Department for Environment Food & Rural Affairs

NATURAL ENGLAND

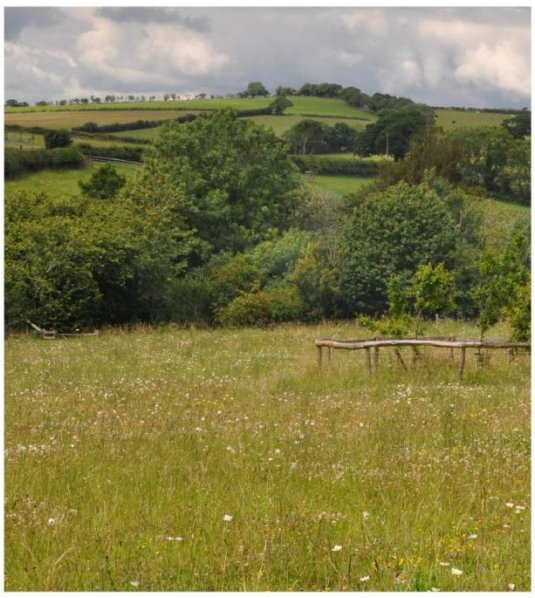
BD5303: Monitoring the effects of Environmental Stewardship on Landscape Character and Quality

Developing a method for reporting and monitoring the direct and cumulative impacts of Environmental Stewardship on the maintenance and enhancement of Landscape Character and Quality

6. Synthesis Overview: Summary of Findings and Conclusions

Prepared by LUC in association with Julie Martin Associates, Countryscape, Fabis Consulting, and Professor Carys Swanwick

June 2013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BD5303: Monitoring the effects of Environmental Stewardship on Landscape Character and Quality

Executive summary

This three year Research and Development Study has been funded by Defra and run by Natural England. It reflects a concern that previous monitoring of agri-environment schemes has not captured fully the landscape effects of these schemes.

This study has developed a sampling frame that allows the landscape effects of agri-environment schemes to be assessed from the national to the local level**. It has developed rapid, consistent, repeatable and rigorous methods for assessing the landscape effects of Environmental Stewardship (ES) and subsequent agri-environment schemes.** A detailed survey method lay down a baseline and explored the different landscape effects of ES. From this, a rapid field survey method has been developed allowing the quick collection of data on the landscape performance of individual options in a wide range of circumstances. At the strategic level, using digital data and a bespoke database, complex information is presented in simple format. This allows consistent assessment using landscape thresholds to identify the landscape performance of ES across every National Character Area (NCA).

Using meta-analysis of field survey results, the study has reviewed different counterfactual scenarios. It has also developed an approach for capturing public opinion on which elements of the landscape people value and would prefer agri-environment schemes to support. This will be particularly valuable in informing landscape-scale projects.

Results

1. Overview. The information collected through these different forms of analyses **provides the most comprehensive evidence to date on the landscape effects of agri-environment schemes** and particularly ES. The study has confirmed that ES is meeting the objective of maintaining and enhancing landscape character and quality. It is having a strongly positive effect on the landscape of the Uplands and a positive effect on landscapes elsewhere. The exception is urban fringe areas and some western pastoral areas, where its effect is neutral.

In pastoral and mixed farming areas, including the Uplands, the primary landscape need is **to conserve and restore characteristic landscape features** such as hedgerows, hedgebanks, walls, small farm woodlands and trees, and semi-natural habitats. In intensive and large scale arable landscapes the emphasis needs to be on enhancing the landscape by reinforcing or reintroducing **landscape structure and diversity** through the use of wide buffer strips to strengthen field boundaries and through the reintroduction of semi-natural and non-arable habitat to create localised areas of diversity and interest.

2. Benefits. The evidence identifies that ES options can **conserve, restore and recreate key landscape characteristics**, as well as:

- Highlight landscape scale and pattern
- Conserve / reintroduce traditional land use patterns, colours and textures e.g. through hay cutting and conserving wild flower meadows
- Help reinforce local distinctiveness and sense of place
- Conserve, restore and help reveal historic features in the landscape

3. Option choice. The study has confirmed that ES has the right range of options to support the character of our different landscapes but would benefit from new ELS options for the restoration of

boundary features[1] outside the Upland SDAs. **The study has also highlighted other important areas that would significantly increase the landscape benefits of ES.**

4. Uptake. It is evident that over 50% of uptake by area is focused on a primary ES 'palette' of some 17 options. While HLS agreements can generally be characterised as a range of specific options tailored to individual localities, ELS agreements are often very simple in option choice and do not necessarily respond to the needs of the local landscape. Here significantly greater benefits would be achieved if (a) there was more careful selection of options to conserve and enhance landscape character; and, (b) there was landscape advice/targeting to ensure each option is applied in the optimal location.

ELS low input grassland options are the most popular options by area of uptake in all areas except the Uplands. They cover over 30% by area of all ES uptake in the Upland Fringe and in Western pastoral and mixed landscapes, yet fall far short of meeting the identified landscape threshold. This suggests the need for more purposeful targeting. On the other hand hedgerow options also have very high levels of uptake (up to 70% of all linear feature uptake) but meet their landscape threshold in nearly all types of landscape, bringing discernible landscape benefit. This rarely includes significant uptake of the enhanced management options that bring most benefit and added value – these again could be purposefully targeted.

There are a wide range of other options that have low levels of uptake that rarely meet their landscape threshold yet are vital for supporting the local nuances of landscape (e.g.options associated with woodlands and trees, wood pasture, orchards, ponds, haymaking). Stronger targeting of these options would be highly beneficial in reinforcing local distinctiveness.

5. Location. Options fall into one or more of the following **strategic location** types: (a) options best **dispersed** across the landscape, especially boundary and buffer strip options helping define the scale and structure of the whole landscape; (b) the targeting of grassland options with very high levels of uptake into topographical **swathes or zones** that highlight topography and provide a visual and functional link between areas of more natural grassland and aid resource protection; (c) the **clustering** of options to recreate habitat mosaics, bring back traditional landscape patterns, and protect concentrations of historical / archaeological features; and (d) targeting options in specific locations where they will help **restore local distinctiveness.**

The study has identified that the location of options can be very influential in defining their impact on the landscape, both strategically and at the local scale. Arable options are particularly influential. In the right location these can significantly enhance the landscape, for example, helping define the boundary of large-scale field systems, but in the wrong location can detract from the landscape, as when placed in blocks randomly imposed on the established field structure. Advice that promotes arable options should take account of potential adverse effects and encourage the appropriate scale, design and location of these options.

6. Future monitoring. Evidence collected through monitoring at different spatial scales provides a much better understanding of ES uptake 'what, how much and where' and its effects on landscape character and quality. This can directly inform targeting and advice both nationally and more locally to ensure that the ratio of benefits to costs are maximised. **This underlines the strong value for money that monitoring can offer.**

7. Informing other work. The findings of this study and any future monitoring will inform the National Character Area Profiles and their Statements of Environmental Opportunity. They will also inform monitoring and management planning within National Parks and AONBs; and other integrated management projects such as the Nature Improvement Areas.

8. Further research. Further research would be beneficial. In particular: (a) review of benefits arising from the special projects under HLS capital items: HAPs, HTB & PAH/OES; (b) case studies to assess how to mitigate potential adverse landscape effects of in-field arable options while ensuring that their primary purpose is met; and (c) understanding better how farmer attitudes and their appreciation of landscape affect agri-environment decisions.

[1] There is already a new option EB14 for the restoration of hedgerows in the lowlands

BD5303: Monitoring the Effects of Environmental Stewardship on Landscape Character and Quality

Full set of Final Reports

1 **Methodology Report**
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Appendix 2: Spreadsheet of ES options
Appendix 3: Selection criteria for the choice of sample NCAs
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Appendix 5: Field Survey pro-formas
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2. **Report of Findings: Landscape Effects of Environmental Stewardship at the Study Area Level**
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Appendix 1: Assessment of the 18 NCAs
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Appendix 8: The assessment of the six ALTs
Appendix 9: ES Area Options: Top 20 options by area of uptake
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Appendix 2: Assessing Environmental Stewardship effects at Strategic Level
Appendix 3: Bespoke approach to assessing ES landscape effects.
Appendix 4: Methodology for public engagement to inform ES monitoring

7. **Executive Summary: Briefing Paper**

Environmental Stewardship

Environmental Stewardship is an agri-environment scheme that provides funding to farmers and other land managers in England to deliver effective environmental management on your land.

There are four elements to Environmental Stewardship:

- Entry Level Stewardship (ELS) is open to all farmers and provides a straightforward approach to supporting the good stewardship of the countryside. This is done through simple land management that goes beyond the Single Payment Scheme requirement to maintain land in good agricultural and environmental condition. It is open to all farmers and landowners. ELS Agreements last for five years.
- Organic Entry Level Stewardship (OELS) is the organic strand of ELS. It is geared to organic and organic/conventional mixed farming systems and is open to all farmers not receiving Organic Farming Scheme aid.
- Uplands Entry Level Stewardship (Uplands ELS) was launched in February 2010 to support hill farmers with payments for environmental management. This strand of Environmental Stewardship succeeds the Hill Farm Allowance. It is open to all farmers with land in Severely Disadvantaged Areas, regardless of the size of the holding. UELS Agreements last for five years.
- Higher Level Stewardship (HLS) Negotiated with farmers in target areas or, outside of those areas, using target themes. These agreements involve more complex types of management and agreements are tailored to local circumstances. HLS applications will be assessed against specific local targets and agreements will be offered where they meet these targets and represent good value for money. HLS Agreements last for 10 years (or longer for some options)

Relationship between ELS and HLS agreements

There is an expectation that HLS applicants will already be in an (Upland) ELS or (Upland) OELS agreement or that they will join (Upland) ELS/OELS at the time of making an HLS application. This is because ELS, OELS and HLS have been designed to complement each other. In the cases where an HLS applicant already has an (Upland) ELS or OELS agreement, they are required to re-apply for these options when they make their HLS application. This is to ensure that the different elements of ES are combined in the most effective way. Natural England then provides a joint ELS/HLS, Uplands ELS/HLS, OELS/HLS or Uplands OELS/HLS agreement.

Very occasionally there will be sites for which (Uplands) ELS or (Uplands) OELS options are not available, such as coastal and inter-tidal habitats and lowland heathland. In these cases an HLS-only agreement may be appropriate.

1 Purpose and brief

Purpose of this report

1.1 This overview report for BD5303 summarises (a) the main methodologies that have been developed through this study; and (b) the key findings of this three year study that has looked at the landscape effects of Environmental Stewardship – the agri-environment scheme for England.

1.2 This Research and Development Study (reviewed after the first year) has been funded by Defra and run by Natural England. It reflects a long term concern that monitoring of agri-environment schemes has frequently failed to capture fully the landscape effects of these schemes, both positive and negative, and has failed to capture their cumulative effects on the landscape over time.

Aim of the study (BD5303)

1.3 The stated aim of this study has been "to develop and test a robust, repeatable and comprehensive evaluation framework for reporting and monitoring the direct and cumulative impacts of Environmental Stewardship ((O)ELS & (O)HLS) on the maintenance and enhancement of landscape character and quality at a variety of scales. This will use a series of quantitative and qualitative techniques that, taken together, will:

- Measure the impact of ES on the maintenance and enhancement of landscape character and quality/condition, allowing judgement to be made on the degree to which the ES landscape objective has been met;
- Assess counterfactuals that compare landscape effects with and without ES (the net effect of ES) and the landscape effects of ES compared to the Classic agri-environment schemes (the Environmentally Sensitive Areas (ESAs) and the Countryside Stewardship Scheme(CSS));
- Evaluate the cumulative impact of ES (and the options within it) on landscape character and quality/condition;
- Define lessons learned from the targeting and operation of ES that can be applied to landscape character and quality in the next agri-environment programme;
- Be able to report at a range of appropriate scales and link in with existing landscape monitoring and research projects;
- Be consistent with the European Landscape Convention."

Principles

1.4 In addition to the brief, it was agreed by the Steering Group that the monitoring and evaluation results of the study should:

- have a clear policy focus able to inform the future development of ES for the benefit of the landscape.
- be able to: up-skill ES advisors, so that their advice takes full account of the landscape; inform the targeting of options at different scales; and ensure that ES delivers for landscape and that this delivery is tailored to locality
- be capable of identifying the landscape effects of ES in terms of: the location of different options; their cumulative impacts; and the effects of the co-location and clustering of options.
- Offer a long term monitoring framework that is repeatable and consistent at different spatial scales, allowing comparison of results over time.

1.5 Consistent with on-going discussions with the study Steering Group, the output of the study has been a number of landscape monitoring approaches that **are simple (for the user), repeatable and quick to undertake by those with a landscape background or without a landscape background but with training.** Different monitoring approaches have been developed at different spatial scales but with clear links between each scale.

Timescale

1.6 The study started at the beginning of October 2010 and was completed at the end of June 2013. The study has therefore lasted two years and nine months.

2 Guiding Principles and Outputs

Guiding principles

2.1 The guiding principles that have shaped the overall monitoring framework are as follows:

Hierarchy of sample areas

2.2 The approach has been based on a nested hierarchy of sample areas, with monitoring undertaken in these areas. This hierarchy has worked from a broad national level down to the local level, with the monitoring results at one level informing those at other levels (providing a method of cross-checking). Like Landscape Character Assessment, monitoring has been more detailed but more sample-based as it has become more local.

2.3 This hierarchy is illustrated in **Figure 2.1** and was based on different selection criteria at each level in the hierarchy.

2.4 **The Agricultural Landscape Type (ALT) level**. The six ALTs are made up of groupings of National Character Areas (NCAs) that together cover the whole of England[2]. These have provided the most strategic level of investigation with review of landscape effects based on analyses of ES uptake data compared to other digital and spatial data that reflect the landscape character of each ALT.

2.5 **The National Character Area (NCA) level**. This level is based around 18 National Character Areas, with three NCAs per ALT. These NCAs have been chosen to reflect different aspects of the ALT they represent as well as a wide range of other considerations, not least coverage of protected landscapes, classic scheme uptake (ESAs and CSS). They also cover all of the seven New Agricultural Landscape (NAL) areas[3]. At this level the landscape effects of ES have been assessed based on an analysis of ES uptake data compared to other digital and spatial datasets on stock of landcover types and landscape features at the NCA level (primarily using Land Cover Map 2007).

2.6 **The Study Area / survey square level.** This is the most detailed level of investigation with one Study Area selected per selected NCA (18). It is at this level that the landscape effects of individual ES options have been assessed in the field. As far as possible, these Study Areas have been selected to reflect different landscape types within the overall ALT / selected NCAs, informed by reference to the NCA Profiles and local Landscape Character Assessments. Again the Study Areas capture the seven NALs. At this level the landscape effects of ES have been assessed through detailed field survey within 4 – 5 1km^2 survey squares selected within each Study Area. The main purpose of these Study Areas has been to provide geographical and landscape context to survey work conducted within the individual survey squares.

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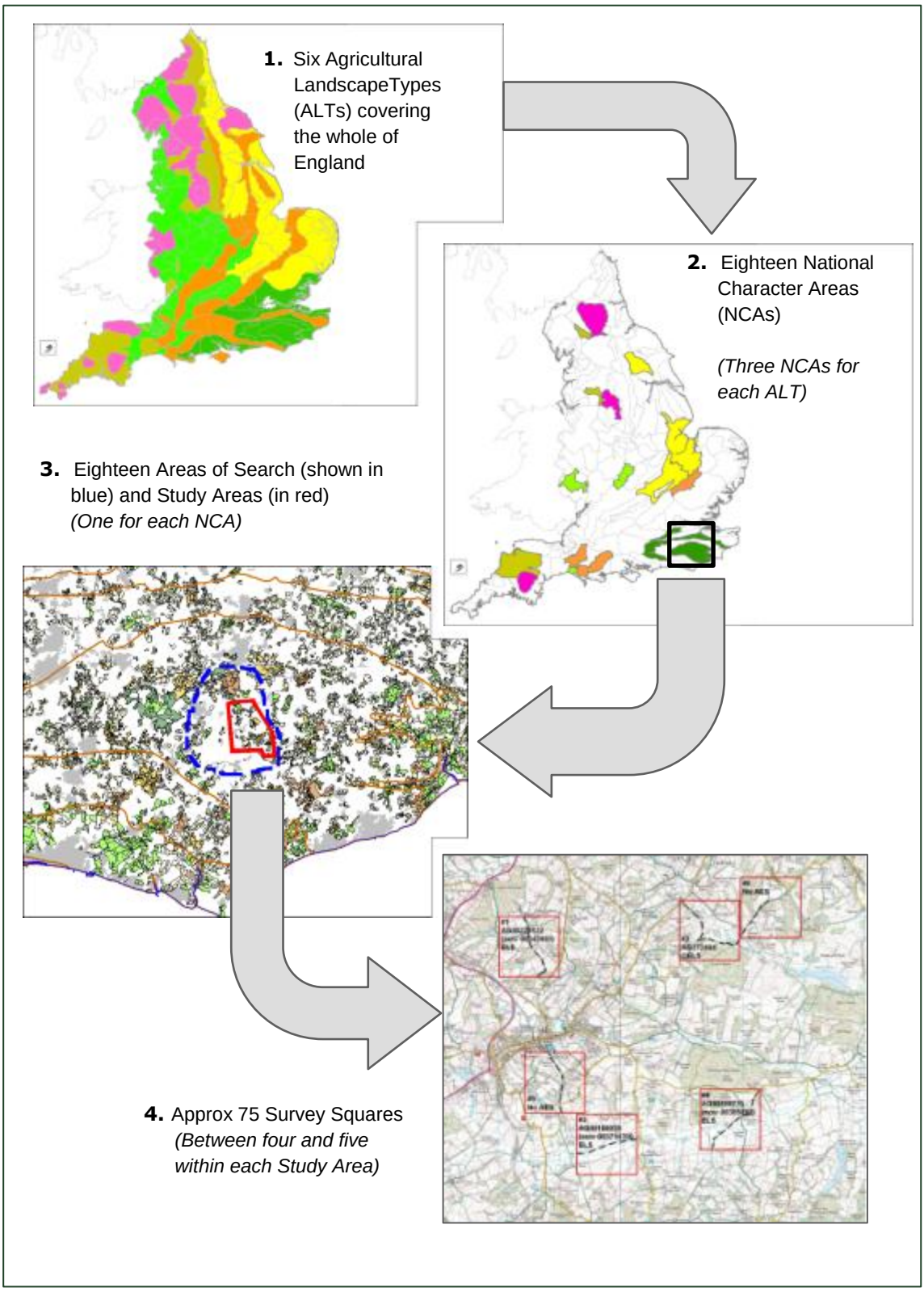
2 Swanwick C, Hanley N and Termansen M (2007) Scoping Study on Agricultural Landscape Valuation. Report for Defra, London. www.naturalengland.org.uk/ourwork/landscape/englands/character/areas/default.aspx

3 The New Agricultural Landscapes (NAL) project was run by the Countryside Commission and Countryside Agency between the 1970s and 1990s to record landscape change in seven project areas across England – the NAL areas. See Countryside Agency (2005) Agricultural landscapes: 33 years of change

2.7 Throughout this study, clear links have been maintained between the different scales of analysis, with NCAs identified in terms of the ALT that they represent, and Study Areas identified with the NCA within which they lie. Equally, all levels of activity have informed each other and created a much fuller understanding of the effects of ES on the landscape overall.

Figure 2.1: The nested hierarchy of sample areas used in this study



Key landscape characteristics providing the link between the different levels

2.8 All landscape assessments start by identifying the key landscape characteristics of the landscape that they are describing. Key landscape characteristics are defined as:

'Elements (such as trees and hedges) or combinations of elements, which make a particular contribution to the distinctive character of the landscape of an area'[4]

2.9 These key landscape characteristics are the essential 'ingredients' in describing the landscape and through this study have provided the 'common currency' for describing the landscape at different scales. They provide the benchmark against which the landscape effects of ES can be judged, enabling an assessment of landscape effects at all levels in the monitoring framework.

2.10 For this study the key characteristics at each scale in the hierarchy have been identified as follows:

- **Agricultural Landscape Types (ALTs)**: Key characteristics of the ALTs have been identified for the first time as part of this study (by Julie Martin) based on a thorough review of the key characteristics of the NCAs falling within each ALT.
- **National Character Areas (NCAs)**: The fine-grained landscape characteristics defined for each NCA (2004) have been used and updated at the outset of BD5303 by Julie Martin as an interim measure awaiting publication of the updated NCA Profiles. These key characteristics were originally drawn up to inform the targeting of ES. They are also being used to inform the current updating of the NCA Profiles.
- **Study Areas**: The key characteristics have been identified from the relevant local authority / protected landscape Landscape Character Assessment(s).

2.11 Key landscape characteristics differ (a) in different types of landscape and also (b) at different scales of landscape assessment, with detailed landscape characteristics identified at the Local / Study Area Level and more strategic key characteristics identified at the NCA and ALT levels. Nevertheless, there will be common key characteristics shared between individual NCAs and the Study Area within them, albeit those at the Study Area level may be described in more detail and will also include other landscape characteristics key to the local area but potentially not evident at the NCA level.

2.12 Key characteristics provide the common thread linking all aspects of the study and lie at the heart of the evaluation questions that have guided the monitoring approaches at all levels, namely:

- What are the important **landscape characteristics** of the area?
- What is the relationship between these characteristics and the ES options/measures?
- What are the specific effects of these ES options on landscape character (informed by the BD5303 field work)?
- What is the up-take of the options that affect the landscape characteristics?
- What is judged to be the effect of this level of up-take on this landscape?

[4] Swanwick, C, and LUC (2002) Landscape Character Assessment: Guidance for England and Scotland (Countryside Agency and Scottish Natural Heritage

2.13 These questions have then been expanded and modified for the specific assessments at different scales in the hierarchy.

Database of key characteristics and ES option uptake

2.14 Reflecting the above evaluation questions, as part of this study, specific analytical tools have been developed. These have played an important supporting role in the analysis and evaluation of results. Most importantly these include an access database that captures (a) the key landscape characteristics of each NCA and ALT; (b) a comprehensive list of every ES option, the potential landscape effects of each (informed by the field surveys), and the scheme to which each option belongs – ELS, UELS, HLS; and (c) the uptake of each option within each NCA (and ALT) based on the Genesis database for the date October 2010 (the date when the BD5303 study started).

2.15 In turn, as part of this study, links have been developed within the database between each key landscape characteristic, their relevant ES options, and the level of uptake of these options, allowing identification of the relevant ES uptake by key characteristic. The links between each key characteristic and each option are unique so that there can be no double counting. This creates a strong analytical tool.

2.16 This database has been informed by a spreadsheet that categorised ES options into Groups and Sub-groups (or option bundles). These bundles bring together those ES options which, as best can be judged from field work and descriptions in the ES Handbooks, have the SAME landscape outcome. These bundles typically include between one and five ES options. A key reason for this rationalisation of ES options was to reduce the number of variables that were being explored at any one time as the study developed. Following this approach some 80 ES option sub-groups or bundles were identified, although within the database every option can still be identified separately for the purposes of analysis.

Outputs

2.17 The main outputs of this study (which have also defined the main activities undertaken) have been:

1. A database of key landscape characteristics and linked ES options and uptake levels (para 2.14 – 2.16).

2. The field survey method and linked pro-formas used in the field survey undertaken at the Study Area level as part of this study – described in *Report 1 – the Methodology Report.*

3. A rapid field survey method developed as an outcome of BD5303 allowing the landscape effects of ES to be monitored quickly over significant areas – described in *Report 1 – the Methodology Report.*

4. The field survey results – described in *Report 2 – Report of Findings: Effects of Environmental Stewardship at the Study Area Level,* especially looking at the landscape effects of individual ES options and their combined effects on the landscape of each Study Area.

5. A method, developed by Julie Martin, for assessing the landscape effects of ES options at the scale of NCAs (and ALTs). This is based on the identification of landscape objectives for each key landscape characteristic, and linked to each objective a landscape indicator and landscape threshold. This is described in *Report 3 - Report of Findings: Landscape Effects of Environmental Stewardship at the National Character Area and Agricultural Landscape Type Levels.*

6. The wider findings arising from the application of landscape objectives linked indicators and thresholds at the NCA and ALT levels, in terms of the area-wide effects of ES options individually and in combination on the landscapes of the NCAs and ALTs. Again described in *Report 3 - Report of Findings: Landscape Effects of Environmental Stewardship at the National Character Area and Agricultural Landscape Type Levels*

7. A method for assessing counterfactuals and the findings arising. This has used survey data derived from the Field Survey work on the condition of landscape features within and outside ES and classic scheme options. The method and findings are described in *Report 4: Report of Findings – Counterfactuals.*

8. Reflecting the importance of public preferences, as underlined by the European Landscape Convention, *Report 5 – Report of Findings: Public Engagement*

9. This report – *Report 6 - Synthesis Overview Report* that brings together all the main aspects of BD5303 – the monitoring methodologies that have been developed and the key findings of this study and what this means for the future of agri-environment schemes in terms of conserving and enhancing landscape character and quality.

3 The methodologies that have been developed

3.1 The specific methodologies developed through BD5303 are outlined below, with fuller descriptions in the relevant Appendices. It is the implementation of these methodologies that has provided the evidence set out in this report. These methodologies are:

- The field survey methodology used through this study
- A rapid field survey methodology
- Assessment of the landscape effects of ES at the NCA and ALT levels using indicators and thresholds
- Counterfactual analysis
- The approach to public engagement

Assessing the landscape effects of ES at the Local Level: Field survey method developed for BD5303

3.2 The initial field survey method developed and used during BD5303 reflects the requirements of the brief and requests of the Steering Group, which together required:

- *The laying down of a baseline of the current state and condition of the landscape:* Reflecting earlier agri-environment monitoring approach the Steering Group requested that the current state of the landscape (presence of features and their condition) was recorded as a baseline against which future change could be compared.
- *Identifying the landscape effects of individual ES options to help inform all other aspects of this study*: This has been a central building block on which all aspects of this study have depended.
- *Responding to the questions raised by the brief*: namely, understanding the landscape effects of:
  - The accumulation of ES options over time
  - The proximity and clustering of ES options on the landscape
  - The co-location of options (located on the same area of land)
  - ELS compared to HLS options, and between ELS only agreements, HLS only agreements and HLS agreements (that will include both ELS and HLS options)
  - ES compared with the do-nothing situation
  - ES agreements compared with classic scheme agreements (ESAs and Countryside Stewardship)
- *The overall effects of ES on landscape character and quality?*

3.3 It was also required that the field survey was repeatable, allowing monitoring of the effects of ES (or other agri-environment schemes) over time.

3.4 This field survey method is described in detail in the Report 1: Methodology Report. It used paper pro-formas and was conducted at two levels (a) the Study Area and (b) within the survey squares.

3.5 At the **Study Area** level the landscape character and key landscape characteristics of the Study Area and the individual grid squares was confirmed, checking the landscape character against relevant information held within Local Landscape Character Assessments (Pro-forma 1).

3.6 Then, working along a transect that crossed each **Survey Square**, following a public right of way or minor lane, the area that could be viewed from the transect (the ISOVIST) was plotted and within this ISOVIST:

- The landscape impact of each ES option (and also of classic scheme options still in operation) was assessed in turn, with the identified effects related to the key characteristics of the survey square wherever relevant (Pro-forma 2).
- A baseline was laid down recording the presence of all visible landscape features (land cover, linear features and point features such as individual field trees) and the condition of all those features that could or were covered by agri-environment were noted (against three condition classes), using an aerial photographic base to help record this information and following the symbology set out in Pro-forma 3.

3.7 This field survey approach relied on written answers to specific pro-forma questions. This, combined with the laying down of a baseline, meant that the survey of an individual square took an average of half a day.

A rapid field survey method

3.8 Looking forward and based on the experiences of the original BD5303 fieldwork, a rapid field survey method has been developed under BD5303. This maintains the core questions of the original field survey but adopts a ‘tick box’ approach with surveyors completing a simple pro-forma electronically in the field. It aims to maximise the number of 1km2 squares that can be surveyed and offers a comprehensive ‘broad and shallow’ survey approach that can collect a large amount of relatively simple data over a large area (many sample 1km2 survey squares) which can be calibrated by the ‘narrow and deep’ survey findings from BD5303.

3.9 To ensure comparability between the two approaches, they share the following characteristics:

- They are based on the survey of 1km2 squares selected because of the range of ES options that they support.
- These 1km2 survey squares fall within a series of Study Areas (BD5303) / Square Clusters (Rapid Survey approach) that encompass an area of similar landscape character found within an NCA and sampled to give an equal number of Study Areas / Square Clusters per Agricultural Landscape Type (ALT).
- The field survey is conducted along a transect that crosses the 1km2 survey squares and follows a route with public access.

- The field survey relates to those ES options that can be viewed from the transect (unlike the BD5303 survey the rapid survey method does not allow for the assessment of classic scheme options as these are no longer in operation).
- The assessment of options in all cases considers whether they are affecting a key landscape characteristic of the local landscape.
- The 'scoring' of options is based on a five point categorisation:
  - *Enhancing* landscape character and quality
  - *Conserving* landscape character and quality
  - *Maintaining* landscape character and quality
  - *Neutral* effect on landscape character and quality
  - *Detrimental* to landscape character and quality (full definitions are provided in **Appendix 1**)
- The scoring takes account of whether the option is co-located with other option(s) i.e. whether other options are also being applied to the same area of land / length of feature.
- The assessment also takes account of whether the landscape effect of an ES option is enhanced or reduced (in landscape terms) by being located directly adjacent or close to other ES options (proximity effect).
- The landscape condition of features under options is recorded and the question is asked whether landscape features under agreement are noticeably different from those which are not?
- A photographic record (georeferenced and dated) is kept of each option in each survey square.

3.10 This Rapid Survey approach is set out in **Appendix 1.**

Assessing the landscape effects of ES at the Strategic Level: A method applied at the NCA and ALT Levels

3.11 This approach, developed through BD5303, measures the effects of the selection, use and location of Environmental Stewardship on 'the maintenance and enhancement of landscape character and quality' at the level of individual NCAs (and ALTs). At this scale it is based on the analysis of digital data that compares the stock of key characteristics/ elements in the landscape with the uptake of relevant ES options, with the effect of these options informed by the field survey results. This assessment is guided by the selection of landscape indicators and thresholds where:

- ***An Indicator*** is a Measure of Change in a key landscape characteristic or element
- A ***Threshold*** is the Level and/or distribution of option uptake that would cause significant (i.e. noticeable) change to the landscape (either positive or negative).

3.12 The approach is structured around a series of explicit evaluation and monitoring questions that expand on the evaluation questions that guided all aspects of this study (para 2.12). These questions form a logical sequence of sequential steps asking:

1) What are the key landscape characteristics / elements of the area that may be affected by ES?
2) What are the objectives for these characteristics / elements? (short and common sense based on a range of data)
3) Which ES options potentially may influence the key characteristics / elements?
4) What indicators could help in reaching judgements on whether these changes are consistent with landscape objectives for the area?
5) What is the level of uptake of ES options that would influence key characteristics / elements or add new features?
6) What is the stock i.e. extent of the key characteristics / elements within the area (where relevant and possible to measure)?
7) What are the indicator results i.e. levels of ES uptake as a % of overall stock
8) What threshold level/ pattern of uptake might be significant to landscape character and quality?
9) Are the effects on the landscape positive, neutral or negative (and why)?

3.13 The assessment is structured around seven landscape themes with the above sequence of questions considered for each landscape theme in turn. These landscape themes are:

- Woodlands and tree cover (including traditional orchards)
- Field patterns and boundary types
- Agricultural land use
- Farm building materials and design
- Historic environment (including parkland and water bodies)
- Semi-natural habitats
- Coast

3.14 It is these landscape themes and the evaluation questions that have framed the approach and defined the structure of the outputs for each NCA /ALT assessed.

3.15 In parallel, the base data used to inform the above questions have been:

- The key landscape characteristics / elements of each NCA
- Those ES options that may influence the key characteristics / elements (Question 3 above)
- The level of uptake of ES options (measured as area, length or item depending on the option) as provided in the Genesis dataset for the date October 2010.
- The spatial distribution of this ES uptake across England by NCA, based on a national GIS dataset held by Natural England (cut to individual NCAs).
- The 'stock' (amount) of individual key landscape characteristics by NCA based on an analysis of relevant Land Cover Map (LCM) 2007 data.
- The spatial distribution of this stock based on GIS analysis of LCM 2007 by NCA.
- The length of boundary features by NCA taken from Countryside Survey 2007 field survey data; and woodland perimeters from LCM 2007 and the National Forest Inventory.

- Supporting digital data on the distribution of certain key landscape characteristics by NCA that are poorly or not covered by LCM, These include the National Forest Inventory (for woodland type and area) and a range of datasets relating to the historic environment:
  - *Traditional orchards:* The Traditional Orchards BAP Priority Habitat Inventory for England v2.2 available on MAGIC
  - *Parklands:* The English Heritage Registered Parks and Gardens dataset on MAGIC plus the separate GIS dataset held by Natural England on Extant Parkland 1995 and 1918 (allowing *analysis of loss). This dataset only covers unregistered parks and gardens.*
  - *Historic Environment / Archaeology:* The Scheduled Monuments dataset on MAGIC, the Scheduled Monuments at Risk dataset plus the SHINE (Selected Heritage Inventory for Natural England) dataset held by Natural England. The latter is a national GIS dataset that identifies the main currently known archaeological features, both above and below ground that are not scheduled.
  - *English Heritage Listed Buildings.*

3.16 The details of this methodology are set out in **Appendix 2**. It has been applied to the 18 sample NCAs selected for BD5303, three per ALT. It has proved effective in distinguishing the different effects of ES in different types of landscape. Based on the simple premise of using the key landscape characteristics and their associated landscape objectives as a guide, and comparing (a) the relevant stock data for that key characteristic with (b) the relevant ES uptake data, the approach follows a simple step by step approach which clearly maps how the assessment of ES effects has been identified.

3.17 By making the assessment for a standard set of landscape themes in turn, it allows the balance of landscape effects within and between the different themes to be easily understood. This, combined with the use of consistent indicators and thresholds, linked to the key landscape characteristics and their objectives, ensures a consistent method for assessing the landscape effects of ES within and across NCAs (or ALTs). It also helps identify the future ES needs of the landscape. This is potentially an important policy tool.

A bespoke approach for assessments at the NCA / ALT Level

3.18 Based on the strength of the approach described above, it has now been developed further (as a follow-on to BD5303) through the creation of a bespoke database that automates much of the work entailed in reviewing each of the steps described above. Specifically the refinements have involved:

- Utilisation of the 2013 ES uptake data from Genesis rather than the 2010 data used in BD5303 to bring the assessment up to date
- The use of a bespoke database which allows greater consistency across the individual NCA assessments when all NCAs are being assessed and allows the data on ES uptake and stock to be prepopulated into the database. This greatly increases the clarity of the thought process and the speed at which the assessments can be done.

3.19 The one drawback of this approach (compared to that developed under BD5303) is that it no longer includes spatial analysis of the location of ES uptake compared to relevant stock.

This is because there is no up-to-date dataset that shows the spatial distribution of ES options other than as point data.

3.20 This bespoke approach is described in **Appendix 3** and so far has been applied to 50 NCAs and will be applied to all NCAs by the end of August 2013.

A method for developing Counterfactuals

3.21 The third type of method that has been developed and applied through this study has been the assessment of counterfactuals. The required comparisons between Environmental Stewardship, the classic schemes and the 'do-nothing' situation have been captured in four hypotheses that reflected the nature of the data that has been collected in the field and requirements identified by the Steering Group. These hypotheses are:

- **Hypothesis 1:** Features covered by agri-environment scheme options (ES options or past and current classic scheme options) are in better condition than those that are not.
- **Hypothesis 2:** Features under current agri-environment scheme options (ES and current classic scheme options that were still running at the time of survey) are in better condition than those that are not.
- **Hypothesis 3:** There is a difference between land covered by one of the classic schemes (ESAs and the Countryside Stewardship Scheme – still active at the time of survey) and land under ES option.
- **Hypothesis 4:** Features under continuous management (under an agri-environment scheme) are in better condition than those more recently included in the ES scheme.

3.22 The approach used has drawn on the data collected through the field survey, in particular, the recording of (a) all visible landscape features (land cover, linear features and point features such as individual field trees) and (b) the condition of all those features that could or were covered by agri-environment against three condition classes (good, fair, poor). The analysis of this digitised data in an Axis database has enabled features to be assigned to one of seven categories that define different 'policy or agri-environment regimes' (**Table 3.1).**

Table 3.1: Classification of agri-environment regimes identified from the database of field survey results

1. Not under any current or previous ES scheme
2. On ES Agreement land, but not under Option
3. On ES Agreement land and under ES Option
4. On land that was previously under a classic scheme (but not in either ES or classic now)
5. On land that was and still is under a classic scheme
6. Was under a classic scheme but now forms part of ES Agreement land
7. Was under a classic scheme and now is under an ES Option.

3.23 The classification in **Table 3.1** recognises that some features may in the past have been in one of the classic schemes (i.e. Countryside Stewardship or an ESA) so providing a legacy effect. The links between each hypothesis and the different agri-environment regimes (**Table 3.1**) is shown in **Table 3.2**.

Table 3.2: Link between each hypothesis and the comparison of different agri-environment regimes

Classification	Hypothesis 1	Hypothesis 2	Hypothesis 3	Hypothesis 4
1. Not under any current or previous ES scheme	Control	Control		
2. On ES Agreement land, but not under option	Control	Control		
3. On ES Agreement land and under ES Option	Treatment	Treatment	Control	Control
4. Land that was previously under a classic scheme (but not in either ES or classic now)	Control			
5. On land that was and still is under a classic scheme	Treatment	Treatment	Treatment	
6. Was under a classic scheme but now forms part of ES agreement land	Treatment			
7. Was under a classic scheme and now is under an ES option.	Treatment	Treatment		Treatment

3.24 A comparison of proportions between control and treatment groups is a standard method used in **meta-analysis**. Meta-analyses provide a set of statistical tools that enables quantitative summaries to be made of the results of a set of empirical studies or data collections. Within meta-analysis, proportional data can be used to calculate an 'odds ratio'. Conventionally the log of this ratio is used to summarise the data because it is simpler to interpret. Using the log-odds ratio **values greater than zero indicate that the treatment is having an effect (in other words the features under specific treatments are in better condition than the control), while values less than zero suggest the reverse (in other words that the features under specific treatments are not in as good condition as the control).**

3.25 This is an approach that could be applied to future counterfactual data on the condition of landscape features.

An approach to Public Engagement

3.26 The final method is that of public engagement to assess how communities recognise and value landscape character and the landscape elements that chosen ES options seek to maintain and enhance. This enables the views of local citizens to inform the results of monitoring (and to help shape the future of their landscape). This reflects the principles of engagement promoted by the European Landscape Convention and the ecosystems approach.

3.27 A review of methods and research was carried out at the outset to inform the development of a methodology to consider the way local communities perceive their local landscapes and changes occurring within it. The review provided evidence that less heavily text based approaches, would be preferable to enable people to understand and engage with the approach. It also became clear that a choice experiment approach could yield appropriate results and therefore the methodology combined these two elements.

3.28 The first stage of the consultation method asks whether the participant knows the landscape through living, working or visiting the area. Participants were then asked to identify which

landscape features they felt were important to landscape character, based on 18 different categories that reflected the range of ES options. Participants were asked to judge whether these elements were getting better, staying the same or getting worse. Participants were asked to allocate funding resources for future management to each of the 18 categories. A final stage collected information about attitudes to landscape and demographic information.

3.29 The public engagement was carried out via a voluntary online survey advertised in six of the Study Areas used for the field monitoring. Local groups and businesses including parish magazines, parish halls, community groups (WI, toddler groups, heritage groups etc.), pubs, cafes and local shops, were informed about the survey and asked to advertise the survey to others in their community or display a poster. A small price drawer was offered as an incentive to participate.

3.30 It had been intended that the on-line survey would be followed by focus groups in two of the six Study Areas to explored perceptions of change in the agricultural landscape in more depth and test the results of the online consultation. These were to have followed an information exchange approach where participants were provided with information about their local landscapes in exchange for them providing their views and perceptions. on landscape change. Approaches used in the focus groups would have included Group Mapping Techniques and Mind Mapping followed by group feedback and discussion (**Appendix 4**).

3.31 Despite the considerable effort expended in promoting the survey there was a very low response rate. For this reason there were insufficient participants to make up the two focus groups. To supplement the online survey, therefore, a street survey was carried out in the Dark Peak to expand the results for this study and test an alternative approach to information gathering.

3.32 The reasons for the very low response rate are likely to be two-fold, First, previous experience suggests it is easier to engage people if particular issues of change are affecting the landscape – a proposed development or designation or participation in a local project aimed at conserving / enhancing the landscape. As part of BD5303 it was not possible to give any assurance that the responses would affect the future of a local landscape, which gave little incentive to participate beyond the modest prize draw. Second, the majority of those responding were over 51, with those in the 61-70 category having the highest representation. This suggests that there may be issues of access to / familiarity with the internet or unwillingness to share information on-line.

3.33 It is evident, by comparing the results of the on-line survey with those of the street survey, that the results of street surveys can be strongly influenced by the location of the surveyor and this will need to be given careful consideration in future surveys In the Dark Peak those responding to the street survey placed a much greater emphasis on access[5] as a priority for future management – this is likely to be explained by the location of a surveyor close to a car park attracting walkers that had just completed their walk, access would have been prominent in their minds at this time. Conversely, while access was still a priority for those responding to the online survey, priorities were much more evenly distributed across a range of landscape features, It was also suggested by respondents that access was easier to consider as it was something that they have more direct interactions with.

[5] The ability to access the countryside is an aspect that has not been considered in the remainder of this study, which has focused solely on the landscape effects of ES.

4 Findings from the field work at the Study Area Level

4.1 This and the next Chapter draw together the main findings from all the different aspects of the BD5303 study and other directly linked work. This Chapter focuses on what has been learnt from the field work, adopting the BD5303 field survey methodology set out in the previous Chapter. It focuses on:

- The contribution of different ES options to maintaining and enhancing landscape character and quality.
- What the counterfactuals (which draw on the field work findings) tell us about the performance of different ES option types.
- The landscape effects of the co-location and proximity of options.
- Observations on **ELS** and **HLS** agreements.

4.2 This Chapter is about how ES works on the ground for landscape. But at this level of investigation it cannot comment on the overall balance of ES uptake and the effects of this at the strategic level on landscape character and quality. This is picked up in the next Chapter which summarises the effects of ES at the strategic level, reporting on the assessment at the NCA and ALT levels, using digital data.

4.3 This study has confirmed that field work at the local level (unless there is very significant coverage) cannot act as a surrogate for assessing the landscape impacts of ES at the NCA level – for which an NCA-wide assessment is required. Equally landscape effects of single NCAs cannot act as a surrogate for the landscape effects of ES at the scale of whole ALTs. This reflects that landscapes vary considerably within an NCA and between the NCAs of individual ALTs. ES uptake patterns also vary at each of these scales. This underlines that separate assessments are required at each scale in the spatial hierarchy. Nevertheless, the field survey findings on the **landscape effects of individual ES options** and option groups has proved critical in informing **all l**evels of assessment.

The landscape contribution of different ES options

ES options that benefit the landscape

4.4 The field work and wider observations during this study have confirmed that the majority of ES options **BENEFIT** the landscape. This especially relates to those ES options that:

1. **Conserve, restore and recreate key landscape characteristics / elements** that contribute to landscape character in nearly all the landscapes in which they are found. These are options for (HLS options in bold to enable quick comparison between ELS and HLS):

   Woodland and trees

   - Maintenance of woodlands and woodland edges (EC3-EC4, UC5-UC22, **HC7, HC11**) and restoration (**HC8**)
   - Creation of woodland (**HC9-HC10**)
   - Management of hedgerow (EC23-EC25) and field trees (EC1-EC2, **HC5-HC6**)
   - Management, restoration and creation of wood pasture and parkland (**HC12–HC14**)

- Management of successional areas and scrub (**HC15–HC17**)
- Management, restoration and creation of traditional orchards (**HC18-HC21**)

Boundary features

- Management of hedgerows (EB1–EB3, EB8-EB10, **HB11-HB12**) and restoration (EB14)
- Management of ditches(EB6-EB7, **HB14**)
- Management of stone-faced hedgebanks (EB4-EB5,UB4-UB5)) and restoration in SDAs (UB15) and earth banks (EB12-EB13, UB12-UB13) and restoration in SDAs (UB16)
- Protection and maintenance of stone walls (EB11, UB11) and restoration (in SDAs) (UB17).

Historic environment

- Management of archaeology on grassland (ED4-ED5)
- Maintain visibility of archaeological features on moorland (UD13)
- Management of archaeology on arable (where the feature is evident) (ED2-ED3, **HD6-HD7**)
- Retention of traditional farm buildings (ED1, UD12)
- Maintenance of designed/engineered water bodies (**HD9**)
- Maintenance of ponds (**HQ1-HQ2**)

Species-rich and wet grasslands

- Maintenance, restoration and creation of species-rich semi-natural grassland (**HK6-HK8, HR1**)
- Maintenance, restoration and creation of permanent grassland with a diversity of species (**HK15-HK17, HR1**)
- Hay making (UL20, **HK18**)
- Management of rush pastures (EK4, EL4)
- Maintenance, restoration and creation of wet grasslands (for waders & wildfowl) (**HK9-HK14, HK19, HQ13, HR1**)
- Maintenance of traditional water meadows (**HD10-HD11, HK19, HQ13, HR1**)

Wetlands

- Maintenance, restoration and creation of reed beds (**HQ3-HQ5, HQ11-HQ12**)
- Maintenance, restoration and creation of fen (**HQ6-HQ8, HQ11-HQ12**)
- Maintenance and restoration of lowland raised bog (**HQ9-HQ10, HQ11-HQ12**)
- Winter livestock removal next to streams, rivers and lakes (UJ12)

Lowland heathland

- Maintenance, restoration and creation of lowland heathland (**HO1-HO5, HR1**)

Coastal habitats

- Maintenance, restoration and creation of vegetated shingle and sand dune habitats (**HP1-HP4**)
- Maintenance and restoration of salt marsh (**HP5-HP6**)
- Creation of inter-tidal and saline habitat (**HP7-HP9**)

Management of moorland

- Maintenance and restoration of moorland (**HL9-HL10, HL12, HL13, HL15**)
- Creation of upland heathland (**HL11**)
- Management of rough grazing (uplands) (EL5-EL6, UL22-UL23, **HL7-HL8**)
- Cattle grazing on upland grassland / moorland (UL18).

(Many of the option groups named above are repeated in different combinations in terms of positive landscape effects identified below. These options are not itemised each time, although new option groups, when mentioned, are identified).

4.5 It is equally evident that ES options **BENEFIT** the landscape where they:

2. **Highlight landscape scale and pattern**. This relates to options that restore, conserve and maintain all types of **traditional field boundary**, including the re-creation of field boundaries on original footprints, and the management of **trees** and **woodlands** (see relevant options above) to help restore and reinforce characteristic landscape scale and pattern. In large-scale landscapes characterised by large rectilinear fields, the addition of field margin options (**buffer strips** and **conservation headlands**) can help strengthen field layout and shape if they are created in a regular and consistent arrangement following field boundaries. Where located next to hedgerows, ditches and woodland edges and follow their full length, they can help accentuate the presence of these boundary features in the landscape. Use of these field margin options works less well in landscapes with small irregular fields and can result in a negative impact on landscape character (see 10 below). In large-scale landscapes field edge options that are particularly beneficial are:
   - Wide buffer strip options in arable (EE2-EE3, EE8-EE10, EE12, EJ9, **HE10**)
   - Seed mixes (where these are located as strips adjacent to the field edge, ideally for its full length – see 9 below) (EF2, EF4)
   - Cereal headlands and arable margins (EF9-EF11,**HF14**)

3. **Conserve or re-introduce traditional land use patterns, colours and textures into the landscape**. This will include maintaining and creating more **floristically diverse permanent grassland** as opposed to short term grass leys (as in the options for **species-rich and wet grassland** and **rough grasslands in the uplands** identified above), as well as **fens, lowland raised bogs** and **upland and lowland heathlands**. It will also include re-enforcing land-use and visual diversity through the seasons (as in options that bring seasonal flooding to wetland areas, encourage **hay cutting**, as identified above, or that retain **stubbles** through the winter).
   - Retention of winter stubbles (EF6, EF15, EF22, EG4, **HG5**)

4. **Help reinforce local distinctiveness and sense of place.** In particular, this is concerned with conserving, restoring and recreating landscape features that are especially distinctive in a locality (such as a certain **style of wall** construction or hedge laying; characteristic **stone stiles** or gates; **water meadows**; **ponds and other water features**; **traditional orchards**; **hay making** or **habitats with a particular association with the locality**, such as the reed beds of lowland raised bogs, or indeed the **ancient trees of estate and parkland**. It will also be concerned with **re-introducing traditional breeds into the landscape**, especially where they have a particular association with the locality, such as the use of Devon (Ruby Red) cattle in the West Country and the use of **native pony breeds** in conservation grazing.
   - Grazing supplement native breeds at risk (HR2)
   - A wide range of Capital items (such as **TSG** Welded steel tree guard, **TS1/TS2** Tree pollarding, **HTB** Restoration of historic buildings, **LSP** Stone gatepost, **LS** Ladder stile)

5. **Conserve, restore and help reveal historic features** (**that will also often be identified as key characteristics of the landscape in their own right**)**.** This will

include **historic earthworks** on ridgelines, **historic farm buildings**, traditional **orchards,** old **water meadow** systems, **ancient wood pasture**, and **historic parkland** landscapes (using options that support the historic environment and restore traditional features such as parkland and parkland trees).

6. **Conserve or re-introduce the traditional 'functions' of the landscape.** This will include the shallow flooding of winter washlands with rivers working in continuity with their floodplains and with floodplain areas brought back under permanent grassland cover and / or other traditional wetland habitats (as in a number of **wet grassland** and **wetland** options).
7. **Help retain and frame locally important views from publically accessible places**, or conversely filter and screen views to adverse features in the landscape. This role is more traditionally associated with woodland planting under the England Woodland Grant Scheme but may also be associated with ES options that help manage appropriate vegetation features such as **boundaries** and **scrub,** and especially trees and **woodland**.

ES options that can detract from the landscape in the wrong location

4.6 The field work also identified that there are some ES options that may **DETRACT** from the landscape where they are inappropriately located. In particular, where they:

8. **Cause visual intrusion through the creation of new uncharacteristic and discordant features or features insensitively sited.** For example where fence lines run across the skyline or follow a woodland perimeter creating a new hard line rather than being set back 1-2 metres into the woodland edge, or where new un-screened car parking is provided. These options include:
   - Option for woodland fences (EC4)
   - Maintenance of water course fencing (HJ11)
   - Beetle Banks (EF7)
   - Capital items for fencing in association with conservation work
   - Capital item for hard standing for car parking

9. **Disrupt the established field pattern.** This particularly relates to arable options that create new edge of field or in-field blocks or strips of grassland / seed mixes un-associated with the field boundary that disrupt the 'flow' of arable cultivation and can appear incongruous in an established field pattern. This will include very wide margins that do not extend the full length of the field boundary. Particularly noticeable are infield blocks and plots that can create an 'Advent Calendar' appearance when viewed from across a valley or on a hillside. Also evident are field corners introduced as large rectilinear blocks, These options include:
   - Management of field corners (EF1)
   - Options for plots and blocks within arable cultivation (EF2, EF4, EF8, EF13 **HF12, HF20**)

10. **Detract from the established field pattern.** This particularly relates to the use of wide buffer strips or conservation headlands where fields are small and irregular in shape. In these circumstances wide field margins can create 'stripes' in the landscape which detract from the established field pattern. This may be particularly evident where fields are on a slope, accentuating the visibility of the 'stripes'. These stripes may be further

accentuated where field margin options are located adjacent to each other, as recommended in the ES Handbooks for some options:

- Wide buffer strip options in arable (EE2-EE3, EE9-EE10, EE12, EJ9, **HE10**, EF9-11)

ES options that are largely invisible or neutral in the landscape

4.7 There are also a number of options that are largely invisible within the landscape and therefore their effect is **NEUTRAL** on landscape character and quality. These are:

- Buffer strips in grassland (EE4 – EE7). Supplementary feeding for birds (EF23, EK20, EK21,**HF24**)
- Options to protect soil and water (EG1, EJ2, EJ5, EJ10, EJ13, **HJ6)**

Missed opportunities

4.8 Finally there are a number of significant options that it is evident from the field survey work are missed opportunities for the landscape. These especially relate to grassland options but also to a range of boundary options.

Grassland options

4.9 There are three ELS grassland options that, as we will see in the next Chapter, have very high levels of uptake nationally. These are EK2 and EK3 (grasslands with low and very low inputs) and EK5 (mixed stocking). From the field survey it is evident that these options are clearly beneficial for the landscape where helping to conserve (a) areas of unimproved and semi-improved permanent pasture - these will be a key landscape characteristic in nearly all landscapes where they are found; and (b) retaining areas of permanent pasture more generally in intensive arable landscapes, where permanent pasture is increasingly rare.

4.10 The field work noted, however, that EK2/3 and EK5 are not infrequently located on improved permanent pasture of no intrinsic interest in pastoral and mixed landscapes where there is not strong pressure for conversion to arable. This is a missed opportunity in that the basic impact of these options of retaining grassland is not providing significant benefit. Whereas when applied to characteristic areas of unimproved or semi-improved grassland they are maintaining features that are more especially significant to the area's landscape character or where they are retaining pasture in areas where there is pressure to convert to arable. They were noted in a number of instances as applied to pony paddocks.

4.11 A further observation is that there are no ELS options, other than for the management of rush pasture (EK4/EL4), that are specifically focused on **wet or floodplain grasslands**. These are important landscape features. These could be covered by EK2/3 ideally co-located with EK5 but this cannot be achieved without purposeful targeting. These and the findings above, suggest the need for some form of targeting of these options that otherwise appear to be often used as 'default' options that are selected by ES applicants regardless of the character of the local landscape.

Boundary features

4.12 In the case of boundary features, these ES options are noted as supporting one of the most important set of options for landscape – with boundary features helping define the scale and structure of the landscape. Boundary features are identified as key landscape characteristics in nearly all cases where they are present.

4.13 At the time of undertaking the field work, however, there were no ELS options for the restoration of boundary features outside the SDAs. Within the SDAs there were options for

hedgerow restoration (UB14), stone-faced hedgebank restoration (UB15), earth bank restoration (UB16), and stonewall restoration (UB17). The lack of these restoration options outside the SDAs was noticeable, with hedgerows in arable landscapes under hedgerow management options (EB1-EB3), often appearing very gappy and in need of significant gapping up and thickening / laying. Equally some wall lengths under EB11 (wall management) were in need of restoration.

4.14 The addition of option EB14 Hedgerow restoration in 2013, applicable to all areas therefore is valuable in filling this clear gap but it would be beneficial if similar options were extended to all the boundary types outside the uplands, including stone walls which are highly characteristic of limestone Wolds, and ditches. Again targeting would help ensure that such options are used in the most beneficial locations. It is also evident that there are no specific options for lines of trees.

Evidence from the counterfactuals

Linear features

4.15 Observations during the field survey suggested that in under half of the Study Areas, hedgerows, ditches and walls were of the same condition whether in or out of option. Where of the same condition, there appeared to be two reasons for this:

- Some lengths of hedgerow, wall and ditch were in poor condition at the time they were entered into the scheme – many ditches were dry.
- In the case of hedgerows and ditches, lengths in and out of option appeared to be being managed in the same way, suggesting that potentially the ELS standard of management was now being applied across the whole holding and not just those lengths under option.

4.16 On balance, though, the counterfactual analysis concluded that the condition of linear features will usually benefit from being under an agri-environment scheme option, especially in the case of walls, and to a lesser extent, hedgerows. The counterfactual also indicated that walls and hedgerows that had been under continuous conservation management under a classic scheme and then under ES option where generally in better condition than those that had been under ES option alone. This is consistent with the field observations and generally supports the observations on missed opportunities made above, with the classic schemes having greater emphasis on restoration.

Area features

Low input grasslands (EK2/ EK3 and EL2 / EL3 and Mixed grazing options (EK5)

4.17 From the counterfactual analysis it was also concluded that for area features, positive effects appear to exist for broadleaved woodlands, improved grassland, and unimproved or semi-improved grassland under agri-environment option.

4.18 Of interest here are the conclusions reached on grasslands, and particularly the use of the low input grassland options and the mixed stocking option EK5. As already noted, these two groups of option cover very significant areas of the total ES uptake by area.

4.19 Yet the field survey data suggested that these options are sometimes being applied to areas of improved grassland, potentially explaining the ‘good’ condition of areas of improved grassland under ES, as identified through the counterfactual analysis.

4.20 Of particular note, is the conclusion from the counterfactual analysis that areas of unimproved and semi-improved grassland appear to be in better condition under ES option than areas that are not. These are likely to include not only areas of unimproved grassland under HLS options but also areas of semi-improved grasslands under the ELS options EK2/3, EL2/3 and EK5. Here these ELS options have the potential to 'punch well above their weight' in terms of landscape (and biodiversity) conservation.

4.21 So overall, the key issue to emerge from these analyses is that it is critical where ELS options are applied, if their landscape benefits are to be maximised. This clearly also relates to HLS but as these options are applied under the guidance of ES officers there is a much greater opportunity to ensure that they are located in the right place.

The co-location of ES options

4.22 Overall, the field survey confirmed that co-located options bring benefits that are greater than a single ES option in isolation, allowing the tailoring of options to meet specific circumstances. This particularly relates to the co-location of HLS options. It also relates to the co-location of ELS with HLS options, which were identified as nearly always being beneficial for the landscape, focusing on conserving/ enhancing important landscape features, such as the co-location of HC12 Maintenance of wood pasture and parkland with EK3 Permanent grassland with very low inputs and TS2 Tree surgery.

4.23 Some co-located ELS options may also be beneficial, such as the co-location of EL2 Permanent grassland with low inputs in SDAs with UL20 Haymaking, which is helping conserve important upland hay meadows; or the co-location of EK2 Permanent grassland with low inputs with EK5 Mixed stocking which is being used to conserve an area of ridge and furrow. Nevertheless, there were several sites in different parts of the country where EK2/3 Permanent grassland with low inputs were co-located with EK5 Mixed stocking on improved grassland grazed by ponies.

4.24 The conclusion therefore is that co-location of options can be very helpful in meeting specific objectives but that co-location will not make up for the poor location or implementation of ES (especially ELS) options.

Proximity and clustering of options

4.25 As part of the field surveys, specific questions were also asked about the proximity of options and whether there was specific landscape benefit if certain options were placed immediately adjacent to each other or in close proximity. On the whole, the combined effect of nearby options was generally noted as positive, further enhancing the landscape impacts of the scheme.

1. Adjacent HC8 (Restoration of woodland) and HF4 (Nectar flower mixture)

2. Adjacent EB6 (ditch management), EE2 (4m buffer strip) & EE3 (6m buffer strip)

4.26 A good example of the combined effect of adjacent options is shown above (1. from an HLS agreement in the Leighton Bromswold Study Area – Bedfordshire and Cambridgeshire Claylands NCA). This shows the edge of a restored woodland (HC8) merging into a strip of nectar flower mixture (HC4[6]). Combined together they provide a semi-natural character to the field edge in an otherwise intensive arable landscape. In large arable fields the beneficial effects of locating different border options side by side along the field edge (such as a wide grass buffer strip and an adjacent strip of nectar flower mix) were highlighted in helping strengthen overall field pattern.

4.27 A similar example was provided in another Leighton Bromswold square (2.). This shows the combined positive effect of a ditch managed under option EB6 and adjacent four metre and six metre buffer strips (EE2 & EE3). By locating these buffer strips adjacent to the ditch, the presence of the ditch becomes evident and the chequer-board pattern of fields is revealed strengthening the structure of the landscape. This combination of options also has the benefit of creating a more natural corridor within the arable landscape.

4.28 Nevertheless, while the use of wide margins can be very successful in large-scale arable landscapes it may detract from small-scale landscapes, especially where fields have an irregular pattern, as identified earlier. This underlines that the location of options is critical to their success.

4.29 The field surveys also underlined other option combinations that in close proximity bring enhanced benefits. These include the location of semi-natural habitats (say under HK6/7/or 8) adjacent to woodland edges under management or the management of semi-improved grasslands with very low inputs (EK3) and mixed stocking (EK5) in small scale landscapes in areas where hedgerows are under enhanced hedgerow management (EB3).

4.30 The field surveys identified the benefit of having clusters of options in the landscape either conserving areas forming a rich habitat/landscape mosaic or creating them as focal points of interest in the landscape. As one example, a collection of options in a mixed farm landscape offered a combination of HD5 Management of archaeological sites on grassland (in this case managing an area of strip lynchets), EK3/HK3 Permanent grassland with very low inputs, HK7 Restoration of species-rich, semi-natural grassland, HK16 Restoration of grassland for target features, and HC20 restoration of orchards, together helping conserve the traditional character of this landscape.

[6] At the time of survey (post flowering) the nectar flower mix had the appearance of a grass buffer strip

4.31 Equally, within a Devon coastal combe stretching inland from the coast, a rich mosaic of semi-natural habitats of maritime grassland, heath and scrub was being conserved through a combination of HK7 Restoration of species-rich, semi-natural grassland, HK18 Haymaking, HC15 Maintenance of successional areas and scrub, and a series of options relating to the Management, Restoration and Creation of lowland heathland (HO1, HO2, HO4). In both these cases, HLS is making a clear response to the key characteristics of these two different landscapes, and conserving important habitat / landscape mosaics.

Dispersal or grouping of ES options

4.32 This leaves the question, what is best for the landscape: the concentration or dispersal of ES options? The field surveys suggest both, depending on the types of option and the needs of the landscape.

4.33 **Dispersal of options**: There are some options, particularly boundary feature and buffer strip options that are best dispersed across the landscape. There are two reasons for this. Firstly, certainly in the case of hedgerow management and buffer strips, the field surveys suggest that if conservation management of hedgerows (or buffer strips) is being followed on one part of a farm (under ES) the same management approach may be adopted on the remainder of the farm, perhaps because it is difficult to have different management regimes in different areas. Secondly, the boundary patterns formed by hedgerows (and other boundary features) and buffer strips define the scale and structure of the field pattern which is a central part of the English landscape. It is beneficial therefore if this is seen across the landscape rather than in isolated pockets. The same might also be said for options for field and hedgerow trees and archaeological and other cultural heritage features where the resource again tends to be scattered across the landscape, although there will be areas of particular concentration.

4.34 Within this dispersed pattern of distribution, however, there would be significant benefit in greater targeting of those boundary options that help restore and strengthen these features, as in the new ELS option EB14 and the HLS option HB11,and the targeting of wall, stone-faced hedgebank, and earth bank restoration options (UB17, UB15 & UB16 respectively).

4.35 **Grouping/concentration of options**: As illustrated above (paras 4.30 – 4.31), there are clear benefits in the clustering of some options, particularly those that conserve, restore and create semi-natural habitat mosaics. These will also bring strong landscape benefits if these habitats are restored and created in locations where they are traditionally found. The benefits from a concentration of options will also be felt where they are aiding parkland restoration or responding to a concentration of archaeological sites. Of course these landscape features are also important in their own right and often influence the landscape character of the wider landscape around them.

4.36 There is then a third category that was very well illustrated in the ESAs but has yet to be fully captured under ES. This is the creation of **swathes** or **zones** of improved conservation management. This reflects the Lawton Review's[7] call for large-scale habitat restoration and recreation. This is being achieved through ES in the uplands and on lowland heaths where large tracts have been brought under ES conservation management but it is less evident across the farmed landscape. From the landscape perspective this focus on zones

[7] Making Space for Nature: A review of England's Wildlife Sites and Ecological Network (2010) Chaired by Professor Sir John Lawton CBE FRS

particularly relates to the use of ELS grassland options. It has been noted above that options EK2 /3 and also EK5 are not always located where they will bring landscape benefit and yet they have very significant uptake levels, the benefits of which need to be realised.

4.37 As illustrated by the ESAs, the targeting of options within particular areas or zones can result in whole areas (such as the valley floor of the Test Valley ESA) becoming a continuous ribbon of habitats and low or at least lower input grasslands. Thus grassland options in combination with other options could help accentuate topographical features or areas traditionally under low input grasslands as in: river valleys and floodplains; levels (as in the Somerset Levels); coastal grasslands; scarp slopes; and other steep slopes such as steep valley sides including areas susceptible to soil erosion where permanent pasture is being lost. In these locations some of the grasslands under ELS options may well be improved but here they help provide a buffer around and a visual and functional link between areas of more natural grassland (rather than the more random non-linking improved grasslands under ELS that were noted in the field survey). Targeted at topographical zones these grasslands could also perform an important resource protection function.

4.38 The real benefits for the landscape will be realised where a zonal approach is adopted in conjunction with, for example, dispersed boundary and tree options (across the landscape), potentially combined with very specific groupings/clusters within defined zones. This describes a landscape-scale and integrated approach to targeting.

ELS and HLS agreements

4.39 Looking at the nature of agreements, the field survey has identified that, for the landscape:

1. ELS agreements can be broadly characterised as having a limited range of common options applied to a wide range of circumstances, while HLS is characterised by a wider range of specific options that are tailored to individual localities.
2. Many ELS agreements visited during the field survey had signed up to less than half a dozen options, sometimes just two. Even in more complex landscapes, it was common to find the use of limited options, with a single option often applied across multiple fields or features, even if there were other options that could have delivered greater landscape benefit in these different situations.
3. Other than HLS options for the protection of soil and water, which are generally neutral in their landscape effects, HLS options generally benefit the landscape by conserving and recreating valued landscape characteristics, including important habitats. The involvement of an advisor in tailoring the agreement to suit these needs is apparent in the design of such schemes (and choice of options).
4. Where the choice of ELS options is limited by the intensive nature of farming, there may be a case for encouraging the combined effects of options located close to one another – which can be very effective in enhancing landscape character and quality
5. ELS options that are problematic in the landscape (such as arable plots) remain problematic for the landscape if included in HLS agreements (identified with the replacement of the E prefix with H).
6. ELS options that are co-located with HLS options will usually be beneficial for the landscape - focused on conserving/ enhancing important landscape features.

4.40 It appears, therefore, that the full landscape benefits of ELS are not always being achieved. Greater benefits for the landscape might be achieved if (a) there was more careful selection of options, reflecting local landscape character; and (b) there was some form of landscape character focused advice/targeting to ensure that each option is applied in the optimal location.

4.41 Although an over simplification, the priority for the landscape within pastoral and mixed farming areas is to conserve and restore valued landscape features such as hedgerows, hedgebanks and other boundary features, small farm woodlands and trees, and semi-natural habitats. In intensive arable landscapes the emphasis needs to be on enhancing the landscape by reintroducing or reinforcing landscape structure and diversity, for example, through the use of wide buffer strips to strengthen field boundaries and through the reintroduction of semi-natural habitats and areas of wetland habitat to create localised areas of diversity and interest. These can then be linked by appropriate corridors, as in hedgerows and wide buffer strips and linked grasslands, as part of wider objectives for Biodiversity, following the Lawton Review. In all these decisions though, location of options in keeping with landscape character, is critical.

Public Engagement

4.42 Finally, we turn to the responses from the consultation as this can tell us what people value in the landscape and on what they would like to see agri-environment money spent on in the future. As part of BD5303 the response received to the consultation was very low so it is not possible to make statistically robust judgement of the views of local communities in the Study Areas. However, some observations can be made about the results when considering all the combined responses across all of the Study Areas, numbering 43 responses.

4.43 All landscape features are valued as important by some respondents. A large proportion of respondents identified field boundaries, access, woodland, grassland, historic environment, field trees and water features as important features of the landscape. This reflects the ubiquity of these features across the agricultural landscape and their role in shaping the landscape (para 4.4) as well as the value that people place on them (**Figure 4.1**).

4.44 When asked to judge whether landscape features were ‘getting better’, ‘staying the same’ or ‘getting worse’ in their condition, the majority of respondents judged the condition of landscape features to be ‘staying the same. When considering the combined response for all landscape features, 59% of responses were in this category, while only 24% were in the category ‘getting better’ and 18% in the category ‘getting worse’. This suggests that most people believe that the agricultural landscape is relatively stable. But this element of questioning proved particularly challenging for people and so these conclusions are not robust.

4.45 When asked which features they would allocate most resources to for future management, the highest proportion of resources was allocated to access. Although access is an extremely important aspect of the way in which people relate to landscape, it does not represent a landscape feature as such. Excluding access (which has not been considered in other aspects of this study), the features that respondents allocated most resources to were woodland (14%), field margins (10%), with grasslands (9%), historic environment

(9%), species conservation (9%), and field trees and field boundaries at 8% each (**Figure 4.2**).

Figure 4.1: Percentage of all respondents that value different landscape features (n=43).

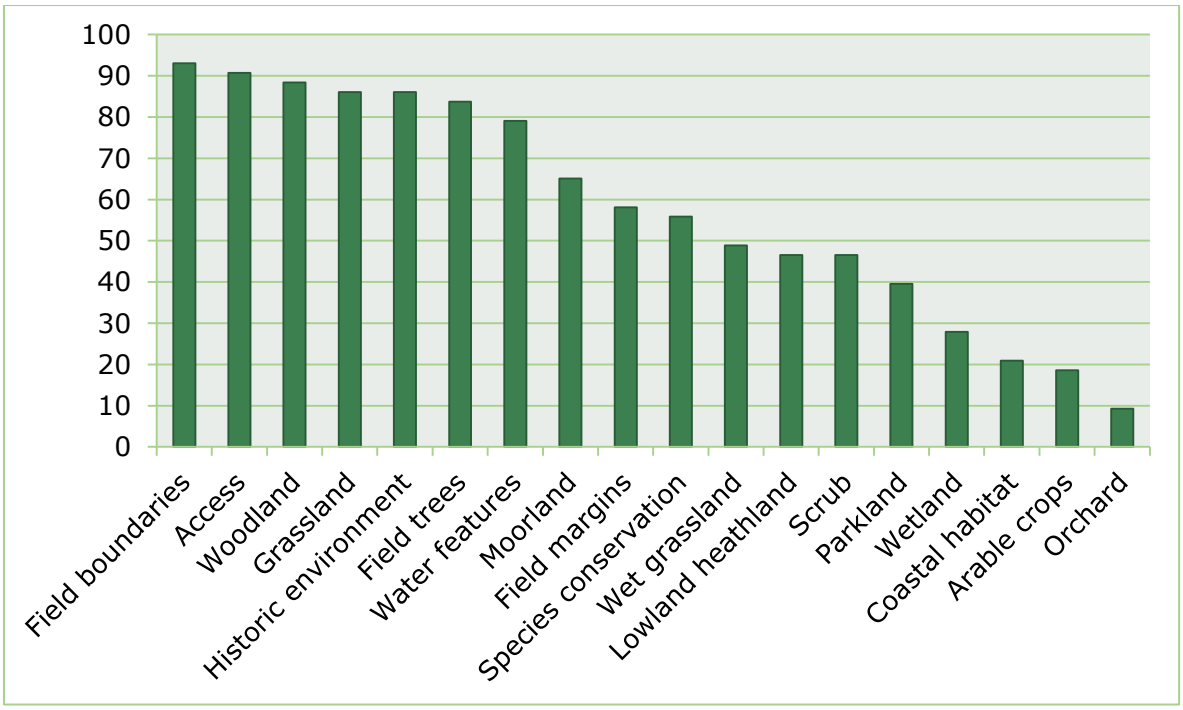


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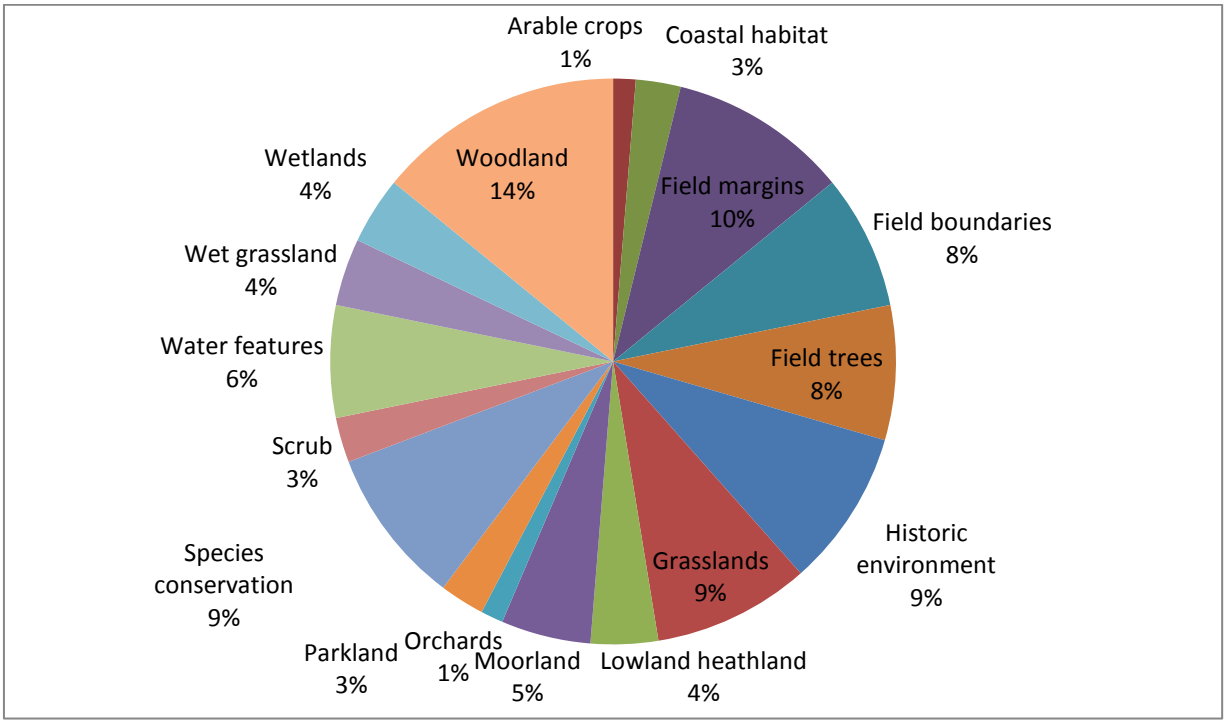
Figure 4.2: Percentage of total resources that respondents would allocate to different features, excluding access (n=43)



5 Findings from assessment at the NCA and ALT levels

5.1 This Chapter draws together the findings from the NCA and ALT levels, especially looking at the overall balance of ES uptake and the effects of this at the strategic level on landscape character and quality. It focuses on the analysis of digital data and looks at:

- The overall levels of ES uptake by option and by option bundles.
- The landscape performance of particular options.
- The landscape effects of ES uptake on individual NCAs and ALTs.
- The balance between ELS (UELS) and HLS options.

ES uptake

5.2 As part of this study an analysis has been made of the top 20 options by area of uptake in each ALT (using 2013 uptake data) and the top 10 options by length of uptake in each ALT. This assessment has then been repeated for the top 20 option bundles by area and the top 10 option bundles by length (i.e. groupings of ES options with the same landscape outcome).

Analysis of top 20 options by area of uptake

5.3 On average the top 20 ES options by area of uptake make up 80% of all ES uptake by area in each ALT, ranging from 69% in the Eastern Arable ALT to 92% in the Uplands, with the top five options by area typically making up over 50% of all ES uptake by area in each ALT. In other words a very few options make up the primary ES 'palette' in each ALT. These top 5 options by ALT are:

- **Chalk and Limestone Mixed ALT**: EK2 Low Input Grassland (17%); EK3 Very Low Input Grassland (11%); EF6 Overwintering stubbles (7%); HK7 Restoration of species-rich grassland (6%); EK5 Mixed Stocking (5%) – **46%** of all uptake by area
- **Eastern Arable ALT**: EK2 Low Input Grassland (13%); EK3 Very Low Input Grassland (10%); EF6 Overwintering stubbles (6%); **HK15** Maintenance of grassland for target features (5%); EF1 Management of Field Corners (5%) - **39%** of all uptake by area
- **South East Mixed ALT: HO2** Restoration of Lowland Heathland (16%); EK2 Low Input Grassland (13%); EK3 Very Low Input Grassland (10%); **HC13** Restoration of Wood Pasture and Parkland (5%); **HK15** Maintenance of Grassland for Target Features – **49%** of all uptake by area
- **Western Mixed ALT:** EK2 Low Input Grassland (25%); EK5 Mixed Stocking (11%); EK3 Very Low Input Grassland (9%); **HR1** Cattle Grazing Supplement (4%) ; ED5 Management of Archaeological Features on Grassland (4%) – **53%** of all uptake by area
- **Upland Fringe ALT:** : EK2 Low Input Grassland (18%); EK5 Mixed Stocking (13%); UL18 Cattle Grazing on Moorland and Grassland (9%); EL2 Low Input Grassland (in SDAs)(8%); EL6 Unenclosed Moorland Rough Grazing (6%) – **54%** of all uptake by area
- **Upland ALT:** EL6 Unenclosed Moorland Rough Grazing (20%); **HL10** Restoration of Moorland (17%); UL18 Cattle Grazing on Moorland and Grassland (8%); **HL15** Seasonal Livestock

Exclusion Supplement (7%); **HL12** Supplement for the Management of Heather, Gorse and Grass by burning, cutting or swiping (6%) – **58%** of all uptake by area.

5.4 In four out of six of the ALTs, amongst the top 20 options by area, ELS options cover a greater area than HLS options, with ELS options making up between 66% and 69% of the top 20 options by area. But in two of the ALTs (South East Mixed (Wooded) and the Uplands), HLS options dominate in terms of area covered. This reflects the heavy emphasis on Lowland Heathland Restoration with option HO2 making up 16% of the total area of uptake in the South East Mixed ALT. Here there is also a notable emphasis on restoration of Wood Pasture and Parkland. Equally in the Uplands there has been a very heavy emphasis on Moorland Restoration, with option HL10 making up 17% of the total area of uptake in this ALT.

5.5 Overall, the top 20 options by area for each ALT (ELS +HLS) clearly reflect the differing landscape character of the different ALTs and therefore have the potential to bring significant landscape benefits to the landscape of that ALT, such as the emphasis on maintenance and restoration of grasslands in the Chalk and Limestone ALT and the restoration of wet grasslands in the Eastern Arable ALT, where most of the land has been drained and is now subject to intensive cultivation. Aspects of this top 20 uptake that have the potential to have a strongly positive effect on landscape character include uptake of:

- **HC7** Woodland management and **HC12** Management of parkland in three ALTs (Chalk and Limestone, Eastern Arable and South East Mixed).
- **ED5** Management of Archaeological Features on Grassland with significant uptake across all ALTs.
- **EE3** 6m Grass Buffer Strips in arable, found particularly in the Chalk and Limestone ALT and the Eastern Arable ALT, helping define field pattern in these very large-scale landscapes
- **HK5/7** Maintenance and restoration of species-rich grassland in all ALTs except the Uplands
- **EL6, HL9, HL10, HL12, HL16** Moorland and related options in the Uplands ALT, helping retain moorland character
- **HP5** Maintenance of coastal salt marsh in the Eastern Arable and Western Mixed ALTs
- **HR2** Native breeds at risk grazing supplement in all ALTs except the SE Mixed ALT.

5.6 At the same time, the four ELS options that dominate levels of uptake by area are:

- **EK2 / EK3:** Permanent grasslands with low / very low inputs(covering the largest area of all options in all ALTs except the SE Mixed and Uplands ALTs) and EK5 Mixed Stocking (which has significant uptake in the Western Mixed and Upland ALTs).
- **EF6:** Over-wintering Stubbles (in the arable landscapes) that bring winter texture and colour to arable landscapes.

5.7 The main options falling in the top 20 by area of uptake that could be detrimental to the landscape largely relate to:

- **EFI** Management of Field Corners. This option can, in the wrong location, disrupt the dominant field pattern
- **EE3** use of Wide Buffer Strips in small-scale landscapes – again these can detract from organic small-scale field patterns, as found in parts of the South East of England.

Analysis of top 20 option bundles by area of uptake

5.8 Turning to the top 20 option bundles by area, this gives a more complete picture of ES uptake and landscape effects. Overall the top 20 option bundles by area of uptake cover between 86% (the Eastern Arable ALT) and 98% (the Uplands ALT) of the area of all ES option uptake in each ALT.

5.9 With options EK2 / EK3 and EL2 / EL3 now combined as a single option bundle for Low Input Grassland, this option bundle has the highest level of uptake in ***all*** the ALTs, only slipping to second place in the Uplands ALT, underlining the dominance of these options. In the Western Mixed ALT this bundle makes up 36% of ***all*** ES uptake by area and 34% in the Upland Fringe. This figure falls to 24% in the Eastern Arable ALT where these options have the lowest level of uptake other than in the Uplands.

5.10 The split between ELS, UELS and HLS across the ALTs within these option bundles is shown in **Table 5.1**. This shows that ELS options within the option bundles generally cover a greater area overall compared to HLS except, as noted above, in the South East Mixed where HLS options cover a greater area and the Uplands where ELS/UELS and HLS cover the same area.

5.11 **Table 5.2** then shows the % of total ES uptake in each ALT subdivided by both the type of land cover being affected and the degree of likely landscape impact. This shows the dominance of uptake of :

- grassland options in the Chalk and Limestone, Western Mixed and Upland Fringe ALTs
- arable options in the Chalk and Limestone and Eastern Arable ALTs
- the historic environment in the Chalk and Limestone ALT
- semi-natural habitats in the South East Mixed ALT with its lowland heathland, and in the Upland Fringe and especially the Upland ALTs with their moorland habitats

5.12 All of this is consistent with the landscape character of each of the ALTs.

Table 5.1: Top 20 ES option bundles split between component schemes by % area of uptake

ALT	No. of option bundles with very positive landscape potential	ELS	UELS	HLS	% of total uptake (by area)
Chalk and Limestone Mixed	9	55%	0	37%	92%
Eastern Arable	12	49%	0	37%	86%
South East Mixed (Wooded)	10	34%	0	58%	91%
Western Mixed	11	57%	2%	29%	88%
Upland Fringe	13	61%	11%	22%	98%
Uplands	13	37%	12%	49%	98%

Table 5.2: Analysis of the landscape effects by ALT of the top 20 ES option bundles measured by area of uptake

Land cover type	Landscape effect of ES uptake	ALTs (% of total ES uptake by area)					
		Chalk & Limestone	**Eastern Arable**	**SE Mixed**	**Western mixed**	**Upland Fringe**	**Uplands**
Grassland	Strongly positive landscape effect	1%	7%	7%	4%		
	Positive landscape effect	41%	35%	34%	51%	51%	16%
Arable	Strongly positive landscape effect	4%	11%	1%			
	Positive landscape effect	11%	9%		7%		
	Neutral / negative landscape effect	7%	10%	7%	3%	2%	
Historic environment	Strongly positive landscape effect	10%	3%	6%	7%	7%	2%
	Positive landscape effect	4%					
Woodland/scrub	Strongly positive landscape effect	2%	2%	3%	1%	1%	
	Positive landscape effect	1%					
Semi-natural habitats	Strongly positive landscape effect	14%	8%	29%	15%	34%	79%
	Positive landscape effect			4%	1%	1%	1%
% of total uptake (all area options) (1)		92%	86%	91%	88%	94%	98%

(1) Due to rounding, figures in the table do not always equate to the percentage of total uptake

Analysis of top 10 options and option bundles by length of uptake

5.13 Turning to the linear feature options and option bundles, these are made up almost entirely of ELS options. The only ALT where this ELS contribution falls below 85% of all linear option uptake, is in the Uplands where there is considerable capital (HLS) investment in the restoration of stone walls (which will be particularly beneficial for landscape character and quality).

5.14 These analyses re-emphasise:

- The strongly positive contribution of ELS to the conservation and management of traditional linear features that are such an essential characteristic of the English countryside.
- The dominance of option uptake for hedgerows across all ALTs, with the single exception of the Uplands where hedgerow options fall into second place (behind walls).. In the Chalk and Limestone Mixed ALT and the Western Mixed ALT this option bundle represents over 70% of ***all*** linear uptake. However, the relative proportion of hedgerow uptake does not necessarily reflect those landscapes where hedgerows are a particularly dominant feature, such as in the South East Mixed ALT where thick hedgerows are a defining characteristic yet proportionally ELS hedgerow option uptake is lower than in other ALTs.
- The regional variations in landscape character, with ELS options for hedgebank management concentrated in the Upland Fringe (which includes much of the South West peninsula) and Upland ALTs, and ditch management options more prevalent in the Eastern Arable ALT and the South East Mixed ALT which in the latter case includes significant areas of low lying drained coastal marshes, as in Romney Marsh and the Pevensey Levels.

- A distribution of woodland boundary options that closely reflects woodland distribution more generally (with the highest percentage uptake in the South East Mixed (Wooded) ALT. Overall woodland boundary options (under ELS) are more popular than woodland management options (under HLS).

ES Uptake compared to landscape thresholds

5.15 The summary of uptake above has simply looked at raw ES uptake data. Using the bespoke database (para 3.17 – 3.19), this uptake data has also been looked at within each NCA using the identified landscape thresholds (i.e. the levels at which uptake against existing total stock of that feature is likely to make a discernible difference to the landscape). This analysis is for **all** NCAs and uses 2013 uptake data and gives some revealing results.

Options with highest levels of ES Uptake

5.16 First, looking at two option bundles with the highest levels of ES uptake – Hedgerows and Low input grasslands, two different patterns emerge, as shown in **Figures 5.1 & 5.2**.

5.17 **Hedgerows:** What is immediately evident (**Figure 5.1)** is that the landscape threshold for hedgerow uptake (20% of total stock) is largely met in all ALTs with the exception of the South East Mixed (Wooded) ALT, where it is only met in 26% of NCAs, highlighting a trend that has been noted earlier. It is met in all of the Chalk and Limestone NCAs (other than the Isle of Portland where there is no ES uptake) and in 88% of the Western Mixed NCAs. Even in the Uplands it is met in all but 27% of the NCAs (being associated with areas of valley in-bye land).

5.18 In those NCAs where the threshold is met, only in six NCAs does the percentage of uptake for enhanced hedgerow options (EB3 & HB11) exceed 30% of total hedgerow uptake: this is in the Cheviot Fringe, Durham Magnesian Limestone, North West Norfolk, North Norfolk Coast, Breckland, and Isle of Wight.

5.19 **Low input grasslands:** Looking at **Figure 5.2,** it is evident that the landscape threshold for low input grasslands (20% of total stock of permanent grassland) is not met in the majority of NCAs despite the very high levels of uptake.

5.20 Only in the Uplands ALT does the number of NCAs that meet this threshold exceed 50%. In the two most pastoral lowland landscapes of the South East Mixed and Western Mixed ALTs fewer than 20% of NCAs meet this threshold. Equally in the two ALTs (Chalk and Limestone Mixed and Eastern Arable) where these options perform an important role in conserving permanent grassland in an otherwise arable dominated landscape, the constituent NCAs meet the threshold in 46% and 23% of NCAs respectively. This suggests that to maximise the landscape benefits of these options there would be merit in some form of targeting (see paras 4.17-4.21, 4.36–4.37).

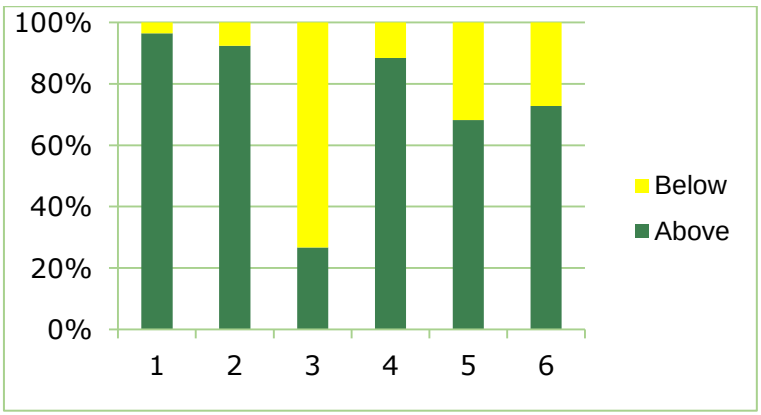


Figure 5.1: Number of NCAs per ALT that meet the landscape threshold for hedgerow options

1: Chalk and Limestone Mixed ALT, 2: Eastern Arable ALT, 3: SE Mixed (Wooded) ALT, 4: Western Mixed, 5: Upland Fringe ALT, 6: Upland ALT

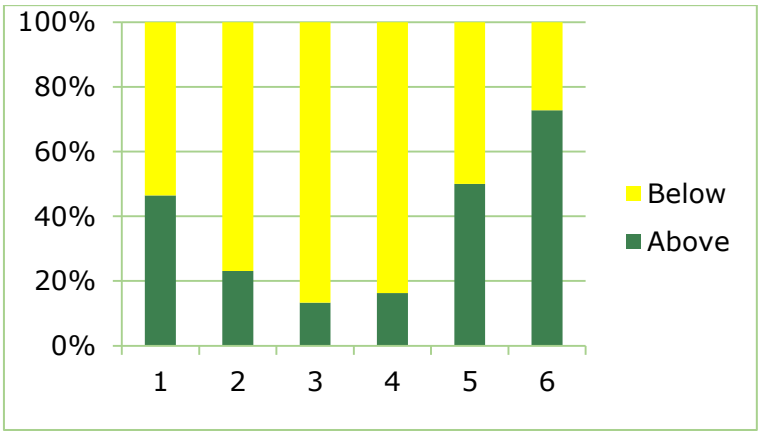


Figure 5.2: Number of NCAs per ALT that meet the landscape threshold for low input grassland options

Options with a mixed pattern of uptake across the NCAs

5.21 **In-field trees**: While not characteristic of all landscapes, field trees are important landscape elements where they are present. From the NCA assessments undertaken under BD5303 and subsequently (total 68 NCAs), it is evident that options for field trees may also have been applied to hedgerow trees[8] – perhaps because hedgerow tree options were not introduced until 2010. Nevertheless, overall levels of uptake for field tree options are generally quite low, achieving the relevant landscape threshold as follows:

- Chalk and Limestone Mixed ALT: in 29% of all NCAs
- Eastern Arable ALT: 11% of NCAs
- South Eastern Mixed (Wooded) ALT: 27% of all NCAs
- Western Mixed ALT: 30% of all NCAs
- Upland Fringe ALT: 27% of all NCAs
- Upland ALT: 32% of all NCAs

5.22 It is quite possible, of course, that this reflects the distribution of field trees in the landscape more generally, for example, as in the open arable landscapes of the Chalk and Limestone and Eastern Arable ALTs where field trees tend to be quite localised. But it is less expected in the South Eastern Mixed, Western Mixed and Upland Fringe ALTs, especially in landscapes such as the New Forest, Dorset Heaths and South Hants Lowlands where field trees are a common characteristic and yet uptake is low.

[8] With NCAs where the key landscape characteristic for trees describes hedgerow trees but the uptake has been for field trees

5.23 It is also evident that the balance of ES option uptake is firmly weighted towards the conservation of trees in pasture as opposed to arable, where trees are arguable under greater threat from damage.

5.24 **Archaeology:** In the NCA assessments (both BD5303 and subsequently) the identification of the stock of archaeological sites has been relatively precise with the areas of Scheduled Monuments and SHINE (Selected Heritage Inventory for Natural England) sites overlaid using GIS on LCM 2007 to identify those archaeological sites on arable and those on grassland. A separate exercise was then undertaken to identify those Scheduled Monuments at Risk on arable.

5.25 What is evident is that looking at the total NCA population, in the majority of NCAs the thresholds are not met for either the management of archaeology on grassland or arable - this is particularly evident in the Eastern Arable ALT where the thresholds are not achieved in any of the NCAs assessed. The highest levels of threshold achievement are in the Chalk and Limestone ALT (21% of NCAs meeting the threshold for both archaeology on grassland and arable) and the South East Mixed ALT (20% of NCAs respectively for both archaeology on grassland and arable) reflecting uptake patterns noted earlier. Yet where these thresholds are met they are more often than not very significantly exceeded with an indicator score in excess of 100% common. This suggests that in these instances local archaeological sites, not included on SHINE, are also being brought under management.

Options with low uptake but for landscape elements that are characteristic across the majority of NCAs

5.26 There are two particularly noticeable groups of ES option that generally have relatively low uptake but cover landscape elements that are highly characteristic of many NCAs: that is option bundles for woodland and hedgerow trees:

5.27 **Woodland:** Deciduous and mixed woodlands are a characteristic of at least parts of nearly all NCAs. Yet uptake of relevant options typically only meets the relevant landscape thresholds in some 18% of NCAs even though these options are in the top 20 option bundles by uptake in most of the NCAs (**Table 5.2**). Achievement of the landscape threshold (5% of the woodland stock brought under management) is particularly low amongst the NCAs in the Eastern Arable ALT. This may be because of the strong influence of the England Woodland Grant Scheme but leaves unmanaged the many small farm woodlands that fall below the EWGS size threshold.

5.28 **Hedgerow trees**: Options for hedgerow tree protection and hedgerow tree establishment are also currently very underused, with these options only introduced in 2010 (although this analysis is based on 2013 uptake data). There is only one NCA out of all 157 (38. Nottinghamshire, Derbyshire and Yorkshire Coalfield) that meets or exceeds the threshold for the Renewal of hedgerow trees (EC23) while none meet the threshold for Protection of hedgerow trees (Options E/O/HC24, EC25.). As already identified, the uptake of options for field trees is more common, although still underutilised.

Other options that benefit the landscape but are poorly utilised

5.29 In addition, across the NCAs there are a range of other options that are often underused, rarely meeting their landscape threshold (where the threshold has been purposefully lowered to try and capture those NCAs where there has been some uptake). These are significant missed opportunities for the landscape and include:

- *Orchards:* Orchard options generally have low levels of uptake even in areas where there was a strong orcharding tradition, as the South East Mixed ALT, with the High Weald, for example, having an uptake of just 18 ha compared to an area of traditional orchards of 466 ha. Equally surprising are very low levels of uptake in Essex and Suffolk, areas also once with a strong orcharding tradition.
- *Parklands:* ES options for both parkland and water features are underused in many landscapes.
- *Specialist options* such as HLS options for lowland haymaking and water meadows, would also benefit the landscape if there were greater uptake.
- *The Coast:* Although there are relatively few coastal options those that there are (relating to low lying coastal areas) are often underused.
- *Overwintering stubbles:* In the large-scale arable landscapes of the Chalk and Limestone and Eastern Arable ALTs it is noticeable that despite high levels of uptake, this is rarely sufficient to meet the landscape threshold.

The landscape effects of ES uptake on individual NCAs and ALTs

Assessment at the NCA level

5.30 So far this analysis has focused on levels of uptake relating to individual features. This section turns to the effects of ES uptake on the overall landscape character of individual NCAs (and ALTs), as above, based on the application of indicators and thresholds. In total 68 NCAs have been assessed in this way: 18 under BD5303 and 50 subsequently using the bespoke database (paras 3.18 – 3.20).

5.31 Overall ES uptake is bringing landscape benefits to the majority of those NCAs assessed. As indicated in **Table 5.3,** out of 68 NCAs assessed, in 11 NCAs (16%) ES is having a **strongly positive** effect on landscape character (primarily in the Uplands and Upland fringe); in 45 NCAs (66%) ES is having a positive effect; and in12 NCAs (18%) it is having a neutral effect. These neutral NCAs are of three types: (a) urban fringe NCAs where mainstream farming and thus ES uptake is limited; (b) very small NCAs where there has been limited/no ES uptake as in the Isle of Portland; and (c) NCAs where some ES options are ill suited to the particular characteristics of the NCA, as in the Quantock Hills.

Table 5.3: Landscape effects of ES uptake at the NCA level

ALT / ALT assessment result	No. of NCAs assessed	NCAs with **strongly positive** landscape effects	NCAs with **positive** landscape effects	NCAs with **neutral** landscape effects
Chalk and limestone mixed	17		16	1
Eastern arable	9	1	8	
South east mixed (wooded)	9		8	1
Western mixed	13	1	6	6
Upland fringe	9	3	3	3
Uplands	11	6	4	1
Totals	68	11	45	12

5.32 It is possible that these results indicate a more positive outcome for the landscape than will emerge when all NCAs have been assessed. This is because the sample of 50 NCAs is skewed towards protected landscapes and areas supporting Nature Improvement Areas (NIAs). Nevertheless, the above results are supported by assessment at the ALT level (para 5.41).

5.33 The assessment approach used helps identify the performance of ES across a range of landscape themes: (a) woodland and trees; (b) field boundaries and boundary patterns; (c) agricultural land uses; (d) traditional buildings; (e) the historic environment; (f) semi-natural habitats and (g) where present, the coast. To be identified as positive or strongly positive for landscape character, ES uptake in an NCA must be meeting or exceeding landscape thresholds across a range of themes. Looking at the NCAs assessed in the different ALTs the following patterns are evident:

5.34 **Chalk and Limestone ALT:** These NCAs are typically characterised as making a strongly positive contribution to the conservation of **semi-natural habitats** – in this case primarily species-rich grasslands and a positive contribution to the conservation of **boundary features** and the strengthening of field pattern through the use of wide buffer strips. Likewise, in the chalkland landscapes of South East England ES uptake is making a strong contribution to the conservation of the **historic environment**. This includes the conservation management of archaeological sites on arable and grassland and the conservation management of parkland.

5.35 **Eastern Arable ALT:** Unlike the Chalk and Limestone ALT, not all NCAs in the intensively farmed Eastern Arable ALT are showing ES uptake for **semi-natural habitats** (including coastal habitats) at levels that have a strongly positive effect on the landscape. The exceptions are the Fens (including coastal salt marsh under option), the Broads and the Suffolk Coast and Heaths. Thresholds for **field boundaries** are met (although often starting from a low base in terms of remaining stock). Conversely, in some of the NCAs uptake of **tree and woodland** options is low relative to stock, although thresholds are met in the Fens, Vale of York, Cambridgeshire Claylands, the Broads and the South Suffolk and North Essex Claylands. Many of these NCAs do not meet the landscape threshold for **low input grasslands** (and therefore the conservation of permanent grasslands in these arable landscapes) although uptake for **wet grasslands** is strong in a number of the NCAs such as the Broads, Vale of York and the Fens. In this heavily cultivated ALT there are no NCAs where ES is identified as making a strongly positive contribution to the conservation of the **historic environment** and none meet the thresholds for the retention and management of archaeological features on grassland or arable.

5.36 **South East Mixed (Wooded) ALT:** As noted previously, over half of the NCAs in this ALT do not meet the landscape thresholds for **boundary features** or small farm woodlands – defining features of these small scale landscapes. This is particularly noticeable in the New Forest and Dorset Heaths, where it appears that the successful targeting of ES on the internationally important heathland and other habitats (including coastal habitats) of these NCAs may have focused attention away from the surrounding enclosed lands which are relatively poorly covered by ES uptake. It is also noticeable that there are relatively low levels of uptake for **semi-natural habitats** in the Low Weald and Pevensey Levels and especially in the industrial and built up Greater Thames Estuary where uptake for salt marsh is insufficient to meet the landscape threshold, although this habitat was once an over-riding characteristic of the landscape. On the other hand, the majority of NCAs have uptake levels that are having a strongly positive effect on the wider **historic environment** - primarily the

management of archaeological sites on grassland and arable, although uptake of parkland options is generally below threshold other than in the New Forest - where much uptake relates to the management of wood pasture.

5.37 **Western Mixed ALT:** In this landscape, again strongly characterised by its hedgerow pattern, nearly all NCAs are showing ES as bringing positive benefit for field boundaries, although in most cases thresholds for woodlands and trees are not met, yet these are also an important characteristic of this landscape. Compared to other ALTs uptake relating to semi-natural habitats in this sample of NCAs is lower, with under half of the NCAs having ES uptake that is strongly positive for semi-natural habitats, and with some of the NCAs assessed as neutral. It is also noticeable that thresholds are less regularly met compared to other NCAs for the conservation management of agricultural land uses and also for the historic environment. This reflects that just under half of the NCAs have levels of ES uptake that are assessed as having a neutral effect overall on landscape character.

5.38 **Upland Fringe ALT:** Again, landscape contributions of ES in the NCAs of this ALT are variable, reflecting the split in overall assessment ratings identified in **Table 5.3**. This is another landscape type where **the field boundary** pattern is very important with uptake assessed as strongly positive in the Cornish Killas and South Devon NCAs (where there is high uptake of both hedgerow and hedgebank options), and the Orton Fells. But this pattern is not repeated across the other NCAs. Likewise landscape thresholds for **woodlands and trees** are not always met. On the other hand, across the NCAs in this ALT, there is relatively even uptake for ES options relating to **agricultural land use** and the **historic environment**. In addition, in nearly all NCAs the thresholds for **semi-natural habitats** are significantly exceeded resulting in a strongly positive assessment for the landscape, although thresholds for **coastal habitats** are not met in the Blackdown Hills or the Culm, while they are met in South Devon and the Cornish Killas NCAs.

5.39 **Uplands ALT:** High levels of ES uptake have been experienced in the Uplands with strong targeting of HLS options to assist in the conservation and restoration of **moorland**. These levels of uptake are evident with nearly all these NCAs having levels of uptake for moorland and other characteristic **semi-natural habitats** that are strongly positive for the landscape. Equally all but two of the NCAs have uptake that is strongly positive for the conservation of **field boundaries**. Another aspect is that all the NCAs in this sample have levels of ES uptake for **agricultural land use** that should be having a positive landscape effect. It is also notable that four of the NCAs have levels of uptake that are strongly positive for the retention and conservation of characteristic **traditional farm buildings** – a pattern that is not observed in lowland NCAs. For the wider **historic environment**, the NCAs are split between those where ES uptake is strongly positive for the landscape and those having limited uptake that is of neutral landscape benefit. In this respect Bodmin Moor is interesting. It has had very high levels of ES uptake, equivalent to some 60% by area of the NCA as a whole (although this does not allow for co-location of options) but , while having an important monumental landscape, uptake of relevant options has been low, resulting in a neutral effect under this theme. Nevertheless, the generally strong performance of these NCAs means that over half have been assessed as ES having a strongly positive effect on landscape character.

5.40 Overall, the details of these NCA assessments help paint a thorough picture of the effects of ES uptake on the landscape of individual NCAs – where ES is being highly beneficial for the landscape and where its effects are neutral. The above summary has focused on the main landscape themes but the detailed assessments help indicate the more local nuances of

success and missed opportunities of ES. Such missed opportunities often relate to locally important features, such as the low levels of uptake for orchards and ponds in the High Weald, the limited uptake of options for lowland raised bogs in some of the north west coastal NCAs, the lack of uptake for water meadow options in the chalkland valleys of the south and the intermittent uptake of options for salt marsh, such as along the coast of the Greater Thames Estuary, or the limited uptake of options for the management of lowland hay meadows and ancient trees. This provides useful evidence and direction for future targeting for new scheme and option uptake.

Assessment at the ALT level

5.41 Under BD5303 an assessment was also undertaken of the effects of ES uptake on the landscape character of the ALTs as a whole (as opposed to the individual NCAs lying within the different ALTs). These results are summarised in **Table 5.4**, showing both the successes of ES and the missed opportunities. Overall patterns are very similar to those described previously, although amalgamation of all data has 'smoothed' some of the differences noted between individual NCAs within the same ALT. In this analysis ES is identified as having a **positive** effect on the landscape of all ALTs with the exception of the Uplands ALT where it is assessed as **strongly positive**.

Table 5.4: Overview of the assessment results for each ALT - Landscape contributions of ES

ES Landscape benefits	Missed opportunities where greater uptake would be beneficial	ELS / HLS effects on the landscape	
CHALK AND LIMESTONE MIXED ALT			
In this mainly arable ALT, ES is contributing **positively** to retention and management of hedgerows, low input grasslands, archaeology on both arable and grassland, species-rich grassland and lowland heathland	ES is having more **limited impact** on woodlands, in-field trees, characteristic drystone walls (in limestone areas), rough grassland, historic farm buildings and parklands	**ELS** is the main influence in relation to hedgerows, low input grasslands, and archaeology on grassland. **HLS** is influential in relation to archaeology on arable land, semi-natural grasslands and heaths	**POSITIVE (3)**
EASTERN ARABLE ALT			
ES is contributing **positively** to retention and management of hedgerows and ditches, semi-improved and wet grassland, archaeology on grassland, water features, fen marsh and swamp, lowland heathland, salt marsh and sand dunes	ES is having more **limited impact** on woodlands and hedgerow trees, historic farm buildings, archaeology on arable land, parkland, and species-rich grassland	**ELS** is the main influence in relation to hedgerows and archaeology on grassland. **HLS** is influential in relation to semi-improved and wet grassland, water features, fen marsh and swamp, lowland heathland, salt marsh and sand dunes.	**POSITIVE (3.5)**
SOUTH EAST MIXED (WOODED) ALT			
ES is contributing **positively** to semi-improved and wet grassland, archaeology on grassland, parkland, water features and semi-natural habitats	ES is having **much less influence** on woodlands, traditional orchards, hedgerows and historic farm buildings (all of which are highly characteristic of this landscape); and only limited influence on archaeology on arable land	**ELS** is the main driver in relation to archaeology on grassland but **HLS** is much more influential in this ALT, especially in relation to semi-improved and wet grassland, parkland, water features, semi-natural habitats and coastal features	**POSITIVE (3.5)**

WESTERN MIXED ALT			
ES is contributing **positively** to management of in-field trees, orchards, hedgerows, historic buildings, archaeology on grassland, lowland heathland, wetland and salt marsh	ES is having **more limited impact** on woodlands, hedgerow trees, locally distinctive ditches and stone walls, traditional pastures, archaeology on grassland, parkland, water features and sand dunes.	**ELS** is the main driver in relation to in-field trees, hedgerows and archaeology on grassland. **HLS** is influential in relation to orchards, historic buildings, lowland heathland, wetland and salt marsh	**POSITIVE (3)**
UPLAND FRINGE			
ES is contributing **positively** to protection of in-field trees and restoration of traditional orchards, as well as retention and management of traditional field boundaries, archaeology on grassland, moorland and coastal features	ES is having **less impact** on retention and management of woodlands, permanent pasture, historic farm buildings, archaeology on arable land, parkland, and species-rich grassland – although all of these are key characteristic landscape elements.	**ELS** is the main influence in relation to in-field trees, field boundaries, archaeology on grassland, and moorland. **HLS** more influential in relation to orchards, semi-natural habitats and coastal features	**POSITIVE (4)**
UPLANDS			
ES is contributing **positively** to retention and management of in-field trees, traditional field boundaries, traditional pastures and rough grazing, historic farm buildings, archaeology on grassland, moorland and other semi-natural habitats and coastal features	ES is having **less impact** on retention and management of woodlands, archaeology on arable land, and species-rich grassland	**ELS** is the main driver in relation to in-field trees, field boundaries, traditional pastures and hay meadows. HLS is more influential in relation to species-rich grassland and coastal features. Both ELS and HLS strongly influence management of historic farm buildings, archaeology and moorland.	**STRONGLY POSITIVE (6)**

5.42 The general findings for each of the ALTs (compared to the analysis by NCA) is summarised below:

- **The Chalk and Limestone Mixed ALT**: This ALT continues to show a strongly positive level of uptake for semi-natural habitats and also for the historic environment. The landscape benefits of high field boundary uptake noted previously is slightly diluted at the ALT level, potentially because of lower levels of uptake for wall options in the Limestone landscapes. Option uptake for agricultural land use is stronger at the ALT level compared to the NCA sample, whereas uptake for woodland and trees is not as strong at the ALT level compared to the individual NCAs. Uptake of options for traditional agricultural buildings is identified as neutral for the landscape.
- **The Eastern Arable ALT**: This ALT has strongly positive uptake for the landscape in relation to field boundaries and coastal habitats, reflecting a pattern first observed in the Fens. Uptake for agricultural land uses, the historic environment and semi-natural habitats is positive for the landscape of the ALT as a whole compared to a more patchy pattern across individual NCAs, while the landscape effect of ES on woodlands and trees and traditional agricultural buildings is neutral. Overall the ALT analysis is very similar to that for the NCA sample.
- **South West Mixed (Wooded) ALT**: As previously noted, this ALT demonstrates relatively low uptake of woodland and tree, and boundary options which is potentially surprising given the high woodland cover and dense hedgerow pattern across much of

this landscape type. By contrast uptake for semi-natural habitats, coastal habitats and the historic environment is strongly positive for the landscape in this ALT as a whole, a pattern not always evident at the NCA level for semi-natural and coastal habitats.

- **Western Mixed (ALT):** In the assessment of NCAs in this ALT described previously, landscape benefits provided by ES were identified as more variable than in the other ALTs. This pattern is reflected in this ALT-wide assessment with no theme identified as strongly positive for the landscape but with option uptake for woodland and trees, agricultural buildings, the historic environment and semi-natural habitats as well as coastal habitats all identified as positive for the landscape. Conversely uptake for agricultural land uses and field boundaries (a strong characteristic of these landscapes where ES was generally identified as having a positive effect at the NCA level) is identified as neutral in their landscape effect.
- **Upland Fringe ALT**: Again the earlier assessments by NCA described previously, painted a variable picture across this ALT in terms of the landscape benefits provided by ES, partly reflecting that this ALT includes the post-industrial landscapes of the coalfields and areas or urban fringe. Seen as a whole though, ES uptake for field boundaries, semi-natural habitats and the coast is identified as strongly positive for the landscape of the ALT, while that for woodland and trees and the historic environment are positive. Conversely uptake of options for agricultural land uses and traditional farm buildings is identified as neutral.
- **Uplands ALT**: Finally, in this ALT, as noted previously, landscape effects are identified as strongly positive overall. ES uptake levels are identified as strongly positive in respect of boundary features, agricultural land uses traditional farm buildings (with stone field barns a particular characteristic of these landscapes), semi-natural habitats and coastal habitats where present. Uptake levels are also positive for woodland and tree cover and for the historic environment. In this ALT there are no landscape themes that have been assessed as having a neutral effect on the landscape.

5.43 These findings confirm the positive effect that ES uptake offers to the landscape and indicates where it is most particularly helping the landscape, across these different ALTs. It also highlights where gaps in uptake need to be addressed at the strategic level.

The balance between ELS (UELS) and HLS options

5.44 Finally, this section summarises the relative contributions of ELS (including UELS) and HLS to the landscape benefits provided by ES (based on an assessment of 50 NCAs). From this, two over-riding trends are apparent: Firstly, linear options are clearly dominated by ELS option uptake i.e. primarily those for the conservation management of boundary features. This is noted across all ALTs. The small lengths of HLS uptake for linear features primarily reflect capital items for their restoration and recreation – primarily walls in the Uplands.

5.45 Secondly, and surprisingly, there are no clear trends across the pattern of ELS and HLS uptake for area options (**Table 5.5**).

Table 5.5: Relative contribution of HLS to overall ES uptake of area options

Proportion of total ES uptake	Percentage of NCAs in each ALT					
	Chalk and Limestone	Eastern Arable	SE Mixed (Wooded)	Western mixed	Upland Fringe	Uplands
> 50% HLS uptake	23%	67%	83%	20%	17%	37%
30% - 50% HLS uptake	62%	33%	17%	60%	50%	63%
> 30% HLS uptake	15%	-	-	20%	33%	-

5.46 While it might be assumed that ELS was having the overriding influence by area, this is by no means always the case, with some NCAs in every ALT having a higher proportion of HLS as opposed to ELS option uptake by area. This is very evident in the South East Mixed ALT where 83% of the NCAs assessed have significantly higher levels of HLS over ELS uptake (primarily but not exclusively driven by targeting of lowland heathland management and restoration options). What is more surprising is that a similar pattern is seen in the Eastern Arable NCAs, part but not exclusively explained by the inclusion of the Broads and the Suffolk Coast and Heaths AONB in the sample where there has been significant targeting of different habitats (**Table 5.5**).

5.47 Equally, amongst these NCAs, while nationally the Uplands have had very significant targeting of moorland options, which will usually have a high proportion of HLS uptake, in this sample, HLS does not dominate uptake in all the Upland NCAs (**Table 5.5**).

5.48 These differing levels of uptake of ELS and HLS options are interesting to the extent that they slightly blur the distinction in terms of area of uptake between (a) ELS as the 'Broad and Shallow' aspect of ES i.e. with options that cover significant areas but have a lighter touch, and (b) HLS which offers a 'Narrow and Deep' approach, with options covering more limited areas but being significantly more exacting in their requirements. The reality is that HLS is also covering significant areas in some NCAs bringing the benefits of advice and targeting and the tailoring of options to local circumstances (para 4.39).

6 Conclusions

6.1 This final Chapter draws conclusions from the wide range of evidence that has been generated by this study and which has been summarised in this report. These conclusions are presented under the following main headings:

- Future agri-environment scheme development, delivery and targeting
- Future Environmental Stewardship and Natural England Monitoring
- Support for other Natural England and Defra research initiatives
- Further research and development suggested by this study.

6.2 This study has developed rapid, consistent, repeatable and rigorous methods for assessing the landscape effects of Environmental Stewardship (ES) at (a) the study area level based on field survey and (b) at the strategic level (National Character Area (NCA) and Agricultural Landscape Type (ALT) levels) using digital data that compares the stock of landscape features with the relevant uptake of ES options against landscape thresholds (para 6.13). It has also developed approaches for counterfactual analysis based on meta-analysis of field results, and an approach to capturing public opinion on which aspects of the landscape they would wish agri-environment schemes to support. The study has laid down a baseline against which future change in the landscape under agri-environment can be compared. The significant evidence collected through these different forms of analyses provides the most comprehensive evidence to date on the landscape effects of agri-environment schemes and particularly ES. This study has confirmed that ES is meeting the objective of maintaining and enhancing landscape character and quality by helping to conserve and enhance important landscape features. It has also identified how landscape benefits could be significantly enhanced.

Future agri-environment scheme development, delivery and targeting

Suitability of options

6.3 In pastoral and mixed farming areas, including the Uplands, the primary landscape need is to **conserve and restore characteristic landscape features** such as hedgerows, hedgebanks, walls, small farm woodlands and trees, and semi-natural habitats. In intensive arable landscapes the emphasis needs to be on enhancing the landscape by **reintroducing landscape structure and diversity**, for example, through the use of wide buffer strips to strengthen field boundaries and through the reintroduction of semi-natural habitats and areas of non-arable habitat to create localised areas of diversity and interest.

6.4 In short the main benefit that ES options can provide for the landscape are **conserving, restoring and recreating key landscape characteristics**, as well as:

- Highlighting landscape scale and pattern
- Conserving / reintroducing traditional land use patterns, colours and textures into the landscape
- Helping reinforce local distinctiveness and sense of place

- Conserving, restoring and helping reveal historic features (that will also often be identified as key characteristics of the landscape) (para 4.4 – 4.5)

6.5 Review of all ES options through this study suggests that there is a sufficient range of options to achieve the above in different types of landscape. Those options of particular benefit to the landscape are identified in paras 4.4 - 4.5 and cover those for small woodlands and trees and boundary features, which together are vital for defining the scale and pattern of the landscape, as well as options which support semi-improved and wet grasslands, species-diverse grasslands, historic features, options for coastal, and other lowland and upland semi-natural habitats, and specific options such as hay making that help restore local distinctiveness. In addition, in large scale arable landscapes, wide grass buffer strips and conservation headlands are valuable in bringing back landscape structure by helping define field pattern. The above also reflects the landscape features that are most valued by people (as demonstrated by public engagement) with a large proportion of respondents identifying field boundaries (93%), access (90%), woodland (88%), grassland (86%), historic environment (86%), field trees (83%)[9] and water features (79%) as important (Figure 4.1). Equally if access was discounted, the features that respondents wanted most resources allocated to were woodland (14%), field margins (10%), with grasslands, historic environment, and species conservation at 9%, and field trees and field boundaries at 8% each (Figure 4.2), although the low response rate means that these are not statistically robust findings (para 4.42.

6.6 From, the field survey work, however, the three areas where **additional options** would be very beneficial are:

6.7 **Restoration of boundary features**: Boundary features are one of England's most important group of landscape features. As noted above, they help define landscape scale and pattern as well as being important features in their own right. In 2013 a new ELS option was introduced for the restoration of hedgerows (EB14). This joined options under UELS for the restoration of walls, earth banks and stone-faced hedgebanks. The field surveys identified that some boundary features under ES maintenance options are in clear need of restoration. There would be great benefit therefore if all boundary types including ditches, outside the SDAs, could have the benefit of restoration options. This will have **significant added value** over those options simply focusing on maintenance.

6.8 **Tree lines:** Other than HLS capital items there are no obvious options within ES to cover tree lines. Although not as common as other boundary trees, they are nonetheless, important where they are found and would benefit from their own option, covering for example, the pine lines of Breckland and the outgrown beech lines of the Quantock Hills. As above it would be best if this is a restoration option, although it may be felt that these are better covered as a Special Project.

6.9 **Wet grassland**: Other than options for the management of rush pasture (EK4/EL4), there are no ELS options specifically focused on **wet or floodplain grasslands**. These are important and much reduced landscape features. These could be covered by EK2/3 ideally co-located with EK5 but this cannot be achieved without purposeful targeting. The issue in this case therefore may be more one of focus and location rather than the need for a new option, as discussed further below (para 6.27, 6.38 – 6.39).

[9] These are both field and hedgerow trees

Option uptake

6.10 Assessments undertaken at the ALT level have highlighted that large levels of uptake are concentrated in a few options, with some 50% of all ES uptake by area per ALT concentrated in just five options. In other words a very few options make up the primary ES 'palette' in each ALT (para 5.3).

6.11 Nevertheless, the top 20 options and the top 20 option bundles (made up of options with the same landscape outcome) by area of uptake clearly reflect the differing landscape character of the different ALTs. They therefore have the potential to bring significant landscape benefits to the landscape of that ALT, such as the emphasis on maintenance and restoration of grasslands in the Chalk and Limestone ALT and the restoration of wet grasslands in the Eastern Arable ALT, where most of the land has been drained (para 5.5). Selection of linear options likewise reflects the different landscapes and boundary types of the different ALTs (para 5.14)

6.12 The beneficial effects of ES option selection and uptake levels on landscape character as a whole are confirmed by the assessment of the effect of ES on the landscape of individual NCAs, using landscape indicators and thresholds. This has identified that out of the 68 NCAs assessed, in 11 NCAs (16%) ES is having a **strongly positive** effect on landscape character (primarily in the Uplands and Upland fringe); in 45 NCAs (66%) ES is having a **positive** effect; and in12 NCAs (18%) it is having a **neutral** effect (para 5.31, Table 5.3).

6.13 In these assessments **thresholds** are judged as the levels at which ES uptake against existing total stock of individual landscape features is likely to make a discernible difference to the landscape.

6.14 The imbalance between a few options with very high levels of uptake and many others with low levels (under 0.5% of total area of uptake) though, does represent a significant missed opportunity. In the case of the area options, those for low input grasslands (EK2/EK3 and EL2/EL3) together form the top option bundle by area of uptake in ***all*** ALTs with the single exception of the Uplands where they slip to second place. In the Western Mixed ALT together these options make up 36% of ***all*** ES uptake by area and 34% in the Upland Fringe. This figure falls to 24% in the Eastern Arable ALT where these options have the lowest level of uptake other than in the Uplands (para 5.9).

6.15 In the case of linear features, hedgerow management options (EB1-3) form the top option bundle by length of uptake in all ALTs except the Uplands where the stone wall option (EB11) dominates. Hedgerow options EB1-3 together cover 77% of all linear option lengths in the Chalk and Limestone ALT, dropping to 53% in the Upland Fringe ALT (para 5.13 – 5.14).

6.16 Low input grasslands and hedgerow options therefore are THE dominant options of ES. But to what extent are they contributing to the landscape character of NCAs?

6.17 Returning to the assessment of the contribution of ES to the landscape of individual NCAs (based on the identification of indicators and thresholds) it is evident, looking across all 157 NCAs, that the landscape threshold for hedgerow uptake (20% of total stock) is largely met in the individual NCAs of each ALT with the exception of The South East Mixed (Wooded) ALT, where it is only met in 26% of NCAs (**Figure 5.1**). Put simply, there are high levels of uptake for hedgerows and this is making a visible difference to the landscape, with hedgerows being a defining characteristic of the English landscape. This has been an important contribution of ES.

6.18 Conversely, for low input grassland options, only in the Uplands ALT do over 50% of the NCAs meet the landscape threshold (20% of total stock). In the two most pastoral lowland landscapes of the South East Mixed and Western Mixed ALTs fewer than 20% of NCAs meet this landscape threshold despite very high levels of uptake. In other words, despite very high levels of uptake, this option is not being taken up at a level that is visible in the landscape (para 5.20). This suggests that to maximise the benefits of these options to the landscape there needs to be some form of prioritised targeting (this will be returned to in para 6.37-6.39).

6.19 At the same time there are many ES options that are very valuable to the landscape where uptake is low and rarely meets their identified landscape threshold, This includes options for small woodlands; hedgerow trees; orchards; parklands and wood pasture; hay cutting; flood meadows; ponds and water bodies; and coastal options, as well as many capital items, as just some examples (paras 5.26 – 5.29).

6.20 As a consequence, the local nuances of landscape in different localities are often not being assisted by ES, as in the low levels of uptake for orchards and ponds in the High Weald, the limited uptake of options for lowland raised bogs in some of the north west coastal NCAs, and the lack of uptake of water meadow options in the chalkland valleys. This suggests the need for higher levels of uptake of these types of option combined with more focused targeting of these options responding to the key characteristics of different landscapes.

Range of options within individual agreements

6.21 As well as some options having very high levels of uptake and others very low levels, it was evident from the field work that some ELS agreements are made up of only two or three options applied over a wide number of fields (para 4.39). This further confirms that the potential ES palette that is available is not being used and is not being tailored to best respond to local circumstances.

6.22 On intensive arable farms, where the nature of farming limits the range of options available, there can be considerable benefit in locating different options side by side (as illustrated in paras 4.25 – 4.27). There may also be a case for stipulating a minimum number of options that must be included in any agreement, although it will be essential that these options help retain and reinforce the key landscape characteristics of the area and / or help bring structure back into the landscape.

Balance of ELS / HLS agreements

6.23 From the field work it is evident that ELS agreements can be broadly characterised as having a limited range of common options applied to a wide range of circumstances, while HLS agreements can more commonly be characterised by a wider range of specific options that are tailored to individual localities (para 4.39).

6.24 Other than HLS options for the protection of soil and water (which tend to have a neutral effect on the landscape), HLS options generally benefit the landscape by conserving and recreating valued landscape characteristics (para 4.39).

6.25 It appears, therefore, that the full landscape benefits of ELS are not necessarily being achieved. Greater benefits for the landscape might be achieved if (a) there was more careful selection of options, to conserve / enhance landscape character (linked to para 6.22); and in turn, (b) there was some form of landscape advice/targeting to ensure that each option is applied in the optimal location to meet landscape and other objectives (returned to below).

Location of ES options

Particular types of option

6.26 The results as summarised above suggest there could be considerable benefit for the landscape if closer attention was given to the location of some options. There are three different considerations here, based on the findings of the field survey work:

6.27 **Grassland options:** Much has already been said about low input grassland options, with their very high level of uptake (EK2/3 and EL2/3) whilst not meeting the identified landscape thresholds within individual NCAs (para 6.18). From the field survey work it was evident that these options, and EK5 Mixed Stocking are clearly beneficial for the landscape where helping to conserve areas of unimproved and semi-improved permanent pasture. In these locations, the counterfactual analysis suggested they were 'punching above their weight' (para 4.20). They were also identified as beneficial where helping retain permanent pasture in arable dominated landscapes. However, the field work noted that these options are also often applied to areas of permanent improved pasture in pastoral and mixed farming landscapes where the pressure to convert to arable is less, such that their basic impact of retaining grassland is not providing significant landscape benefit (para 4.10). From the landscape perspective, therefore, it would be better if these options singly and co-located, could be targeted to areas where their landscape benefit will be maximised (para 6.38 – 6.39).

6.28 **Boundary features and tree options:** By their nature these options are automatically focused on extant boundaries and trees and so are in the 'right place', However, stronger focus on maximising benefits would be beneficial, for example, bringing gappy outgrown hedgerow lengths under restoration options (para 6.7) and giving greater focus to trees in arable cultivation (para 5.23).

6.29 **Arable options**: Although options such as over-wintering stubbles are likely to be beneficial for the landscape wherever they are located, there are a range of other options that can have adverse landscape effects, in particular these are:

- **Use of wide buffer strips (4m – 12m) or conservation headlands** in small scale landscapes with an irregular field pattern where they can create incongruous stripes in the landscape that detract from the established field pattern. Conversely they will be strongly beneficial in large scale landscapes where they can help redefine and strengthen the field pattern (photo 4).
- Use of large **rectilinear field corners** within small field systems where they can disrupt the established field pattern (see photo 3)
- Use of **block options** such as EE3/HE3 which, if located along part of a field edge or as an infield block can again disrupt the established field pattern (see photos 4 & 5)
- Use of **skylark plot** options on the side of hills, where they can have an 'advent calendar' effect.

3. Field corner (EF1)

4. HE3 (6m buffer strip) adjacent to HF2 wild bird seed mix), enhancing the field edge

5. HE2 (wild bird seed mix), forming a block that disrupts established field pattern

6.30 For all these arable options (see para 4.6) particular care is needed in their location, especially where they are being encouraged to meet other objectives. Here advice on location is very important in terms of scale, design and specific location. It is also evident that ELS options that are problematic in the landscape (such as arable plots) remain problematic for the landscape if included in HLS agreements (identified with the replacement of the E prefix with H) as illustrated by photo 5.

Co-location and proximity of options

6.31 The evidence is that the co-location of options can be very helpful in meeting specific objectives but that co-location will not of itself make up for the poor location or implementation of ES (especially ELS) options (paras 4.22 – 4.24).

6.32 Equally the combined effect of nearby options is usually positive, further enhancing the landscape impacts of the scheme, especially where:

- **Bringing back traditional patterns**, such as the restoration of hedgerows around a field being restored to semi-improved or unimproved grasslands, managed by hay cutting (para 4.29).
- **Encouraging natural gradations** as in a woodland edge option (C4) grading into a nectar flower mix along an arable boundary (para 4.26).
- **Reinforcing field pattern** such as the location of one boundary option against another (as in photo 4 above) with a grass buffer strip lying directly adjacent to a boundary of bird seed mix thereby accentuating the field boundary in large-scale arable landscapes (as already noted not to be encouraged in small scale landscapes) (para 4.27 – 4.28).

6.33 There is also merit in clustering options to reinforce a particular landscape character, as in a traditional character reinforced by the clustering of options for hedgerow management, semi-improved grasslands, hay cutting, and orchard and pond restoration and / or the management / restoration of habitat mosaics (paras 4.30 – 4.31).

Dispersal or grouping of options?

6.34 So what is best for the landscape – the concentration or dispersal of options? The field survey suggests both depending on the types of option and the needs of the landscape.

6.35 **Dispersal of options**: Boundary features and buffer strips are best dispersed across the landscape to help define the scale and structure of the whole landscape, rather than focused on small pockets, and also to encourage the application of these management approaches across the whole farm (para 4.33).

6.36 **Grouping / concentration of options:** This provides strong landscape benefits as in the restoration of habitat mosaics and traditional patterns of land use and responding to the concentration of archaeological sites or other historical features (para 4.35).

6.37 **Swathes or zones:** There is also a very strong case for the creation of swathes or zones through targeting. This reflects the Lawton Review's call for large-scale habitat restoration and recreation and could form part of Nature Improvement Areas. While being achieved for upland moorland and lowland heaths, such an approach has been significantly less evident (in terms of landscape benefit) across the farmed landscape. From the landscape perspective a focus on zones particularly relates to the use of ELS grassland options (especially EK2 /3, EL2/3 and EK5).

6.38 As illustrated by the ESAs, the targeting of options within particular areas or zones can result in whole areas (such as a valley floor) becoming a continuous ribbon of habitats and low or at least lower input grasslands. Thus grassland options in combination with other options can be used to help **accentuate topographical features or areas traditionally under low input grasslands** as in: river valleys; levels (as in the Somerset Levels); coastal grasslands; scarp slopes; and other steep slopes such as steep valley sides and including areas susceptible to soil erosion where permanent pasture is being lost. Within these zones, some grassland under option will be improved but here they help provide a visual and functional link between areas of more natural grassland, as well as performing an important resource protection function.

6.39 This focus on zones for low input grasslands and mixed stocking will be as valuable in arable landscapes (the Chalk and Limestone ALT and the Eastern Arable ALT) as in more pastoral landscapes. Of course, low input grasslands and mixed grazing will also continue to have an important role in helping conserve semi-improved and unimproved grasslands wherever they are found (paras 4.36-4.38).

6.40 **Targeting for local distinctiveness:** Finally, there would be great benefit for the landscape if there was purposeful targeting of the specialist options that are so important to the landscape, such as options for ancient trees, orchards, ponds, haymaking etc., to areas where they were once locally distinctive (para 6.19 – 6.20).

6.41 The suitability of these different spatial approaches for different types of option is illustrated in **Table 6.1.** Many options are relevant to more than one approach.

6.42 The real benefits for the landscape will be realised where a zonal approach is adopted in conjunction with, for example, dispersed boundary and tree options (across the landscape), potentially combined with very specific groupings/clusters within defined zones and targeting for local distinctiveness. This describes a landscape-scale and integrated approach to targeting.

Table 6.1: Spatial approaches for different types of option

Option type	Dispersal	Concentration	Zones	Local distinctiveness
Woodlands	●	●		●
Trees	●			●
Wood pasture		●		●
Traditional orchards				●
Boundary features	●			●
Buffer strips and headlands	●			
Overwintering stubbles	●		●	●
Low input grasslands		●	●	
Mixed stocking		●	●	
Semi-improved / rough grasslands			●	
Rush pasture		●	●	
Haymaking/ native breeds at risk		●	●	●
Archaeology	●	●		●
Traditional farm buildings				●
Ponds and water features				●
Flood meadows		●		●
Species-rich grasslands		●	●	●
Wetlands		●		●
Lowland heathlands		●	●	●
Coastal habitats		●	●	●
Moorlands			●	●

Summary of suggestions for future agri-environment scheme development, delivery and targeting

6.43 In summary the suggestions made for future agri-environment scheme development for the benefit of the landscape are as follows:

Agreements

- There could be merit in specifying a minimum number of options per agreement to encourage uptake of a wider range of options that reflect the key landscapes characteristics of the area (para 6.22)

- Linked to the above, advice could be provided to encourage more careful selection of options to reflect local landscape character, combined with targeting to ensure that each option is applied in the optimal location to meet landscape and other objectives (para 6.25). Expanded under location below.

Arable options

- Advice that promotes arable options should take account of the adverse effects that these can have on the landscape and should encourage the appropriate scale, design and location of these options wherever possible (para 6.29 - 6.30).
- Wide buffer strips in large-scale arable landscapes are beneficial in helping define landscape scale and pattern, and the location of different buffer/margin options side by side can further strengthen this pattern (para 6.32). Conversely in small-scale landscapes with irregular field pattern they can detract from the established field pattern, as can field corners and beetle banks.

Boundary options and trees

- There would be great merit in the introduction of ELS restoration options (outside the uplands) for all types of boundary feature (including ditches) (paras 6.7 – 6.9).
- Linked to the above, there should be targeting of boundary restoration options to where they might bring most landscape benefit (added value) and giving greater focus to the protection of trees on arable land (para 6.28).

Grassland options

- ELS Grassland options with very high levels of uptake especially (EK2/3, EL2/3 and EK5) could greatly increase their landscape impact if targeted (a) at areas of semi-improved and unimproved grassland; and (b) within topographical zones to create continuous swathes of low input grasslands that link to other options, helping accentuate topographical form and assisting with resource protection.

Option groups that are especially important in restoring local distinctiveness

- Greater uptake should be encouraged of options associated with woodlands and trees, wood pasture, orchards, ponds, haymaking etc as they are vital to defining local distinctiveness (paras 6.19 – 6.20).

Overall option distribution

- The findings of this study have identified that the location of options can be very influential in defining their impact on the landscape. There is no one locational strategy that is appropriate to all options. Nevertheless from the landscape perspective options fall into one or more of the following strategic location types: (a) the **dispersal** of options across the landscape, especially boundary and buffer strip options to help define the scale and structure of the whole landscape; (b) the targeting of grassland options with very high levels of uptake into topographical **swathes or zones**; (c) the **clustering** of options to recreate habitat mosaics, bring back traditional landscape patterns; and protect concentrations of historical / archaeological features; and (d) targeting options where they will help **restore local distinctiveness.**

6.44 Ultimately there is no one definitive answer for the distribution of options. However, evidence collected through monitoring at different spatial scales (as in this study) provides a much better understanding of ES uptake ‘what, how much and where’ and its effects on

landscape character and quality. This can directly inform targeting and advice both nationally and more locally to ensure that the ratio of benefits to costs are maximised. **This underlines the strong value for money that monitoring can offer.**

Future Agri-environment Monitoring

6.45 The value of monitoring the landscape effects of agri-environment schemes has been proved through this study, helping our understanding of the landscape effects of individual options in different landscapes, and the effects of ES on whole landscapes (NCAs and ALTs) and between different landscapes. As indicated above, this monitoring should be continued to inform the on-going choice and targeting of options for the benefit of the landscape.

6.46 Rapid monitoring approaches developed through this study enable this monitoring to continue in a highly efficient and cost effective manner. These are:

- The rapid field survey method (paras 3.8 – 3.10) that monitors the broad-scale landscape effect of the scheme (**Appendix 1)**
- A bespoke approach for NCAs / ALTs (paras 3.18 – 3.19) and **Appendices 2 & 3**

6.47 These will be equally valid monitoring approaches for any new scheme brought forward. They are best and most effectively undertaken by a landscape specialist but, although more challenging, could be undertaken by non-landscape specialists with bespoke training.

6.48 There may also be a role for the more detailed field survey approach developed and used under BD5303 to:

- Monitor change over time repeating once every 10 years in the same squares as used during BD5303
- For detailed 'calibration' of the landscape effects of individual options introduced under a new scheme
- For more concentrated/focused area monitoring where there is a particular need and interest

Monitoring at different spatial scales

6.49 This study has demonstrated the benefit of having a clear sampling frame across a hierarchy of scales, where the results at one level in the hierarchy can help inform and challenge findings at another level. This approach is strongly advocated for future monitoring of agri-environment schemes.

6.50 This study has also confirmed that field work at the local level (unless there is very significant coverage) cannot act as a surrogate for assessing the landscape impacts of agri-environment at the NCA level – for which an NCA-wide assessment is required. Equally landscape effects of single NCAs cannot act as a surrogate for the landscape effects of agri-environment at the scale of whole ALTs. This reflects that landscapes vary considerably within and between NCAs of individual ALTs. Agri-environment uptake patterns also vary at each of these scales.

6.51 This underlines that separate assessments are required at each scale in the spatial hierarchy, Nevertheless, the field survey findings on the landscape effects of individual options and option groups at the local level are critical in informing all levels of assessment.

Monitoring at the NCA / ALT scales

6.52 The approach developed through BD5303 has proved very effective in understanding the implications of agri-environment scheme uptake on the whole landscape. The approach, by assessing landscape effects across a standard set of landscape themes, can highlight missed opportunities both within and between themes. For example in areas such as the New Forest and the Dorset Heaths, targeting on the areas of lowland heathland has resulted in fairly low levels of ES uptake in the surrounding enclosed landscapes, Equally, high overall levels of uptake on Bodmin Moor have not included any significant uptake for archaeology in a recognised monumental landscape. With missed opportunities identified in this way, there is robust evidence to inform where future effort might be best placed for the benefit of the landscape. This ensures that future expenditure is informed by the results of past monitoring to ensure the most cost effective targeting of agri-environment.

6.53 Looking within themes, it is also very easy to identify through this approach the extent to which uptake is assisting in reinforcing local distinctiveness. As just one example, areas with distinctive stone walls should be anticipated to have high uptake of walling options, with this being checked against the relevant threshold.

Monitoring at the sub-NCA level

6.54 It is likely that in the future this type of monitoring may have an important role at the sub-NCA level, for example, as part of the monitoring of Nature Improvement Areas and any zonal approach that may be adopted for the targeting of agri-environment in the future. Exactly the same approach could be adopted as that described in this report (**Appendix 2**) but at this level there would need to be:

- a recalibration of the thresholds to reflect the specific objectives for the area under consideration
- the development of accurate spatial information on the distribution of ES uptake. Natural England developed such a spatial dataset in 2010 but this is now increasingly out of date and needs updating. This requires that the current point data on ES uptake (area options only) held by Natural England are applied to the relevant land parcels in the Rural Land Registry Land Parcels Data. This is a significant task but will also be essential for developing the field survey maps for ANY future field monitoring. Without this mapping it will be very difficult to identify with any accuracy the level of uptake of each option within the selected area.

6.55 With this information though, it will then be possible to develop a published map, for the area in question (assuming there is a shape file that defines the boundaries of the area), as was undertaken for BD5303 for each NCA. Such a published map can then provide paired spatial stock and uptake data for each key characteristic allowing uptake to be viewed as a layer on top of the baseline stock data.

6.56 Indeed if the above spatial information was prepared as a published map it would be possible to view exactly where different options are being taken up relative to stock and to understand the spatial linkages between options and the concentration of option groups. This information could also be captured in a slightly revised bespoke database that would assess levels of uptake relative to area-specific objectives and thresholds.

6.57 In short, the approach developed during BD5303 can equally be applied at the sub-NCA level so long as the correct spatial data can be provided on ES uptake.

Support for other Natural England and Defra research initiatives

6.58 There are two aspects of the research findings that should be particularly helpful to other Natural England and Defra research initiatives. These are:

- The findings from the field work on the landscape effects of different ES options and how different options interact (Chapter 4)
- The assessment of the landscape effects of ES at the NCA (and ALT) scales (Chapter 5).

6.59 Particular areas where these findings may assist are:

- The **NCA Profiles** and, in particular, the **Statements of Environmental Opportunity (SEOs)**. By showing what ES has achieved so far for the landscape at the NCA scale, and showing where landscape objectives and thresholds are not being met, the NCA assessments coming out of BD5303 can directly inform the SEOs. Recognising that the SEOs identify integrated priorities, this evidence can also be seen alongside other desired outcomes, to identify those ES options that can deliver for the landscape of the NCA as well as meet other priorities.
- **Integrated management planning.** As in the case of SEOs, the outputs from the NCA assessments can inform different types of integrated management planning. A challenge that we face for the future is to ensure that the delivery of essential provisioning and regulating ecosystem services is achieved in a way that helps support and strengthen landscape character (which of itself, is a central aspect of the cultural services) rather than detracting from it. The information from this research has helped identify which ES options are most beneficial for the landscape in different types of landscape. There are often different ways of delivering the same ecosystem services. This study helps identify those options that deliver for the landscape but which equally may play an important role in enhancing the regulating services. The need is to select those options that provide the functions we need in ways that deliver the landscapes we want.
- The **Protected Landscapes**. Natural England has recently provided each of the protected landscapes in England with data to support their Framework for Monitoring Environmental Outcomes. This includes data against the theme of natural beauty which has been provided in the form of an interactive spreadsheet (an 'ES analyser') to enable protected landscape bodies to calculate the uptake of Environmental Stewardship (ES) relevant to identified indicators of natural beauty. The NCA assessments from BD5303 can provide more specific detail to this analysis if required, covering a significantly wider range of landscape indicators. It is recognised that National Park and AONB boundaries do not equate to NCA boundaries. However, there is a relatively close fit in some instances allowing some comparison to be made. In the longer term, if up to date spatial data can be made available on ES uptake a bespoke assessment could easily be undertaken for each protected landscape (6.50 – 6.52).
- **Management planning at the landscape-scale**: The approaches developed through this study, in the same way, could inform landscape-scale projects, such as Nature Improvement Areas and Landscape Partnership Projects. These would, however, particularly benefit from the cutting of uptake data to the boundaries of the area in question, following the approach set out in paras 6.54. It is at this scale also, that public

engagement will be most helpful in providing insight into those features that people most value locally and would like to see supported by agri-environment schemes.

The engagement work undertaken under BD5303 suggests that community views may be best elicited by a combination of on-line and street surveys (with both following the same sequence of questions developed through this study). Street surveys may attract a wider age range of participants and give greater immediacy to the request for information, although the location of surveyors needs to be considered carefully to avoid skewing results (para 3.33). Experience suggests that direct and personal recruitment may also be beneficial, with face to face contact with the community and businesses to enable them to ask any questions in order to dispel any suspicion of the survey. Linking any public engagement exercise to a project that will deliver environmental conservation and enhancement locally, is likely to stimulate participation, as there will be a direct link between the information provided by the community and subsequent project delivery. Such community engagement recognises that local people need to be at the core of environmental aspirations if the principles of the ecosystems approach are to be achieved.

Further research and development suggested by this study

6.60 There are three areas of further research that would greatly complement the findings of this study. These are:

6.61 **Special projects:** As far as possible this study has tried to capture the contribution of capital items which are often complementary to the standard HLS options. But there are three capital items that may represent significant projects in their own right. These are:

- *Protection of historical and archaeological features* (**HAP**): Intended for dealing with historic features or landscapes that require management that falls outside the scope of the annual land management payments. Used for proposals that directly contribute to the conservation and enhancement of the historic environment including the preparation of Parkland and other Management Plans.
- *Restoration of historic buildings* (**HTB**)
- *Special Projects (***PAH/ OES***)*: For proposals that may need work outside the scope of the standard payments or may need a specific tailored specification.

6.62 The full scope of these Projects funded under HLS would benefit from further investigation. Through this study it has not been possible to review their individual outcomes and assess their wider effects on the landscape.

6.63 As an example, this study has identified a generally low uptake of parkland options (HC12/13/14). However, this does not take account of the number of HAPs that have been agreed that have included Parkland Management Plans. These will have suggested the use of a range of complementary HLS options (such as protection of veteran trees, capital items for tree management and planting, maintenance and creation of species-rich grasslands and introduction of mixed grazing) that may not include the specific parkland options. A comparison between the parkland figures generated through this study and a more detailed investigation of the HAPs would be valuable. In this case this may already have been covered in the separate Natural England study *Evaluating the Effectiveness of Environmental Stewardship Agreements for the conservation and enhancement of historic*

parklands and developing a method of prioritisation of funding. However, there is still a case for assessing the wider use of HAPs and the other options listed, to understand their landscape and other contributions.

6.64 **Maximising the landscape benefits from arable/in field options and others that are focused on species/resource protection and have the potential to have negative landscape effects:** As noted through this study, there are a limited number of options aimed at species or natural resource protection, which in the wrong location can have an adverse effect on the landscape (paras 4.6 – 4.7). Through a series of case studies that specifically focus on these options it would be very beneficial to see how any adverse landscape effects could be mitigated while ensuring that the primary purpose of these options is achieved. The findings could then form the basis of practical guidelines that are incorporated into any advice promoting these options.

6.65 **Farmer attitudes and decision-making:** This study has not included any farmer interviews that would allow assessment of farmer attitudes to the landscape and the landscape effects of ES. From a landscape perspective it would be very helpful to understand:

- what influences farmer decisions on the most appropriate agreement and individual option selection on their farm.
- the extent to which the agreement and/or the individual option selection potentially influence wider management practices on the farm.
- the degree to which the management observed has changed as a result of entering ES.
- the nature of advice that they would find helpful.

6.66 Lack of farmer interviews was identified as a potential shortcoming of this study through the counterfactual work (Report 4). Farmer attitudinal surveys have been undertaken but these have not been focused on landscape, nor have they collected robust evidence on farmer knowledge of and attitudes to landscape opportunities and effects of land management and ES on the landscape. Such farmer interviews would be very helpful in understanding how to encourage appropriate uptake and wider management practices that maximises landscape benefits.

Appendices

Appendix 1: The rapid field survey approach

As in the BD5303 field survey method it is anticipated that the Rapid Survey approach would have three phases:

- Planning and preparation
- Field Survey
- Reporting

Planning and preparation

The main tasks that need to be undertaken in this phase are:

- Identification of the Square Clusters
- Identification of the location of individual survey squares within each of the Clusters
- Identification of the key landscape characteristics relating to each survey square
- Preparation of maps to be taken into the field as part of the field survey
- Any finalisation of the field survey spreadsheet.

Identifying the Square Clusters

As part of BD5303 a broad range of criteria were developed to aid the selection of the Study Areas. In the case of the Rapid Survey approach, as a very much larger number of squares will be identified and all classic schemes will have ended, it is recommended that the Square Clusters are selected against four main criteria:

- Ensuring an equal split across the six ALTs with individual Square Clusters lying clearly within one National Character Area (NCA)
- Stratified by Broad Habitat Type (with reference to the stratification of Countryside Survey Squares)
- Ensuring that each Square Cluster has a significant number of ES agreements and that across the whole sample there is a good split between ELS and HLS agreements
- Ensuring that each Square Cluster lies within a single local landscape type (LCT) or area (LCA) as defined in the relevant District / Borough Landscape Character Assessment.

In selecting the Square Clusters, information on the **spatial extent and nature of agreements** can be taken from Natural England's GIS data download site http://www.gis.naturalengland.org.uk/pubs/gis/gis_register.asp[10] and compared with the boundary of

[10] The GIS data comes in 100km^2 tiles (i.e. 28 separate tiles for the whole of England). The data includes the following fields:
- AGREF - The agreement number, allowing mapping of the extent of individual agreements
- SCHEME – identifying the nature of the scheme - ELS, ELS with HLS, OELS, OELS with HLS and HLS only, allowing mapping in the different tiers
- UELSFLG - A 'flag' identifying agreements that also include UELS
- CUSTNAME - The name of the agreement holder (withheld in some cases) allowing identification of land in charitable or institutional ownership

NCAs and ALTs, while **stratification by Broad Habitat Type** can be referenced to the stratification of the Countryside Survey Squares**.**

Ensuring that each Square Cluster lies within a single local landscape type or area is important both logistically and to create a strong landscape framework to the overall monitoring programme. In the final analysis it will allow assessment of the variation of ES outcomes within areas of common landscape character.

From the experience of BD5303, it is essential that the field surveys are guided by information on the **key landscape characteristics** of the area. It is against these key characteristics that the landscape assessment of ES options is made, as described further below. These are best taken from the local Borough/ District Landscape Character Assessment where specific key characteristics will have been identified for each local Landscape Character Type / Area. The NCA key characteristics are at too strategic a scale to inform field work relating to individual ES options.

Most Local Landscape Character Assessments are only available on line as .pdf files. The boundaries of local Landscape Character Areas / Types therefore have to be judged by eye rather than through the use of GIS.

Identifying the location of individual survey squares within each Cluster

It is assumed that five survey squares will be identified per Square Cluster. The location of survey squares will be determined primarily by four factors, namely, that:

- the combination of squares within a cluster covers a range of ES options that are typical of the type of landscape under consideration.
- a survey square typically covers one or two holdings (although in areas of small-holdings / small farms) there may be more. This is simply to keep the number of FERs and FEPs that need to be reviewed within reasonable limits.
- each survey square has a significant area under ES option.
- a right of way or minor road provides a transect across the survey square allowing the majority of ES options within that square to be viewed close at hand.
- the travel distance between squares is manageable, allowing five squares to be surveyed in one day.

Identifying the key landscape characteristics of each survey square

As noted previously, key landscape characteristics are central to the rapid survey methodology. These will be identified for the Square Cluster (para 15) and thus for each survey square in that Cluster from the relevant local landscape character assessment.

Preparation of maps to be taken into the field as part of the field survey

Three maps are needed to inform the field survey:

- Overview map of the Square Cluster showing the location of the 5 survey squares overlaid on OS 1:25,000 (for general navigation)
- **Map 1:** Map of the active ES options within each survey square (one map per square). These will need to be checked against the relevant FEP/FER information to ensure that all information on ES options is correct.

- **Map 2:** Aerial photo of each survey square with overlay of Mastermap, contours and the survey transect to provide detailed context.
- FER & FEP Maps (baseline features and the most recent options map) for each sample holding covered by each square. The holding numbers for each survey square will need to be noted and passed to Natural England to allow the identification of the relevant FERs and FEPs.

Map 1 should be extracted from a new England-wide map showing the accurate spatial distribution of all ES options. This will need to be developed by Natural England by applying the point data on ES option location held by NE to the Rural Land Registry Land Parcels Data. This ensures that each field will have its own unique (ID) land parcel reference number. However, the spatial option data held by NE only covers area options and not linear or point options which, for the selected squares, will need to be digitised or marked on printed maps by hand using the relevant information on the FERs / FEPs option maps.

There will be considerable economies of scale if all of this preparatory work can be undertaken as one phase, allowing all maps to be prepared as a single exercise.

Field survey

Field survey preparation

Supporting references: The following supporting references need to be available to surveyors in the field:

- Entry Level Stewardship: Environmental Stewardship Handbook. Fourth Edition January 2013 or subsequent editions (Chapter 3 describes the individual options)
- Higher Level Stewardship: Environmental Stewardship Handbook. Fourth Edition January 2013 or subsequent editions (Chapter 2 describes the individual options)
- Condition scoring protocol (developed by LUC as part of BD5303).

Survey documents and equipment also needed in the field include:

- Ordnance Survey Explorer (orange) maps covering the Square Cluster
- SLR digital camera
- Tablet with survey spreadsheet and linked GPS
- Compass
- Binoculars
- Clipboard (with waterproof cover) for maps

As in BD5303 the survey spreadsheet will need to be pre-populated with the key landscape characteristics of each of the survey squares.

Field survey conducted within each of the survey squares

The field survey and results will be collected using a spreadsheet, ideally loaded onto a Tablet allowing direct entry of results in the field. Maps can also be held in digital form but from the experience of BD5303 may be better in paper form so that they can be referred to at the same time as the survey results are being entered.

The purpose of the field survey will be to:

- Verify the key landscape characteristics of each survey square

- Assess the landscape impact of each ES option in turn and relate the identified effects to the relevant key characteristics.

The Excel spreadsheet

The Excel spreadsheet is shown in **Figure A1.1** at the end of this Appendix. This is a much condensed version of the BD5303 field survey pro-formas. It focuses on the most important aspects of the landscape effects of individual ES options.

The Excel spreadsheet assumes that the user is familiar with landscape characterisation and landscape monitoring but minimises the amount of text responses required.

The main elements of the spreadsheet are as follows:

General information

The spreadsheet asks for:

- Survey square number
- Grid reference
- Cluster name
- NCA: (in which the cluster lies)
- ALT:(in which the cluster lies)
- Number of ES agreements in the square
- Reference number of each agreement
- Nature of the agreement: (selected from a drop down menu: ELS; UELS;(0); HLS; HLS only)
- Surveyors name
- Date
- Weather (selected from a drop down menu)

Key characteristics of the landscape of the survey square

These key characteristics will be taken from the relevant local Landscape Character Assessment, with the spreadsheet pre-populated with this information **before** going out into the field. As a first task in the field, from a vantage point where the majority of the square can be seen, the key characteristics are reviewed, with:

- The existing key characteristic phrases edited if required to reflect the local circumstance
- Additional key characteristics added if they are present in the square but are not present in the wider area or have previously been missed
- Key characteristics deleted if they are not present in the square.

This revised list of key characteristics will then set the template for the assessment of the effects of ES options on the local landscape.

Assessment of the landscape effects of individual ES options

Only those options that can be viewed from the transect will be assessed. The spreadsheet is designed such that each separate parcel or length of an option is assessed separately i.e. if there are three separate land parcels under the same option (e.g. EK2) the option will be assessed three times, once for each land parcel. In the case of linear features a single length will be identified as a continuous length of, for example, hedgerow where there is no substantial break and where the

hedgerow is of common character and under a single ES options. It will become a separate length if there is a gap or 5m or more, the hedgerow changes in character, or where it is under a different ES option.

The separate cells of the spreadsheet, moving from left to right are:

a) *Option:* (enter option code)

b) *Is the landscape feature under option a key characteristic?* Answer Yes or No. Key characteristics will encompass elements such as hedgerows, field walls, field trees, farm woodlands, semi-natural grasslands. Conversely features created by ES that are not traditionally found in the landscape such as field buffer strips and bird plots, are not traditional features and so will not be identified as key characteristics.

c) *Map ID:* Enter the unique ID number by which the option can be identified, in the case of area options this will be the land parcel number of the field.

d) *Co-located with…?* This requires that any other ES options that relate to exactly the same parcel of land / length as the primary option are entered here. This may include supplements. Under ELS, up to two options[11] can be co-located under HLS a wider range of options can be co-located[12].

   The only exception to this will be when separate options with entirely different landscape effects are co-located on the same parcel of land. Examples of this are new fence lines to facilitate grazing or a new access route across a field. In these cases, while these options may form an integral part of the overall plan for the land parcel in question, such as enabling the reintroduction of grazing as part of a scheme to restore a flower-rich meadow, their landscape impact will be different to that of the associated grassland options. In these cases, therefore, the fence line or access track should be scored separately from the co-located grassland options, being added as a new line to the spreadsheet.

e) *Landscape impact:* This cell scores the landscape impact of the option (or co-located options) in question. One of five scores can be selected. If the option is co-located with other options then the score will be for the main option and the co-located options in combination. The five alternative scores(which are the same as those used in BD5303) are*:*

   - *Enhancing (landscape character):* by adding new features / land cover that are characteristic of the landscape and/or enhance local distinctiveness. This might include re-introducing features traditionally associated with the landscape that have previously been lost (e.g. traditional orchards).
   - *Conserving (landscape character):* conserving important traditional landscape features / landcover that are characteristic of the landscape and valued because they have suffered from significant loss / decline in the wider landscape of the NCA, or nationally (even if common in the sample square). They are also aspects which are difficult and / or time consuming (taking a number to many years) to recreate / re-establish. In terms of the landscape effects of options assessed under this category, they are judged as being of equal importance to those options that are 'enhancing' landscape character (as they are focused on existing features of importance in the landscape). Species-rich semi-natural grasslands and heathlands are examples of land uses likely to be in this category (if being appropriately conserved through ES).

[11] There are a number of specific exceptions to this. See page 118 of the Environmental Stewardship Entry Level Handbook 4th Edition January 2013

[12] The potential for co-location of options is set out in the Environmental Stewardship Higher Level Handbook 4th Edition January 2013 starting on page 57

- *Maintaining (landscape character):* maintaining landscape features / land cover that are characteristic of the landscape but distinguished from the above in that they have not suffered from significant decline in the wider landscape (e.g. permanent [improved] grassland in pastoral landscapes) – and are easy to restore/re-create if lost.
- *Neutral (no change):* having no visible landscape effects at the time of field survey.
- *Detracting (from landscape character):* having an adverse effect on landscape character – either because the option itself is uncharacteristic / intrusive (e.g. new fence lines); or more often due to the option being poorly located in the landscape.

f) *Adjacent to… (name option):* This cell identifies any other ES option that lies close to the option being assessed, allowing consideration of whether this proximity has an additional landscape effect (either positive or negative) that is greater than the score given to the options in isolation.

g) *Proximity score:* This cell records the proximity score for (f) i.e. the combined landscape effect of the two options seen together. The purpose of this score is to understand the potential landscape benefits or disbenefits of locating certain ES options directly adjacent or in close proximity to each other. One of three scores can be selected:

- P – the two options in close proximity brings greater landscape benefit than the two options considered separately.
- 0 – there is no additional landscape benefit from the two options being in close proximity.
- D – the two options in close proximity has a more strongly detrimental effect than the two options considered separately.

h) *Condition of feature under option (or options if they are co-located):* Using the condition classes developed under BD5303 this cell records the condition of the feature under option according to one of three classes:

- *POOR* - the landcover / feature shows little evidence of current management, is derelict or poorly managed. For example, this may include a collapsed stone wall network or an abandoned field.
- *FAIR* - if the landcover / feature shows some evidence of recent but not necessarily regular management and / or is reasonably intact and could be brought back into good condition through the reintroduction of appropriate management.
- *GOOD* - if the landcover / feature shows *evidence of appropriate management and is intact and in a good state of repair.*

i) *Is the landscape feature under option noticeably different to those that are not?* Answer Yes or No. This will require the surveyor to identify the same feature in other locations in the survey square that are known not to be under option and to consider whether there are any noticeable differences in the state / management of the feature between those that are and are not under ES option.

Summary of landscape effects

The spreadsheet ends with a number of overview questions relating to the survey square as a whole, as follows:

- *What is the overall impact of the ES options on the landscape of the survey square?* This follows the same gradation as under ‘Landscape Impact’ of the individual options, with the score identified numerically as follows:

Enhancing = +2
Conserving = +2
Maintaining = +1
Neutral = 0
Detracting = -1 or -2 (depending on severity)

- *Does the survey square appear to be in noticeably better condition than the surrounding landscape (not under ES options)?*

- *Comments:* Opportunity to make any particular comments relating the survey square. Particular aspects that will be worth a comment are:

  - *Options that are having a particularly beneficial or detrimental impact on the landscape either singly or in combination and the reasons why*

  - *The reasons why the square appears better or worse than the surrounding landscape, relating answers to the role of ES.*

Reporting

Analysis of the spreadsheets from a large number of Square Clusters will allow assessment of the landscape impact resulting from particular ES options, especially those with the highest level of uptake and which are geographically most widespread.

Amalgamation of this data by ALT will allow analysis of the landscape implications of ES in different types of landscape.

Figure A1.1: Rapid Survey Method

Survey Square details:										Date				
Cluster Name:										Surveyors Names				
Related Squares										Weather				
NCA														
ALT														
Grid Co-ordinates														
No. of agreements in square														
Agreement number and type														

Line No	Options	Is the landscape feature under option a key characteristic?	Map ID	Co-location with	Landscape Impact					Adjacent to	Proxicity Score	Condition of the feature under agreement	Are landscapes features under agreement noticeably different from those which are not?
					Enhancing	Conserved	Maintained	Neutral	Detrimental				
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

Overall Impact of ES options on the landscape character of the survey square	
Does this square appear to be in better condition to the surrounding landscape	

Comments	

Appendix 2: Assessing the landscape effects of ES at the Strategic Level (NCA and ALT Levels)

This method follows the outline approach described in paras 3.10 – 3.16.

Use of these base data

The identified base data have been used to directly inform the approach through:

1. **A Database:** The key datasets have been brought together in an Access database that captures (a) the key landscape characteristics of each NCA grouped by the themes noted above; (b) a comprehensive list of every ES option, their potential landscape effects (drawing on the BD5303 Field Survey results), and additionally information on the scheme to which each option belongs – (ELS, UELS, HLS); and (c) the uptake of each option by each NCA based on the data in Genesis.

2. **Database links:** For each key landscape characteristic, links have been made to those options that have the potential to affect it and in turn to the uptake of those options. Each option has only been linked to one key characteristic (to avoid double counting) but each key characteristic is likely to be affected by a suite of options, so any one characteristic is likely to linked to a range of options.

3. **Stock:** In order to understand the stock (i.e. the extent of each key characteristic) in each NCA, analysis of LCM 2007 GIS data was undertaken. LCM 2007 data was cut to each NCA and analysed using GIS to calculate total stock under each broad habitat and sub-habitat. For some key characteristics, LCM 2007 data were not the best available and additional GIS data sources were interrogated as noted above, such as Natural England's Traditional Orchards Inventory and other historic environment data sources. For linear/boundary features, non-spatial field survey data from the 2007 Countryside Survey was interrogated as well as the National Forest Inventory from the Forestry Commission to identify the boundary lengths of woodland blocks within each NCA.

4. **Published maps:** In piloting the approach under BD5303, a published map was prepared for each NCA to identify the location of area options and stock. The published map paired spatial stock and uptake data for each key characteristic allowing uptake to be viewed as a layer on top of the baseline stock data. The uptake data that was used for these maps was Natural England's ES uptake GIS dataset. This national dataset can be cut to each NCA in GIS. It is a polygon dataset of field parcels and option uptake within them.

In using LCM to provide the assessment of **stock** a considerable amount of effort went into trying to find the best broad habitat and sub-habitats of LCM to (a) reflect the different key characteristics and (b) to prevent double counting of stock between different key characteristics. The full set of LCM of broad habitats and sub-habitats is set out in **Table A2.1**. In some cases there was not a direct fit between the LCM habitats and the identified key characteristics, for example, there is no LCM sub-habitat for wet grassland and so rough grassland has been used as a proxy for this landscape feature. Nevertheless, having a measure of stock against which to compare ES uptake is a major step forward for this type of assessment. The use of LCM across all NCAs provides a constant measure greatly increasing the accuracy of cross comparison between NCAs.

Table A2.1: LCM Broad habitats and sub-categories

Broad habitat	Broad habitat sub category	Code
Acid grassland	Acid grassland	Ga
Acid grassland	Bracken dominated grassland	Br
Arable and horticulture	Arable bare	Aba
Arable and horticulture	Arable Stubble	Ast
Arable and horticulture	Arable unknown	Au
Arable and horticulture	Arable wheat	Aw
Arable and horticulture	Orchard	O
Bog	Bog	Bo
Bog	Bog, grass dominated	Bg
Bog	Bog, heather dominated	Bh
Broad leaved, mixed and yew woodland	Deciduous	D
Broad leaved, mixed and yew woodland	Mixed	M
Broad leaved, mixed and yew woodland	Scrub	Sc
Built up areas and gardens	Bare	Ba
Built up areas and gardens	Suburban	Us
Built up areas and gardens	Urban	U
Built up areas and gardens	Urban industrial	Ui
Calcareous grassland	Calcareous grassland	Gc
Coniferous woodland	Conifer	C
Coniferous woodland	Felled	Fd
Coniferous woodland	Recent (<10 years)	Cn
Dwarf shrub heath	Burnt heather	Hb
Dwarf shrub heath	Gorse	Hg
Dwarf shrub heath	Heather and dwarf shrub	H
Dwarf shrub heath	Heather grass	Hga
Fen marsh and swamp	Fen marsh and swamp	F
Freshwater	Flooded	Wf
Freshwater	Lake	Wl
Freshwater	River	Wr
Improved grassland	Hay	Gh
Improved grassland	Improved	Gi
Inland rock	Despoiled land	Ud
Inland rock	Inland rock	Ib
Littoral rock	Littoral rock	Lr
Littoral sediment	Littoral mud	Lm
Littoral sediment	Littoral sand	Ls
Littoral sediment	Saltmarsh	Sm
Littoral sediment	Saltmarsh grazing	Smg
Montane habitats	Montane habitats	Z
Neutral grassland	Neutral grassland	Gn
Rough low-productivity grassland	Rough low-productivity grassland	Gr
Supra-littoral rock	Supra-littoral rock	Sr
Supra-littoral sediment	Sand dune	Sd
Supra-littoral sediment	Sand dune with shrubs	Sds
Supra-littoral sediment	Shingle	Sh
Supra-littoral sediment	Shingle vegetated	Shv

The separate steps in the approach

The description that follows sets out the separate steps in the approach that directly reflect the evaluation and monitoring questions set out in para 3.12. In this approach these questions are addressed in turn for each of the landscape themes (para 3.13).

1. What are the key characteristics / elements of the NCA?

- These key characteristics were informed by the database of NCA key characteristics with further information being sought as necessary from the original and fine-grained NCA descriptions.
- Only two or three of the most important characteristics or elements were recorded per theme (focusing solely on those that may be affected by ES)
- Where relevant, the distribution of key characteristics / elements within the landscape were noted to help assess the appropriateness of the location of ES options.

2. What are the relevant objectives?

- These are essential both to the development of indicators and to the assessment of effects.
- Objectives were informed by the original and fine-grained NCA assessments; they are common sense and brief.
- Where there were gaps in coverage of objectives for some landscape elements these were plugged, informed both by the stock and uptake data, as well as the landscape descriptions of the NCAs and, where they had been completed, by the Key Facts and Data of the NCA Profiles.
- The new objectives forming part of the updated NCA Profiles were not used during BD5303 as they were still in development and their concerns stretch beyond the application of agri-environment schemes.

3. Which ES options may potentially influence the key characteristics/ elements?

- In most cases relevant options were clear from review of the ES handbooks' option categories and were also informed by the BD5303 database.
- Review of all the potential options is important to understand the impacts of ES option selection. Are the right options (i.e. those that will offer optimal landscape benefit) being selected?
- Most key characteristics/elements will have the potential to be affected by more than one ES option.
- Also need to consider which options may be adding **new features** to the landscape and whether the landscape effects are likely to be positive or negative. New features primarily relates to the Arable options for buffer strips and other margin, block and plot options (again for Arable).

4. What indicators can help in reaching judgements

- The indicators flow from both the objectives and from the options with the greatest uptake – and hence their selection requires judgement.
- In most cases 2-3 indicators per landscape theme were identified as sufficient.
- Sometimes there may be an objective but no relevant uptake (and occasionally uptake but no relevant objective).
- Indicators are similar but not necessarily the same for all landscapes of the same ALT, because key characteristics differ.
- Where possible indicators are expressed as ES uptake as a % of stock – but this is not possible for some themes which have no available stock figures.
- Where no stock figure was available, uptake level was expressed as a number (area or length) to form a simple indicator.

- For some themes surrogate stock data have been used, e.g. listed buildings as a surrogate for historic farm buildings – obviously these will provide less reliable indicators but they may still be better than no stock figure.

5. What is the level of uptake of relevant ES options

- This relates directly back to Step 3 'Which ES options may potentially influence the key characteristics/ elements?'

- Generally uptake for an obvious group of options with similar or related landscape effects was recorded rather than uptake for individual options (although there are some exceptions to this, e.g. haymaking where an individual option will have a very distinctive landscape effect).
- The focus is on the options with the greatest uptake – again an element of judgement is required.
- Where there is no uptake (but uptake would have been expected) this was also noted.

6. What is the stock of key characteristics / elements

- This was largely based on an analysis of LCM (2007).
- There were some difficulties in interpreting LCM classes and deciding which classes are most relevant to different ES option groups. As one example LCM has no separate recognition of wet grasslands (discussed in the supporting notes at the end of this Appendix).

7. What are the indicator results?

- For each indicator this specifically compared area / length of relevant ES option uptake with the overall stock of that key characteristic to create a percentage figure.

8. What threshold level/ pattern of uptake might be significant to landscape character and quality?

- Uptake thresholds have been developed to indicate the level at which landscape effects may be considered 'significant'.
- Thresholds very broadly reflect the level at which effects are likely to be noticeable.
- They have also been set at levels that will help identify which NCAs are performing relatively better and which relatively worse.
- Because most thresholds are expressed as uptake as a % of stock, they can be the same across all NCAs.
- However where thresholds are based on uptake level only and not as % of stock they need to be interpreted with greater caution.
- This applies to deer fencing, fencing along watercourses, in-field trees, fallow plots etc.

9. What are the effects of ES on the landscape?

This question is answered under three headings.

Overall effects

- Effects were classed as positive, neutral or negative by reference to:
    i. the objectives for that theme
    ii. the identified landscape effects of individual options
    iii. whether the uptake thresholds are met or exceeded

- In a few cases, e.g. wide buffer strips in arable, the effects will depend on the landscape context13 and so no definitive assessment of effects may be made.

Distribution

- Comments are made on the geographical distribution of effects where possible, using the published maps comparing the distribution of stock versus uptake.
- The assessment considers whether or not option uptake appears to occur in locations that are consistent with landscape character and objectives, and flags up any issues that may need further consideration (e.g. woodland that appears inappropriately located on moorland tops).

Are the right ES options being selected?

- This section comments on whether there has been uptake / sufficient uptake of the options with the greatest landscape benefit, and on whether there are other options that should be focused on in this NCA.

10. Overview

Finally, at the end of each NCA assessment a summary was provided of:

- the themes affected/ not affected by ES.
- the respective influences of ELS and HLS.
- whether ES is having a strongly positive, positive or neutral effect on the landscape as a whole, based on the nature and scale of its influence on all the different landscape themes.

Supporting notes on the approach

The notes below describe further considerations that have guided the approach in terms of its application to the individual landscape themes.

Woodlands and tree cover

- The assessment focused on broadleaved woodlands and tree cover as conifers are generally not managed under ES
- In-field and hedgerow trees were included under this heading
- Woodland management uptake levels (and hence the threshold of change) are relatively low across all NCAs primarily because the major driver of woodland management is the England Woodland Grant Scheme
- There are no stock figures for in-field (or hedgerow) trees so a crude uptake level was used as an indicator here
- LCM orchards does not provide a reliable stock measure – for example it does not record orchard areas in landscapes such as the Herefordshire Lowlands that definitely have orchards – for this reason the Traditional Orchards BAP Priority Habitat Inventory for England v2.2 available on MAGIC was used to provide the stock data for this element of the analysis

Field patterns and boundary types

- The NCAs with the greatest uptake of deer fencing, fencing along watercourses and wide buffer strips in arable were identified and comments on the effects of these options were made where appropriate

[13] Wide buffer strips from the field surveys have been identified as positive in large-scale arable landscapes where they can help define overall field pattern, especially where this has been weakened by past hedgerow loss. On the other hand they can distort the field pattern where applied to small-scale-fields of irregular shape – detracting from their intrinsic shape and often traditional character, reflecting past medieval field patterns.

Agricultural land use

- The main indicators here are all those options that relate directly or indirectly to the retention of permanent pasture
- Care is needed to avoid double counting of uptake relative to semi-natural grassland
- Stock data are generally taken from LCM rough and/or permanent grassland
- For fallow plots (potential negative effect) uptake level was used as a crude indicator (as clearly there is no stock as these are new introduced features).

Building materials and design

- Listed buildings were used as a surrogate stock measure – but note that many historic farm buildings are not listed and many listed buildings are not farm buildings, so this is less than ideal
- Strongly positive effects (e.g. Orton Fells, North Pennines) may reflect presence of field barns (although these are not listed among the key characteristics for these areas)
- There are some signs that uptake levels are depressed in peri-urban areas where there is high demand for barn conversions to residential use
- There is extremely low uptake of capital items (max 5-10 per NCA)
- As there is no uptake mapping, no comments on distribution have been made

Semi-natural habitats

- In upland and upland fringe ALTs, the stock of semi-natural grassland has been assumed to be LCM rough grassland
- In lowland ALTs the stock of semi-natural grassland has been assumed to be LCM acid, calcareous and neutral grassland (these figures seem to be particularly unreliable, especially those for calcareous grassland)
- Again care was needed to avoid double counting of uptake relative to agricultural land use

Setting landscape thresholds

As identified in academic literature, even where the science is strong, thresholds are rarely absolutes but are defined as a policy tool to aid decision-making. In the approach described above the thresholds are judgement-based closely informed by:

- The effects of ES options observed in the field and recorded in the database.
- The effects of different levels of uptake observed in the field.
- The uptake and stock levels identified across NCAs: these levels are essential to know before setting the thresholds because the change brought about by ES needs to be seen in context.

However, overall the thresholds **aim is to help judge the significance of the change in the landscape, positive or negative**, introduced by Environmental Stewardship option uptake. Fundamentally the thresholds have been set at:

- levels at which change would be expected to be noticeable; and
- levels that help to differentiate between NCAs that are doing well under ES and NCAs that are doing less well.

As noted above, these thresholds are normally expressed as a specific percentage of relevant ES uptake relative to the stock. Where there is no stock data the threshold has been set as a set

number or area of the landscape feature in question under option. Higher thresholds are set for those indicators where:

- there is a high stock and where significant uptake is needed to create any noticeable effect in the wider landscape, such as the conservation of hedgerows (a key landscape feature in most landscapes) and retention of winter stubbles in arable landscapes
- the stock is small and dwindling and therefore significant uptake is necessary as in some semi-natural habitats.

In addition the thresholds are particularly high at 50% for the management of archaeological features on grassland and on arable. This reflects that the measurement of the stock is very accurate, based on the combined measurement of the area of scheduled monuments and of non-scheduled sites identified through Natural England's SHINE dataset (para 3.14). It also reflects that, compared to other options, very high levels of uptake have been recorded.

Conversely thresholds have been set low for woodland management (at 5% of total stock) recognising that the more dominant grant scheme for woodland is the England Woodland Grant Scheme (EWGS).

Thresholds have also been tempered by the ES uptake figures. For example, there has generally been very low uptake for traditional orchard ES options across the whole country and for parkland too. As a consequence the threshold has been set low with an uptake at 5% of stock to ensure that where there has been some noticeable uptake this is captured.

Assessing landscape effects

In this approach, as described above, the effects of ES on landscape character and quality have been judged for each key landscape characteristic / element by comparing the indicator result (Question 7) with the stated threshold (Question 8) with effects classed as:

- **positive** if the threshold is met or exceeded
- **neutral** if the threshold is not met but the options are not having a negative effect on the landscape
- **negative** if one or more options are having a negative effect on the landscape (these options are few in number and relate to extensive protective fencing and some forms of arable plots) and have sufficient uptake to meet or exceed the stated threshold.

The approach then takes a further two steps (a) to summarise the effects of ES on the individual landscape themes of each NCA; and (b) to draw together these summaries for each theme to provide an overview of the landscape effects of ES on the NCA as a whole, as follows:

Assessing the effect of ES on each landscape theme

This assessment is based on a three point 'score' as follows:

- 1 point: ES is having a **strongly positive** landscape effect with most (or key) identified thresholds of individual indicators (within that theme) being met or exceeded.
- 0.5 points: ES is having a **positive** landscape effect with some identified thresholds for individual indicators (within that theme) being met

- 0 points: ES is having a **neutral** landscape effect with most or all the identified thresholds not being met.

Overview of the landscape effects of ES on the NCA (or ALT) as a whole

In turn, to summarise the effects of ES on the landscape of the NCA as a whole, the assessment findings are drawn together as follows:

- **Strongly positive** for the landscape of the NCA where the sum of the theme 'scores' = 4.5 – 6
- **Positive** for the landscape of the NCA where the sum of the theme 'scores' = 2 – 4
- **Neutral** for the landscape of the NCA where the sum of the theme 'scores' = 0 –1.5

Comparison with the field survey assessments

These classes or 'scores', based around an initial assessment of **positive**, **neutral** or **negative (detracting)**, are simpler than the five point assessment used in the field survey work which had the separate classes of **enhancing**, **conserving**, **maintaining, neutral** and **detracting**.

This reflects the different scales of the two assessments (Ikm squares for the field survey compared to a whole NCA of up to 300,00ha) and their different purposes. A primary requirement of the field survey was to assess the landscape effects of individual options and it was important to understand not only whether the option was beneficial to the landscape but *why* it was beneficial with:

- Enhancing relating to the recreation of lost features or the addition of new ones of benefit to the landscape
- Conserving relating to conserving and restoring valued key characteristics / elements which have suffered significant decline in the past and take a considerable time to re-create (often many years) if lost e.g. hedgerow trees or semi-natural habitat
- Maintaining relating to the retention of key characteristics / elements which are common in the landscape and can be recreated relatively quickly, such as improved permanent pasture.

In the case of the NCA (and ALT) assessments described here, the purpose has been to assess the effect of ES over *whole landscapes*. It has been important, therefore, to keep the assessment scores simple against the huge amounts of other data that were being analysed in terms of the measurement of stock and the range of options and their uptake being considered (explained further in Chapter4). In this assessment the score of 'positive' brings together those options that are enhancing, conserving and maintaining the landscape. But there are two important points to note:

- In the *field survey assessment,* enhancing and conserving were considered of equal importance as it is as important to conserve valued landscape elements as it is to recreate them
- In the *NCA (ALT) assessment,* described here, those types of option described as maintaining the landscape, such as the retention of winter stubbles or permanent pasture have been given higher thresholds to reflect that their value in the landscape is to remain 'common'.

Appendix 3: Assessing the landscape effects of ES at a strategic level, a bespoke approach

This refines the approach developed under BD5303 through the development of a separate bespoke database that has allowed greater consistency in assessments between NCAs and allows the data on ES uptake and stock to be prepopulated into the database. It has also allowed further consideration of the landscape objectives and indicators. This development is still firmly built around the nine evaluation questions that guided the BD5303 approach.

Developing objectives

Building on the development work undertaken for BD5303, a generic list of 46 objectives has been used within the bespoke database. Each objective relates to a key landscape feature (key characteristic) and the list represents the full set of objectives that should be required across all 157 NCAs.

Developing indicators

As in BD5303, for each objective, a linked indicator has been generated, drawing on the experience gained through BD5303. As before, indicators are expressed as a percentage of ES uptake versus stock (either as a percentage of area or a percentage of length depending on how the relevant ES options are measured). As in the BD5303 assessment, where no stock figure is available, uptake level (area, length or number as in trees) may form a simple indicator.

As for BD5303 significant effort was put into ensuring that the right stock data was selected for each indicator, and also the right ES uptake data.

Setting thresholds

Again, building on the experience of BD5303, a threshold has been set for each indicator and tested through some early piloting of the newly formed database. As before, these thresholds help the assessor to evaluate whether ES is having a positive, neutral or negative effect on a landscape.

These thresholds are normally expressed as a specific percentage of relevant ES uptake relative to the stock. Where there is no stock data the threshold has been set as a set number or area of the landscape feature in question under option. The variation in threshold levels for different landscape objectives has retained the thinking developed through BD5303.

All of the above information has been aggregated into a master table which sets out each of the objectives with its corresponding indicator, relevant uptake and stock data as well as the threshold.

The bespoke database

The bespoke database that has been developed has the following elements:

- Clear data entry forms have been developed allowing those unfamiliar with access databases to complete the individual NCA analyses.
- The database and the data entry forms have been structured around the nine evaluation and monitoring questions identified in Chapter 2.

- The data entry forms have been built up horizontally moving from left to right through the evaluation questions making it easier to see the flow of information relating to each evaluation question (rather than vertically as in the BD5303 NCA indicator and threshold Word tables).
- For each NCA the database pre-populates the data entry form with the relevant base information relating to the area of ES uptake by relevant options and the area / length of the stock of key landscape features.
- Thus completion of the data entry form per theme, once the key characteristics have been entered, requires the selection of the most appropriate objectives to which are linked the correct indicators and thresholds, and the relevant stock and ES uptake data. In turn, the database displays the indicator score which can be compared with the threshold.
- The assessor then needs to (a) check the pre-populated data; (b) check the indicator score derived by the database from a comparison of relevant stock and uptake data; and (c) identify whether for that objective the effect on the landscape is positive, neutral or negative.

In **Table A3.1** below the overall structure of the Microsoft Access database is illustrated. The database has been developed to facilitate the assessment and follows the logical thought process that the Assessors need to follow in order to arrive at the final assessment for each NCA.

The following key is used in **Table A3.1** to denote how the information is entered/created:

Action is required by assessor at the time of reviewing an individual NCA – either in the form of preparing free text, tick box selection or dropdown menu selection
No action required by assessor at the time of reviewing an individual NCA as the data is prepopulated

Table A3.1: Database structure

Information	Method of inputting data into database
Evaluation for each theme	
1. Key characteristics/ elements	Key characteristics per NCA are pre-populated from the BD5303 NCA key characteristics database. .
	The key characteristics require checking against full fine grained landscape descriptions. They are edited to focus on the relevant key landscape **elements** of that NCA. The stock and uptake data are used as a check to ensure that the edited key characteristics include all relevant landscape elements.
2. Objectives	For each theme, a list of objectives has been generated at the outset directly linked to each key landscape element. These objectives are presented in the data entry form as a list for each theme.
3. Selection of relevant objectives	A tickbox selection allows the assessor to mark which objectives are relevant to the NCA being assessed. (For each objective, the assessor uses the edited key characteristics as well as stock and uptake data (described below) to judge whether that objective is relevant to the NCA. Only those objectives marked as relevant form part of the assessment.
4. Indicators	Each objective has a corresponding indicator expressed as a percentage of uptake versus stock (measured as area, length, area or number).
5. Uptake	Drawing on the analysis of Genesis uptake data per NCA, uptake calculations are prepopulated against each objective/indicator and expressed as a total. In addition, to these totals, there is access to the 'raw' options uptake data so that it can be reviewed by scheme group (ELS or HLS) via a button. A series of summary calculations and queries have been set up behind the main database interface to allow the correct information to be pulled through to the right location. This has been done for **all** NCAs.
6. Stock	Where possible, each indicator has a corresponding stock value that is prepopulated using LCM 2007 analysis by NCA or analysis of other GIS datasets as described in the previous section. Stock calculations have been generated for each indicator for **all** NCAs in order for the relevant stock figure to be pulled through to the right location.
7. Thresholds	Threshold values have been set for each indicator for **all** NCAs. These were set up in a way that allows for 'tweaked' threshold values to recalculate '*on the fly*'[14]. This was important as initial piloting of a few NCAs highlighted where thresholds needed tweaking, and this set up allows thresholds to be changed and the indicator results to be automatically recalculated.

[14] '*on the fly*' means that the database contains a formula which allows a calculation to be made depending on the data that has been entered. Thus the actual calculation only occurs when the 'button' is clicked.

Information	Method of inputting data into database
8. Indicator results	Database analysis of the stock versus uptake values allows this to be prepopulated on screen – usually as a percentage value. These calculations have been set up as a formula that undertakes the calculation within the database. This has been done for **all** NCAs.
9. Effects Are the effects on the landscape: positive, neutral or negative?	The assessor uses the above information on uptake, stock, and indicator result compared to the threshold to evaluate whether the effects on the landscape for each objective are positive, neutral or negative and uses a drop down list to make this selection.
10. Are ES options with greatest potential landscape benefit being taken up?	For each objective, the assessor responds to this question with a Yes or No (selected from a drop down list) and enters the justification for this, if needed.
11. Overall effects on theme	Following completion of the assessment for each relevant objective, an overall effect of ES on landscape for that theme is selected (from a drop down list) by the assessor. The values available are strongly positive, positive, neutral, negative and not applicable. This overall effect reflects the sum of the assessments made against each of the objectives.
Summary results for all themes	
Theme effect scores	The 'scores' from 11 are automatically assigned to the overall results summary with one 'score' for each theme. The scores are assigned as follows: • Strongly positive = 1 • Positive = 0.5 • Neutral = 0 • Not applicable = 0
Total score for overall effect	Based on the summation of the theme effect scores, an overall score for each NCA is generated. The scores are assigned as follows: • 0 – 2 = Neutral • 2.5 – 4 = Positive • 4.5+ = Strongly positive
ES seems to be benefiting the landscape in respect of:	This is a free text box for the assessor to complete having reviewed all of the analysis above.
ES seems to be having more limited impact on:	This is a free text box for the assessor to complete having reviewed all of the analysis above.
Comments	A free text box for the assessor to complete having reviewed all of the analysis above.

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Appendix 4: Methodology for public engagement to inform Environmental Stewardship monitoring

This method follows the outline approach described in paras 3.26 – 3.29. It is designed to be conducted on-line but was also tested as a street survey

A review of participatory methods on landscape appreciation and linked research informed the development of a methodology to ensure reporting on the results of ES landscape monitoring considered the way local communities perceive their local landscapes and changes occurring within them.

The review provided evidence that less heavily text based approaches, were preferable enabling people to understand and engage with the subject. The research also revealed that a choice experiment approach could yield appropriate results and therefore the methodology combined these two elements.

Survey sample

As part of BD5303 the public engagement method was tested in a subset of six National Character Areas, one per Agricultural Landscape Type. Parishes that overlapped the relevant Study Areas[15] were selected and population data used to assess the target sample size.

Recruitment

The public engagement was carried out via a voluntary online survey. Local groups and businesses including parish magazines, parish halls, community groups (WI, toddler groups, heritage groups etc.), pubs, cafes and local shops, were informed about the survey and asked to advertise the survey to others in their community or display a poster. Around 150 community groups and businesses were contacted across the six study areas. This involved an initial telephone call to the group or business leaders followed by a letter or email including further information and a poster for them to display. Demographic analysis was carried out in each of the sample areas that guided the publicity channels used and assessed the representativeness of the response. A small prize of a £25 voucher to be spent with a local business or donated to a local community group was offered through a prize draw to acknowledge the time commitment people had made in participating in the survey.

Online consultation methodology steps

For the online survey participants registered with an email address and password in order to access the consultation. The website 'front page' provided contact details, both email and telephone number, for people who wished to contact the team or encountered problems with the consultation. Responses were provided as soon as possible to enable people to continue with the consultation and to reduce any disappointment / frustration people may have felt through any problems encountered.

How do you know the landscape?

In order to focus attention on the landscape, participants were asked how they knew the landscape. This information provided participant data whilst also enabling attitudinal information to be gathered about the participant's relationship with the landscape.

The first stage of the survey was to ensure familiarity with the landscape in question – participants were asked how long they had known the landscape for and how they knew the landscape in terms

[15] For the field work element of the BD5303 study, described in Report 1, one Study Area was identified in each sample NCA

of which activities they enjoyed in the landscape. Participants then marked on a map the area of landscape which they knew best and were considering when completing the survey. An alternative of providing a postcode was available to marking on the map to save people time and to make the survey as easy and accessible as possible for all participants. The need for an alternative method became clear during early tests of the online survey when some people had difficulty in using the map.

Which features do you value: what is their condition and how have they changed?

This aimed to identify which landscape features participants felt were important to landscape character, based on 18 categories related to ES funded options. The grassland options (for improved permanent grassland, semi-improved grassland and unimproved grassland were combined into one category as it was clear in user testing that the different categories were too difficult for people to identify separately in the local landscape.

Table 2.1 shows the set of icons and short text definitions that were used to describe the different features. Participants were asked to select characteristic features they felt were representative of their local landscape.

Table 2.2: Icons and descriptions of landscape features

Icon	Description
	Access - the rights of way and the ability to access the landscape for recreation and enjoyment. This includes footpaths, field entries, stiles etc.
	Field boundaries - boundaries around the edges of fields to enclose different parcels of land and create pattern and scale. Can include hedgerows, walls, ditches etc.
	Field trees - trees which are a feature either within a field, providing shelter to animals, or trees which are a part of hedgerows.
	Field margins - An area of land, usually strips or corners between the boundary and crops, not under cultivation and providing habitat and food for animals and plants.
	Historic environment - all the material remains that have been created in the landscape by previous generations, e.g. field barns, routeways or ridge and furrow.
	Arable crops - a plant crop cultivated for food or other uses.
	Grassland - areas permanently covered by grassland and usually used for pasture or grazing.

	Wet grassland - periodically flooded pastures or meadow with high water levels. Almost all are grazed and some are cut for hay. May contain seasonal water-filled hollows, permanent ponds with reedbeds.
	Wetland - areas of land saturated by water, usually identifiable as swamp, marsh or bog land.
	Water features - ponds, streams, dew ponds and other features with an aquatic character.
	Coastal habitat - including sand dunes, coastal grazing marshes or dune slacks, or other habitats associated with the coast.
	Lowland heathland - characterised by heather, gorse and acidic grasses and generally found below 300 metres in altitude.
	Moorland - predominantly semi-natural upland vegetation, usually acidic and wet, includes purple moor grass, heather, heath, bilberry.
	Scrub - unmanaged land often characterised by low growing woody shrub plants such as brambles, willow, currants or alder.
	Orchard - area of land cultivated for fruit trees. Can be traditional with low usage of fertiliser or commercial.
	Parkland - designed and influenced by a land owning estate. Includes wood pastures: areas of pastoral land with abundant trees and sometimes hedgerows.
	Woodland - land covered by trees, which can be deciduous or coniferous or a combination of both. It can also mean plantation woodlands or semi-natural woodlands.
	Species conservation - land management aimed at conserving a species (or set of species) and the food source or habitat on which it relies for survival.

Following identification of these features, participants were asked to score any they recognised in the local landscape (not just those identified in the previous exercise) to show whether their condition was enhancing, stable or declining. The three categories were defined thus:

- Getting better – the condition of the element is improving or it is more abundant
- Staying the same – the condition of the element remains the same and it has not become more abundant
- Getting worse – the element is in a bad state of repair or is declining in quantity

This exercise generated data to understand the relationship between features, character and condition. The data generated gave an insight into how people view the character of their local landscapes; making it possible to compare their views with the interpretation of the landscape by professionals. It also enabled participants to build on their understanding of landscape change, in terms of considering how the condition of features had altered in the last ten years, helping prepare participants for the next stage of the consultation requiring them to think about future landscape changes.

Which of the elements should be funded for future management?

Participants were presented with a choice experiment asking them to allocate funding to the different features in order to direct future management in the landscape through two options:

- Improve condition
- Increase extent

Participants were free to decide how to allocate credits and it was made clear that they did not have to spend credits on every feature.

The results of how credits were spent both in terms of the different categories of landscape feature, and the choice between increasing extent or improving condition, helps to identify whether the public would choose to manage the landscape in line with current prescriptions for ES.

This develops understanding of how closely public perceptions and values for a landscape correlate with current policy approaches and funding options. It also enables an understanding, for participants, of the complexity of such management issues and the trade off approach required for selecting between the different elements and future management choices.

Attitude to landscape and demographic information

At the end of the consultation, participants were asked to provide basic information about themselves in order to identify the demographic of the survey sample. Information collected included age, gender and ethnicity. Information on the demographics for each Study Area was provided by the statistics team at Natural England to enable comparison with the sample. Information was also gathered about the participant's attitude to nature and landscape. Participants were asked to assess their level of interest in the landscape and to record the kinds of activities involving the natural environment that they participated in. Options included gardening, watching wildlife and walking. This section followed the Monitor of Engagement with the Natural Environment (MENE) survey.

Consultation Storyboard

Table 2.2 shows the steps in the consultation. Each step formed a separate page of the online consultation.

Table 2.2: Consultation storyboard

Stage	Contents and data requirements
Stage one	This survey is focused on the farmed landscape – the countryside and land that is managed by farmers. The farmed landscape is used to produce crops and rear livestock. It also provides habitats for plants and animals, and contributes to the character and 'sense of place' of an area. We would like to hear your views on what features make your local landscape and how you think these features should be managed in future. This will help us to understand the relationship between how land is managed and how you understand the landscape. • How have you got to know the landscape? CATEGORIES: • I live in the landscape • I work in the landscape • I regularly visit the landscape • I regularly travel through the landscape • Other • How long have you known this landscape? CATEGORIES • 0-4 years • 5-10 years • 11-15 years • 16-20 years • 20+ years • If you spend time in the landscape, which of the following best describes your activities? • To spend time with family • To spend time with friends • To learn something about the outdoors • For fresh air or to enjoy pleasant weather • For health or exercise • For peace and quiet • To relax and unwind • To exercise your dog • To enjoy scenery • To enjoy wildlife • To entertain children • To be somewhere you like

	Other (please specify below)
	In order to identify where you will be considering when you complete this survey please either input a postcode or click on the Location Map tab and draw the area on the map. A map was provided to allow people to place a pin / draw a boundary.
Stage two	What makes up your landscape? Landscapes are made up of different features, such as walls, hedges, woodlands, heaths, grasslands, waterways, farm crops, buildings, routes and so on. It is the combination of these different features that gives each landscape its own unique 'feel' or character. Some landscape features are more important to the character of the landscape than others – for instance, if certain features disappeared, the character of the landscape might change. Select from the elements below: • Access – the rights of way and the ability to access the landscape for recreation and enjoyment. This includes footpaths, field entries, stiles etc • Historic Environment – all the material remains that have been created in the landscape by previous generations, e.g. field barns, routeways or ridge and furrow. • Field boundaries – boundaries around the edges of fields. These enclose different parcels of land and create pattern and scale in the landscape. Boundary types can include hedgerows, walls, ditches etc. • Field trees – trees which are a feature either within a field, providing shelter to animals, or trees which are a part of hedgerows. • Field margins – An area of land, usually strips or corners between the boundary and crops, which are not under cultivation and provide habitat and food sources for animals and plants. • Arable crops – a plant crop cultivated for food or other uses. • Grassland – areas permanently covered by grassland cover and usually used for pasture or grazing. • Wet grassland - periodically flooded pastures or meadow with high water levels. Almost all wet grasslands are grazed and some areas are cut for hay. Sites may contain seasonal water-filled hollows and permanent ponds with reedbeds. • Wetland – areas of land saturated by water, usually identifiable as swamp, marsh or bog land. • Water features – ponds, streams, dew ponds and other features with an aquatic character. • Coastal habitat – areas including sand dunes, coastal grazing marshes or dune slacks, or other habitats strongly associated with the coast, which provide food or habitat to species. • Lowland heathland – land characterised by plants such as heather, gorse and acidic grasses and generally found below 300 metres in altitude. • Moorland – predominantly semi-natural upland vegetation, usually acidic and usually wet, includes species such as purple moor grass, heather, heath and bilberry. • Scrub – unmanaged land often characterised by low growing woody shrub plants such as

	brambles, willow, currants or alder. • Orchard – An area of land cultivated for fruit trees, can be traditional with low inputs of fertiliser or more commercial, which tend to be larger and more intensively managed with fertilisers and pesticides • Parkland – land which has been designed and influenced by a land owning estate. This often comprises wood pastures which are pastoral land with a strong wood and sometimes hedgerow character • Woodland – land covered by trees, which can be deciduous or coniferous or a combination of both. It can also mean plantation woodlands which are cultivated or semi-natural woodlands which are self sown and first developed naturally, rather than by being planted. • Species conservation – land management aimed at conserving a species (or set of species) and the food source or habitat on which it relies for survival.
Stage Three	The condition of a feature is its physical "intactness" – for example, is it in good condition, or is it in need of repair or becoming scarce? Condition can be affected by the state of repair (e.g. does a hedgerow have too many holes to provide a barrier?) or it can be affected by the quantity of something (e.g. are there enough hedgerows to provide a barrier?). **Think about how your local landscape has changed over the last 10 years or less. How would you describe the condition of your landscape under the headings below? You only need to consider the features which exist in your landscape or that you feel you can comment on.** CATEGORIES: • Getting better – the condition is improving or it is more abundant • Staying the same – the condition remains the same and it has not become more abundant • Getting worse – the feature is in a bad state of repair or is declining in quantity
Stage Four	Priorities for the future? You have credits to spend on managing your landscape. Please distribute these as you feel appropriate for the future management of the landscape. Use your credits to prioritise managing different features by spending them on those you feel are most important. For example: you can choose to spend one credit from each category on one feature, if you wish. Or you might choose to spend no credits on a feature if you feel it needs no further management. **What do you believe are the priorities for the future management of the landscape?** List of landscape features with the ability to score resources for each feature between 0 and 10.
Stage Five	Who are you? • What is your age? CATEGORIES: • 10-20

	• 21-25 • 26-30 • 31-40 • 41-50 • 51-60 • 61-70 • 70+ • What is your gender? CATEGORIES: • Female • Male • Prefer not to say • Which of these best describes your ethnic group? CATEGORIES: • White British • White Irish • Any other white background • White & Black Caribbean • White & Black African • White & Asian • Any other mixed background • Indian • Pakistani • Bangladeshi • Any other Asian background • Caribbean • African • Any other Black background • Chinese • Other (please specify) • Prefer not to say • On a scale of 1-5, (1 being low, 5 being very high) how would you describe your interest in the natural environment? • Which of the following activities involving the natural environment do you take part in? • Watching or listening to nature programmes on the TV or radio • Looking at books, photos or websites about the natural world • Looking at natural scenery from indoors or whilst on journeys • Sitting or relaxing in a garden • Gardening

	• Watching wildlife (including bird watching) • Choosing to walk through local parks or green spaces on my way to other places • Doing unpaid voluntary work out of doors • None of these Please choose everything you do, both regularly and occasionally.
Stage Six	Thank you and prize draw entry screen

Street survey

The street survey included the same questions as the online survey.

Focus Groups

The intention had been that the on-line survey would have been followed by small focus groups in a sub-set of the Study Areas to explore the perceptions of change in the agricultural landscape in more depth and test the results of the online consultation. This did not prove possible because of the poor response rate to the on-line consultation.

The aim had been that these focus groups would work on an information exchange basis where participants were provided with information about their local landscapes in exchange for them providing their views and perceptions on landscape change. This would have followed a similar format to the online consultation so that the results could be used to test and verify the findings of the online consultation. The structure of the focus groups, if undertaken, would have been as follows:

Presentations on the landscape and landscape features: The focus groups would have begun with a presentation describing the relevant national and local information about the landscape and how it may change (the updated NCA Profiles would have provided a valuable resource here).

Group mapping techniques: Following the presentation the participants would have worked in small groups with large scale maps to identify where they felt the boundaries of the relevant landscapes were. This would have helped to increase their comfort and confidence in thinking about the landscape in ways that may, thus far, have been unfamiliar to them and would have helped to focus their minds on the local landscape.

Each group would have then described why they had chosen the landscape i.e. what makes their area different from surrounding areas. It would have been made clear throughout this exercise that there was no correct boundary - all boundaries were appropriate. Participants would have been asked to focus on the farmed landscape, avoiding settlements.

Mind mapping exercise: The groups would then have been asked to consider landscape features using a Ketso engagement toolkit. They would have been asked to identify the features that they regard as key to the landscape, with each participant given 10 ‘leaves’ which are part of the kit. They would have been asked to identify what they see as the top ten features in the landscape (they could use less but limiting each participant to ten helps to focus thinking on the landscape). Participants would have been asked to add these to the Ketso under different categories as identified by different ‘branches’. They would have been able to discuss their choices with the group although consensus is not required. Each group would have been supported by a help sheet which included the icons and associated definitions that had been used as part of the online consultation to help them consider and understand landscape features.

The groups would have then been asked to identify the direction of change of these features i.e. whether they are getting better, staying the same or getting worse in condition and abundance. Again, discussion would be encouraged but consensus is not required.

The final stage of the mind mapping exercise would have required the group to discuss and identify on the maps which features they regarded as priorities for future action and management. This was a two staged process. Participants would have identified the features using icons on the mind map. They would then have completed a pro-forma as a group, providing a brief description of how they felt the features should be managed into the future.

Group feedback and discussion: Following the mind mapping session the groups would then have explained their choices and priorities to other groups followed by an overall discussion. This discussion would have aimed to identify an 'overall' list of key features for the local landscape and how these should be managed into the future.