b>               | <b>% (n=80)</b> |
| None/unsure                             | 34              |
| Inflexible                              | 12              |
| Some will do nothing                    | 8               |
| Specific measure/requirements           | 10              |
| Lack of targets                         | 5               |
| Potential of enforced alternative       | 9               |

There was a wide range of comments on aspects of the Campaign that participants did not like, although many of these indicated they were either unsure or there were no aspects they did not like (Table 34). Some mentioned particular measures/requirements that they did not like, and there was a feeling from some participants that whilst some landowners would actively contribute to the Campaign others would do nothing (a feeling mirrored in the 'non-participant' results). One of these said that he would *'favour scheme where everyone has to do a bit'*. Participants are clearly fearful of the potential consequences that may be brought about if the Campaign is not viewed as successful.

A key message to be taken from the aspects 'disliked' is the perceived lack of targets. Specific comments included *'Need direction - a target that they are trying to achieve'* and *'Not sure how much we should do'*. Evidence from both 'non-participants' (Figure 25) and 'participants' (Table 34) demonstrated poor awareness of implementation targets for ELS renewal, voluntary measures etc. compared to the awareness of themes and implementation. This is a potential area that if explained with more clarity, perhaps including guidance on contribution expected at various farm sizes, could result in increased participation.

Of the participants that mentioned they did not like some aspect of the measures/requirements, many gave the general impression that they thought that there was insufficient flexibility. Specific comments included *'One size fits all is a bit of a problem. Needs flexibility to mix and match soil conditions'*, *'Grazing – restrictions too much.'* Two individuals disliked the fact that the Campaign did not include aspects such as ponds, hedges and woodland, again demonstrating a lack of understanding about the general aims of the Campaign. Notable comments that were given about specific measures included:

- **C7a** *'Some rules strange e.g. over-wintered stubbles - keep weeds etc.. However partridge don't like weeds prefer clean stubble.'*
- **C9/C10** *'Some of the prescriptions for gc/wbc - not allowing maize - trying to combine with shooting aims.'*
- *'Heavy stubble so can't just spray, needs cultivating.'*
- *'Not sure benefit of over-wintered stubble.'*
- **C5** *'Small fallow plot - pointless and hard to maintain. Used in past and not worked.'*

### 3.4.2 Awareness

In a similar way to the 'non-participants', the participants were asked about their awareness of various 'aspects' of the Campaign. The difference in the method was that in the first instance the participants were initially asked what they knew about the Campaign under the main headings, to ascertain which aspects were uppermost in their minds. Only after that response was recorded were they prompted. As expected, the awareness of each aspect was much higher once the participant had been prompted (Table 35). Of the eight aspects under 'Purpose/theme' & 'Implementation', participants showed higher awareness than non-participants in all aspects other than resource protection and promoting in-field options. The two groups showed similar results for targets and advice and support, although more participants (55%) than non-participants (37%) were aware of leaflets for each theme, perhaps explaining the higher awareness recorded for two of the three themes.

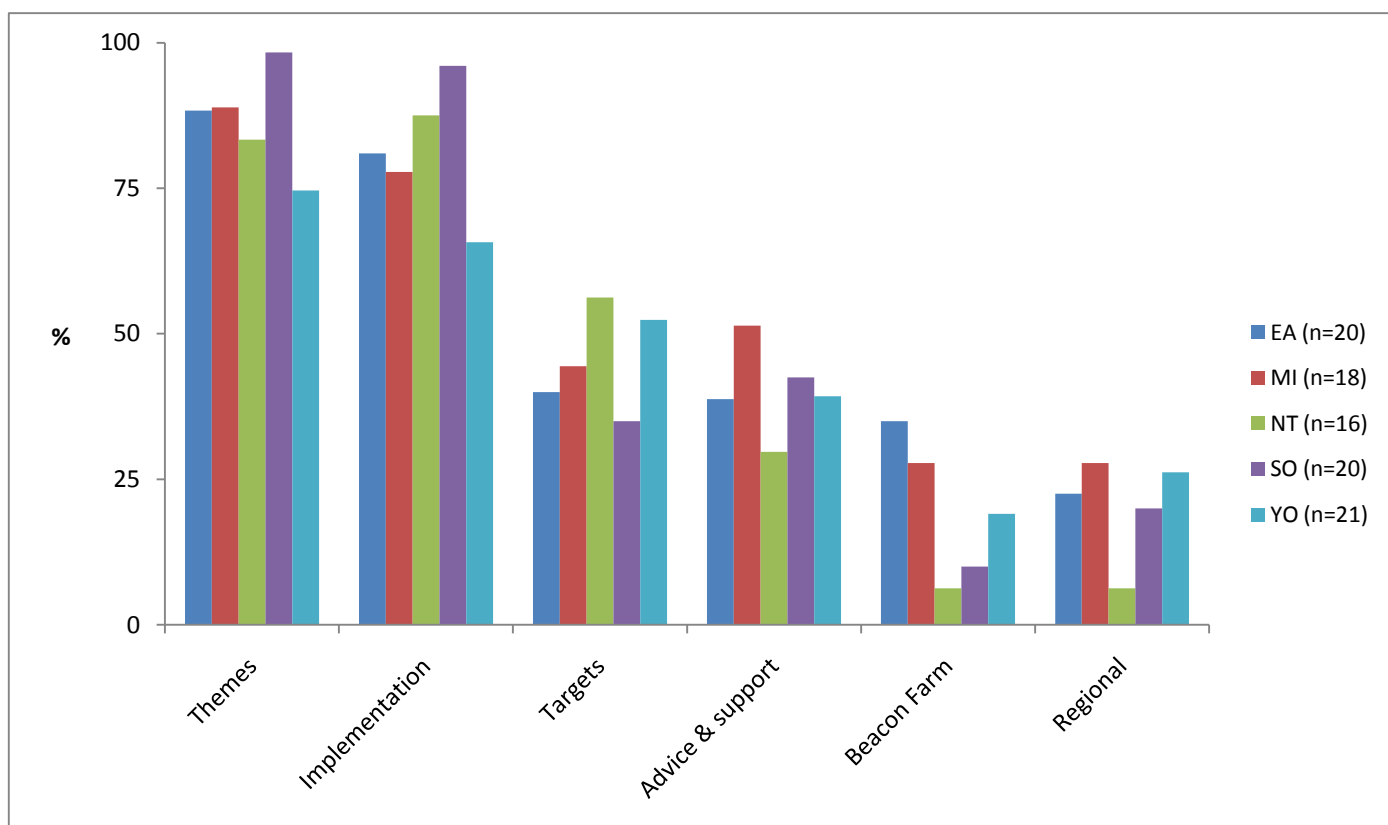
Awareness of Beacon Farms and Regional issues was very poor across both groups, with a quarter or fewer of those sampled showing awareness of these aspects.

**Table 35 Percentage of farmers aware of different aspects of the Campaign**

|  | Participant % (n=97) |          |                    | Non-participant<br>(for comparison)<br>% (n=57) |
|--|----------------------|----------|--------------------|---|
|  | Volunteered          | Prompted | Total <sup>8</sup> | Prompted  |
| <b>Purpose/theme</b>                           |                      |          |                    |   |
| Resource protection                            | 16                   | 57       | <b>73</b>          | 79  |
| Farmland birds                                 | 34                   | 59       | <b>93</b>          | 84  |
| Farmland wildlife                              | 34                   | 58       | <b>92</b>          | 82  |
| <b>Implementation</b>                          |                      |          |                    |   |
| ELS renewal                                    | 26                   | 62       | <b>88</b>          | 77  |
| Promoting ELS in field options                 | 15                   | 57       | <b>72</b>          | 77  |
| Maintaining uncropped land                     | 20                   | 64       | <b>84</b>          | 74  |
| Voluntary measures                             | 34                   | 59       | <b>93</b>          | 70  |
| Nutrient management                            | 10                   | 59       | <b>69</b>          | 61  |
| <b>Aware of targets for<br/>Implementation</b> | N/A                  | 46       | <b>46</b>          | 51  |
| <b>Advice and support</b>                      |                      |          |                    |   |
| Local liaison group                            | 10                   | 27       | <b>37</b>          | 40  |
| Beacon farm                                    | 5                    | 37       | <b>42</b>          | 39  |
| Leaflets for themes                            | 13                   | 42       | <b>56</b>          | 37  |
| County co-ordinator                            | 8                    | 19       | <b>27</b>          | 37  |
| <b>Know where Beacon Farm is</b>               | N/A                  | 20       | <b>20</b>          | 23  |
| <b>Regional issues</b>                         |                      |          |                    |   |
| Target counties                                | 2                    | 15       | <b>18</b>          | 19  |
| Regional priorities                            | 3                    | 22       | <b>25</b>          | 18  |

Awareness of all aspects of the Campaign was similar across the regional groupings (Figure 26) although numbers were rather low to draw comparisons. Farmers in YO were slightly less aware of themes and implementation, continuing the trend seen in the non-participants (Figure 25). As may be expected the NT (non target) areas have the poorest awareness of advice and support, beacon farms and regional issues; although no area demonstrated significantly high awareness levels for these three groups of aspects.

<sup>8</sup> Overall total; directly comparable to the non-participant results as it is assumed that the participants that volunteered would have also responded 'Yes' when prompted.



**Figure 26 Regional variation in ‘participants’ awareness (measured as percentage) of Campaign aspects**

### 3.4.3 Information Sources and advice

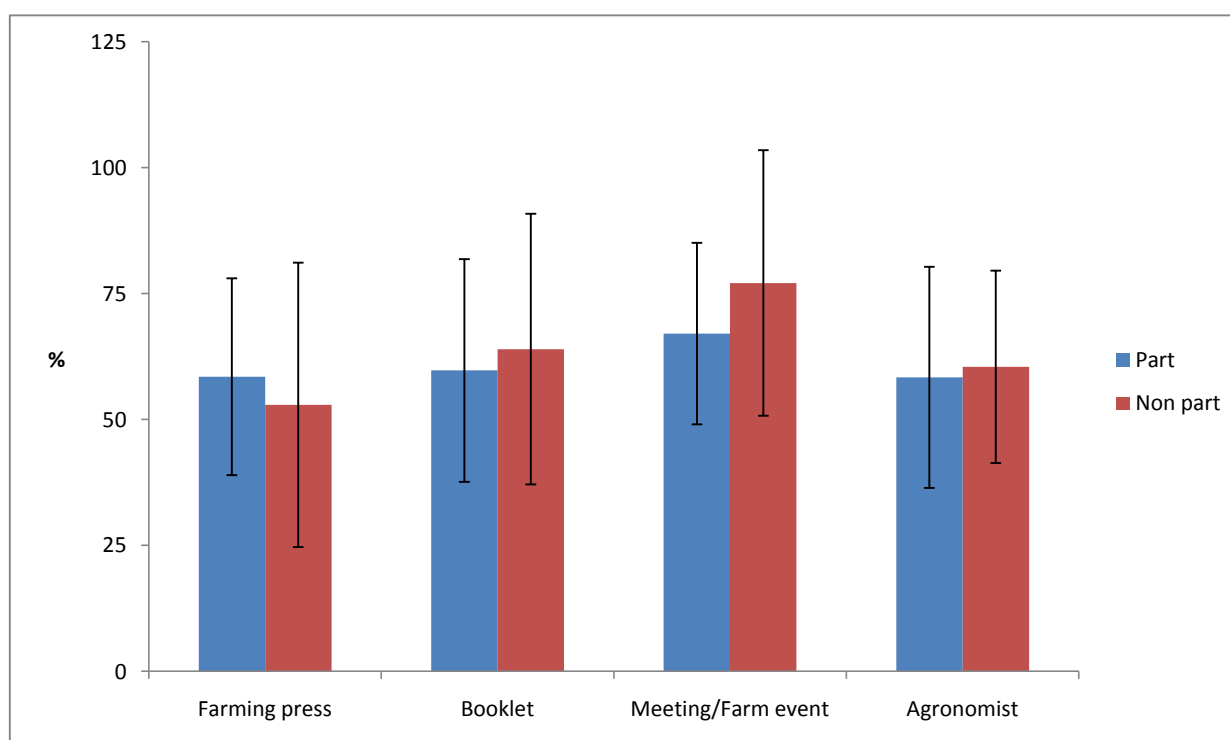
Information sources mentioned by the participants followed similar patterns to those noted by the non-participants, with the farming press (notably ‘Farmers Weekly’) and CFE booklets/leaflets being the most common information sources (Table 36). Somewhat surprising for both participants and non-participants is that 3 and 7% respectively claimed to have received no or little information about the Campaign. This is possibly a reflection of the levels of paperwork and literature that farmers and landowners receive, with many claiming to be so overwhelmed by the volumes of paperwork that non-essential information is disregarded. Organisations that were specifically mentioned as information sources were most commonly the NFU, NE, FWAG, CLA and Defra – it was not always clear from the response as to whether the information from these was in the form of a meeting, literature or a visit. Overall only four individuals (participants and non-participants) said that they had used the internet to find information about the Campaign.

Similar to the results from the non-participant survey, many of the meetings that were mentioned by the participants were not specifically CFE meetings. In particular, CFE information was delivered during ES renewal meetings. Those (participants and non-participants) in the Midlands (35%, n=29), East Anglia (35%, n=35) and Yorkshire (30%, n=30) were most likely to have received information about the CFE from meetings/farm events that they had attended. However, fewer farmers in the South (17%, n=29) and non-target farms (15%, n=27) had received information from meetings. Both participants and non-participants from the midlands and East Anglia showed consistently high levels of awareness for all 6 groups of aspects (Figure 26 & Figure 25), suggesting that meetings and farm events are the best method of raising awareness of the Campaign.

**Table 36 Information sources (as percentage)**

| Information source  | Participants % (n=95) | Non-participants % (n=57) |
|---------------------|-----------------------|---------------------------|
| Farming press       | 44                    | 53                        |
| Booklet/leaflet     | 57                    | 53                        |
| Local liaison group | 0                     | 5                         |
| Farm event/meeting  | 23                    | 32                        |
| Agronomist          | 3                     | 5                         |
| Other               | 10                    | 5                         |
| No information      | 3                     | 7                         |

Relating the source/delivery method of information to the overall awareness of the non-participants and participants indicated that the best method of delivering information was through local liaison groups and farm events/meetings (Figure 27).



**Figure 27 Awareness of Campaign aspects in relation to information sources (error bars represent SD).**



Only 20 of the participants visited indicated that they had received any advice on implementing voluntary measures, or selecting ones that would be suitable for their farm. The main source of advice mentioned was Natural England (n=7) followed by the NFU (n=3). The Game and Wildlife Conservation Trust, FWAG, Defra and agronomists were also mentioned. Fourteen of those receiving advice thought that it met their needs fully, and three that it met their needs in part. There were very positive comments from those who had received advice from Natural England including *'Detailed, strategic and thorough'*, and *'Down to earth which does not interfere with what you do on a daily basis.'* One participant that had been to meetings run by the NFU said he now had a *'Clear idea of what the scheme requires.'*

A total of 33 comments from participants were recorded with regard to advice and information, and as in Section 3.2.3.3 the need for targets was mentioned by four of these. One comment simply said *'Need more goal posts'* whilst another said *'Need some more advice - what targets are expected. How they link into ES schemes. Are HLS holders exempt?'* A further six people gave the impression that they felt they could do with some more information as they were still unclear of the detail and one was *'Still not entirely sure what the Campaign is trying to achieve.'* However in addressing this care needs to be taken as it was also noted that some of the information on the Campaign could be lost in the volume of literature from Defra, and some did not want any more leaflets.

Over half of the 40% of participants that said that they had selected measures to enhance particular environmental attributes made comments that referenced birds as an aspect they were trying to enhance. A quarter of the 40% mentioned biodiversity/environment in general and a further quarter considered resource protection to be important.

#### **3.4.3.1 Implementation or intention to implement measures**

As previously stated the 'participant' sample was selected from those that indicated they were implementing voluntary measures from the Defra survey. As far as possible this was verified during telephone calls to arrange the visit. Despite this, 13% of the participants visited were not implementing or intending to implement measures and a further 20% were unsure. This was often because ES agreements were due for renewal and options would not remain the same, and additional uncropped land might be entered in a future agreement.

Those who were intending to implement measure were asked what their reasons for doing so were, the two main reasons being that it was beneficial to wildlife & the environment, and that the measures they were intending to implement were in place already (Table 37). Notably, buffer strips were often present in order to comply with the requirements of LERAPS.

**Table 37 Reasons for implementing voluntary measures as part of the Campaign**

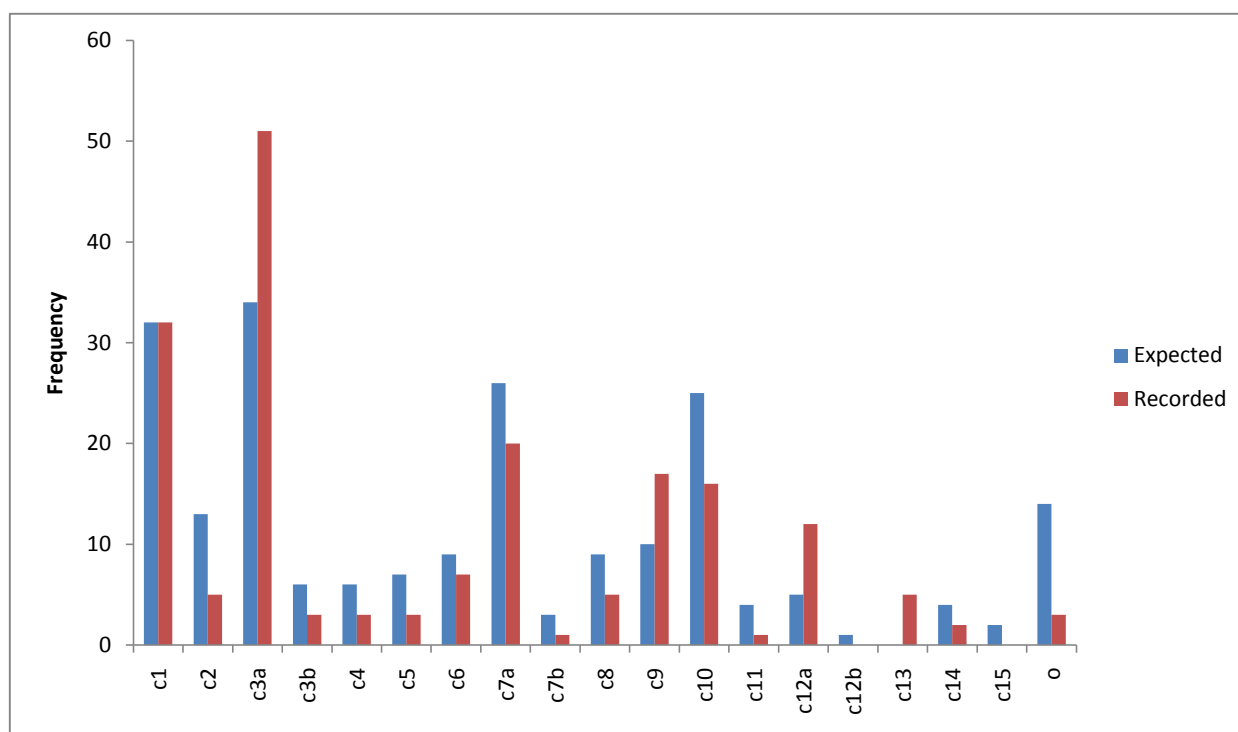
| Reason                                  | % (n=65) |
|---|----------|
| Measure already present                 | 32       |
| Environment/wildlife                    | 32       |
| Birds                                   | 11       |
| Game birds                              | 8        |
| Support CFE & avoid compulsory measures | 15       |
| Economic/poor land                      | 9        |

## 3.5 MEASURE SPECIFIC RESULTS

### 3.5.1 Uptake

On the farms visited, the most common measures, recorded on the farm and on the Defra questionnaire, were C1, C3a, C7a and C10 (Figure 28). All other measures (excluding C9) were recorded on less than 10% of holdings, with C12b and C15 not recorded on any holding.

During the field visit the surveyors attempted to match the feature on the ground to the most appropriate measure from the 'Farmers guide to voluntary measures' regardless of what the farmer considered it to be. This approach was taken as very early in the field survey it became clear that most of the farmers had not read the specific management requirements. As a general rule the less common measures were recorded less frequently than expected, with the notable exception of pollen and nectar mix (C12a) and wildflower headlands (C13). These two measures were more common in the field than had been anticipated from the postal returns (Figure 28).



**Figure 28 Number of farms on which each measure was recorded and the expected number based on the Defra postal survey returns**

Assessment of the features present on individual farms indicated that very few had completed the Defra survey completely correctly in terms of the measures they had on their farm (Table 38). It is worth noting that during the visits some farmers recalled additional uncropped land that they had not recorded on the Defra survey that would correspond to voluntary measures, and so a further subset had entered the correct measures on the Defra form, but also had additional measures. In the majority of cases this was an area of C3a (reverted arable area) that had been left out of cultivation for various reasons (examples included unproductive areas shaded by woodland and awkward field corners).

Just over a quarter of those visited had the same number of measures that were expected from the Defra survey (Table 38), but they had been misidentified largely because the farmers had not read the management requirements of the measure. Notably there was considerable misidentification and confusion between what constituted wild bird seed mix (C9) and game strips (C10), with the measure being misreported by at least 7 participants (7 equating to 28% of the participants that in the Defra survey reported having either a C9, C10 or both).

Almost a third of participants visited had fewer measures than expected. The timing of the Defra survey within the arable year suggests that it is unlikely the measures on the ground would have changed, so the differences are attributable to poor understanding of the specific details of the measures.

**Table 38 Comparison of measures recorded on field visits and Defra postal survey**

| Field comparison with Defra survey | Number of farms |
|------------------------------------|-----------------|
| Exact measures                     | 18              |
| Exact measures plus more           | 11              |
| Same number but different measures | 25              |
| More measures but different        | 12              |
| Fewer measures                     | 31              |
| <b>Total</b>                       | <b>97</b>       |

On 69% of the farms visited there were either one or two different measures present. Overall, these figures are comparable the number of measures expected per farm from the Defra survey, although 2% of farms did record having 6 different measures present in the survey, and 2% recorded five. After the visits had been completed the maximum number of different measures per farm was found to be only four, with 7% of farms falling into this category. No farm had more than four measures.

### 3.5.2 Management

The individual measures were assessed against red box requirements (**Error! Reference source not found.**) through a combination of interview questions and field survey. In cases where multiple examples of a feature were present on a farm, field assessments were made on up to five of the areas, chosen at random. Assessments were completed as fully as possible but some measures could not be assessed, for example overwinter stubbles had been returned to cropping and some sown seed mixes had not yet established. If this did occur the participant was questioned as far as possible to ascertain from interview whether the criteria would be met. In the majority of cases the measure was one that had been carried out previously by the participant and so the management questions could be answered fully. This approach can be substantiated with the fact that only 7 of the participants answered 'yes' when asked if the management had changed as a result of the Campaign. This represented management changes as a result of the Campaign on 5% of features assessed.

Field survey could not be completed where the participant intended to carry out a measure in the future. Those considered to be imminent were included in the final numbers for each measure, but assessment of red box criteria were only included where sufficient information was provided.

Assessment of the management and implementation against red box requirements for the measures highlights that low numbers meet the red box criteria specified in the CFE handbook (Table 39 & Table 40). In total, a complete assessment (field and interview) was possible on 281 measures. Of these only 128 (46%) met the red box requirements.

Only eight farms had created measures specifically for the Campaign. These consisted of one each of C2, C4, C7b, C8, C13, two C7a and four C9. Given that the participant inferred that these were measures specifically chosen and implemented for the Campaign, one would expect that there would be higher awareness of (and therefore improved compliance with) the red box requirements. Of the ten areas where measures had been implemented directly as a result of the Campaign, all but one met the red box criteria. The one that failed was the C4 (Skylark plots), the reason being that they were at the wrong density within the field. Notably, all three farms that were implementing skylark plots failed for this very reason, with them all placing only one plot in each field despite the essential requirements stating '*a minimum density of roughly 2 plots per hectare*'.

#### **3.5.2.1 Red box failures**

In addition to being the most common measure, field and interview questions revealed C3a to be the measure most frequently meeting the specified requirements, with 58% of those surveyed managed as specified from the CFE handbook (Table 39). Overall 52 farms had this measure, despite the Defra returns indicating that only 34 farms had the measure. As stated previously, during the interview participants often recalled areas of uncropped land they had not recorded on the Defra form. In general this was recorded as C3a; usually the areas were small sections of fields that (for a variety of reasons) were no longer cultivated.

**Table 39 Summary of red box requirements met for the four common measures (\* No field assessment because areas had been recently cultivated)**

| Measure | No. of Farms | No. of measures | No. of measures visited | Percentage of measures meeting each red box requirements       |  |   |  |  |  | Percentage of measures meeting ALL red box requirements |
|---------|--------------|-----------------|-------------------------|--|--|---|--|--|--|---|
|         |              |                 |                         | Next to watercourse  | Grassy strip minimum width 5 m (excl CC)         | Remove compaction   | Do not cultivate once established                  | Do not apply fertiliser, OM or waste materials | Do not use for access, turning, storage.                 |   |
| C1      | 32           | 109             | 64                      | 94   | 50   | 83  | 98   | 95   | 75   | 31  |
|         |              |                 |                         | Grassy area minimum width 6 m (excl CC)                        | Maintain by light grazing or annual cut          | Remove compaction and subsoil                             | Do not cultivate once established                  | Do not apply fertiliser, OM or waste materials |  |   |
| C3a     | 52           | 135             | 115                     | 81   | 92   | 72  | 100  | 98   |  | 58  |
|         |              |                 |                         | Do not apply pre harvest desiccants or post harvest herbicides | Do not locate where risk of soil erosion/run off | Subsoil on sloping fields post harvest where run-off risk | Do not apply pesticide, fertiliser, lime or manure | Do not top or graze                            | Return to farm rotation only after 1 <sup>st</sup> March |   |
| C7a     | 20           | 14              | 4                       | 66   | *  | *   | 66   | 94   | 69   | 25  |
|         |              |                 |                         | Establish block/strip but not maize or giant sorghum           | Retain until mid February                        | Do not graze  |  |  |  |   |
| C10     | 17           | 51              | 23                      | 27   | 100  | 100   |  |  |  | 27  |

The C3a areas failed to meet all the red box requirements for a variety of reasons (Table 39). Taking the participant survey results in combination with those of the field surveys, the most common reason that this measure was deemed to fail was the presence of compaction. In some cases the participant commented that the soil type meant that compaction was not a problem, but this was not always substantiated by field assessment and compaction was evident on 28% of the C3a measures. Nineteen percent of the C3a areas did not meet the minimum width requirement of 6 m in addition to the appropriate cross compliance zone. None of the C3a measures assessed were created specifically for the Campaign.

Only 31% of the C1 areas surveyed met the red box requirements specified. Despite even the name of this measure denoting that it was '*alongside temporary or permanent watercourses*', 6% of the measures failed for this reason. This again highlights the poor awareness and understanding of the details of management requirements under the Campaign. The main reason for failing to meet the red box criteria for C1 was that the minimum width requirement of 5 m was not met in 50% of cases. It was also often found in the field that these grass buffers were used for vehicle access; if this was judged to be a regular occurrence then the strip was deemed to fail. In 25% of cases the strip failed on for this reason.

As highlighted previously, there was a lot of confusion between what constituted a C9 as opposed to a C10. It was often misreported on the Defra survey. Although red box requirements were more frequently met for the C9 measures (15 out of the 20 assessed; 75%) than the C10 measures (27%) the main reason for failing to meet the red box criteria was the same. Both of these measures restrict the use of maize and giant sorghum in the seed mix, and it is this restriction that caused the majority of failures for both of these measures. On a positive note, game strips/wild bird seed would on all occasions be left in the field until the minimum date stated in the CFE handbook, so it is the awareness of the restrictions on maize and giant sorghum that needs to be highlighted for both of these measures. If this can be achieved, compliance with the red box requirements would improve dramatically.

Assessments of over winter stubbles (C7a & C7b) were completed as fully as possible, with the majority of the information acquired through interview questions on the management practices alone, due to the timing of the survey. Overall red box criteria were only expected to be met in a quarter of the cases. With this measure there appears to be no single main reason for failure. On 34% of areas assessed under this measure, pre-harvest desiccants or post-harvest herbicides were applied, and again on 34% of areas pesticide, fertiliser, lime or manure were applied to the stubble.

Eight of the visited farms initially said they had one or more areas of C6 (overwinter stubble followed by spring/summer fallow), however when questioned further one of the farms said that the area would be going into an ELS agreement imminently, and a further two were unable to provide sufficient information on the management, so only data from five farms were assessed against red box requirements. On these five farms there were 14 areas of C6 with field visits done on nine of the areas. None of these areas visited met the red box criteria; none of them were given light cultivation in late February to create the spring/summer fallow. In addition, none of the areas were subsoiled, but it is unclear as to the specific reasons for this – it may be that it was not deemed necessary and so it would be unjustified to say this would be a main reason for failure to meet red box requirements. Areas identified as C6 were often fields that had not been drilled for agronomic reasons, but no additional management had been undertaken with reference to the Campaign requirements.

**Table 40 Summary of red box criteria for less common measures**

| Measure | No. of farms | Total number of measures | Number of measures assessed | Assessed measures meeting red box |
|---------|--------------|--------------------------|-----------------------------|-----------------------------------|
| C2      | 5            | 12                       | 7                           | 3                                 |
| C3b     | 3            | 4                        | 3                           | 3                                 |
| C4      | 3            | 13                       | 13                          | 0                                 |
| C5      | 3            | 11                       | 2                           | 0                                 |
| C6      | 7            | 14                       | 9                           | 0                                 |
| C7b     | 1            | 1                        | 1                           | 1                                 |
| C8      | 5            | 8                        | 6                           | 3                                 |
| C9      | 16           | 60                       | 20                          | 15                                |
| C11     | 1            | 0                        | 0                           | 0                                 |
| C12a    | 12           | 16                       | 8                           | 7                                 |
| C12b    | 0            | 0                        | 0                           | 0                                 |
| C13     | 5            | 5                        | 3                           | 1                                 |
| C14     | 2            | 3                        | 3                           | 1                                 |
| C15     | 0            | 0                        | 0                           | 0                                 |

For certain measures there are major failings of single red box requirements that have resulted in large number of measures failing to meet the requirements. These have been highlighted within this report and are summarised in the bullet points below. If the failures attributed to these red box criteria can be reduced over the coming 12 months, the percentage of measures meeting the red box requirements could rise significantly. This will only be possible if farmers are willing to change their management of uncropped areas in response to the Campaign. With figures in this survey implying that only 5% had changed the management of their measures as a result of the Campaign this may take some considerable persuasion to achieve.

Main red box failure points for Campaign measures;

- C1 - Width
- C2 – Width
- C3a/b – Compaction & width
- C4 – Density
- C5 -

- C6 - No cultivation to create spring/summer fallow
- C7a/b - Pre harvest desiccants or post harvest herbicides
  - Pesticide, fertiliser, lime or manure
  - Date returned to cultivation
- C8 – Width & fertiliser application
- C9 – Inclusion of maize/giant sorghum
- C10 – Inclusion of maize/giant sorghum
- C11
- C12a – Not cut & cuttings not removed/shredded
- C13 – Width/not cut/timing of cut
- C14 – Autumn herbicide applied
- C15

### 3.5.3 Areas of land under CFE measures

The area of land in voluntary measures or management similar to voluntary measures was recorded using GPS devices or maps. This information, alongside that gained from the interview, was used to estimate the area of the measure on the ground at each farm. The average size of each of the 15 measures is shown in Table 41. For the analysis relating to the areas the measures were split into two categories; 'Uncropped measures' and 'Cropped measures'. Uncropped measures are those that are on land that is uncropped for the entire year, and cropped measures include those that are cropped for part or all of the year, such as overwinter stubbles, skylark plots and selective use of spring herbicides.

For each visited farm, land recorded as either OT1 or OT2 on the Single Payment Scheme return was amalgamated to establish the total arable area. This in turn was used to calculate the percentage of the arable area on each farm that was considered to be under a Campaign measure. Skylark plots were often implemented singly in fields. The recommended density for skylark plots is two per hectare, so each plot was considered to be equivalent to 0.5 ha.

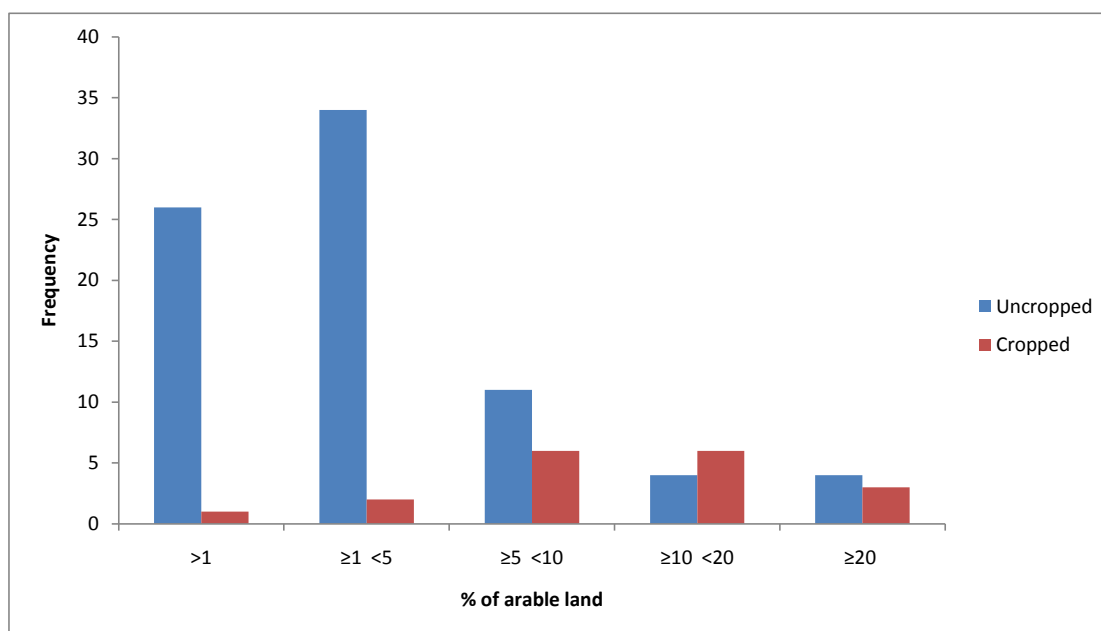
For those farms that had uncropped measures, these measures covered on average 4.73% of the arable area of the farm. For the farms that had cropped measures, 16% of the arable area was under one or more of these measures. The percentage of each farm under cropped or uncropped measures was categorised and the distribution is highlighted in Figure 29. Unsurprisingly farms with uncropped measures generally have less of their land under Campaign measures than those with cropped.

Figure 30 indicates that three farms have more than 25% of their arable land under uncropped Campaign measures which is surprisingly high. However these farms are all less than 100 ha in size, and the one with the highest proportion of uncropped measures only has a small arable area (with a high percentage under C3a), with the majority of the farmland under grass. The other two farms both had large proportions of C3a for two differing reasons relating to personal circumstances and the current economic climate of agriculture. If these three farms are discounted from the average area of uncropped measures on farms, then the average decreases to 3.3% of arable land under uncropped measures.



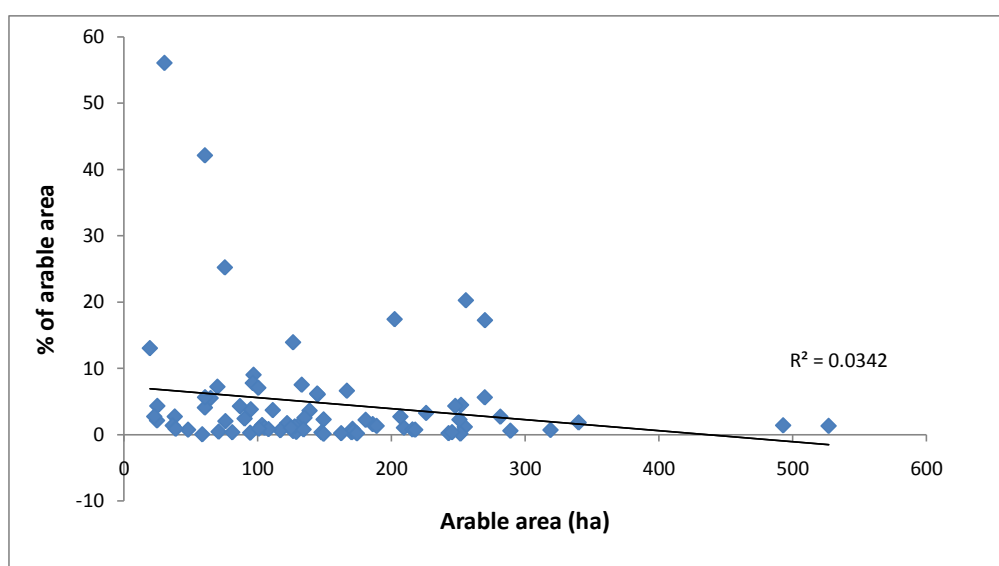
**Table 41 Average area covered by individual Campaign measures**

| Measure                   | n   | Average size |
|---------------------------|-----|--------------|
| <b>Uncropped measures</b> |     |              |
| C1                        | 82  | 0.27         |
| C2                        | 7   | 0.34         |
| C3a                       | 128 | 2.05         |
| C3b                       | 4   | 0.97         |
| C5                        | 11  | 4.39         |
| C6                        | 14  | 6.32         |
| C8                        | 6   | 0.90         |
| C9                        | 47  | 0.57         |
| C10                       | 40  | 0.80         |
| C11                       | -   | -            |
| C12a                      | 10  | 0.78         |
| C12b                      | -   | -            |
| C13                       | 5   | 1.21         |
| C15                       | -   | -            |
| <b>Cropped Measures</b>   |     |              |
| C4                        |     |              |
| C7a                       | 20  | 9.65         |
| C7b                       | 1   | 9.14         |
| C14                       | 3   | 3.95         |



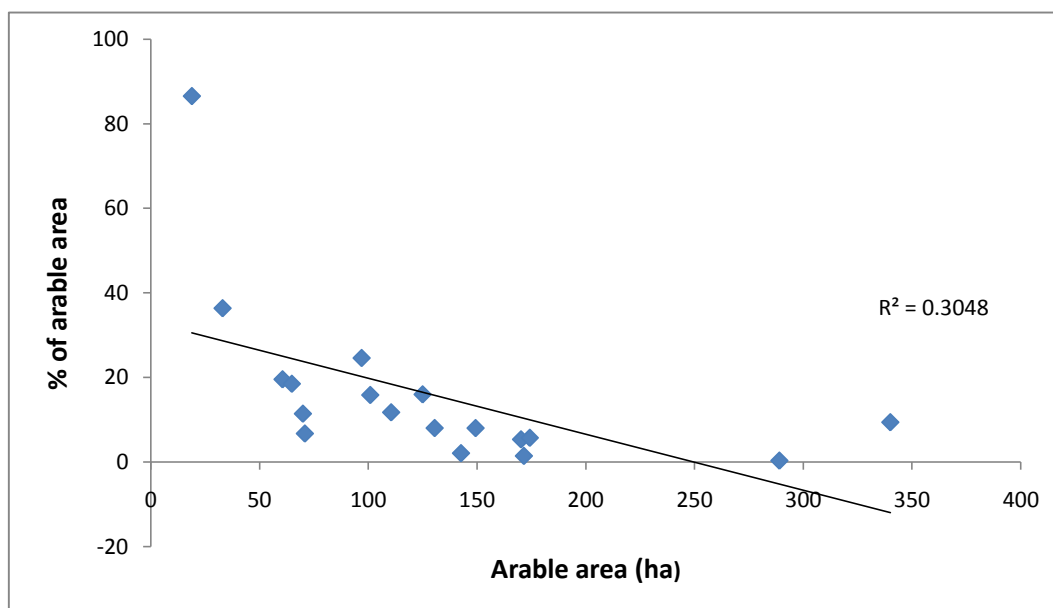
**Figure 29 Distribution of farms with varying percentages of land under cropped and uncropped Campaign measures**

Perhaps somewhat surprising is the slight negative correlation between the farm arable size and the percentage of their land that they have under either cropped or uncropped voluntary measures. This trend can be seen for both uncropped (Figure 30) and cropped (Figure 31) measures, although it is only very slight for the area of uncropped measures.



**Figure 30 Percent of farm under uncropped measures compared to arable area**

It can be seen from Figure 29 and Figure 30 that in general participant farms with uncropped measures are contributing less than 5% of their arable land, and this is fairly consistent across the board, with only a slight tendency for larger farms to contribute a lower proportion. However there is a stronger trend seen in Figure 31 that indicates smaller farms that have cropped measures are contributing proportionally more of their land towards the Campaign than larger farms.



**Figure 31 Percent of farm under cropped measures compared to arable area**

#### 3.5.4 Additional field assessments

Additional assessments of vegetation and other habitat characteristics carried out in the field during May and June 2010 will be reported along with those carried out in summer, autumn and winter, in the report to be submitted in March 2011.

## 4. DISCUSSION

A high percentage of both participants (79%) and non-participants (79%) considered themselves to be participating in the Campaign. This was largely through existing Agri-Environment schemes, and additional voluntary measures. Despite these high apparent levels of participation and an apparent understanding of the objectives and methods of implementation, a more in depth appreciation of the Campaign was often missing. A number of those contacted throughout the survey, both participants and non-participants, demonstrated poor understanding with regard to the purpose and background of CFE. For example, a high proportion of both participants and non-participants had no 'in field' options within their AE agreements, and the questions were raised by others as to why ponds, woodlands etc. were not recognised within the Campaign. There was a clear misunderstanding of the objectives of the Campaign, which needs to be addressed to improve the understanding as to what constitutes as appropriate contributions to the overall targets. However, the survey was undertaken relatively early in the life of the Campaign, and further publicity since the work was carried out would be expected to have increased awareness and understanding.

Overall there were high levels of support for both the aims and approach of the Campaign, but this is clouded by the apparent misunderstanding of the objectives. It is possible that if all those surveyed had a better understanding of the aims, for instance increasing in-field options within ELS

rather than boundary options, the support for the aims may decline. From those that did not like the voluntary approach of the Campaign, the most notable comments related to the potential for some people to do nothing to contribute whilst others 'do their bit'. Some mentioned that they had a preference for everyone to be required to do something to make it fair, and it may be worth introducing question in the future surveys to ascertain the overall feelings towards this.

One notable area that was brought up by a number of farmers was the perceived lack of targets. Many of them were unsure how much they were expected to contribute individually. The national targets are well illustrated in the CFE handbook although awareness of these targets was limited, but it is evident that there needs to be some form of guidance as to what this equates to at a finer spatial scale. If farmers knew what would be an appropriate contribution per 100 hectares, it is possible more may contribute through voluntary measures as the targets may become more achievable than they realised, and have little impact on them individually.

The Campaign had been running for six months when this survey began and there was still a lot of confusion as to what constituted participation. Many of those that were contacted via telephone but not visited gave the impression that Environmental Stewardship in itself was a sufficient contribution. The key message regarding ELS, to '*choose some key-in-field options when renewing or entering Entry Level Stewardship (ELS) for the first time*' has been diluted and lost in the information that has been delivered to farmers regarding the Campaign, whether during ELS renewal meetings or in the post. It is suggested that the key message regarding the need to increase in-field options should be highlighted more in the future.

Farmers had high levels of awareness of the general aspects of the Campaign (such as the themes), but were poorly informed about the specific details such as sources of information and advice that may be available to them and the regional issues. Of those that were questioned in detail about their understanding and awareness, those who had attended meetings demonstrated highest levels of knowledge about the Campaign. Some farmers said they had had no information regarding the Campaign at all. Unfortunately it is not possible to say how many people had read the 'Farmers guide to voluntary measures' they had been sent, but there is a feeling that information delivered in this manner had in many cases been mislaid amongst the large amount of other literature that they had received. Meetings and farm/agricultural events could perhaps be better utilised to get the key messages about the Campaign across in an interactive way. Very few of those questioned had used the Internet to find information.

The picture gained from the questionnaire sent out by Defra was misleading due to the interpretation, or misunderstanding as to the information required in Section 4 of the form. This asks for information voluntary measures that have been undertaken taken EXPLICITLY as part of the Campaign. The majority of measures recorded here were in fact baseline (i.e. already in place before the start of the Campaign), and so not voluntary in the way the question implies. Field surveyors classified the measures according to the closest type of voluntary measure as described in the CFE guidelines booklet. The majority of these baseline measures were classified as C10, C7a, and C3a/C1. Notably these are the measures that are likely to require the least alteration in the management of the farm to implement. The majority of C10s were in place due to a shoot on the land, C7a was a usual part of the farm rotation and the C3a/C1 areas had often been put in place to meet the requirements of LERAPS or for access reasons.

At the time of the survey, only eight farms were implementing measures as a result of the Campaign, and very few of those that included baseline measures were actually going to change the management of the area to meet the Red Box requirements. There seems to be a general feeling that due to the voluntary nature of the Campaign the existing uncropped land is sufficient, and even if it does not meet the Red Box requirements it will still be suitable for a voluntary measure. This perception needs to be changed if areas managed in a way that does not fully comply with the red box requirements are to be considered as contributing to the campaign, at least as voluntary measures (though they will presumably contribute as uncropped land with improved environmental management).

On farms with uncropped land, around 3.3% of the arable area on average was uncropped (ignoring the influence of a few outliers with atypically large percentages). This is lower than the percentage that was considered under the proposals for mandatory measures under cross-compliance ("Option A"), i.e. 4-6%, but is nevertheless encouraging at such an early stage in the Campaign and suggests that farmers are prepared to maintain a sufficient level of land out of production to achieve significant environmental benefits.

On average, 16% of the arable area was devoted to measures on cropped land, where these occurred. Most of these were stubbles. The model developed by Gillings *et al* suggests that this level of stubble provision could be sufficient to reverse population declines of slylark and yellowhammer.

These results indicate that on farms implementing voluntary measures or management similar to voluntary measures, areas were on average adequate to achieve environmental gains. This is an encouraging outcome for the first season of the Campaign. The challenges for the forthcoming season are to increase the numbers of farms with voluntary measures, increase the areas of uncropped land on those farms with small areas in voluntary measures (especially larger farms), and to increase the proportion of uncropped land that meets the 'red box' requirements.

Access to details of Environmental Stewardship agreements is being sought for farms that were visited and if these can be obtained, it is planned to carry out an analysis to investigate the extent to which relationships may exist between ES agreements and presence/areas of uncropped land and voluntary measures. This will be reported in the March report.

## References

- Boatman, N. (2010). Campaign for the Farmed Environment: field verification of Campaign uptake and delivery of environmental benefits - Scoping study: defining field assessment criteria for data collection
- Gillings, S., Newson, S.E., Noble, D.G., & Vickery, J.A. (2005) Winter availability of cereal stubbles attracts declining farmland birds and positively influences breeding population trends. *Proceedings of the Royal Society B*, 272, 733-739.