Natural England

Effectiveness of historic environment options within the Countryside Stewardship scheme (HS3, HS4, HS9)

Final Report

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Authors	John Elliott, Samantha Outhwaite, Carla Turner, Ben Hockridge, Fiona Tweedie and Tom McFarland	**Technical reviewer**	Liz Lewis-Reddy
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EXECUTIVE SUMMARY

Background

Countryside Stewardship (CS) is a voluntary scheme that provides financial incentives for farmers and other land managers to undertake environmental land management through taking up a range of targeted options, including to improve the historic environment (HE). Under CS it is compulsory to include Scheduled Monuments (SMs) in their agreement; where the SM is not currently in good condition, applicants must choose options and/or capital items to improve the condition of the SM, or if the site is in good condition they should choose options to maintain the site in that condition.

This project focuses on three options from a suite of historic environment specific options that have been developed, namely:

HS3 Reduced-depth, non-inversion cultivation on historic and archaeological features;
HS4 Scrub control on historic and archaeological features; and
HS9 Restricted depth crop establishment to protect archaeology under an arable rotation.

These options aim to address the two greatest threats to historic environment features on farmland, namely cultivation and scrub encroachment. They were developed with the farming sector, and given the requirement to include SMs in agreements, it was hoped that option uptake would be high. However, data from CS agreements highlight that this is not the case and uptake has been very low, especially for HS4.

Research objectives and method

The aim of this project is to evaluate the effectiveness of three historic environment options within the CS scheme that have low uptake. This review is required to assess option deployment trends to understand where and why the options have been used, to gather evidence as to why options have not been selected and to suggest ways the options could be improved, promoted or targeted more effectively.

To address these aims, five key research tasks were deployed:

Task 1 - Analysis of data, including Agri-environment scheme uptake data, Heritage at Risk (HAR) data, RPA's CropMap and satellite data

Task 2a - Online survey of farm managers who omitted options HS3, HS4 and HS9 from their applications to understand low option uptake in areas where it is most needed

Task 2b – Telephone survey of agreement holders who have used options HS3, HS4 and HS9 (both on and off SMs) to assess their motivations for option choice

Task 3 - Field survey of option HS9 in-situ (both on and off SMs and within HT and MT) to assess option effectiveness

Task 4 – Synthesis and Recommendations

The research was impacted by the COVID-19 pandemic insofar as planned face-to-face interviews could not be undertaken and Task 3 site visits were undertaken in the absence of the agreement-holder. Risk assessment and relevant protocols were put in place to ensure Government regulations were followed.

Results

Analysis of data

Uptake of HS3, HS4 and HS9: Spatial datasets from Countryside Stewardship Scheme 2016 Management Options (England) identified a total 6,678 ha in HS3, HS4 and HS9. HS3 has the highest uptake at 88% of the total option area, while HS9 covers 11% of the option area and HS4 option area is just 1.6% of total option area. Uptake varies spatially with a south and east bias. Uptake of HS3 is greater in Higher Tier agreements (61%), while HS4 and HS9 have higher uptake in Mid Tier agreements (16% and 34% respectively). While there are approx. two land parcels in HS3 for each CS agreement, HS4 and HS9 are represented by just one land parcel in most agreements.

SMs under threat from cultivation and scrub: From the Heritage at Risk register (HAR) 50,072 ha of land has SMs under threat from cultivation and scrub. Of the total area, only 126 hectares are under option HS3, HS4 or HS9. Further analysis refined the area at risk, with the total HAR at risk of cultivation estimated at 3,117 ha with around 3.76% (117 ha) in options HS3 and HS9. HAR features at risk from scrub encroachment was estimated at 736 ha with 1.19% (9 ha) in HS4.

SHINE assets under threat from cultivation or scrub: The area of SHINE assets that intersect cultivated and scrub areas have been identified. HS3, HS4 and HS9 options cover 1,527 ha (<1%) of the area of SHINE sites at risk from cultivation, with most (95%) being in option HS3 (1,448 ha).

CSFF areas where heritage assets are at risk from cultivation and scrub: Focusing on CSFFs that fall with National Parks and AONBs that may have priorities on landscape and the historic environment. Of these, 34 had heritage or the historic environment as a priority and 29 groups highlighted improvement in the historic environment as an outcome.

Online survey of farm managers who omitted options HS3, HS4 and HS9 (n=25)

The online survey aimed to capture a broad sample of land managers targeted to areas of historic environment interest. A number of approaches were used to recruit the sample (including emailing to contacts, posting on the ADAS website and sharing on Twitter) but only 25 valid responses were received. This provided a list of non-participants for in-depth interview (12) but limits the statistical robustness of the survey results. As such, we report median rather than average responses and all data should be treated with a degree of caution.

Nine of the twenty-five farms have an historic environment option as part of their CS agreement. Reasons for not taking up HE options include concerns over the commitment and how that might restrict future land use or practice, a view that it was uneconomic at current payment rates and concerns over liability for any damage to features. One respondent reported that they were unaware of the HS options. Only a minority of the sample had considered taking up HS3, HS4 or HS9. Key points raised include:

- the new rules under Mid Tier only allow options on SM, not SHINE features
- strict CS rules limit eligibility for Historic Environment options

In-depth interviews with CS participants (n=34)

Of the 34 farms in the sample, 13 had taken up HS3, 7 had HS4 and 16 had HS9. Influencing factors driving option choice were dominated by practical considerations (fit with farm system, applicability of the scheme and economic factors), but access to knowledge and advice, including Historic England or Local Authority Historic Environment advisors is also important. Some respondents also reported a vested personal interest in the feature, citing feeling passionately about protecting historic features. Barriers to uptake also included lack of fit to

farming systems and economics but importantly some perceived risks were highlighted, including:

- inflexibility with regard to the option specification and risk of non-compliance;
- external conditions (e.g. weather and blackgrass) as a compliance risk;
- lack of consistency and flexibility with regard to expectations and compliance; and
- unclear advice and/or problems resolving disputes with the RPA

The interviews also highlighted lack of knowledge and experience of HE options, lack of guidance and advice, inflexibility in the rules, low payment rates and a complex and lengthy application process as barriers to uptake. Often these perceived barriers overlap, and compounded the reluctance to take up HE options.

In-depth interviews with non-participants (n=12)

Seven of the twelve non-participants (for HS3, HS4 and HS9) are currently in Mid Tier/ Higher Tier CS and a similar number are or have been in ELS/HLS. A range of justifications for omission of HS options were cited including, not being aware of the HS options and the incoherence of the option in relation to land management practices. Three common themes emerged around risk, perception of cost effectiveness and fit with farming system, including eligibility. The perception of risk related to repercussions and fines for non-compliance, together with the risks of being tied into the option for a prolonged period of time and of irreversibility.

Respondents also regularly perceived the options to be uneconomic, relating to the inconvenience of taking fields out of normal rotation, an inability to cultivate fields and a negative impact on the bottom-line of reduced production. Respondents that have omitted HS3, HS4 and HS9 options report finding the options too restrictive for their farming system, with greater consideration being given to options that would require no change to that individual's farming system. Some HS9 farms also felt obliged to use the option to protect Scheduled Monuments, even when the payment was considered inadequate, rather than not have an agreement at all.

Eligibility was also highlighted as a barrier to uptake. Several respondents highlighted that the presence of grass as part of an arable rotation in the year of application was a specific barrier to accessing the HS3, HS4 and HS9 options and as a consequence there was a need for greater flexibility to accommodate the range of farm contexts. This was however a mis-interpretation of the rules as the options can be applied on arable land or temporary grassland.

Field survey of option HS9 (n=15)

Of the farms visited 12 were in Mid Tier and 3 in Higher Tier. 13 had a SM and 2 had a SHINE feature. Farmers using HS9 on a part parcel basis were applying the cultivation techniques across the whole field because the option guidance lacked clarity and they did not realise that the whole parcel could be included.

At all the site visits a visual assessment of the risk of soil erosion or runoff on each parcel was undertaken using the Defra risk assessment guide. This highlighted that 50% of the parcels had a Moderate or High risk of soil erosion or runoff and as such should not have been eligible for HS9 under the current option specification.

No cover crops were observed in place at the time of visit. 7 of the 12 farmers had grown cover crops but not to control blackgrass. The cover crops were grown to allow early establishment of spring crops and to facilitate spraying of blackgrass after the cover crop was destroyed and a late autumn crop established.

While no prohibited activity was observed on the site visits and no fields were ploughed, there were two occurrences where a HS9 was being used on a part-field feature and there was also another option on the same area; AB9 Winter bird food which is not permitted and AB11 Cultivated areas for arable plants, which is permitted. AB options can be used to protect below-ground archaeology and historic features can be found on land at risk of erosion and run-off. The complexity around the eligibility of options should be resolved to ensure that features are protected through an appropriate option that applicants will want to choose, through consistent scheme guidance.

Discussion and recommendations

Bringing the findings together from tasks 1-3, a list of recommendations is made based on the evidence gathered in this research, as follows:

R1. Agree priorities for increasing uptake of HS3, HS4 and HS9 and, where options are in place, only remove these sites from the HAR when it has been verified that the risk has been addressed.

R2. Review opportunities for synergy (and conflict) between HE options and those focused on other outcomes, to support wider protection of at-risk features and ensure accurate statistics on features that are protected through CS.

R3. Review eligibility of HS options to resolve conflict between assessment of soil erosion and run-off and use of options HS3 and HS9.

R4. Improve the awareness of historic features on farmland, risks of damage and the role of farmers in protecting these assets, including through sympathetic management and uptake of AES options.

R5. Extend eligibility for the uptake of HE options in Mid Tier, to include SHINE features as well as SMs.

R6. Consider alternative payment mechanisms to 'additional costs and income forgone', such as reverse auctions or payment by results, so that higher payments can be made for valued assets on more productive land.

R7. Historic England should provide updated advice and guidance in a range of formats for farmers, explaining various farming/ archaeology types and what might be expected to survive there.

R8. Provide clarity on which CS options can be used on historical sites to encourage increased protection of features and reduce the risk of penalties. This should also cover options for non-designated sites.

R9. Maintain datasets to include up-to-date information on agreements and the location of management options. Up-to-date and accurate data allows for greater accuracy of analyses and improved understanding of the current levels of uptake

R10. Clarify option guidance, including the eligibility of land, aims and recommended management to improve option choice and understanding.

R11. Improve the clarity and consistency of information and advice on part and whole-field option coverage throughout scheme guidance.

R12. Consider opportunities to introduce more flexibility in terms of what land use and management (including precision farming) represents effective protection for groups of features across a range of contexts.

R13. Undertake research into the efficacy of targeted precision farming approaches in protecting historic features on arable sites.

R14. Review and revise HEFERs to ensure that they are more user-friendly

R15. Scope opportunities to increase applicability and eligibility for using all options on HE sites and HE options, particularly under Mid Tier so that regionally and nationally important sites that are not designated are offered protection.

CONTENTS

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Acronyms

Acronym	Phrase
AES	Agri-environment Scheme
ALGAO	Association of Local Government Archaeological Officers
AONB	Area of outstanding Natural Beauty
CS	Countryside Stewardship
CSFF	Countryside Stewardship Facilitation Fund
CSFO	Catchment Sensitive Farming Officer
ESA	Environmentally Sensitive Area
ha	Hectare
HAR	Heritage at Risk
HEFER	Historic Environment Farm Environment Record
HER	Historic Environment Record
HT	Higher Tier
ITT	Invitation to Tender
MT	Mid Tier
NCA	National Character Area
NE	Natural England
NI	Nationally important archaeological sites
NP	National Parks
RLR	Rural Land Registry
RPA	Rural Payments Agency
SHINE	Selected Heritage Inventory for Natural England
SM	Scheduled Monument

1 INTRODUCTION

Background

Countryside Stewardship (CS) provides financial incentives for farmers and other land managers (including foresters and woodland owners) for delivering environmental land management through a competitive application process. There are two 'tiers', Higher Tier, for the most environmentally important sites and often involving complex management, and Mid Tier, addressing more widespread environmental issues. Alongside delivering priority outcomes of improving biodiversity, the natural environment, water quality and reducing impacts on climate change the programme also aims to improve the historic environment (HE), including the protection and enhancement of historic and archaeological features, including non-domestic traditional rural buildings". CS has evolved from the previous agri-environment (AE) schemes as it is compulsory for farmers and land managers to include Scheduled Monuments (SMs) on their land in their agreement. Furthermore, the scheme stipulates that where the SM is not currently in good condition, applicants must choose options and/or capital items to improve the condition of the SM, or if the site is in good condition they should choose options to maintain the site in that condition.

To help deliver aspirations for the historic environment within CS a suite of historic environment specific options has been developed. This project focuses on three HE options:

- HS3 Reduced-depth, non-inversion cultivation on historic and archaeological features;
- HS4 Scrub control on historic and archaeological features; and
- HS9 Restricted depth crop establishment to protect archaeology under an arable rotation.

These options have been developed to address the two greatest threats to historic environment features on farmland, namely cultivation and scrub encroachment. Using Heritage at Risk (HAR) data for Scheduled Monuments (SM) as a proxy, one third of SMs are at risk from cultivation, with scrub encroachment being the second highest risk.

Uptake of HE options

Within the Mid Tier strand of CS only SMs are eligible for options HS3 and HS9, whereas in the Higher Tier strand, non-designated historic environment features as well as SMs are eligible (at the discretion of local Advisers). HS4 is eligible for all historic environment features in both tiers. Both HS3 and HS9 were developed with NE's arable specialists and an arable farming sector working group (comprising farmers, agronomists and arable plant specialists) to address a lack of uptake of similar Environmental Stewardship (ES) options in predominantly arable areas. In particular HS9 included a cover crop as a means of addressing farming concerns over black grass and a restriction on sub-soiling across archaeological features. Given that these options were developed with the farming sector, and given the requirement to include SMs in agreements, it was hoped that option uptake would be high. However, data from CS agreements highlight that this is not the case and uptake has been very low, especially for HS4.

Historic environment (HE) is a secondary objective in CS. Research on the early implementation of CS (Jones et al., 2018) noted that Higher Tier (HT) agreements were more likely than Mid Tier (MT) to include historic environment options, although most HE options (HS, HE codes) are available in MT, suggesting that uptake of these options in MT is poor. However, the analysis reported that more than 90% of options to reduce/remove of cultivation for historic features were applied to appropriate features in the databases, including HS3, HS4 and HS9 (although samples were small for HS4 and HS9). Overall, targeting of options to historic features was highly variable and this may be related to the quality of data in the targeting layers.

To help applicants make the right choices for their historic environment assets, they are provided with a Historic Environment Farm Environment Record (HEFER). The HEFER gives management recommendations from Historic England (HE) on how to maintain or bring SMs and other designated heritage assets into favourable condition by protecting the feature of historic interest and helps NE Advisers set management prescriptions. It also provides information from the local Historic Environment Record about undesignated historic environment assets on the applicants' land, and for Higher Tier applications management recommendations for undesignated heritage assets are also provided. Applicants are expected to use this information to help choose appropriate options and capital items.

In a recent review of HEFERs and SHINE data, Robertson (2020) highlighted two key points. Firstly that less than half of end-users found HEFERs easy to use and, secondly, how good quality historic environment advice can improve outcomes. To address these points, the report made a number of recommendations including simplifying HEFERs to improve the end-user experience in order to increase their impact on historic environment delivery, and to increase the level of historic environment options payments.

There is a range of literature on the role of farmer attitudes and behaviours with respect to engagement with agri-environment schemes but few focus on historic environment. While it is expected that many of the generic drivers for participation apply, it is likely that there are some very specific issues around HE. This is addressed in this research, with a defined focus on three discrete HE options, using an established behavioural model to frame the research (see chapter 2). Chapter 3 sets out the results and chapter 4 set out discussion and recommendations.

Aims and objectives

The **aim of this project** is to evaluate the effectiveness of three historic environment options within the CS scheme that have low uptake. This review is required to assess option deployment trends to understand where and why the options have been used, to gather evidence as to why options have not been selected and to suggest ways the options could be improved, promoted or targeted more effectively.

The overall **objectives of the project** are to:

1. Identify arable areas of England where little use has been made of HS3 and HS9;
2. Identify geographic gaps in the selection of HS4;
3. Where options HS3, HS4 and HS9 have been deployed, assess whether they have been deployed appropriately (e.g. in accordance with advice, on appropriate historic environment features & land use types, with tailored prescriptions and the correct Indicators of Success).
4. Use Heritage at Risk data as a proxy to identify areas where scrub and arable cultivation is a particular issue, and where there have been missed opportunities to deploy HS3, HS44 and HS9;
5. Engage with the farming sector to gather evidence as to why these options have low uptake;
6. Engage with the farming sector to understand option choice and to determine if different factors are at play for designated vs undesignated sites;
7. Assess the effectiveness of option HS9 and the inclusion of cover cropping within the option prescriptions;
8. Draw the evidence together to suggest ways the options and option guidance can be revised to deliver farmer requirements as well as the needs of the heritage asset;
9. Consider the potential for adding value to the options or indeed reducing requirements to focus on primary objectives.

2 METHODOLOGY

To meet the research aims, ADAS set out a series of tasks for evidence gathering, analysis and reporting: (1) analysis of data, (2) survey of land managers, (3) field survey and (4) reporting and recommendations (Figure 2-1). These align with research tasks 1-4 set out in the RFQ.

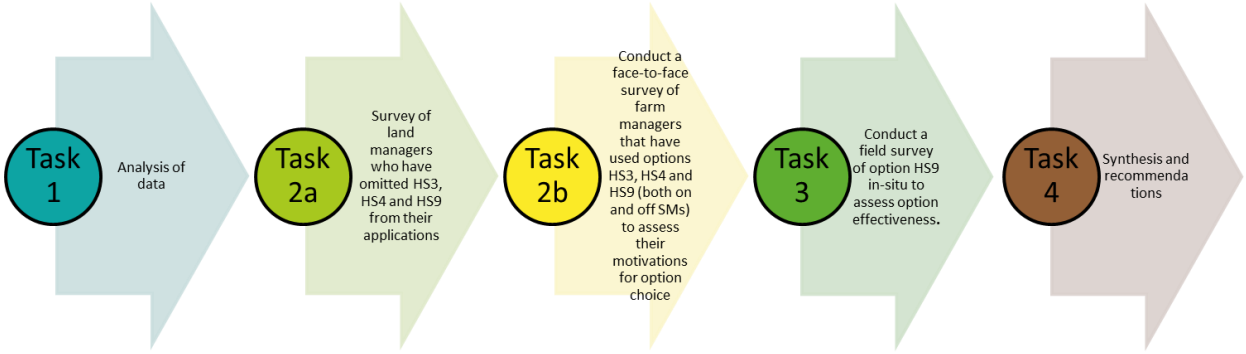


Figure 2-1 Project tasks

The methodology used for these tasks is described in turn in this section.

2.1 Task 1: Analysis of data on need and use of HE options

The 'Countryside Stewardship Scheme 2016 Management Options (England)' spatial dataset (2020 version) was used to identify **where options HS3, HS4 and HS9 have been taken up**. To determine the extent of the area covered by the option for HS3 and HS9, these were linked to the Rural Land Registry (RLR) parcel dataset using GIS analysis and that parcel used as a proxy for the option area.

A number of sequential steps were used:

1) **Identifying features at risk**. Historic England Heritage at Risk data for Scheduled Monuments (SMs) was used as a proxy for features that are at risk. The 2019 Heritage at Risk Register spatial dataset was used alongside a CSV extracted from the register that details condition assessment and principal vulnerability. SHINE (Selected Heritage Inventory for Natural England) features[1] were also mapped.
2) **Uptake of CS options where features are at risk**. Geoprocessing routines (e.g. intersect) were used to quantify the number of options of each type by scheme (Mid or Higher Tier) that coincide with 'at risk' SMs and SHINE features for each geographic area (e.g. county or National Character Area (NCA)) in England. Since the locations of option points may have a certain degree of inaccuracy, the proxy option areas (polygons) created have been used for this analysis. This has enabled an intersect to be performed using the SHINE features. SMs are not all on agricultural land so the dataset was refined for use as a denominator using the RLR land parcel dataset for agricultural land (i.e. only SMs that fall within an agricultural land parcel boundary). The extent of options covering SMs or SHINE features was calculated and compared against the total option extent or SMs and SHINE feature extent within each geographic region.
3) **Identifying SMs under threat from cultivation and scrub**. The details in the attributes of the SMs from the Heritage at Risk register, specifically the 'principal vulnerability' attribute, have been used to flag SMs that are under threat from cultivation and scrub.

[1] Provided by The Association of Local Government Archaeological Officers (ALGAO)

Geographic area (e.g. county or NCA) boundaries have been used in GIS routines to calculate the number and area of features with each type of principal vulnerability (i.e. cultivation or scrub) within each area.

4) **Identifying missed opportunities**. Each of the CS targeting statements were inspected to extract information on the historic environment priorities within that NCA. Whilst NCAs are currently under review, and CS targeting statements do not provide a consistent, exhaustive identification of historic environment priorities, they do contain a range of comments on HE assets and issues which would not otherwise be easily accessible. NCAs provide specific detail on the historic environment of the area with place names and locations included. This is not reflected in the CS targeting statements despite them being aligned to NCAs. The relevant information includes some of the biggest land management threats in the area for the historic environment (e.g. bracken, scrub and tree growth). The NCAs with historic environment priorities relating to sites with scrub or under cultivation have been identified and the results recorded in a spreadsheet. This was used to identify where there have been missed opportunities to deploy HS3, HS4 and HS9. Data from the 2019 Crop Map of England (CROME)[2] classified as cereal or leguminous crops (i.e. under cultivation) and in the 'trees and scrubs, short woody plants, hedgerows' (as a proxy for scrub) were extracted and overlaid with the SHINE GIS dataset in what was described during per review as an innovative approach. The percentage area of SHINE assets that intersect these cultivated and scrub areas have been identified and recorded, where coverage exceeds 50% of the area. Finally, GIS data on CS Facilitation Fund (**CSFF**) **areas with HE management priorities** (areas that have HE management within their statement of priorities) were identified and the boundaries of these areas overlaid with the Heritage at Risk SMs and SHINE assets that are under cultivation or scrub. Options HS3, HS4 and HS9 that fall within these CSFF areas were also calculated.

2.2 Task 2a: Survey of farm managers who omitted options HS3, HS4 and HS9

To understand farmer decisions on uptake of the three HE options, the ISM behaviour change model[3] was used to structure data collection around understanding the Individual (e.g. knowledge, values, costs and benefits), Social (e.g. public perception, peer support), and Material (e.g. farming system, land management, eligibility criteria) factors and how these create barriers or opportunities for the land manager.

Evidence on farm managers who omitted options HS3, HS4 and HS9 (non-participants) from their agreements was gathered from an online survey and in-depth telephone interviews. The ambition was to secure a sample of 300 responses from the online survey and, from this, 45 telephone interviews (15 per HE option) where relevant motivations, barriers or opportunities were highlighted. The initial sample was drawn from geographies highlighted in the mapping of features (Task 1). The online survey aimed to capture a broad sample of land managers targeted to areas of historic environment interest, e.g. via Facilitation Funds and farming groups which have heritage as an objective. A mix of farm types and sizes was also targeted. A number of approaches were used, including emailing to group contacts, posting on the ADAS website and sharing on Twitter.

[2] CROME is a vector map using a hexagonal ~0.4ha grid as its geographic unit and provides a tessellated multi-temporal visualisation of the type and distribution of land covers identified by remote sensing.

[3] The ISM model uses Individual (e.g. beliefs, self-efficacy, skills etc.), Social (e.g. peer support, advice available, social capital), and Material (e.g. tenure, equipment available) factors to explain behaviours https://www.ismtool.org/

The **online survey** was set up on the portal of Online Surveys (formerly BOS, https://www.onlinesurveys.ac.uk/) and the survey link circulated to land managers by email. The survey asked questions in a structured way with limited open questions so the questionnaire could be completed in around 15 minutes. The **telephone interviews** used more open questioning, building on the responses from the online survey. This allowed us to explore the barriers and enablers to the uptake of the options and to ask about influences on decision making.

Both surveys explored the following:

- Farm and farmer characteristics
- Income sources
- Motivations for agri-environment scheme participation
- Reasons for not taking up the HE options, specifically HE3, HE4 and HE9 where relevant

Defra Survey Control Liaison Unit (SCLU) reviewed and approved the survey questionnaire and interview guides. The telephone interviews were undertaken by experienced researchers and all respondents (including online) were provided with information on the purpose, scope and survey process, along with information on how their data would be managed, stored and used. All participants were asked for consent to participate in the interview and for their recording and transcripts to be used by ADAS.

In practice, there was very poor take up of the online survey and only 25 valid responses were received. This also impacted on the telephone interviews, both for those taking up HE options and those who did not (Table 2-1). Given the shortfall in responses, it was agreed that a number of advisors should be interviewed to provide additional evidence on reasons for taking up or omitting options. Starting with the Countryside Stewardship Implementation advisers list (Turner and Tweedie, 2017), we targeted advisers who represented potential applicants (a large body of them) and who understand the importance of HE features within a particular landscape/designation/group, largely facilitators from the CSFF. We then looked to identify groups of advisers who represent particular areas of the country, those who might be identified as local advisers and reached out to Farming and Wildlife Advisory Group (FWAG) advisers. This process provided was limited in scale (5 advisors – 4 external and 1 from ADAS) and outputs were used as supporting evidence in the analysis.

Table 2-1: Sample targets and responses

	Target sample	Actual responses
Online survey	300	25
Telephone survey (non-participants)	15	12
Telephone survey (HS3)	15	12
Telephone survey (HS4)	15	7
Telephone survey (HS9)	15	15

2.3 Task 2b: Survey of farm managers that have used options HS3, HS4 and HS9

The in-depth interviews with farm managers that used options HS3, HS4 and HS9 (participants), were planned to be completed in-person; however in response to the COVID-19 pandemic, these were completed via telephone. The interviews made use of a semi-structured interview guide, comprised of both closed and open questions. The line of

questioning was formatted against the same behavioural model and broad themes to explore motivations for participation in AES and option selection as the previous work package. The interviews also drew out perspectives regarding motivations and barriers as well as experiences with implementation of the options and reflections on effectiveness. Farmers in this sample who used option HS9 were also asked to take part in a site visit to assess implementation (see section 0).

2.4 Task 3: Field survey of option HS9 in-situ

Field surveys were undertaken for the 15 land managers interviewed with an HS9 option in their agreement. Prior to the site visit, relevant datasets were reviewed including, but not limited to: CS application material including: HEFER, Options Map – for land cover and option extent, Farm Environment Record – soil erosion and run off records; Soil maps; MAGIC; Flood maps.

The following criteria were assessed in terms of option selection, placement and management:

- type of agreement - Mid Tier or Higher Tier;
- presence of Scheduled Monuments and/or SHINE features;
- approval by Historic England;
- placement only on the area of the feature (SM or SHINE) or over the entire parcel;
- placement on parcels at risk of soil erosion or runoff, as identified in the FER; and
- prohibited activities on HS9 area.

Photographs of key features were used to supplement the visual survey to check for evidence of HS9 indicators of success. Farmers were also asked about barriers to AES uptake and option HS9 selection (see section 2.3).

Given the timing of the fieldwork (February and March, 2021), specific measures were taken to reduce risk of COVID-19 spread and to protect field staff. An initial risk assessment was undertaken and a decision made that the ADAS surveyor should not meet farmers on site. Instead, relevant fields for survey and the location of historic features would be agreed in the telephone interview (Task 2b) and the standard ADAS Visit Risk Assessment used for the site visit. The protocol was updated for COVID-19 guidelines at the time of survey from the government site https://www.gov.uk/coronavirus (see Appendix 3).

2.5 Task 4: Synthesis and Reporting

This final task involved the analysis of data and synthesis of this evidence to answer the research questions set out in the RFQ. The initial data mapping and analysis was reported in an interim report in December 2020 to address objectives 1-4, namely:

1. Identify arable areas of England where little use has been made of HS3 and HS9;
2. Identify geographic gaps in the selection of HS4;
3. Where options HS3, HS4 and HS9 have been deployed, assess whether they have been deployed appropriately (e.g. in accordance with advice, on appropriate historic environment features & land use types, with tailored prescriptions and the correct Indicators of Success).
4. Use Heritage at Risk data as a proxy to identify areas where scrub and arable cultivation is a particular issue, and where there have been missed opportunities to deploy HS3, HS4 and HS9;

Survey returns were analysed using Stata to provide statistics on sample characteristics and response to closed questions, with all open responses coded using a thematic framework. This evidence sought to answer objectives 5-9, as follows:

5. Engage with the farming sector to gather evidence as to why these options have low uptake;

6. Engage with the farming sector to understand option choice and to determine if different factors are at play for designated vs undesignated sites;
7. Assess the effectiveness of option HS9 and the inclusion of cover cropping within the option prescriptions;
8. Draw the evidence together to suggest ways the options and option guidance can be revised to deliver farmer requirements as well as the needs of the heritage asset;
9. Consider the potential for adding value to the options or indeed reducing requirements to focus on primary objectives.

3 RESULTS

3.1 Uptake of historic options and HE features at risk

3.1.1 Uptake of HS3, HS4 and HS9

Spatial datasets from Countryside Stewardship Scheme 2016 Management Options (England) identified a total 6,678 ha in HS3, HS4 and HS9, with an associated land parcel area covered by these options of 9,801 ha. HS3 has the highest uptake of the three options, with 88% of option area and 77% of parcel area. HS9 covers 11% of option area and 9% of land parcel area. HS4 options only cover small areas of land parcels; the option area is just 1.6% of total options, while the land parcels on which they fall cover 14% of total land parcel area. Table 3-1 shows the breakdown of areas of option areas and land parcel areas.

Table 3-1 Option uptake area

Option	Count of land parcels with HE options		Area of land parcels (ha)	Total option area (ha)
	(Mid Tier)	(Higher Tier)		
HS3	191	237	7,538	5,872
HS4	34	15	1,355	106
HS9	56	19	908	700
Total	**281**	**271**	**9,801**	**6,678**

The larger data table in the appendices (Table 5-2 Option uptake across NCAs

NCA	Higher Tier		Mid Tier		Total Sum of QUANTITY	Total Sum of HECTARAGE
	Sum of QUANTITY	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE		
HS3	**3594.78**	**4363.07**	**2277.10**	**3174.69**	**5871.88**	**7537.75**
Avon Vales	39.77	29.3	6.83	31.67	46.6	60.97
Bedfordshire and Cambridgeshire Claylands	3.58	4.62	19.25	22.81	22.83	27.43
Berkshire and Marlborough Downs	430.86	601.86	182.41	256.04	613.27	857.9
Blackmoor Vale and Vale of Wardour	49.31	50.6	1.66	9.85	50.97	60.45
Bristol, Avon Valleys and Ridges			12	29.99	12	29.99
Central Lincolnshire Vale	42.05	43.29	9	9.34	51.05	52.63
Chilterns	42.88	73.63	13.8	16.05	56.68	89.69
Cornish Killas			5.32	5.32	5.32	5.32
Cotswolds	83.1	98.27	154.65	192.52	237.75	290.79
Dorset Downs and Cranborne Chase	546.05	589.12	326.41	571.93	872.46	1161.05
Dunsmore and Feldon			60	67.94	60	67.94
East Anglian Chalk	250.27	336.57	85.39	103.62	335.66	440.19
Eden Valley			5.44	5.44	5.44	5.44

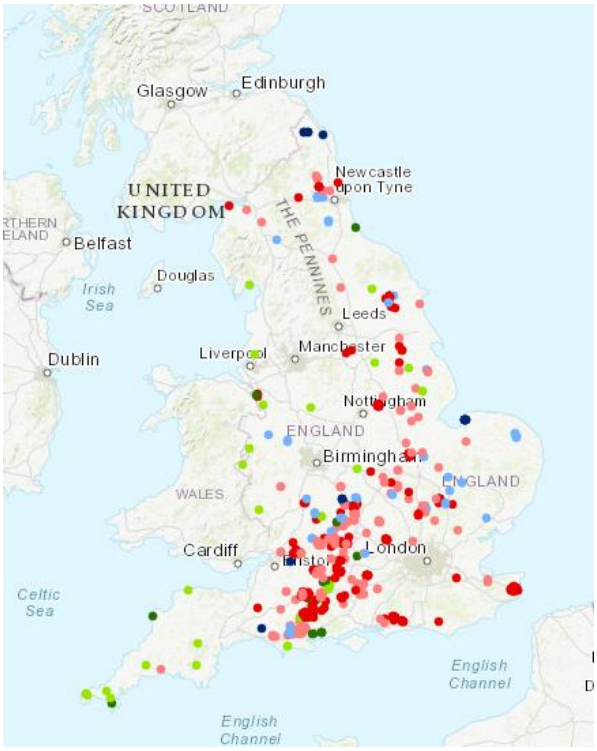
NCA	Higher Tier		Mid Tier		Total Sum of QUANTITY	Total Sum of HECTARAGE
	Sum of QUANTITY	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE		
Hampshire Downs	93.93	100.74	165.45	242.82	259.38	343.56
Herefordshire Plateau			4.66	4.77	4.66	4.77
Holderness			0.2	14.27	0.2	14.27
Humber Estuary			4.7	5	4.7	5
Kesteven Uplands			49.22	61.1	49.22	61.1
Lincolnshire Wolds			48.04	50.09	48.04	50.09
Low Weald	8.58	9.31			8.58	9.31
Mid Northumberland	34.17	34.23	58.77	58.22	92.94	92.45
Mid Somerset Hills	22.95	24.96			22.95	24.96
Midvale Ridge	118.65	132.49	24.96	26.73	143.61	159.22
North Downs	270.84	385.68			270.84	385.68
North Kent Plain			87.77	87.77	87.77	87.77
North West Norfolk			2.2	22.11	2.2	22.11
Northamptonshire Uplands	64.89	74.38	14.58	26.11	79.47	100.49
Northamptonshire Vales	94.93	119.52	14.89	20.76	109.82	140.28
Northern Lincolnshire Edge with Coversands	32.2	36.75	8	39.57	40.2	76.32
Northern Thames Basin			5.28	47.02	5.28	47.02
Nottinghamshire, Derbyshire and Yorkshire Coalfield	5.02	20.14			5.02	20.14
Rockingham Forest			26.21	27.02	26.21	27.02
Salisbury Plain and West Wiltshire Downs	472.4	489.96	277.94	324.61	750.34	814.58
Severn and Avon Vales	18.45	49.26			18.45	49.26
Shropshire, Cheshire and Staffordshire Plain	5.83	22.43			5.83	22.43
Solway Basin	4.75	4.95	5.35	5.45	10.1	10.4
South Coast Plain			6.13	7.42	6.13	7.42
South Downs	379.38	450.32	26.47	31.39	405.85	481.7
South East Northumberland Coastal Plain	3.57	4.85	8.25	8.54	11.82	13.39
South Suffolk and North Essex Clayland			19.32	34.41	19.32	34.41
Southern Lincolnshire Edge			17.39	64.78	17.39	64.78
Southern Magnesian Limestone			0.4	7.38	0.4	7.38
Thames Basin Heaths	76.45	90.33			76.45	90.33
The Fens			31.02	65.62	31.02	65.62
Trent and Belvoir Vales	189.54	209.82	1.1	7.69	190.64	217.51
Tyne Gap and Hadrian's Wall	5.01	5.01			5.01	5.01
Upper Thames Clay Vales	53.16	80.24	453.08	519.29	506.24	599.54
Vale of Mowbray			0.39	5.35	0.39	5.35

NCA	Higher Tier		Mid Tier		Total Sum of QUANTITY	Total Sum of HECTARAGE
	Sum of QUANTITY	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE		
Yardley-Whittlewood Ridge			27.2	30.72	27.2	30.72
Yeovil Scarplands			5.97	6.17	5.97	6.17
Yorkshire Wolds	152.21	190.42			152.21	190.42
(blank)						
HS4	**16.59**	**1035.77**	**89.14**	**319.68**	**105.73**	**1355.45**
Berkshire and Marlborough Downs	0.77	3.49			0.77	3.49
Carnmenellis			8.45	8.45	8.45	8.45
Central Lincolnshire Vale			2.53	2.4	2.53	2.4
Cheshire Sandstone Ridge			2.72	3.02	2.72	3.02
Clun and North West Herefordshire Hills			0	0.83	0	0.83
Cornish Killas			0.16	6.17	0.16	6.17
Cotswolds	1.68	1.72	0.19	0.19	1.87	1.91
Dartmoor			12.93	14.29	12.93	14.29
Dorset Downs and Cranborne Chase	0.44	0.44	0.26	0.26	0.7	0.7
Dorset Heaths	0.31	335.82			0.31	335.82
Durham Magnesian Limestone Plateau	0.02	9.73			0.02	9.73
Exmoor			0.1	1.56	0.1	1.56
Herefordshire Lowlands			0.13	0.13	0.13	0.13
Howardian Hills			0.21	0.43	0.21	0.43
Humberhead Levels			0.37	0.37	0.37	0.37
Lancashire and Amounderness Plain			0.35	13.57	0.35	13.57
Leicestershire Vales			0.1	10.16	0.1	10.16
Morecambe Bay Limestones			0.26	3.48	0.26	3.48
Potteries and Churnet Valley			1.28	1.28	1.28	1.28
Salisbury Plain and West Wiltshire Downs	9.08	641.44	28.04	220.8	37.12	862.24
Shropshire Hills			0.06	0.06	0.06	0.06
Shropshire, Cheshire and Staffordshire Plain	0.83	0.88			0.83	0.88
The Culm	1.12	29.64			1.12	29.64
The Lizard	2.34	12.61			2.34	12.61
West Penwith			12.4	12.95	12.4	12.95
Weymouth Lowlands			18.6	19.28	18.6	19.28
HS9	**237.05**	**230.81**	**462.90**	**676.95**	**699.95**	**907.77**
Bedfordshire and Cambridgeshire Claylands			1.64	12.64	1.64	12.64

NCA	Higher Tier		Mid Tier		Total	Total
	Sum of QUANTITY	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE
Berkshire and Marlborough Downs			47.59	48.85	47.59	48.85
Blackmoor Vale and Vale of Wardour			10.51	11.29	10.51	11.29
Central North Norfolk			7.96	19.98	7.96	19.98
Cheviot Fringe	46.08	48.13			46.08	48.13
Chilterns			2.62	16.96	2.62	16.96
Cotswolds	10.29	11.29	81.30	87.91	91.59	99.20
Dorset Downs and Cranborne Chase			37.50	37.51	37.50	37.51
Dunsmore and Feldon	31.83	22.81			31.83	22.81
Durham Coalfield Pennine Fringe			14.80	15.17	14.80	15.17
East Anglian Chalk			37.42	92.68	37.42	92.68
Eden Valley			7.36	7.36	7.36	7.36
Lincolnshire Wolds			11.58	12.12	11.58	12.12
Mid Northumberland			22.71	25.53	22.71	25.53
Mid Severn Sandstone Plateau			14.44	14.63	14.44	14.63
North Northumberland Coastal Plain	10.13	10.13			10.13	10.13
North West Norfolk	68.27	72.76			68.27	72.76
Northamptonshire Uplands	15.71	7.86	32.58	47.48	48.29	55.33
Northamptonshire Vales	9.69	9.68			9.69	9.68
Northern Thames Basin			4.10	12.99	4.10	12.99
Salisbury Plain and West Wiltshire Downs	41.72	44.82			41.72	44.82
Severn and Avon Vales			37.85	37.90	37.85	37.90
Shropshire, Cheshire and Staffordshire Plain			5.51	6.31	5.51	6.31
The Broads			5.70	41.51	5.70	41.51
The Fens			24.41	39.52	24.41	39.52
Tyne and Wear Lowlands			10.23	10.23	10.23	10.23
Tyne Gap and Hadrian's Wall			44.40	44.63	44.40	44.63
Yeovil Scarplands	3.33	3.33			3.33	3.33
Yorkshire Wolds			0.69	33.74	0.69	33.74
Grand Total	**3,848**	**5,630**	**2,829**	**4,171**	**6,678**	**9,801**

Table 5-3shows that the highest uptake of HS3 is in the South with a focus on the south-west. NCAs Dorset Downs and Cranborne Chase, Salisbury Plain and West Wiltshire Downs, Berkshire and Marlborough Downs, Upper Thames Clay Vales and the South Downs have the highest number of HS3 options in their areas. Again HS4 follows a similar pattern with high concentrations in the south, particularly the south-west. HS9 has been taken up in similar positions, but with a more east midlands/south-east emphasis.

The mapping data reflects the figures in the table, with a larger number of CS agreements which include HS3 as an option relative to the other options (



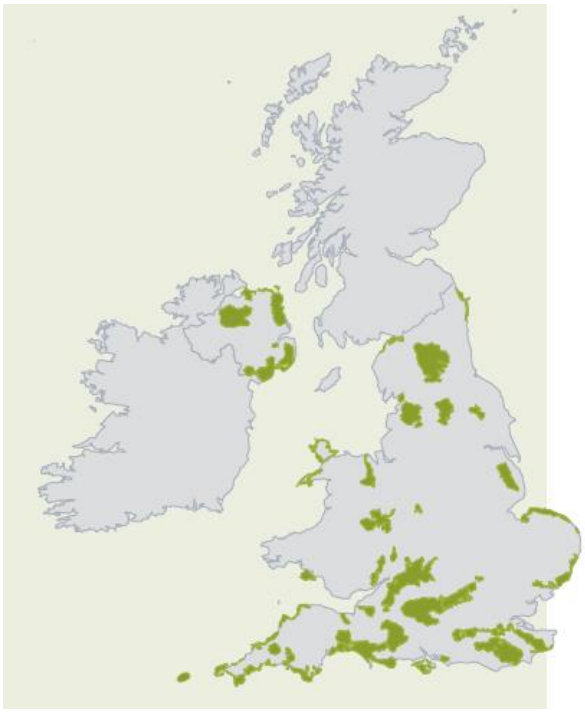
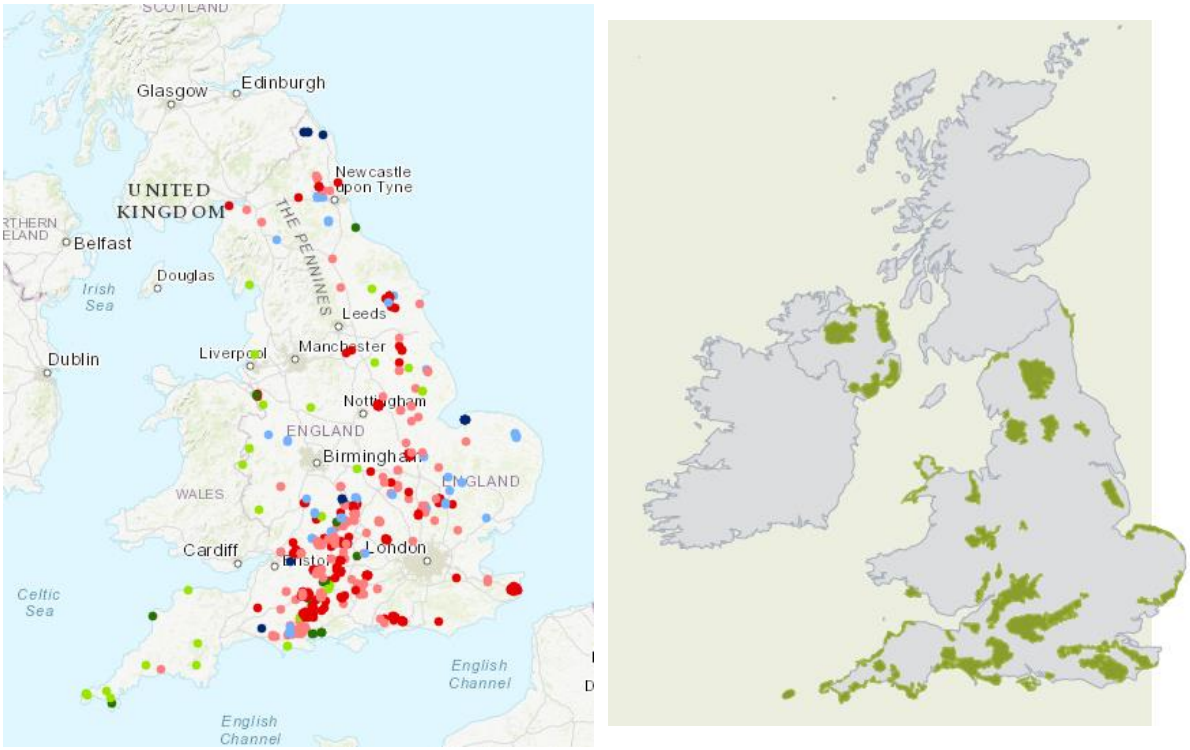


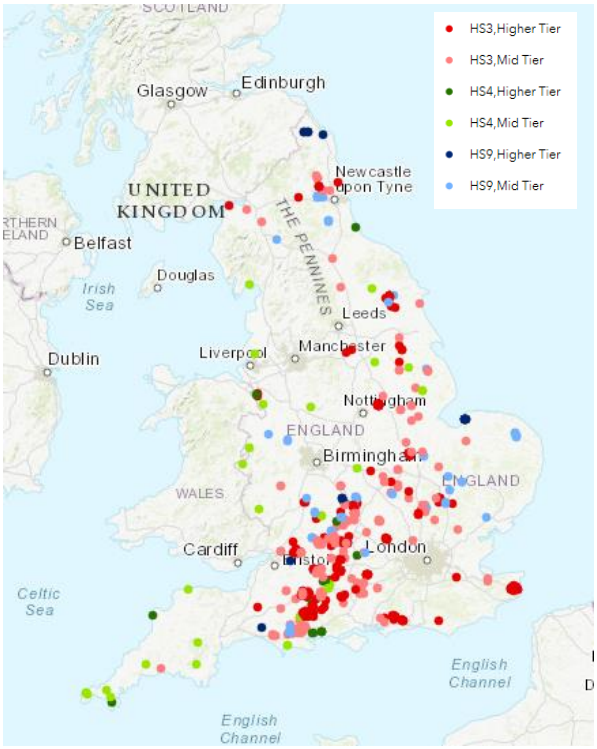
Figure 3-1)[4].

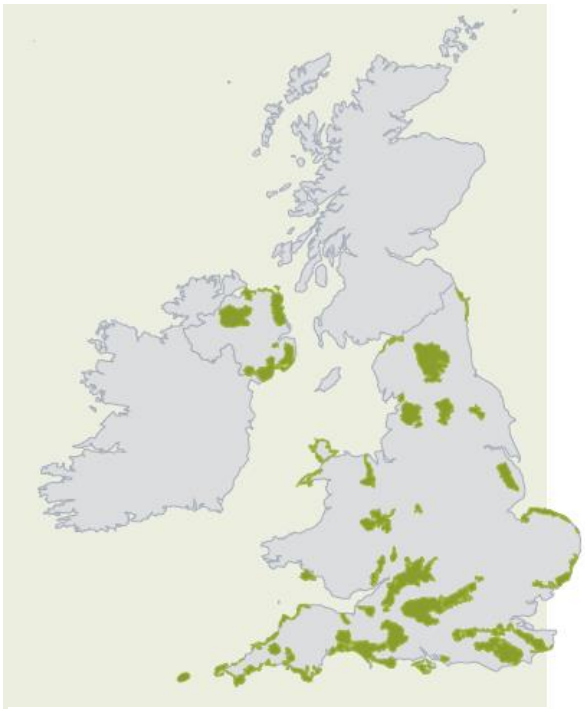


[4] Interactive mapping of the data presented here is available at: https://adasuk.maps.arcgis.com/apps/webappviewer/index.html?id=abf792fdaab44de7b7f3898f1a136a76

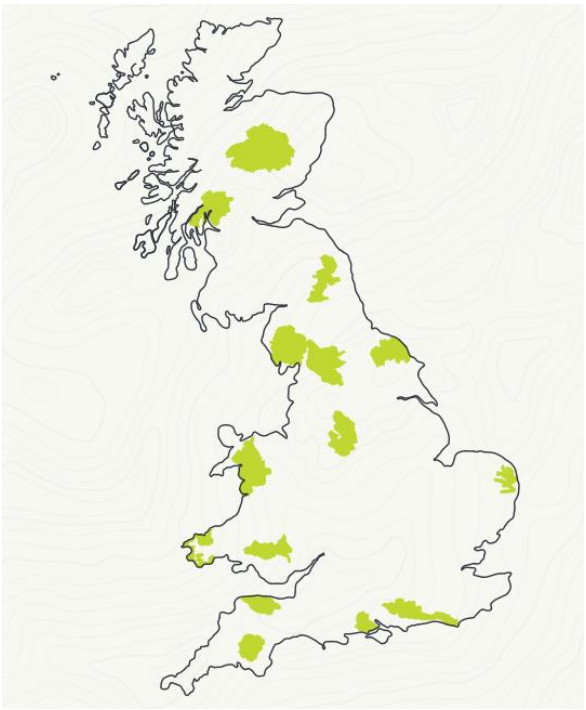
Figure 3-1 reveals a greater concentration of HS3, HS4 and HS9 uptake east of the Pennines, together with a density in the South West bordering the Home Counties. There are lower levels of uptake of HS3 and HS9 towards the north-west, where farming is more biased towards livestock-based systems. In addition, the density of HS3, HS4 and HS9 uptake highlighted here overlaps to some degree with a concentration of Area of Outstanding Natural Beauty (AONB) designations in England (see

Figure 3-1; but this has not been substantiated). Any coincidence may reflect a greater focus on heritage in designated landscapes and/or increased provision of advice. The same does not appear to be true of the National Parks, except for those farms within the South Downs National Park. This may be reflective of the farming types within these protected landscapes.





Areas of Outstanding Natural Beauty (AONBs) in England, Wales and Northern-Ireland (EUROPARC, 2017)



Areas of National Parks in England, Wales and Scotland (https://www.nationalparks.uk)

Figure 3-1 Map of HS3, HS4 & HS9 Higher and Mid Tier uptake and AONBs

The largest area of uptake of the three options of interest is HS3 in Higher Tier agreements (3,571 ha), with a slightly lower area in Mid Tier (2,283 ha). In comparison, HS4 and HS9 have higher uptake in Mid Tier agreements (Table 3-2), but overall have a much lower uptake than

HS3. While there are approx. two land parcels in HS3 for each CS agreement, HS4 and HS9 are represented by just one land parcel in most agreements.

Table 3-2 Option uptake by CS tier

Option	Option area (ha)		
	Higher Tier	Mid Tier	All tiers
HS3	3,571	2,283	**5,854**
HS4	17	90	**107**
HS9	237	463	**700**

Figure 3-2 brings together six maps which show uptake of HS3, HS4 and HS9 across England.

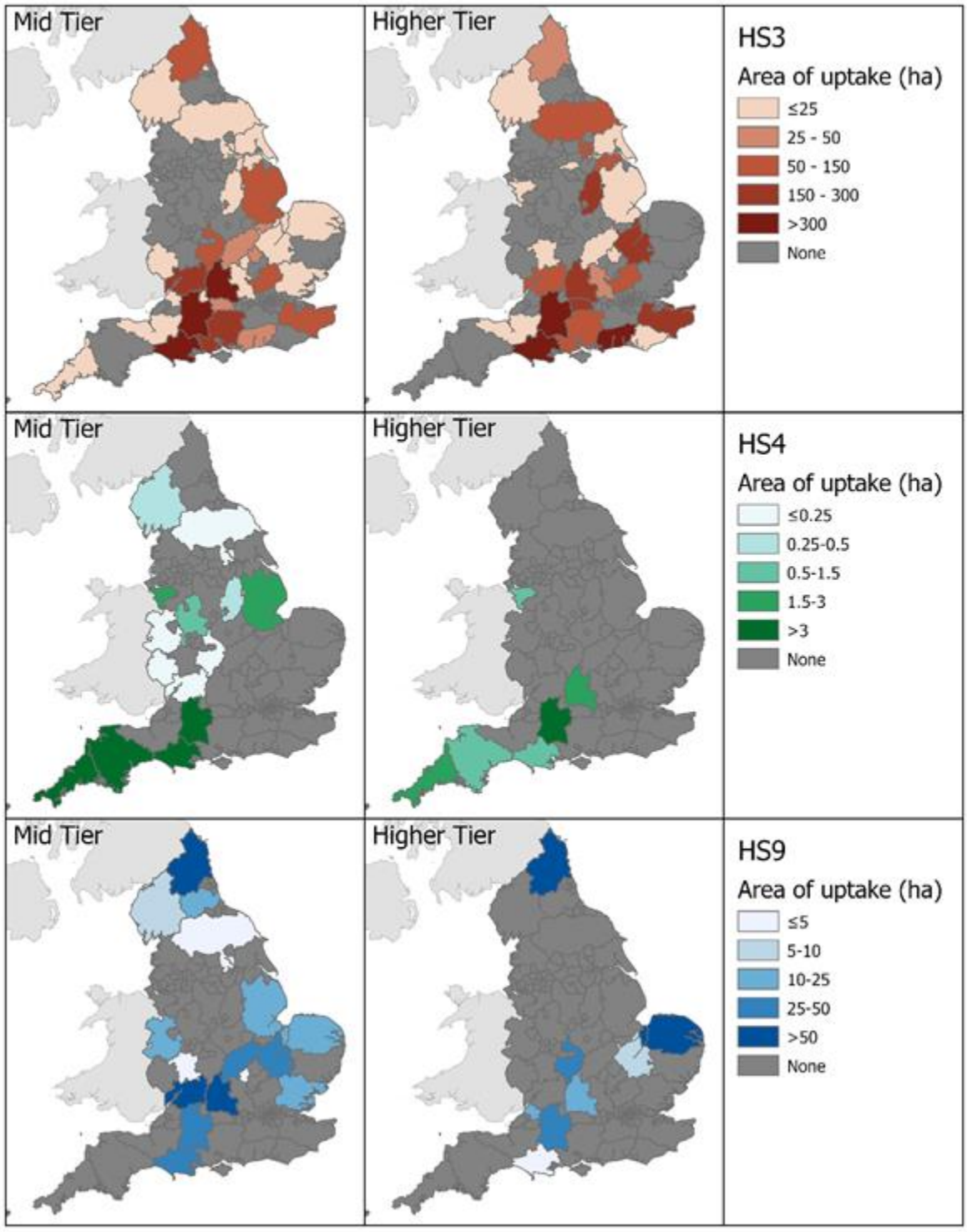


Figure 3-2 HS3, HS4 and HS9 uptake

Table 3-3 Number of agreements for each option type by county

County	HS3		HS4		HS9		Grand Total
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Avon		3			1		4
Bedfordshire	1	3					4
Berkshire	14	2					16
Buckinghamshire	6	6				1	13
Cambridgeshire	19	5			1	7	32
Cheshire	2		1	1			4
Cleveland			1				1
Cornwall And Isles Of Scilly		1	1	7			9
Cumbria	1	3		1		1	6
Devon			1	3			4
Dorset	15	32	6	3	1	4	61
Durham						3	3
East Sussex	1						1
Essex	1	1				3	5
Gloucestershire	7	14		2		5	28
Hampshire	12	11					23
Hereford And Worcester	2	2		1		1	6
Hertfordshire	4	5					9
Humberside	5	2					7
Kent	10	2					12
Lincolnshire	1	13		3		1	18
Merseyside				1			1
Norfolk		1			7	6	14
North Yorkshire	11	2		1		2	16
Northamptonshire	4	6				3	13
Northumberland	6	6			5	7	24
Nottinghamshire	23	1		1			25
Oxfordshire	17	30	2		1	7	57
Shropshire				2		3	5
Somerset	1	3					4
South Yorkshire	2						2
Staffordshire				1			1
Tyne And Wear		1					1
Warwickshire		4		1	2		7
West Sussex	28	2					30
Wiltshire	41	32	3	7	1	2	86

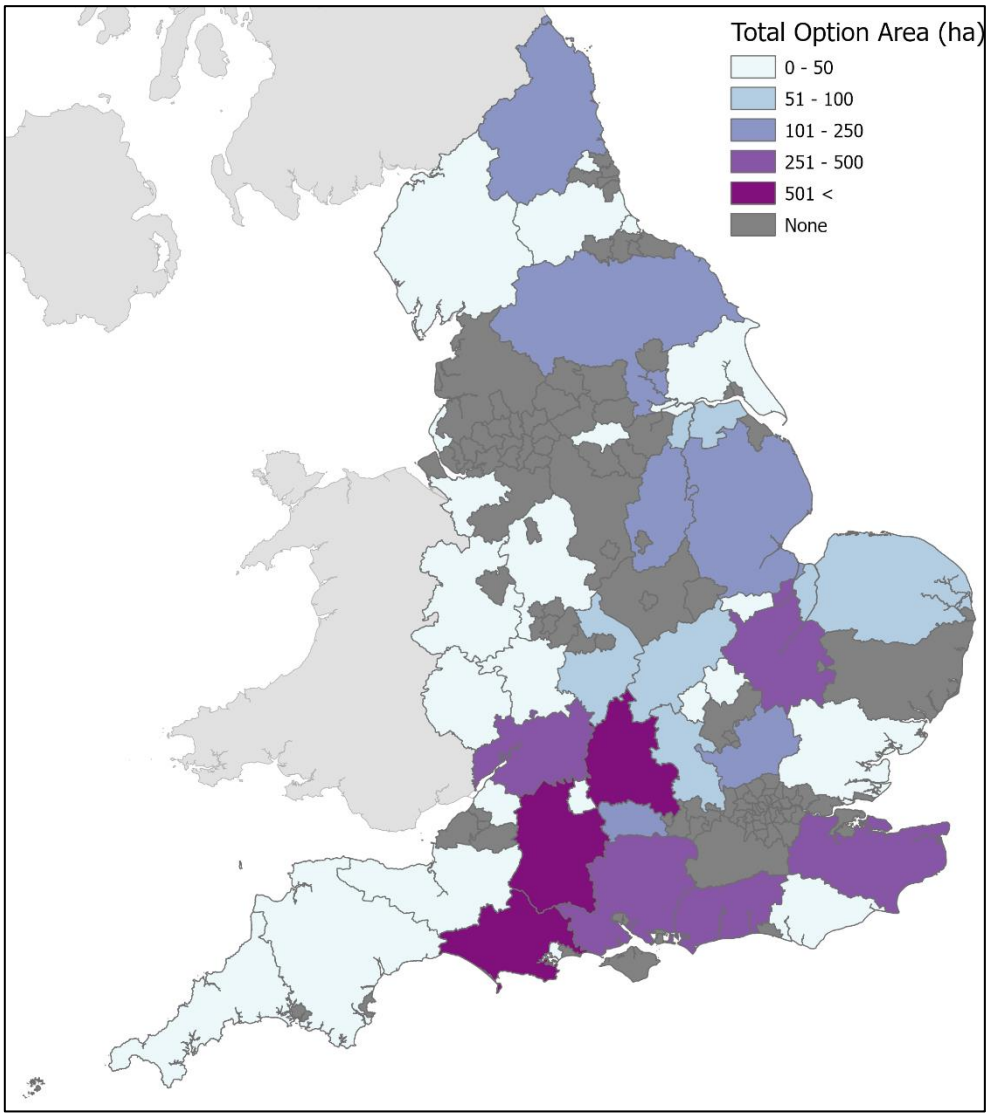


Figure 3 Total option area within each county

The total option areas within each county are shown in Figure 3. The counties with the largest agreement areas are in Oxfordshire, Wiltshire and Dorset. Table 3-3 provides the number of options in each county by type (counties with no options are not listed).

3.1.2 Heritage at Risk (HAR) and SHINE features distribution

Figure 5 below shows the total areas by county for HAR and SHINE features, with no filter on risk level.

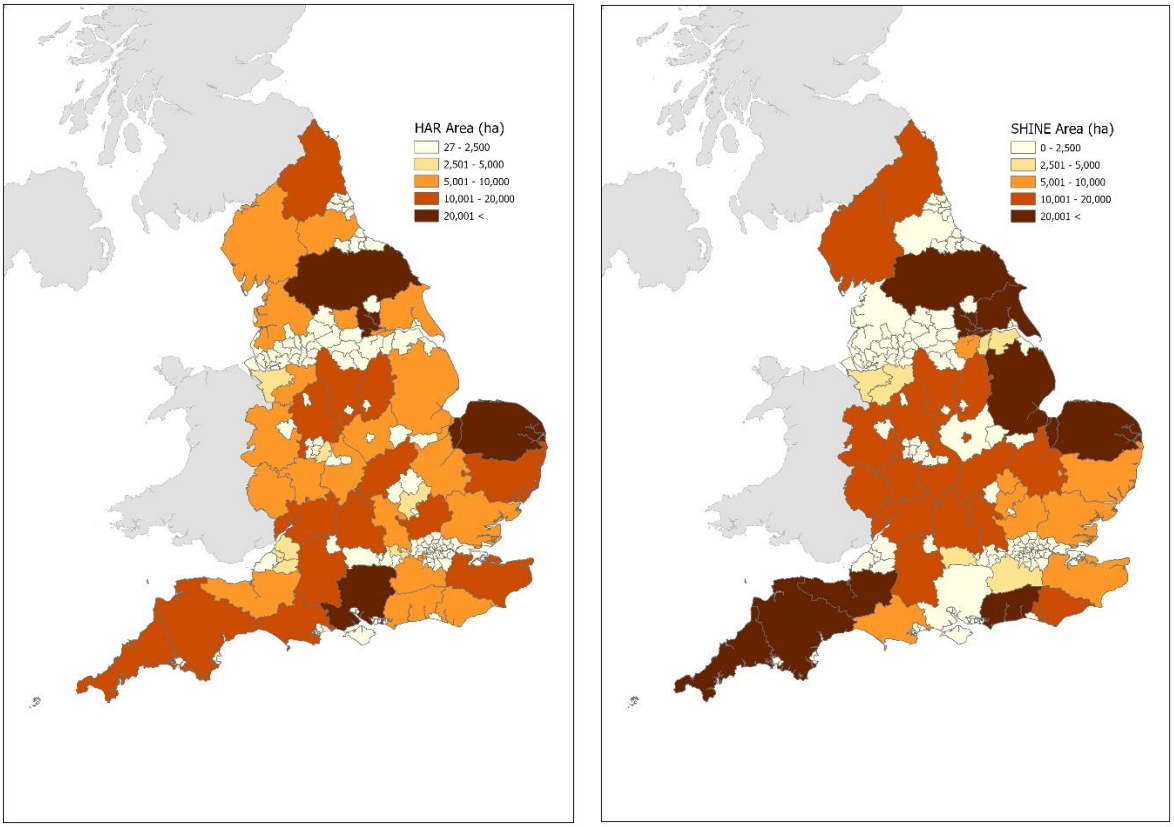


Figure 4 Distribution of HAR and SHINE features

Based on the distribution of options HS3 and HS9 and the location of the historic environment features, there is a correlation between the use of options and the combinable cropping areas of England as well as the distribution of historic features. Looking at the South of England, of which Oxfordshire is part, the region's land use is predominately arable (55% as opposed to 31% permanent pasture) with none of the arable area recorded as field vegetables or root crops[5].

Similarly in the East of England region, which is a region well known for arable cropping, there is uptake of HS3 and HS9 in Norfolk and Cambridgeshire which are predominately combinable cropping counties but not Suffolk which is an important county for growing field vegetables, potatoes and sugar beet as well as large areas of land being used for outdoor pigs.

One explanation for the prevalence of options that require reduced cultivation systems in certain areas of the country is due to land use and farm management considerations.

Reduced cultivation is less likely to be adopted in wetter parts of the country as timely cultivations are more important for min-till than for ploughing. This is due to the fact that the shallow tines and discs common in min-till equipment, combined with the heavier machinery weight of min-till equipment compared to a plough, are more likely to cause smearing and compaction in wet soil conditions.

Rainfall influences the number of days when soils are workable without causing damage as even drained soils can remain unworkable for long periods in a wet year. Free draining soils in the drier parts of the country are more suitable for min tillage. The uptake of HS3 and HS9

5 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/972103/regionalstatistics_overview_23mar21.pdf

broadly correlates where the available windows of autumn works days extend into November and December[6]

As a result, the use of options that include these systems are most likely to fall in areas where there is the greatest opportunity for reduced cultivations. With payment rates of £79/ha and £179/ha respectively, the payment rates for the CS options are most likely to tempt farmers who are already using reduced cultivations rather than those who aren't.

Ploughing is often used to remove soil compaction close to the soil surface and to carry out rotational weed control, therefore farmers may not choose the options in an agreement that last 5 years or more in order to retain the flexibility of being able to plough at times should compaction be identified, or weeds build up. Reduced cultivation systems are not generally appropriate to establish root crops either due to the need to create deep seedbeds, so use of these options are likely to be restricted in areas where roots are grown as part of the rotation.

With regards to the use of HS4 the option is most often found in the South West; Cornwall, Devon, Dorset and Wiltshire. These counties form part of the South West Region which in terms of land use is a predominately grassland region with 41% land under arable cropping and 48% under permanent pasture[7] (the England average is 52% arable and 36% permanent pasture). HS4 aims to reduce the risk of root damage to historic and archaeological features by permanently removing the majority of scrub on features and through the delivery of a well-managed grass sward. One of the ways the scrub will be controlled after the initial removal is through livestock grazing therefore the use of this option in a predominantly grazed region is possibly to be expected.

3.1.3 SMs under threat from cultivation and scrub

The details in the attributes of the SMs from the Heritage at Risk register (HAR) (specifically the 'Principal Vulnerability' attribute) have been used to flag SMs that are under threat from cultivation or scrub. In total 50,072[8]ha of land has been flagged as having an SM which is at risk on the HAR (Table 5-4, appendices).

The next part of the analysis completed then showed the amount of the land identified as Heritage at Risk that was highlighted as at risk from cultivation or scrub encroachment.

Of the total area, 3853 ha of land was identified as having SMs under threat from arable cultivation or scrub (3117 ha at risk from cultivation and 736 ha at risk of scrub encroachment) only 126 ha are covered by options HS3, HS4 and HS9 across Mid Tier and Higher Tier covering 19 NCAs.

9 ha or 1.19% of SMs on the HAR which are at risk from scrub encroachment are protected by HS4. All is in one NCA, West Penwith. 117 ha of SMs on the HAR at risk of cultivation was covered by options HS3 and HS9.

HS3 in Mid Tier agreements is the most used option to protect SMs on the HAR (Table 3-4).

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[6] http://adlib.everysite.co.uk/resources/000/091/259/vicjordancropguide.pdf)

[7] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/972103/regionalstatistics_overview_23mar21.pdf

[8] Figures have been rounded to the nearest whole number.

Table 3-4 Area covered by HS3, HS4 or HS9 on land at risk of cultivation or scrub encroachment (HAR)

CS option	Higher Tier (HT)	Mid Tier (MT)	Hectares
HS3	11.83	79.86	91.69
HS4	0.00	8.78	8.78
HS9	0.00	25.69	25.69
Total	**11.83**	**114.33**	**126.16**

Based on NCA-level data: Only NCAs which have SHINE features at risk of cultivations in relevant options have been included. All NCAs and the data split by county level can be found in the appendices.

Only 19 of the NCAs had agreements that covered at risk SMs[9], with Lincolnshire Wolds having the greatest coverage (44% of the total HAR at risk of cultivation and scrub). This coverage was all Mid Tier and using only HS3.The NCA had identified this as a threat in their NCA profile.

"There remains some threat to archaeological sites from ploughing with a number of scheduled monuments on the national 'Heritage at Risk' owing to plough damage, however this is improving."[10]

For scrub encroachment, the NCA with the greatest HAR at risk coverage of HS4 was West Penwith (8.8 ha representing 19% of the HAR at risk features).

The NCA had identified scrub control as a target, to contribute to the management of the Cornwall and West Devon Mining Landscape World Heritage Site.

"The NCA is characterised by a particular wealth of archaeological and historic features. The visible remains of human occupation provide a significant depth to the landscape of the area. Many of these sites have remained unaltered for many centuries, although in places neglect is starting to affect the legibility of sites through scrub growth and bracken invasion."[11]

Overall, the coverage of HAR features in HS3 and HS9 at risk from cultivation was 3.76% and for HAR features in HS4 at risk from scrub encroachment 1.19%.

CS targeting statements were inspected to extract information on the historic environment priorities within each NCA. Table 3-5 identifies the different threats and the number of NCAs for which these are a priority. The threat that is a priority for the majority of NCAs is from scrub, with 129 NCAs identifying this as a threat. This is followed by tree growth (105) and cultivation (95).

[9] Details from all NCAs and options split by county can be found in the appendices
[10] NCA Profile 43 Lincolnshire Wolds.

[11] NCA Profile 156 West Penwith

Table 3-5 Priority threats for NCAs

Priority threat	Number of NCAs with treat as a priority
Bracken	8
Scrub	129
Tree growth	105
Cultivation	95
Lack of management/neglect	35

3.1.4 SHINE assets under threat from cultivation or scrub

The percentage area of SHINE assets that intersect cultivated or scrub areas have been identified. Statistics have been produced on the numbers and area of SHINE features thought to be under cultivation or burdened by scrub (where coverage exceeds 50%) by geographic area. HS3, HS4 and HS9 options cover 1,527 ha (<1%) of the area of SHINE sites at risk from cultivation. The majority of that coverage is from option HS3 which covers 1,448 ha making up 95% of the overall coverage (Table 3-6). The highest coverage of SHINE features (percentage coverage against overall area at threat) by HS3, HS4 and HS9 is in NCA area Dorset Downs and Cranborne Chase, however this is only 5%. Coverage was relatively low across all NCAs.

Table 3-6 SHINE features at risk of cultivation in options HS3, HS4 and HS9

CS option	CS tier	Hectares
HS3	Higher Tier	983.0
	Mid Tier	464.9
HS4	Higher Tier	0.5
	Mid Tier	0.9
HS9	Higher Tier	32.7
	Mid Tier	44.9
	Total area	**1,527**

Based on NCA-level data: Only NCAs which have SHINE features at risk of cultivations in relevant options have been included. All NCAs and the data split by county level can be found in the appendices.

The total area of land parcels which cover a SHINE feature is 562,298 ha (Table 5-6 in the appendices). The top five NCAs with largest areas which cover SHINE features are Bedfordshire and Cambridgeshire Claylands (21,330 ha), Yorkshire Wolds (19,224 ha), South Downs (17,934 ha), Shropshire, Cheshire and Staffordshire Plain (16,288 ha) and Yorkshire Dales (16,007 ha). Of the overall area 296,752 ha are at threat of cultivation (52%). The top five NCAs which have the largest areas with SHINE features *which are at risk of cultivation* again include the Yorkshire Wolds (19,244 ha), the Yorkshire Dales (16,007 ha) and the South Downs (17,934 ha).

3.1.5 CSFF areas with HE management priorities where heritage assets are at risk from cultivation and scrub

Data from the CSFF is limited. The steering committee provided a map of CSFF with AONBs highlighted, which may coincide with a stronger remit and priorities on landscape and the historic environment. 22 CSFFs fall with National Parks and 32 fall within AONB.

From our previous evaluation of CSFF[12] 34 of the groups had heritage or the historic environment as a priority and 29 groups highlighted improvement in the historic environment as an outcome for their group.

3.2 Survey of land managers with HE features and options

The online survey aimed to capture a broad sample of land managers targeted to areas of historic environment interest, e.g. via Facilitation Funds and farming groups which have heritage as an objective. A number of approaches were used, including emailing to group contacts, posting on the ADAS website and sharing on Twitter. Despite this only 25 valid responses were received. This was sufficient to draw a list of non-participants for in-depth interview (12) but obviously means that the statistical robustness of the survey is much reduced. As such, we have reported median rather than average responses and all data should be treated with a degree of caution. A table of anonymised responses for both the online surveys and in-depth interviews can be found in Appendices 7, 8 and 9.

3.2.1 Online survey sample

The sample of 25 farms ranged in size from 24 ha to 1,800 ha and were mainly owned (68%). The median age group is 41-64 years old and twenty three of the sample had been educated to college or university level. Only three of the sample agreed or strongly agreed with the statement that 'Farmers should be allowed to maximise their income irrespective of the environmental consequences'.

The sample comprised mostly arable or mixed farms (60%), with one dairy farm and one poultry farm. Arable cropping included combinable arable crops with some representation of potatoes, sugar beet and vegetables. Cultivations methods are detailed in Figure 3-5.

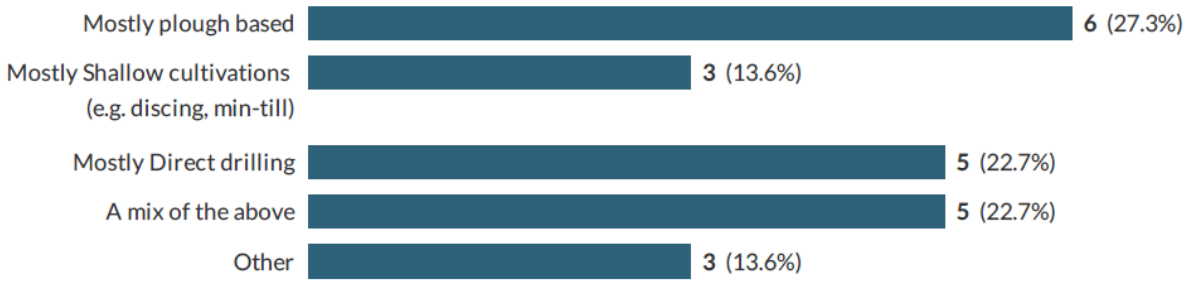

Figure 3-5 Online sample cultivation methods (n=25)

The sample had a range of historic features on their land as set out at Figure 3-6.

[12] Data up to 2019.

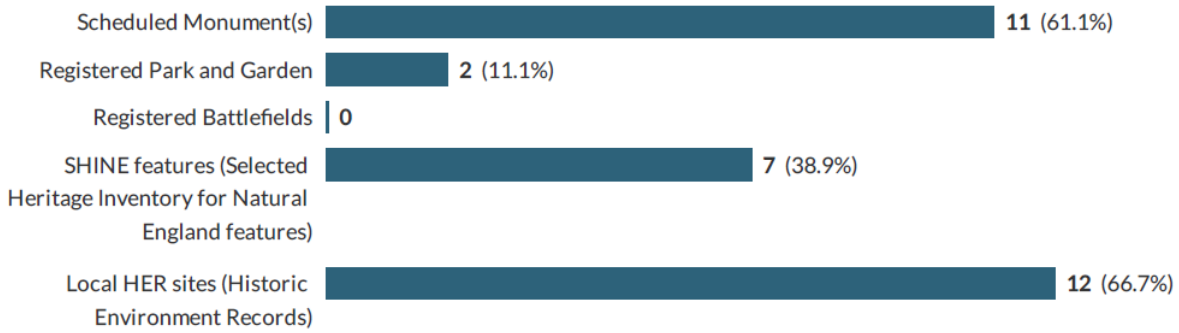

Figure 3-6 Online sample historic features (n=25)

Twenty-three of the twenty-five farms have historically been in an agri-environment scheme; of these, sixteen are currently agreement holders. One is currently part of an AES but has not previously been and one has never been part of an AES. Nine have an historic environment (HS) option as part of their CS agreement. Reasons for not taking up HS options include concerns over the commitment and how that might restrict future land use or practice, a view that it was uneconomic at current payment rates and concerns over liability for any damage to features. One respondent reported that they were unaware of the HS options.

Respondents were asked to rate a number of statements in terms of their influence regarding historic environment option uptake, using a scale from strongly disagree to strongly agree.

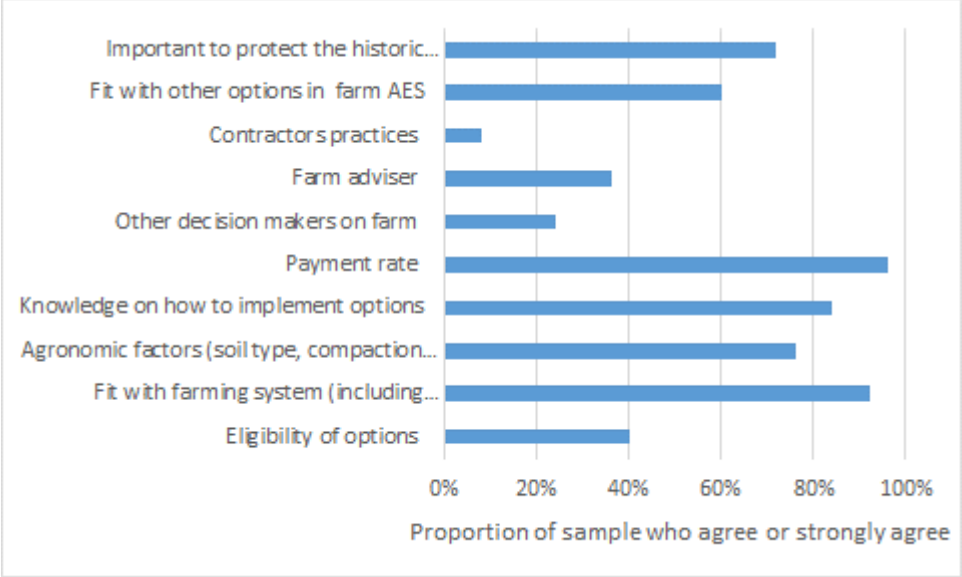

Figure 3-7 Influences on decision to take up HS options (online sample n=25)

When asked about the specific options HS3, HS4 and HS9, only a minority of the sample had considered taking them up.

Table 3-7 Consideration of uptake of options HS3, HS4 and HS9 (online survey n=25)

CS option	Yes	No	N/A
HS3	7	15	3
HS4	6	15	2
HS9	5	17	1

While the reasons given for not taking the options up again largely reflected fit with the farming system or absence of an economic case, there was one specific comment around eligibility for HS3, namely:

We applied for HS3 on areas which had previously been incorporated into an ELS/HLS scheme and the new rules under Mid Tier did not allow their inclusion because they were only SHINE features in arable fields and not Scheduled Monuments.

Wider comments on HS option uptake also included:

The mechanical nature of Countryside Stewardship restricts the eligibility for Historic Environment options too much. There is a lot more archaeology on farms than just that which is designated.

Some of our historic features do not get protection with Mid Tier because they are not SM and fall out of other categories; this is disappointing when they have met the requirements under 2 previous schemes of CS and ES for the last 20 years!

3.2.2 In-depth interviews with participants

The thirty-four farms in the participant sample had a range of historic features on their land as set out at Figure 3-8.

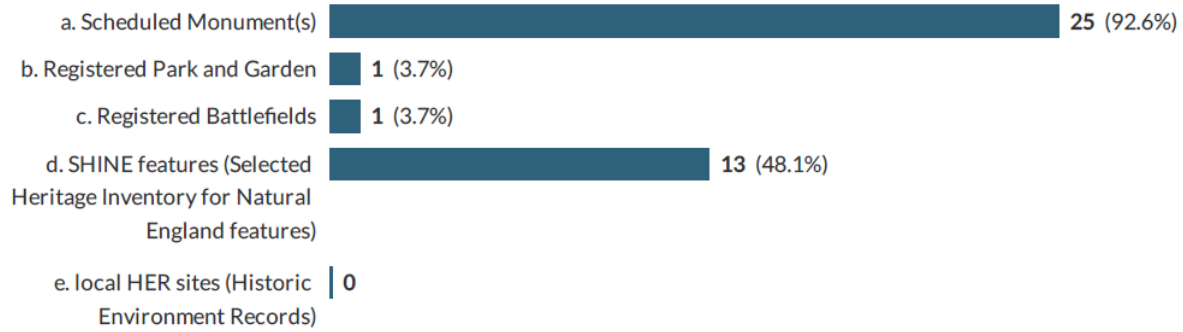

Figure 3-8 Participant sample historic features (n=34)

Thirty-three of the thirty-four farms are currently in Mid Tier/ Higher Tier CS, with one in ELS/HLS. Twenty-four have had ELS/HLS agreements and two were in ESA.

Motivation for participating in AES is illustrated in Figure 3-9.

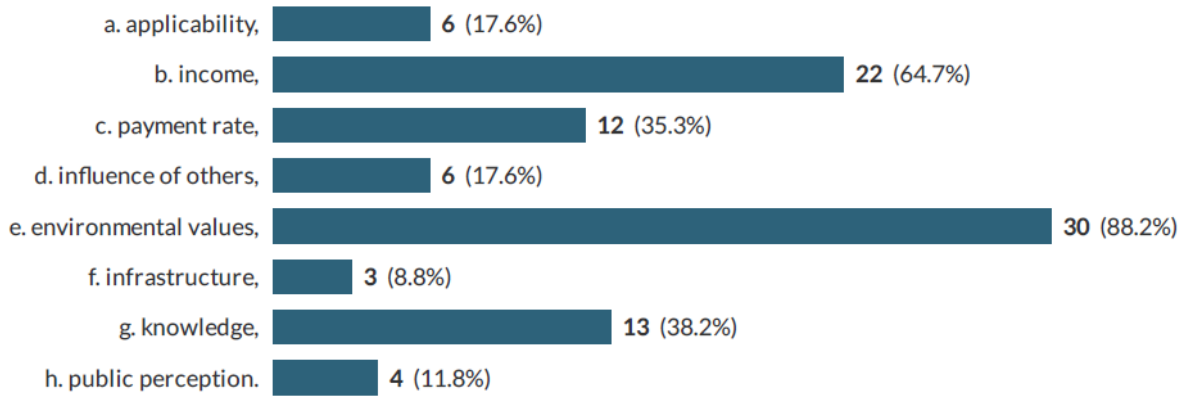

Figure 3-9 Participant sample motivation for joining AES (n=34)

The types of options taken up are indicated by the categories in the most recent agreement, namely Arable (30), Boundaries, trees and orchards (25), Grassland (23), **Historic environment and landscape (21)** and Soil and water (19). There were small numbers (<5) in categories Educational access, Woodland and scrub, Lowland heathland and Wetlands.

The breakdown of uptake between the three HS options of interest is shown in Figure 3-10. This reflects the wider statistics on uptake (see section 3.1.1), with low representation of HS4, although the sample has a higher share of HS9 in agreements. When asked about the likely barriers or limiting factors for HS uptake by other farmers, participants cited mainly practical issues (applicability, fit with farming systems and economics) but one third of the sample thought that knowledge of HS options was also important.

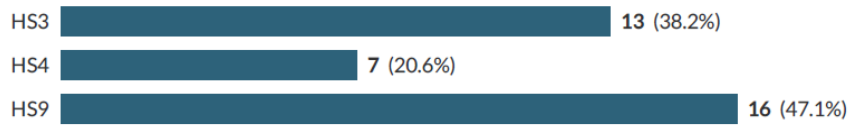

Figure 3-10 Participant sample HS option uptake (n=34)

Influencing factors driving option choice are highlighted in Figure 3-11. It is notable that while practical considerations (fit with farm system and agronomic factors) and economics are key (as with the online sample), the role of knowledge and advisors, including Historic England or Local Authority Historic Environment advisors also have an important influence. Knowledge-exchange events and own knowledge, skills & understanding are also important for most participants.

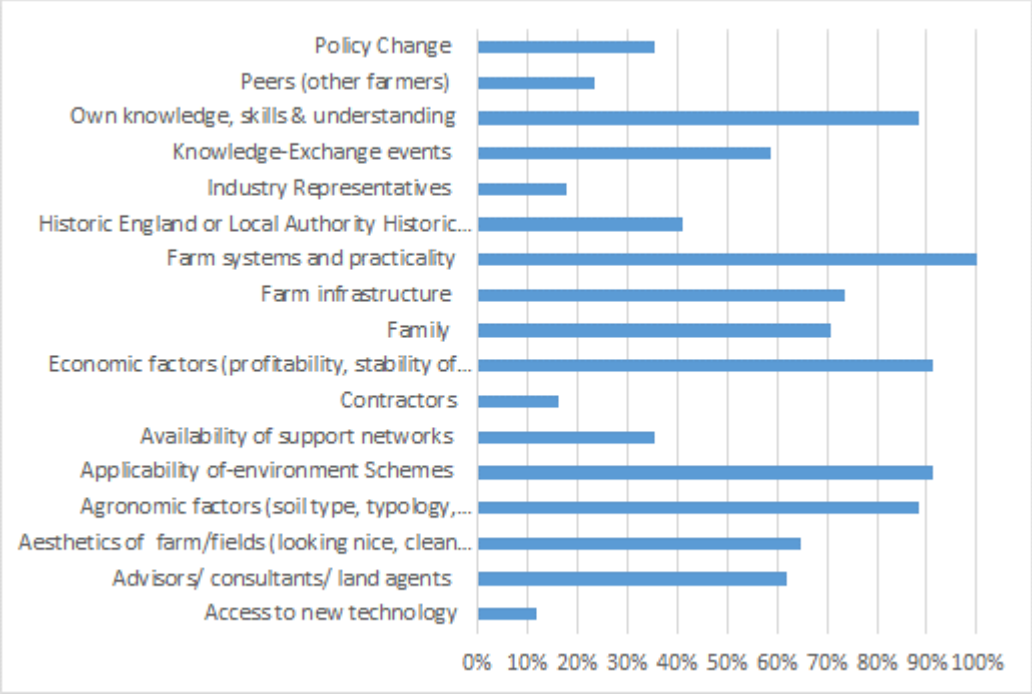

Figure 3-11 Participant sample influences for option choice AES (n=34)

Motivations and barriers of land managers taking up options HS3, HS4 and/or HS9 are considered in more detail below.

Motivations

Motivations underpinning HS option uptake are clustered around fit with farming system and positive economic returns. For HS3 for example, most respondents reported to be already practicing shallow cultivating, or moving towards minimum tillage. Subsequently, HS3 was an easy and convenient option to adopt and is compensated by “fair payment” (Respondent 16).

Similarly, for HS9, most respondents felt the option fitted in well with their farming system for one of two reasons:

1) the farm was already or was moving towards minimum tillage, or
2) the feature was non-visible and non-intrusive, subsurface or a designated site, and therefore had no impact on farming practices.

The second driver stands apart from the other options where frequently features were unknown to the farmer and in some cases had been destroyed/removed decades previously.

In terms of the economic case, HS4 respondents also reported being motivated by the opportunity for unproductive land to receive an AES payment. However, respondents undertaking these options frequently reported a vested personal interest in the feature, citing feeling passionately about protecting historic features, and regarding these options as a mechanism to protect them. For HS3 respondents the economics had to work, with option payment covering at least the minimum costs, but would ideally be profitable and therefore providing a stable, reliable and worthwhile income. Again, HS9 respondents cited option uptake being motivated by a drive to make use of unproductive land, whilst creating environmental benefits and generating extra income.

The evidence suggests that wider motivation for AES uptake is underpinned by drivers, again relating to the fit (with farming system) of the option and its cost effectiveness; the option “has to work financially” (Respondent 17). However, most importantly, past participation and environmental values were frequently reported as a key motivator. Specifically, expressing a desire to ‘do their bit’ to reverse declining farmland bird species, minimise the impact of their farming, or a desire to “improve environmental credentials” (Respondent 24). Advisors interviewed supported these findings, citing both an economic drive to ensure land that is less productive or difficult to farm is still bringing in a stable income (Respondent 49) and "genuine interest in looking after the environment" (Respondent 48).

Barriers

The evidence regarding barriers reflects the motivations identified as well as building on the key issues highlighted by non-participants. Here respondents highlighted risk, perception of costs relative to benefits, fit in terms of farming system, experience/knowledge and accessibility. Considering these in turn, the evidence highlights the following:

<u>Risks as a potential barrier to uptake</u>

- respondents (including advisors) highlighted a perception of inflexibility with regard to the option specification and risk of non-compliance;
- the influence of external conditions (e.g. weather and blackgrass) impacting management represents a compliance risk;
- two (from two) respondents not currently participating but who have in the past, reported that NE has a poor reputation for consistency and flexibility with regard to expectations and compliance; and
- some respondents found communication with the RPA unclear and often difficult, meaning it was hard to receive advice or to resolve disputes.

Cost effectiveness as a potential barrier to uptake

- respondents highlighted the payment rates as a potential barrier, not adequately compensating for the option requirements, although others suggested that HS4 provides a stable and secure payment independent of external impacts and risks (respondent tib_02); and
- more broadly, it was reported that the time investment required for both the application and management, specifically for an AES, was not perceived as financially worthwhile.

Fit with farming system as a potential barrier to uptake

- respondents suggested that changes in management might be barrier for some farmers; and
- restrictions to specific management practices, with strict rules for a long time period, was seen as a barrier to uptake.

Experience/knowledge as potential barriers to uptake

- many people who have a feature registered but actually not quite clear on what it is, where it is, or even if there is something there at all, as it was allocated some time ago (HS9 respondent 1; Respondent 49);
- knowledge and experience of what the options necessitate, e.g. with HS4, prior experience of managing scrub, and currently practicing minimum or shallow tillage in HS3;
- respondents highlighted that general attitude and a reluctance to change may be a barrier for some farmers; and
- many suggested that they would welcome some additional guidance and advice at an earlier stage in the application process to support uptake.

Accessibility as potential barriers to uptake

- respondents suggested there is a general lack of both awareness and understanding of the options and how they apply;
- lengthy and complex application processes (i.e. bureaucracy) which requires “too much paperwork“ (Respondent TIb_3) as well as IT skills/infrastructure; and
- availability of information being limited to online and often not in a format suitable for printing was highlighted as an issue.

Often these perceived barriers overlap, and as such are compounded, for example respondents highlighted that the transition to minimum tillage for HS3 could be a barrier both in terms of fit and experience as well as presenting a financial risk.

3.2.3 In-depth interviews with non-participants

The 12 farms in the non-participant sample had a range of historic features on their land as set out at Figure 3-8Figure 3-12 Non-participant sample historic features (n=12).

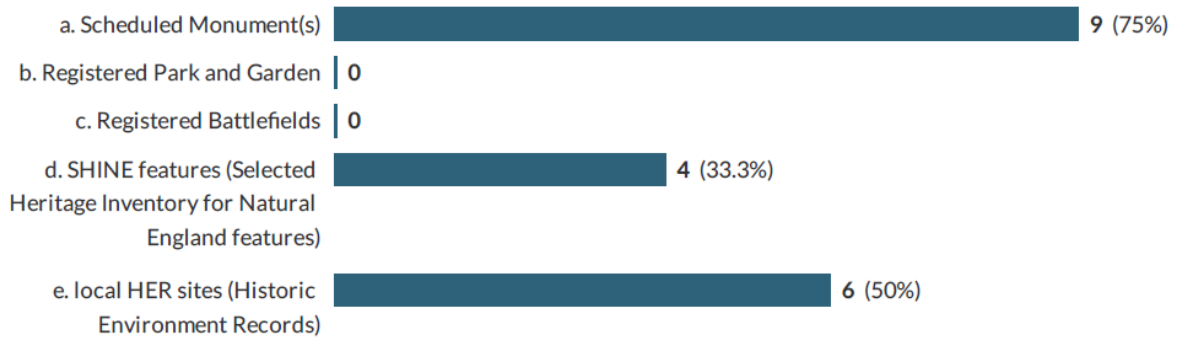

Figure 3-12 Non-participant sample historic features (n=12)

Seven of the twelve farms are currently in Mid Tier/ Higher Tier CS and a similar number are or have been in ELS/HLS. Only two respondents had previously, but are not currently, participating in AES; both identified past conflict with Natural England as the main reason for not participating and one also cited uncertainty over future environmental land management (ELM) scheme opportunities. Motivation for participating in AES is illustrated in Figure 3-13, although given the very small sample, the data should be treated with caution.

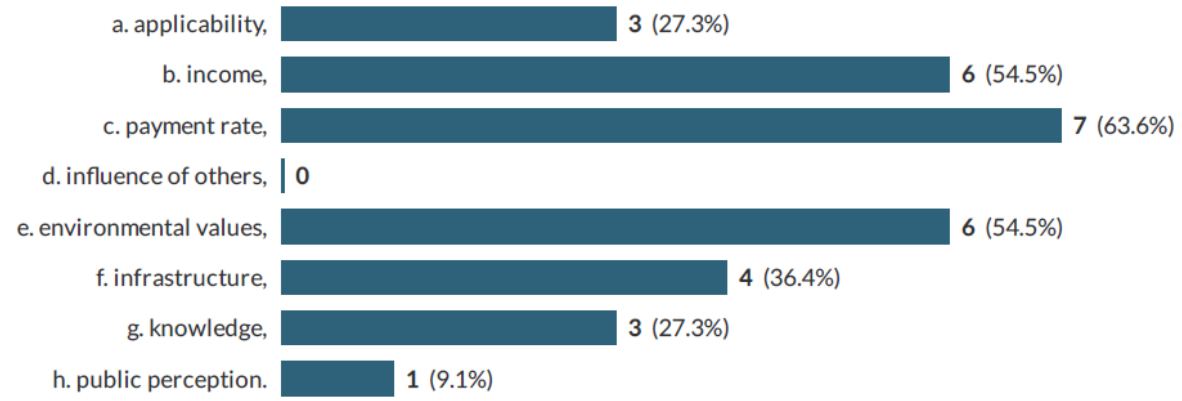

Figure 3-13 Participant sample motivation for joining AES (n=34)

For those with an AES agreement, the types of options taken up are indicated by the categories in the most recent agreement, namely Grassland (10), Arable (7) and Boundaries, trees and orchards (6). There were small numbers (<5) in a number of other categories, including two in **Historic environment and landscape.**

A range of justifications regarding the omission of HS options as part of their AES agreement were cited by the individual respondents including, not being aware of the HS options (Respondent OS1) and the incoherence of the option in relation to land management practices, for example needing to "*deep cultivate on occasions*" (Respondent OS3). Importantly, three common themes emerged around risk, perception of cost effectiveness and fit with farming system, including eligibility.

The respondents reported a three-fold perception of risk, most commonly regarding repercussions and fines for non-compliance, with one respondent stating there is "always a risk of being penalised" (Respondent OS4), together with the risks of being tied into the option for a prolonged period of time and of "*irreversible implications*" (Respondent Tia_TBC).

Respondents also regularly report a perceived negative economic case for the option with common citations reflecting a belief that the option payment is insufficient due to:

- inconvenience of taking fields out of normal rotation;
- inability to cultivate fields; and
- negative impact on the bottom-line of reduced production.

Both the perceptions of risk and cost effectiveness overlap with the fit between the option and farming system.

Respondents that have omitted or discounted HS3, HS4 and HS9 options report finding the options too restrictive for their farming system, with greater consideration being given to options that would require no change to that individual's farming system. This is consistent with the position of participants, who report that options taken up do not require them to adjust farming practices. For example, one respondent took up HS3 without a requirement to do anything differently.

"*It was money for old rope, we were just careful we didn't put muckheaps on it but it wasn't difficult*"

(Respondent 43)

This theme of fit is also borne out in terms of management of the feature itself, with some finding that the feature is easily managed:

"One of the SHINE features was in the corner of the field, which made it easier to take out of cropping"

*(*Respondent 36)

"*We don't want to change the farming system too much because we feel we've got a system that works. So, it is really what fits in with the least disturbance into ours*"

(Respondent 39)

For others, the feature is not so easily managed, and subsequently the uptake of an option, which frequently reported means taking land out of a production rotation, is more impactful:

"If I'm wanting to grow a particular crop in a particular field, to have ten acres at one end that you can't crop, ruins the rotation. It ruins the whole ethos of the way we farm, really. It makes it much more complicated"

(Respondent 39).

Some HS9 farms also felt obliged to use the option to protect Scheduled Monuments, even when the payment was considered inadequate, rather than not have an agreement at all

I don't think we feel the payment does (cover cost and income forgone). I think it was a case of we had to do something with it to put it into the scheme otherwise we couldn't do a scheme at all. We did feel it's very much tied us. We found it quite difficult and it nearly made us think about not doing the scheme at all.

(Respondent 15).

Eligibility was also highlighted as a barrier to uptake, with several respondents highlighting a specific barrier to accessing the HS3, HS4 and HS9 options where there is grass in an arable

rotation in the year of application (land being in grass at the time of application). This reporting is however unfounded in that both HS3 and HS9 can be used when the field is in temporary grassland (but not permanent grassland).

In identifying why these HS options have low uptake the evidence (from task 2a) suggests the three key issues, perceptions of risk, cost effectiveness and fit with farming systems which appear to not only overlap but to be interrelated. In response to these issues, respondents (non-participants) that omitted HS3, HS4 and HS9 perceived the options as too restrictive and reported a need for more flexibility. Specifically, to incorporate and adjust for that specific farm and "find individual solutions to each situation" (Respondent OS3). These sentiments are further evidenced in the participating respondents (Task 2b, HS3 & HS4).

3.2.4 Field survey of option HS9 in-situ

A total of 15 farmers were interviewed and 27 fields were site assessed from those farms (refer to Appendix 10 for anonymised details from site visits). The sample was concentrated in the south of England and while it included a range of farm sizes, most (9) were >300 ha. Twelve of the farms were in Mid Tier and three in Higher Tier. Thirteen has a Scheduled Monument while two had a SHINE Feature.

Table 3-8 Counties of HS9 visited farms

County	Number
Buckinghamshire	1
Cambridgeshire	4
Dorset	1
Essex	1
Gloucestershire	1
Hertfordshire	1
Norfolk	2
Oxfordshire	4
TOTAL	**15**

Six farmers had placed the HS9 option only on the area of the feature (SM or SHINE) whereas the remainder had placed the option over the entire parcel thus ensuring that they would be paid for their management across the whole field and not just the feature area. Farmers using the option as a part parcel option still managed the remainder of the field as HS9, as it would not be practical to split cultivation method and depth on a part parcel basis but were not being paid to do so unlike the whole parcel farmers. Farmers who had entered part fields had done so because they and / or their advisors did not realise that the whole parcel could be included. The eligibility criteria from the HS9 specification in Mid Tier does not provide clarity on whether the option can be included across the whole parcel or only on the feature.

None of the fields had been ploughed. Ten of the farms used cover crops but at the time of the visits, no fields were in cover cropping. During the interviews, the relevance of cover cropping to the HS9 option was not recognised clearly by the farmers.

The interviews highlighted that 7/15 farms had included cover crops which was 10/54 fields that were included in HS9. The reasons for growing cover crops were:

- to give a good entry to a spring crop. Blackgrass wasn't a factor in their decision making. Cover crops were used rotationally. 3/7
- to enable later establishment of an autumn cereal crop, to get the blackgrass to germinate and then spray it off. All 3 farms said that it was a risk because if soil conditions became wet then they wouldn't get an autumn crop in & would have to go

for a lower financial return with a spring crop. None of the farmers felt that the restrictions on cultivation type/depth was specifically going to lead to a blackgrass problem. Late establishment of autumn crops or spring cropping to allow blackgrass germination & spraying was considered very important but cover cropping wasn't considered to be necessary in blackgrass control 3/7

- to provide sheep grazing in early autumn 1/7

One farmer had noticed signs of some water movement in the two fields managed using HS9 and as such these parcels should not be eligible for HS9 according to the specification. All the other 14 farmers (encompassing 25 parcels) reported they had not noticed signs of soil erosion or runoff. At all the site visits a visual assessment of the risk of soil erosion or runoff on each parcel was undertaken using the Defra risk assessment guide. This highlighted that 14 of the 27 parcels had a Moderate or High risk of soil erosion or runoff and as such would not be eligible under the current HS9 option specification. Actual visible signs of soil erosion and runoff were noted on 2 out of the 27 parcels and these were the 2 parcels where the farmer had confirmed that there had been issues with water movement. The soil erosion and run-off risk assessment should be done as part of completing the Farm Environment Record (FER) with fields marked on the accompanying maps. Some options state that they can't be used on land at risk or soil erosion and run-off (including arable options such as AB2 Over-wintered stubbles), HS3 and HS9 are not to be used on fields where soil movement or loss has been identified as a problem (which would represent at least a moderate risk of soil erosion depending on topography and proximity to a watercourse). Some options state that they can only be used on land at risk of soil erosion and run-off (including high paying options SW3 In field Grass strips and SW4 12-24 m buffer strips). The completion of the soil erosion and run-off risk assessment may scope out fields that include historic environment features because they are identified as being at risk of soil erosion and run-off.

Given that one of the reasons farmers may use reduced cultivations and cover cropping in the rotation is potential improvements to soil resilience, structure, erosion, and drainage there is a conflict between where the desired cultivations are used and where they should be used to protect HE features.

4 CONCLUSION

The overall aims of this project were to:

1. Identify arable areas of England where little use has been made of HS3 and HS9;

2. Identify geographic gaps in the selection of HS4;

3. Where options HS3, HS4 and HS9 have been deployed, assess whether they have been deployed appropriately (e.g. in accordance with advice, on appropriate historic environment features & land use types, with tailored prescriptions and the correct Indicators of Success).

4. Use Heritage at Risk data as a proxy to identify areas where scrub and arable cultivation is a particular issue, and where there have been missed opportunities to deploy HS3, HS44 and HS9;

5. Engage with the farming sector to gather evidence as to why these options have low uptake;

6. Engage with the farming sector to understand option choice and to determine if different factors are at play for designated vs undesignated sites;

7. Assess the effectiveness of option HS9 and the inclusion of cover cropping within the option prescriptions;

8. Draw the evidence together to suggest ways the options and option guidance can be revised to deliver farmer requirements as well as the needs of the heritage asset;

9. Consider the potential for adding value to the options or indeed reducing requirements to focus on primary objectives.

Aim	High Level Findings
Identify arable areas of England where little use has been made of HS3 and HS9	Mapping data indicates a spread of HS3, HS4 and HS9 across England, however, analysis highlights the highest uptake of HS3 is in the South with a focus on the south-west. HS4 also follows a similar pattern with high concentrations particularly the south-west. HS9 is found in similar positions, but with a more eat midlands/south-east emphasis. There appears to be a correlation with the distribution of options with designated landscapes such as AONBs and National Parks which has not been tested. A reason for this could be around the input of specialist advice offered to farmers in these areas from farm conservation advisers working in the AONB and NPA organisations.
Identify geographic gaps in the selection of HS4	HS4 has been used in Counties which are predominately grassland where the distribution of HE features is high. This is

	likely to reflect the major motivation for choosing any of these options which was that they fitted in with the farming systems and were practical to implement. However, only 1.23% of SMs on the HAR at risk of scrub encroachment are covered by option HS4 in only 2 NCAs.
Where options HS3, HS4 and HS9 have been deployed, assess whether they have been deployed appropriately (e.g. in accordance with advice, on appropriate historic environment features & land use types, with tailored prescriptions and the correct Indicators of Success).	Only sites with HS9 were visited, however, from responses received from the participant survey, there were several issues raised that could impact on the choice, deployment and management of options. The first was: knowledge of the feature, lack of awareness of the options and how to apply them, lack of knowledge in managing the options, need for additional guidance and advice at an earlier stage in the application process to support uptake. Concerns were also made on the availability of information being limited to online and often not in a format suitable for printing.
Use Heritage at Risk data as a proxy to identify areas where scrub and arable cultivation is a particular issue, and where there have been missed opportunities to deploy HS3, HS4 and HS9;	Overall, the coverage of HAR features in HS3 and HS9 at risk from cultivation was 3.76% and for HAR features in HS4 at risk from scrub encroachment 1.23%. The proportion of land under HS options which was identified as at risk is highest in the Southern Lincolnshire Edge (89%), followed by Lincolnshire Wolds (43%), Avon Vales (38%), Northamptonshire Vales (37%) and North Downs (30%). In these NCAs the option used on the HAR, at risk of cultivation is singly HS3. Within these NCAs it should be considered that due to challenges with option eligibility, some HAR at risk of cultivation in an arable context might not be eligible for the HS options HS3 and HS9, given that those options are not allowed to be applied on land where soil movement is identified e.g where there is a risk medium or high risk of soil erosion and run-off.

	In this situation, it may be that some of the SM and other features are protected by other options (which focus on targets such as water quality or soil health) or good farmer practices. So although the percentage of coverage is quite low, it is likely not a true representation of the area of SHINE and SM under threat which is protected
Engage with the farming sector to gather evidence as to why these options have low uptake	The online survey responses suggested reasons for not taking up HS options include concerns over restrictions to future land use, a view the options were uneconomic and concerns over liability for any damage to features. One respondent reported that they were unaware of the HS options. The motivations for choosing options indicates strongly that farming systems and practicality are the main drivers; with applicability, knowledge and agronomic factors also influential. For HS3 for example, most respondents reported to be already practicing shallow cultivating, or moving towards minimum tillage. Therefore it may be considered reasonable that the distribution of options that use reduced cultivation (HS3 and HS9) coincide with areas where the land use is predominately arable and there is a greater opportunity for using reduced cultivation techniques. Similarly, for HS9, most respondents felt the option fitted in well with their farming system in that the farm was already or was moving towards minimum tillage, or that the feature was non-visible and non-intrusive, subsurface or a designated site, and therefore had no impact on farming practices. In terms of the economic case, HS4 respondents also reported being motivated by the opportunity for unproductive land to receive an AES payment. However, respondents undertaking these options frequently reported a vested personal interest in the feature, citing feeling passionately about protecting historic features, and regarding these options as a mechanism to protect them.
Engage with the farming sector to understand option choice and to determine if different factors are at play for designated vs undesignated sites	The reasons given for taking the options up and for also not taking them up did not suggest that different factors were at play. In fact, frustration was felt by a number of respondents that their historic environment

	features, not being designated, were no longer eligible for inclusion in the HE options: This would suggest that if farmers with un-designated sites were allowed to include those features in an option, then there would be greater take up.
Assess the effectiveness of option HS9 and the inclusion of cover cropping within the option prescriptions	None of the 15 sites had been ploughed at the time of visit. None of the farmers had a cover crop in place at the time of visit and were not clear on the relevance of the cover crop in HS9 management. The interviews highlighted that 7/15 farms had included cover crops. The reasons for growing cover crops were to give a good entry to a spring crop, to enable later establishment of an autumn cereal crop which would then allow blackgrass to be sprayed off after germination and to provide sheep grazing in early autumn. Cover cropping was not considered to be necessary in blackgrass control not part of the decision on where to sow cover crops. The practicalities of the rotation were more important. 6 farmers had placed the HS9 option only on the area of the feature (SM or SHINE) whereas the remainder had placed the option over the entire parcel thus ensuring that they would be paid for their management across the whole field and not just the feature area. Farmers using the option as a part parcel option still managed the remainder of the field as HS9, as it would not be practical to split cultivation method and depth on a part parcel basis, but were not being paid to do so unlike the whole parcel farmers. As part of the site visit 14 of the 27 field parcels in HS9 had a moderate or high risk of soil erosion or run-off and as such should not have been eligible for HS9.
Draw the evidence together to suggest ways the options and option guidance can be revised to deliver farmer requirements as well as the needs of the heritage asset	See Discussion and Recommendations section
Consider the potential for adding value to the options or indeed reducing requirements to focus on primary objectives	See Discussion and Recommendations section

5 DISCUSSION AND RECOMMENDATIONS

5.1 Historic option uptake and location of features as risk

The analysis highlights that there is potential to significantly increase uptake of HS3, HS4 and HS9. Data on coverage of options against total area of HAR and SHINE features at risk and in cultivation and scrub areas was used to identify that there is limited uptake of options, but high areas of features at risk (Table 5-1). The data also demonstrates clear disparities in uptake across options, with HS3 having the highest uptake and HS4 and HS9 much lower uptake. There are also differences in uptake across England, which is likely to reflect the extent of prevalence of arable land. Given this disparity it is important to establish first priorities for increased uptake of relevant HE options.

Table 5-1 Area of SHINE and HAR (At Risk), area under CS and area under HE options

	Total Area (ha)	Area under CS (ha)*	Area under HS3, 4 & 9
SHINE	565,167	8,528	1,527
HAR ('At Risk')	50,072	386	126

* Not all CS options will be effective in protecting heritage features

It should also be noted that once HS3 or HS9 have been applied to a SM at risk from cultivation, the risk will have been reassessed and potentially taken off HAR. As this is a desk-based process, it is possible that the risk has not been addressed in practice and ideally this should be verified by on-site inspection before removing from the HAR inventory.

Recommendation 1. Agree priorities for increasing uptake of HS3, HS4 and HS9 and, where options are in place, only remove these sites from the HAR when it has been verified that the risk has been addressed.

It is important to recognise that some SM and historic features are protected by other CS options (e.g. which focus on targets such as biodiversity recovery, improving water quality and enhancing soil health) or good farmer practices. Many CS options were designed to include protection of HE features but these have their own eligibility requirements, which are not always consistent with meeting HE objectives. For example, SW7 (Arable reversion to grassland with low fertiliser input) can only be used in Mid Tier with Catchment Sensitive Farming Officer (CSFO) approval and is only available in High Priority Water Quality areas. Further, there will be a risk from cultivation on any site that remains under arable cropping and HE protection relies on restricting depth of cultivation. Nevertheless, the percentage of coverage of features by HE options is probably not a true representation of the area of SHINE and SM under threat which is protected by CS options. There is a conflict in eligibility of use of intended to protect historic environment features and the soil erosion and run-off risk assessment which is completed as part of the FER. Parcels identified as at risk of soil erosion and run-off are not eligible for HS3 or HS9.

Recommendation 2. Review opportunities for synergy (and conflict) between HE options and those focused on other outcomes, to support wider protection of at risk features and ensure accurate statistics on features that are protected through CS.

Recommendation 3. Review eligibility of HS options to resolve conflict between assessment of soil erosion and run-off and use of options HS3 and HS9.

5.2 Survey of farm managers

The response to the online survey was substantially lower than planned and this limits the confidence with which we can interpret the responses. Nevertheless a number of recurring

issues have been raised and substantiated in the in-depth interviews with those taking up options HS3, HS4 and HS9 (n=34 participants) and those who omitted these options from their applications (n=12 non-participants). These are discussed below.

Understanding option choice and uptake

- Farmers with an interest in historical features, and who value their protection are more likely to take up HS options and feel some duty to do so. However, many farmers are unaware of historic features on their land and/or of the opportunity to receive payment for these under CS (including option eligibility criteria and CS participation more broadly). For example, targeting statements include non-designated sites but the options especially in Mid tier focus on SMs alone. This may relate to both an absence of information and advice (Historic England hold data on wider 'monuments at risk' damage and loss), a lack of clarity on the HEFER and understanding of the rules on application of options.
- Knowledge of historic features and how to manage them within an AES option is important for farmers to have the confidence to take up HS options. Farmers have concerns about the risks associated with managing options to a prescription and the likelihood of being penalised if they get it wrong and/or the feature is damaged, including by external factors such as weather events.
- Farmers are not inclined to take up options that disrupt their current farming systems in terms of crop rotation or approach to cultivations, both in the short and medium term (including beyond the life of the AES agreement). As such, a case needs to be made to farmers about the inherent value of historic features and their role in protecting it, as well as the capacity for AES to support that financially.
- Farmers expect that they should be financially no worse off by taking up AES options; this includes their time commitment to participate as well as covering additional costs and income forgone elements. Participants in this research consider that HS option payment rates are generally low so some would rather just not bother. This will vary according to land use and productivity and is difficult to address with a single payment rate that represents a nominal typical farm. Payment rates were last set in 2013 (Natural England, 2014) and Defra has commissioned work to update rates in 2021.

Recommendation 4. Improve the awareness of historic features on farmland, risks of damage and the role of farmers in protecting these assets, including through sympathetic management and uptake of AES options.

Recommendation 5. Extend eligibility for the uptake of HE options in Mid Tier, to include SHINE features as well as SMs.

Recommendation 6. Consider alternative payment mechanisms to the 'additional costs and income forgone' model, such as reverse auctions or payment by results, so that higher payments can be made for valued assets on more productive land.

Effectiveness of option HS9 and the inclusion of cover cropping

Designation of historic sites often relies on local history groups and organisations flagging them to Historic England, usually via local Historic Environment Record (HERs)[13]. Nevertheless, amongst this group of agreement holders, there was a widespread view that the extent of the historic feature was uncertain, as it was below ground and many reported an absence of artefacts on the surface. One Advisor noted that because the historic feature isn't visible, it may not even be present if was recorded incorrectly or has been destroyed. However,

[13] https://historicengland.org.uk/advice/technical-advice/information-management/hers/

a lack of surface artefacts may reflect that archaeological layers are not being damaged by ploughing etc. while for other sites, artefacts would not be expected.

For some there was a good fit with their farming system and reduced depth cultivation but for others, the presence of a scheduled monument required them to take up an HS option as part of the wider agreement. Cover cropping within the option is generally acceptable and effective in reducing soil loss, although many of the sites inspected were reasonably flat. Despite the cover cropping potentially being used as a method of managing blackgrass, the relevance of the cover cropping to the HS9 option was not recognised. While only 7 farmers had grown a cover crop, the reasons for doing so were to enable something else in the rotation to take place, be it early spring cropping or to encourage blackgrass germination that would allow spray control. This happened on 6 of the 7 farms who had grown cover crops.

The site risk assessments highlighted that half of the land parcels had a Moderate or High risk of soil erosion or runoff meaning they should not be eligible for inclusion under the current HS9 option specification. Soil erosion and run-off risk assessment is generally done at the initial application stage before the NE adviser gets fully involved with the application (in Higher Tier). For Mid tier there is no specific advice available except for guidance on gov.uk. If the steps in the guidance are followed, the preparation of the Farm Environment Record takes place before the selection of options.

No prohibited activity was observed on the site visits and no fields were ploughed, using either min till or direct drilling (including strip till). Two HS9 part-field feature areas are under another MT option (AB9 Winter bird food, established by min till every 2 years) on the same area, although the HS9 specification does not state that it can be combined with AB9 (see Appendix 1). One farm reported that they had to reduce HS9 because they had AB8 (Flower-rich margins and plots) on the land but could not understand why that was not allowed. Gov.uk guidance provides information on which options can be applied on the same areas as others. AB8 and HS9 cannot be applied on the same area. Such confusion about option use, especially when in combination with others is a major barrier, as getting it wrong can currently lead to large penalties if found on inspection, so some of the barriers are justified. However, arable options might well protect below-ground archaeology but that is not clear in the guidance.

Recommendation 7. Historic England should provide updated advice and guidance in a range of formats for farmers, explaining various farming/ archaeology types and what might be expected to survive there.

Recommendation 8. Provide clarity on which CS options can be used on historical sites to encourage increased protection of features and reduce the risk of penalties. This should also cover options for non-designated sites.

Recommendation 9. Maintain datasets to include up-to-date information on agreements and the location of management options. Up-to-date and accurate data allows for greater accuracy of analyses and improved understanding of the current levels of uptake.

Recommendation 10. Clarify option guidance, including the eligibility of land, aims and recommended management to improve option choice and understanding.

Revisions to the options/guidance to deliver farmer and heritage asset requirements

There are two separate but related issues here:

1) Six farms had placed the HS9 option only on the area of the feature (SM or SHINE), while the remainder had placed the option over the entire land parcel, receiving payment for management change across the whole field. It is understood that Natural England internal option guidance says ‘The prescriptions for this option must be applied over all of the field that is under cultivation. This option applies to both autumn

and spring sowing.' This guidance would only be made available to farmers applying for the option in Higher Tier where advice from Natural England is available. The same information is not available on the GOV.UK website where advice on Mid Tier options is located.. The intention was that the HS9 option was a full parcel option[14]. If farmers are clear that they will be rewarded for a change in management on a whole field to protect a historic environment feature on part of it, they may be more likely to take up the option if they felt sufficiently rewarded..

2) Options could be more specific to the feature that they aim to protect, including the extent to which existing or tailored management, but something less than the prescription, might not be damaging to a feature. This shifts the focus to the outcome rather than actions and is consistent with Defra's new approach to payment for public goods. This would involve a much wider range of feature and site specific options, which, while adding flexibility in principle may also add confusion. Nevertheless, more recently introduced precision farming techniques and continuing technological developments for instance using remote sensing or GPS make a case for review.

Recommendation 11. Improve the clarity and consistency of information and advice on part and whole-field option coverage throughout scheme guidance.

Recommendation 12. Consider opportunities to introduce more flexibility in terms of what land use and management (including precision farming) represents effective protection for groups of features across a range of contexts.

Potential for adding value to the options or reducing requirements

The payment rate needs to reflect the restrictions and work involved but it is also important to promote the value in non-financial terms. While farmers appear to choose options based on practical considerations such as applicability, farming system and agronomic considerations, they are quite proud of their historic features and there should be more promotion and celebration of what they do for historic features. A more site specific approach could improve uptake, where someone comes out to look at the feature and see what could be done and how (using the farmer's expertise of their own management tools), rather than basing eligibility solely on mapping and prescribed options.

Recommendation 13. Undertake research into the efficacy of targeted precision farming approaches in protecting historic features on arable sites.

Responses from farm managers and advisers highlight that many are nervous about entering into schemes because of the risk of infringement penalties that other farmers are perceived to get.

Respondents also perceive that the system seems too rigid and does not account for individual circumstances, with no simple way to appeal the decision of the RPA. Both of these barriers could be overcome to some degree with more on-farm advice and guidance both in terms of the scheme management and the feature management.

As part of this, HEFERs need to be more user friendly as they are crucial for providing HE advice, even if the format and presentation needs review. The guidance is given in a series of standard codes which the applicant has to find on a spreadsheet or matrix. Each code gives possible options depending on the scheme the applicant is looking at but in Mid Tier, and in particular with SHINE features, there are sometimes no options suggested. This is frustrating for individuals who are keen to look after their historic environment features. It is important to encourage and support farmers to make more of their historic features and history in general.

[14] Personal communication, Dawn Enright November 2021

As part of this, HEFERs need to inform or enthuse farm managers' interest in historic environment features and encourage them to keep them in good condition.

This is supported by similar research from East Anglia, Robertson (2020) suggests options should be explored to simplify HEFERs improving their user experience, by providing more relevant and accessible information and maybe even training on their use to improve their impact on the delivery of historic environment options.

Recommendation 14. Review and revise HEFERs to ensure that they are more user-friendly

It would be helpful to increase the number of options or the opportunity for using options that would increase the profile of historic features in the public goods conversation. Features such as ridge and furrow in grassland are often included in the grassland HS5 option because the option can be applied on features in the HEFER and those which are self-declared. An arable option if established using the right techniques (e.g min-till) might well benefit historic features but at this time, this is not communicated. Applicants are often disappointed to not be able to use HS options on non-designated sites. Increasing the potential coverage of historic environment features with a range of options and not confining coverage to only a few options applied in a few situations to a few designated features would significantly raise the profile of the historic environment.

Using complementary options that have a fit with, for example reduced depth cultivation, could be better promoted.

Recommendation 15. Scope opportunities to increase applicability and eligibility for using all options on HE sites and HE options, particularly under Mid Tier so that regionally and nationally important sites that are not designated are offered protection.

5.3 Summary of recommendations

A list of recommendations is made based on the evidence gathered in this research, as follows:

R1. Agree priorities for increasing uptake of HS3, HS4 and HS9 and, where options are in place, only remove these sites from the HAR when it has been verified that the risk has been addressed.

R2. Review opportunities for synergy (and conflict) between HE options and those focused on other outcomes, to support wider protection of at risk features and ensure accurate statistics on features that are protected through CS.

R3. Review eligibility of HS options to resolve conflict between assessment of soil erosion and run-off and use of options HS3 and HS9.

R4. Improve the awareness of historic features on farmland, risks of damage and the role of farmers in protecting these assets, including through sympathetic management and uptake of AES options.

R5. Extend eligibility for the uptake of HE options in Mid Tier, to include SHINE features as well as SMs.

R6. Consider alternative payment mechanisms to 'additional costs and income forgone', such as reverse auctions or payment by results, so that higher payments can be made for valued assets on more productive land.

R7. Historic England should provide updated advice and guidance in a range of formats for farmers, explaining various farming/ archaeology types and what might be expected to survive there.

R8. Provide clarity on which CS options can be used on historical sites to encourage increased protection of features and reduce the risk of penalties. This should also cover options for non-designated sites.

R9. Maintain datasets to include up-to-date information on agreements and the location of management options. Up-to-date and accurate data allows for greater accuracy of analyses and improved understanding of the current levels of uptake.

R10. Clarify option guidance, including the eligibility of land, aims and recommended management to improve option choice and understanding.

R11. ***Improve the clarity and consistency of information and advice on part and whole-field option coverage throughout scheme guidance***.

R12. Consider opportunities to introduce more flexibility in terms of what land use and management (including precision farming) represents effective protection for groups of features across a range of contexts.

R13. Undertake research into the efficacy of targeted precision farming approaches in protecting historic features on arable sites.

R14. Review and revise HEFERs to ensure that they are more user-friendly.

R15. Scope opportunities to increase applicability and eligibility for using all options on HE sites and HE options, particularly under Mid Tier so that regionally and nationally important sites that are not designated are offered protection.

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APPENDIX 1: HE OPTION DETAILS (FROM GOV.UK)

HS3: Reduced-depth, non-inversion cultivation on historic and archaeological features

How much will I be paid?

£79 per hectare (ha)

Where to use this option

It's available for Countryside Stewardship Mid-Tier and Higher Tier.

In Mid-Tier you can use this option only:

- on Scheduled Monuments on arable land or temporary grassland
- with the written approval of Historic England as confirmed on your Historic Environment FER (HEFER) consultation response

In Higher Tier you can use this option:

- on Scheduled Monuments where approved by Historic England and on historic or archaeological features identified in your HEFER

Where this option cannot be used

- Where historic or archaeological earthworks are known to survive
- Where soil movement or loss has been identified as a problem

Related Mid-Tier options

You can locate these options and supplements on the same area as this option.

- AB4 – Skylark plots
- AB7 - Whole crop cereals
- AB10 - Unharvested cereal headland
- AB11 – Cultivated areas for arable plants
- AB14 - Harvested low input cereal
- OP5 - Undersown cereal
- OR3 - Organic conversion - rotational land
- OR4 - Organic conversion - horticulture
- OT3 - Organic land management - rotational land
- OT4 - Organic land management - horticulture
- SW6 - Winter cover crops

How this option will benefit the environment

It reduces damage to historic and archaeological features under cultivation by using non-inversion (minimum tillage) machinery and shallower cultivation depths.

Protecting historic and archaeological features will conserve the historic character of the farm and protect England's heritage for future generations. This option may also maintain and conserve landscape character.

If successful there will be a soil surface with no evidence of:

- erosion
- subsoil (which indicates a deeper cultivation depth)

- freshly disturbed archaeological remains, such as pottery, burnt flint, flint tools, animal and human bone and building stone and tile

Aims

- If you're selected for a site visit, we will check that delivery of the aims is being met and the prohibited activities have not been carried out. This will ensure the environmental benefits are being delivered.
- Non-inversion machinery will be used to reduce cultivation depths to no more than 15 centimetres (cm) deep.

Prohibited activities

To achieve the aims and deliver the environmental benefits, do not carry out any of the following activities.

- Grow the following crops on the option area:
  - maize
  - lucerne
  - root and tuber crops (excluding non-harvestable root crops such as grazed fodder beet and forage turnips)
  - short rotation coppice
  - miscanthus
- Carry out drainage works, including modifying existing drainage, without written permission before work starts
- Locate vehicle or stock access routes within 6 metres (m) of the feature (existing surfaced tracks can be used)
- Carry out the following field operations to deeper than 15cm:
  - tillage
  - soil management
  - planting
  - harvesting

Recommended management

To assist you in achieving the aims and deliver the environmental benefits for this option, we recommend that you use best practice. We recommend that you:

- use non-inversion (minimum tillage) machinery to reduce cultivation depths

HS4: Scrub control on historic and archaeological features

How much will be paid

£137 per hectare (ha)

Where to use this option

Available for Countryside Stewardship Mid-Tier and Higher Tier (Whole or part parcel)

- Only on historic and archaeological features with more than 5% scrub cover

Related Mid-Tier options

These options and supplements can be located on the same area as this option.

- OR1 - Organic conversion - improved permanent grassland
- OR2 - Organic conversion - unimproved permanent grassland
- OT1 - Organic land management - improved permanent grassland

- OT2 - Organic land management - unimproved permanent grassland
- UP1 - Enclosed rough grazing

How this option will benefit the environment

It reduces the risk of root damage to historic and archaeological features by permanently removing the majority of scrub.

Protecting historical and archaeological features will conserve the character of the farm and protect England's heritage for future generations. This option may also maintain and conserve landscape character.

Depending on the site's location, this option may help to:

- reduce diffuse pollution
- reduce soil erosion

Aims

- If you're selected for a site visit, we will check that delivery of the aims is being met and the prohibited activities have not been carried out. This will ensure the environmental benefits are being delivered.
- Throughout the year there will be a well-managed grass sward, keeping bare ground to a minimum, growing over the historic and archaeological feature.
- Throughout the year the historic and archaeological features are not obscured by scrub or damaged by erosion.
- During the autumn and winter, about a quarter of the scrub will be removed each year for the first three years, and regrowth will be controlled thereafter so that scrub covers no more than 75% of the feature.

Prohibited activities

To achieve the aims and deliver the environmental benefits, do not carry out any of the following activities:

- Clear scrub between 1 March and 30 September
- Grub out stumps and roots
- Plough, cultivate or re-seed
- Harrow or roll
- Supplementary feed on or within 6 metres (m) of the historic or archaeological feature
- Locate vehicle or stock access routes within 6 metres (m) of the feature (existing surfaced tracks can be used)

Recommended management

To assist you in achieving the aims and deliver the environmental benefits for this option, we recommend that you use best practice. We recommend that you:

- remove 25% of scrub on the feature every year for the first 3 years (total 75%), clearing only between 1 October and 28 February
- remove cuttings and brash
- prevent and control scrub re-growth
- prevent additional scrub encroaching on historic or archaeological features
- maintain a continuous grass sward or vegetation cover over the features so that no more than 5% have bare patches and erosion
- ensure all necessary consents are in place to remove any mature trees

HS9: Restricted depth crop establishment to protect archaeology under an arable rotation

How much will I be paid?

£174 per hectare (ha)

Where to use this option

It's available for Countryside Stewardship Mid-Tier and Higher Tier.

In Mid-Tier you can use this option only:

- on Scheduled Monuments on arable land or temporary grassland
- with the written approval of Historic England as confirmed on your Historic Environment FER (HEFER) consultation response

In Higher Tier you can use this option:

- on Scheduled Monuments where approved by Historic England and on historic or archaeological features identified in your HEFER.

Where this option cannot be used

On parcels at risk of soil erosion or runoff, as identified in the Farm Environment Record (FER)

Related Mid-Tier options

You can locate these options and supplements on the same area as these.

- AB4 – Skylark plots
- AB7 - Whole crop cereals
- AB10 - Unharvested cereal headland
- AB11 – Cultivated areas for arable plants
- AB14 - Harvested low input cereal
- OP5 - Undersown cereal
- OR3 - Organic conversion - rotational land
- OR4 - Organic conversion - horticulture
- OT3 - Organic land management - rotational land
- OT4 - Organic land management - horticulture

How this option will benefit the environment

It reduces the risk of damage to historic and archaeological features on arable land, particularly where subtle earthwork remains survive.

Maintaining archaeological and historic features will conserve the character of the farm and protect England's heritage for future generations.

Arable cultivation damages archaeological remains by:

- levelling out earthworks
- cutting through and churning up remains below ground
- eroding protective layers of soil

Using direct drill machinery across earthwork remains reduces the risk of damage to archaeological features.

Cover-cropping techniques can help to avoid damage to soil structure and weed problems which might otherwise build up under a direct drilling regime, by:

- reducing compaction

- limiting erosion
- suppressing weeds

If successful there will be a soil surface with no evidence of:

- erosion
- subsoil (which indicates a deeper cultivation depth)
- freshly disturbed archaeological remains, such as pottery, burnt flint, flint tools, animal and human bone and building stone and tile

There will also be improved soil structure and fewer weeds.

Aims

If you're selected for a site visit, we will check that delivery of the aims is being met and the prohibited activities have not been carried out. This will ensure the environmental benefits are being delivered.

- All work involving tillage, soil management, planting and harvesting will go no deeper than 15 centimetres (cm). A direct drill system will used where historic or archaeological earthworks are known to survive.
- A sown cover crop will be used for at least one year of the five in agreement.

Prohibited activities

To achieve the aims and deliver the environmental benefits, do not carry out any of the following activities.

- Use equipment trains that are longer than 6 metres (m)
- Grow the following crops on the option area:
    - maize
    - lucerne
    - root and tuber crops (excluding non-harvestable root crops such as grazed fodder beet and forage turnips)
    - short rotation coppice
    - miscanthus
- Carry out drainage works, including modifying existing drainage, without written permission before work starts
- Locate vehicle or stock access routes within 6m of the feature (existing surfaced tracks can be used)
- Carry out the following field operations to deeper than 15cm:
    - tillage
    - soil management
    - planting
    - Harvesting

Recommended management

To assist you in achieving the aims and deliver the environmental benefits for this option, we recommend that you use best practice. We recommend that you:

- one year in every 5 include a sown cover as part of the crop rotation, based on the 'What to sow' section below

APPENDIX 2: DEPTH-INTERVIEW GUIDE

Interviewer general guidance

Interview No.:	
Interviewee (first name):	
Interviewer:	
Interview mode:	Telephone / Teams Video-call (video off / on)
Audio recorded:	Yes / No
Date of interview:	

Project information and Consent forms must be emailed with the interview confirmation. Consent forms must be completed electronically and returned to the interviewer

Instructions for the interviewer are italicized and in blue (as demonstrated here). Questions numbered and prompts alphabetised.

All appropriate questions must be asked, however the interviewee is not obliged to answer. Where the interviewee declines to answer move on to the next question.

Before starting the interview ensure you have read through the relevant online interview response and are familiar with all heritage options as part of CS and identified in the appendix.

Please start the interview by reading the text below.

Thank you for agreeing to an in-depth interview following your online survey participation, your contribution to this research is highly valued. ADAS are working with Natural England to better understand why some heritage options are not taken up where they are applicable to the farm. The options are HS3, HS4 and HS9 within Countryside Stewardship.

- HS3: Reduced-depth, non-inversion cultivation on historic and archaeological features;
- HS4: Scrub control on historic and archaeological features; and
- HS9: Restricted depth crop establishment to protect archaeology under an arable rotation.

You have been selected as we believe the above options are applicable to your farm, however, you haven't taken them up and we would like to understand why that is.

The interview will take no more than 45 minutes and there are three main parts to the interview:

- You & Your Farm
- Agri-Environment Uptake
- Heritage Options

Your participation in this interview is voluntary, you are free to withdraw at any time during or after the interview. The anonymised information you provide will be shared with Natural England. As we conduct the interview, if there are any questions you prefer not to answer, please just let me know.

If consent form has not been returned please establish verbal consent: For data protection reasons I would now like you to read through the consent form and initial the boxes if you are happy with the associated statements.

In order that we can capture the full detail of what you tell us today, we would like to ask your permission to record the discussion. The recording will be stored securely at ADAS. The recording will

be deleted when the project is completed signed off. Are you happy for the discussion to be audio-recorded today?

If permission given, ask if it is OK to turn on the recorder. [State for the recording: interviewee name or interview reference number].

Background: You & Your Farm

Please confirm details here from the online survey / capture missing data / double check unclear or erroneous data. This section is largely to get the farmer talking and eased into the conversation.

1. How long have you been farming?

2. How did you get into farming? (family farm, came from outside farming or other)

3. Can you tell me about the people who work on your farm?
    a. Full time/part time, family, seasonal 2
    b. Contractors
    c. Decision makers on practices/ AES
    d. Agronomists, advisers (including NE)
    e. Land agents

4. You reported your farm was ***[online survey Q. 5 answer],*** can you describe your farming enterprise in a little more detail for me?
    (land management style- i.e. organic, low input or conventional)

5. **[ONLY: Those producing arable crops]** can you detail your crop rotation for me?

6. You reported environmental features ***[online survey Q. 8 answer]:*** Can you tell me how this feature impacts your farming practices?

    a. Scheduled Monument(s), type of soil[15].
    b. Registered Park and Garden, type of soil.
    c. Registered Battlefields, type of soil.
    d. SHINE features (Selected Heritage Inventory for Natural England features), type of soil.
    e. Local HER sites (Historic Environment Records), type of soil.

Agri-Environment Uptake

7. **[Only those with present or past AES uptake]** You reported that your farm is currently part of an agri-environment scheme, or has been historically ***[Online survey Question 10].*** Please can you outline which schemes you have been part of?
    a. Mid-tier/ higher-tier CS
    b. ELS/HLS
    c. ESA

[15] Shallow, peaty, light, medium, heavy.

8. What were the key categories for your most recent agreement?

Category	Tick
a. Arable	
b. Boundaries, trees and orchards	
c. Coastal	
d. Grassland	
e. Educational access	
f. Historic environment and landscape	
g. Lowland heathland	
h. Organic land	
i. Soil and water	
j. Uplands	
k. wetlands	
l. woodland and scrub	

9. Can you explain how you select the options in your Countryside Stewardship?
    a. How do these options fit with your farming system?
    b. How do these options suit your land management practices?
    c. **[Only past uptake but not currently participating]** Why is it that you are not currently participating in an AES?

10. What motivated your AES participation?
    a. applicability
    b. income
    c. payment rate
    d. influence of others
    e. environmental values
    f. infrastructure
    g. knowledge
    h. public perception

11. Thinking about the influencing factors driving your option choice more broadly: Can you tell me about how important the following people and factors were in your decision to undertake AES by indicating how strongly you agree or disagree with these statements:

Influences	Strongly Disagree	Disagree	Neither Agree / Disagree	Agree	Strongly Agree
Your family were very important influences in the decision					
Your peers (other farmers) were very important influences in the decision					
Your contractor (other farmers) were very important influences in the decision					
Knowledge-Exchange events were very important influences in the decision					
Independent advisors/ consultant/ land agent were very important influences in the decision					
Direct advice from Historic England or Local Authority Historic Environment					

Influences	Strongly Disagree	Disagree	Neither Agree / Disagree	Agree	Strongly Agree
advisors was important in guiding decision making					
Industry Representatives were very important influences in the decision					
Agronomic factors (soil type, typology, compaction etc.) were very important influences in the decision					
Economic factors (profitability, stability of income) were very important influences in the decision					
Aesthetics of your farm/fields (looking nice, clean and tidy) were very important influences in the decision					
Farm infrastructure were very important influences in the decision					
Access to new technology (detail) was a very important influence in the decision					
Your own knowledge, skills & understanding were very important influences in the decision					
Availability of support networks was a very important influence in the decision					
Farm systems and practicality were very important influences in the decision					
Applicability of-environment Schemes was a very important influence in the decision					
Policy Change (detail) was a very important influence in the decision					
Other factors (as discussed above/ please detail) were very important influences in the decision					

12. Reflecting on your participation, what do you think are the barriers or limiting factors for other farmers preventing their AES participation?
    a. applicability,
    b. income,
    c. payment rate,
    d. influence of others,
    e. environmental values,
    f. infrastructure,
    g. knowledge,
    h. Eligibility criteria.

Heritage Options

13. **[Only those with present or past HS uptake]** You reported that your farm is currently, or has historically undertaken a HS option[16] ***[Online survey Question 11a, 12a / 14]:***
    a. Can you explain why these options were included in your agreement?
        i. How do these options fit with your farm enterprises?
        ii. How do these options suit your land management practices? *(Practicality, Applicability)*
        iii. How do these options suit your farming business more broadly? *(Stability of income, payment rate)*
        iv. Did you receive advice on the options in your agreement?
        v. Thoughts on heritage features?
        vi. Previous experience/ knowledge of option management required?

[Only for participants who have had an historical option but do not currently have one]

    b. What was the impact of taking up the HS option previously?
        i. impacts of uptake
        ii. reflections on uptake and implementation
        iii. Perceptions of barriers for other farmers/landowners
        iv. Why did you decide not to include the option currently?
        v. How could the option be made more accessible?

14. Reflecting on your participation, what do you think are the barriers or limiting factors for other farmers preventing their HS uptake?
    a. applicability,
    b. income,
    c. payment rate,
    d. influence of others,
    e. environmental values,
    f. infrastructure (e.g., appropriate machinery),
    g. knowledge,
    h. Fit with farming practices/ rotations.

15. ***[Only those with who reported they had considered HS3,4 or 9]***You reported you considered the uptake of HS option(s) 3, 4 and 9 [*online survey Q.14*] why was this?
    If more than one option is relevant to the farm please talk through them individually. Be clear what each option is: HS3: Reduced-depth, non-inversion cultivation on historic and archaeological features; HS4: Scrub control on historic and archaeological features; and HS9: Restricted depth crop establishment to protect archaeology under an arable rotation.
    a. Specifically, what were/are the barriers for you in taking up HS3, 4 and 9?
    b. Were other management options more suited to the feature land parcel? If so, which and why?
    c. Previous experience/ knowledge of option management required?
    d. What would need to change for you to undertake one of these options?

[16] HS options outlined in the appendix.

16. **[*Only those with who reported they had not considered HS3,4 or 9*]** You reported you did not consider the uptake of HS option(s) 3, 4 and 9 [online survey Q.14] why was this?

If more than one option is relevant to the farm please talk through them individually. Be clear what each option is: HS3: Reduced-depth, non-inversion cultivation on historic and archaeological features; HS4: Scrub control on historic and archaeological features; and HS9: Restricted depth crop establishment to protect archaeology under an arable rotation.

a. Specifically, what were/are the barriers for you in taking up HS3, 4 and 9?
b. Were other management options more suited to the feature land parcel? If so, which and why?
c. Previous experience/ knowledge of option management required?
d. What would need to change for you to undertake one of these options?

Finally

Thank you for your time. Is there anything I have not given you the opportunity to tell me that you feel is important?

END

Interviewer Impressions

Consent form

	Please tick box
1. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my rights being affected.	
2. I understand there is no payment or compensation for participation.	
3. I understand that I can at any time ask for access to the information I provide and I can also request the destruction of that information if I wish.	
4. I agree for the interview to be audio-recorded (recordings will be securely stored in digital format and deleted 12 months after the completion of the project)	
5. I understand that such information will be treated as strictly confidential and any figures I give will not be reported individually, but may be reported at an aggregated level with other responses. I understand that I have the right to anonymity.	
6. I understand that the information I give will be part of a research project which will be published and available to the public.	
7. I agree to take part in this research project.	

Participant Name: Date: Signature:

ADAS Researcher: Date: Signature:

If you wish to contact ADAS, Project Lead Dr Carla Turner can be reached at:

Email: carla.turner@adas.co.uk
Phone: +44 (0)1133900011
Post: 4205 Park Approach, Thorpe Park, Leeds, LS15 8GB

APPENDIX 3: RISK ASSESSMENT FORM

Pre and post Farm or Client Visit Risk Assessment Checklist

To be completed on arrival and update post farm visit.

Upload (scan / photograph) to the ADAS SHEQ (Safety, Health, Environment and Quality) Documents, Completed Risk Assessments channel (file name = contract code, visit ref, Farm or Client, Date, your initials)

ADAS Contract Number	
Consultant Name	
Farmer / Land Manager Name	
Visit Date & Time	
Farm Address (inc. postcode)	
Farm Phone / Mobile Number	
Your "Buddy" Name	
"Buddy" Tel No	

Have you had guidance and instructions on the work required and risks associated with the work you are required to carry out? ***Tick to confirm*** ✓

Have you considered the following potential hazards and put in place actions or measures to minimise the risk? ***Tick box, N/A or Yes/No to confirm***

Lone Working - Does your ADAS or personal "buddy" know where you are going / are details of the visit logged on the portal / Outlook calendar populated with address and contact telephone details	
Have you checked the map / postcode / location of the site or offices / fields you will be visiting?	
Have you checked current Government Health guideline in terms of social distancing/ need to work etc?	
Have you confirmed your appointment on the day of the visit and/ or cancellation/ revisit date?	
Have you provided an item of household disinfectant for use on hard surfaces as per Government advice?	
Is there a good mobile signal – check if not is alternative e.g. Sky Guard GPS required for high risk situations See https://checker.ofcom.org.uk/mobile-coverage	
Have you the correct PPE and weather appropriate clothing, including PPE relevant to COVID19, as per prevailing Government guidelines.	
Is a high vis jacket needed (may not be appropriate where livestock are present)?	
Slippery surfaces / wet conditions / rough terrain – have you got the correct foot wear?	
Have you taken the required bio security precautions / clean boots / disinfectant etc? **This includes domestic disinfectant for contact with hard surfaces (gates/doors etc) re COVID19?**	
Have you got the correct tools & equipment and trained to use them?	
Potential for livestock in fields or buildings – including farm dogs, cattle, sheep, pigs	
Potential risks around buildings / lagoons/ slurry stores/ water courses / fields	

Physical risks , manual handling, hand tools, vehicles and machinery, electricity, falling objects, working at height, chemical hazards, micro organisms	
Are the weather conditions safe (consider extreme heat, risk deep snow, high winds, fog)?	
Are you confident that having arrived and reviewed the risk assessment for the site and task required, it is safe to proceed?	
Other risks considered / mitigations required (note female advisers special awareness of zoonosis risk etc. if you are or may be pregnant)	
Have you completed a post farm visit risk assessment? **This needs to include any potential COVID risk encountered.**	
Have you ensured that you have sanitised your hands in line with prevailing Government guidelines	

No activity is so important, or urgent, that it cannot be performed safely. If in doubt – stop and put in place measures to reduce the risk before continuing.

SHEQ Learning from the visit *What hazards did I miss in my initial assessment and what are the learning outcomes* *None*
Please name any additional people you have come into contact with including any minors

APPENDIX 4: OPTION UPTAKE TABLES

Table 5-2 Option uptake across NCAs

NCA	Higher Tier		Mid Tier		Total Sum of QUANTITY	Total Sum of HECTARAGE
	Sum of QUANTITY[17]	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE		
HS3	**3594.78**	**4363.07**	**2277.10**	**3174.69**	**5871.88**	**7537.75**
Avon Vales	39.77	29.3	6.83	31.67	46.6	60.97
Bedfordshire and Cambridgeshire Claylands	3.58	4.62	19.25	22.81	22.83	27.43
Berkshire and Marlborough Downs	430.86	601.86	182.41	256.04	613.27	857.9
Blackmoor Vale and Vale of Wardour	49.31	50.6	1.66	9.85	50.97	60.45
Bristol, Avon Valleys and Ridges			12	29.99	12	29.99
Central Lincolnshire Vale	42.05	43.29	9	9.34	51.05	52.63
Chilterns	42.88	73.63	13.8	16.05	56.68	89.69
Cornish Killas			5.32	5.32	5.32	5.32
Cotswolds	83.1	98.27	154.65	192.52	237.75	290.79
Dorset Downs and Cranborne Chase	546.05	589.12	326.41	571.93	872.46	1161.05
Dunsmore and Feldon			60	67.94	60	67.94
East Anglian Chalk	250.27	336.57	85.39	103.62	335.66	440.19
Eden Valley			5.44	5.44	5.44	5.44
Hampshire Downs	93.93	100.74	165.45	242.82	259.38	343.56

[17] To understand the area covered for these tables and the GIS maps, two approaches were taken. The datasets provide a single co-ordinate and an area of coverage. The "Sum of quantity" assumes that area is conformally around the single co-ordinate. On the ground, land parcels are different shapes (and areas) and the "sum of hectare" column links the single co-ordinate to the land parcel it falls on and the total hectare is the area of the land parcel the co-ordinate is associated with. Some consistency is expected between them both, however, there may be larger differences for HS4, where the area covered (Sum of quantity) is likely to be much smaller than the overall land parcel (Sum of Hectarage).

NCA	Higher Tier		Mid Tier		Total Sum of QUANTITY	Total Sum of HECTARAGE
	Sum of QUANTITY[17]	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE		
Herefordshire Plateau			4.66	4.77	4.66	4.77
Holderness			0.2	14.27	0.2	14.27
Humber Estuary			4.7	5	4.7	5
Kesteven Uplands			49.22	61.1	49.22	61.1
Lincolnshire Wolds			48.04	50.09	48.04	50.09
Low Weald	8.58	9.31			8.58	9.31
Mid Northumberland	34.17	34.23	58.77	58.22	92.94	92.45
Mid Somerset Hills	22.95	24.96			22.95	24.96
Midvale Ridge	118.65	132.49	24.96	26.73	143.61	159.22
North Downs	270.84	385.68			270.84	385.68
North Kent Plain			87.77	87.77	87.77	87.77
North West Norfolk			2.2	22.11	2.2	22.11
Northamptonshire Uplands	64.89	74.38	14.58	26.11	79.47	100.49
Northamptonshire Vales	94.93	119.52	14.89	20.76	109.82	140.28
Northern Lincolnshire Edge with Coversands	32.2	36.75	8	39.57	40.2	76.32
Northern Thames Basin			5.28	47.02	5.28	47.02
Nottinghamshire, Derbyshire and Yorkshire Coalfield	5.02	20.14			5.02	20.14
Rockingham Forest			26.21	27.02	26.21	27.02
Salisbury Plain and West Wiltshire Downs	472.4	489.96	277.94	324.61	750.34	814.58
Severn and Avon Vales	18.45	49.26			18.45	49.26
Shropshire, Cheshire and Staffordshire Plain	5.83	22.43			5.83	22.43
Solway Basin	4.75	4.95	5.35	5.45	10.1	10.4
South Coast Plain			6.13	7.42	6.13	7.42
South Downs	379.38	450.32	26.47	31.39	405.85	481.7

NCA	Higher Tier		Mid Tier		Total Sum of QUANTITY	Total Sum of HECTARAGE
	Sum of QUANTITY[17]	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE		
South East Northumberland Coastal Plain	3.57	4.85	8.25	8.54	11.82	13.39
South Suffolk and North Essex Clayland			19.32	34.41	19.32	34.41
Southern Lincolnshire Edge			17.39	64.78	17.39	64.78
Southern Magnesian Limestone			0.4	7.38	0.4	7.38
Thames Basin Heaths	76.45	90.33			76.45	90.33
The Fens			31.02	65.62	31.02	65.62
Trent and Belvoir Vales	189.54	209.82	1.1	7.69	190.64	217.51
Tyne Gap and Hadrian's Wall	5.01	5.01			5.01	5.01
Upper Thames Clay Vales	53.16	80.24	453.08	519.29	506.24	599.54
Vale of Mowbray			0.39	5.35	0.39	5.35
Yardley-Whittlewood Ridge			27.2	30.72	27.2	30.72
Yeovil Scarplands			5.97	6.17	5.97	6.17
Yorkshire Wolds	152.21	190.42			152.21	190.42
(blank)						
HS4	**16.59**	**1035.77**	**89.14**	**319.68**	**105.73**	**1355.45**
Berkshire and Marlborough Downs	0.77	3.49			0.77	3.49
Carnmenellis			8.45	8.45	8.45	8.45
Central Lincolnshire Vale			2.53	2.4	2.53	2.4
Cheshire Sandstone Ridge			2.72	3.02	2.72	3.02
Clun and North West Herefordshire Hills			0	0.83	0	0.83
Cornish Killas			0.16	6.17	0.16	6.17
Cotswolds	1.68	1.72	0.19	0.19	1.87	1.91
Dartmoor			12.93	14.29	12.93	14.29
Dorset Downs and Cranborne Chase	0.44	0.44	0.26	0.26	0.7	0.7

NCA	Higher Tier		Mid Tier		Total Sum of QUANTITY	Total Sum of HECTARAGE
	Sum of QUANTITY[17]	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE		
Dorset Heaths	0.31	335.82			0.31	335.82
Durham Magnesian Limestone Plateau	0.02	9.73			0.02	9.73
Exmoor			0.1	1.56	0.1	1.56
Herefordshire Lowlands			0.13	0.13	0.13	0.13
Howardian Hills			0.21	0.43	0.21	0.43
Humberhead Levels			0.37	0.37	0.37	0.37
Lancashire and Amounderness Plain			0.35	13.57	0.35	13.57
Leicestershire Vales			0.1	10.16	0.1	10.16
Morecambe Bay Limestones			0.26	3.48	0.26	3.48
Potteries and Churnet Valley			1.28	1.28	1.28	1.28
Salisbury Plain and West Wiltshire Downs	9.08	641.44	28.04	220.8	37.12	862.24
Shropshire Hills			0.06	0.06	0.06	0.06
Shropshire, Cheshire and Staffordshire Plain	0.83	0.88			0.83	0.88
The Culm	1.12	29.64			1.12	29.64
The Lizard	2.34	12.61			2.34	12.61
West Penwith			12.4	12.95	12.4	12.95
Weymouth Lowlands			18.6	19.28	18.6	19.28
HS9	**237.05**	**230.81**	**462.90**	**676.95**	**699.95**	**907.77**
Bedfordshire and Cambridgeshire Claylands			1.64	12.64	1.64	12.64
Berkshire and Marlborough Downs			47.59	48.85	47.59	48.85
Blackmoor Vale and Vale of Wardour			10.51	11.29	10.51	11.29
Central North Norfolk			7.96	19.98	7.96	19.98
Cheviot Fringe	46.08	48.13			46.08	48.13
Chilterns			2.62	16.96	2.62	16.96

NCA	Higher Tier		Mid Tier		Total Sum of QUANTITY	Total Sum of HECTARAGE
	Sum of QUANTITY[17]	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE		
Cotswolds	10.29	11.29	81.30	87.91	91.59	99.20
Dorset Downs and Cranborne Chase			37.50	37.51	37.50	37.51
Dunsmore and Feldon	31.83	22.81			31.83	22.81
Durham Coalfield Pennine Fringe			14.80	15.17	14.80	15.17
East Anglian Chalk			37.42	92.68	37.42	92.68
Eden Valley			7.36	7.36	7.36	7.36
Lincolnshire Wolds			11.58	12.12	11.58	12.12
Mid Northumberland			22.71	25.53	22.71	25.53
Mid Severn Sandstone Plateau			14.44	14.63	14.44	14.63
North Northumberland Coastal Plain	10.13	10.13			10.13	10.13
North West Norfolk	68.27	72.76			68.27	72.76
Northamptonshire Uplands	15.71	7.86	32.58	47.48	48.29	55.33
Northamptonshire Vales	9.69	9.68			9.69	9.68
Northern Thames Basin			4.10	12.99	4.10	12.99
Salisbury Plain and West Wiltshire Downs	41.72	44.82			41.72	44.82
Severn and Avon Vales			37.85	37.90	37.85	37.90
Shropshire, Cheshire and Staffordshire Plain			5.51	6.31	5.51	6.31
The Broads			5.70	41.51	5.70	41.51
The Fens			24.41	39.52	24.41	39.52
Tyne and Wear Lowlands			10.23	10.23	10.23	10.23
Tyne Gap and Hadrian's Wall			44.40	44.63	44.40	44.63
Yeovil Scarplands	3.33	3.33			3.33	3.33
Yorkshire Wolds			0.69	33.74	0.69	33.74
Grand Total	**3,848**	**5,630**	**2,829**	**4,171**	**6,678**	**9,801**

Table 5-3 Option area uptake across counties

County	Higher Tier		Mid Tier		Total Sum of QUANTITY	Total Sum of HECTARAGE
	Sum of QUANTITY	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE		
HS3	**3,594.78**	**4,363.07**	**2,277.10**	**3,174.69**	**5,871.88**	**7,537.75**
Barnsley	5.02	20.14			5.02	20.14
Bedford	3.58	4.62	40.50	44.16	44.08	48.78
Buckinghamshire	42.88	73.63	24.96	26.73	67.84	100.36
Cambridgeshire	286.46	363.69	9.42	47.61	295.88	411.30
Cheshire West and Chester	5.83	22.43			5.83	22.43
Cornwall			5.32	5.32	5.32	5.32
Cumbria	4.75	4.95	10.79	10.89	15.54	15.84
Dorset	306.56	325.79	326.41	571.93	632.97	897.73
East Riding of Yorkshire	23.94	36.72	0.20	14.27	24.14	50.99
East Sussex	8.58	9.31			8.58	9.31
Essex	0.15	23.90	1.90	16.48	2.05	40.38
Gloucestershire	62.28	73.42	167.47	192.55	229.75	265.97
Hampshire	131.07	144.26	165.45	242.82	296.52	387.07
Herefordshire, County of			4.66	4.77	4.66	4.77
Hertfordshire	55.59	65.08	99.09	143.73	154.68	208.81
Kent	270.84	385.68	87.77	87.77	358.61	473.44
Lincolnshire	9.10	10.04	141.25	242.79	150.35	252.83
Milton Keynes			5.95	9.37	5.95	9.37
Newcastle upon Tyne			8.25	8.54	8.25	8.54
Norfolk			2.20	22.11	2.20	22.11

County	Higher Tier		Mid Tier		Total Sum of QUANTITY	Total Sum of HECTARAGE
	Sum of QUANTITY	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE		
North Lincolnshire	65.15	70.00	4.70	5.00	69.85	75.00
North Yorkshire	128.27	153.70	0.79	12.73	129.06	166.43
Northamptonshire	24.66	25.64	39.32	56.72	63.98	82.36
Northumberland	42.75	44.09	58.77	58.22	101.52	102.31
Nottinghamshire	189.54	209.82	1.10	7.69	190.64	217.51
Oxfordshire	220.95	274.29	383.18	455.58	604.13	729.87
Peterborough			37.36	42.10	37.36	42.10
Somerset	22.95	24.96	7.63	16.02	30.58	40.98
South Gloucestershire			12.00	29.99	12.00	29.99
Swindon			0.34	41.77	0.34	41.77
Warwickshire			60.00	67.94	60.00	67.94
West Berkshire	167.89	266.61	32.95	33.75	200.84	300.36
West Sussex	379.38	450.32	32.60	38.80	411.98	489.12
Wiltshire	1,118.16	1,230.72	504.77	616.53	1,622.93	1,847.25
Worcestershire	18.45	49.26			18.45	49.26
HS4	**16.59**	**1,035.77**	**89.14**	**319.68**	**105.73**	**1,355.45**
Cheshire West and Chester	0.83	0.88	2.72	3.02	3.55	3.90
Cornwall	2.34	12.61	21.01	27.56	23.35	40.18
Cumbria			0.26	3.48	0.26	3.48
Devon	1.12	29.64	13.03	15.85	14.15	45.49
Dorset	0.51	18.85	18.86	19.54	19.37	38.39
Gloucestershire			0.19	0.19	0.19	0.19
Hartlepool	0.02	9.73			0.02	9.73

County	Higher Tier		Mid Tier		Total Sum of QUANTITY	Total Sum of HECTARAGE
	Sum of QUANTITY	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE		
Herefordshire, County of			0.13	0.13	0.13	0.13
Lincolnshire			2.53	2.40	2.53	2.40
North Yorkshire			0.21	0.43	0.21	0.43
Nottinghamshire			0.37	0.37	0.37	0.37
Oxfordshire	2.45	5.21			2.45	5.21
Poole	0.24	317.41			0.24	317.41
Sefton			0.35	13.57	0.35	13.57
Shropshire			0.06	0.89	0.06	0.89
Staffordshire			1.28	1.28	1.28	1.28
Warwickshire			0.10	10.16	0.10	10.16
Wiltshire	9.08	641.44	28.04	220.80	37.12	862.24
HS9	**237.05**	**230.81**	**462.90**	**676.95**	**699.95**	**907.77**
Cambridgeshire	9.69	9.68	43.67	113.89	53.36	123.57
County Durham			14.80	15.17	14.80	15.17
Cumbria			7.36	7.36	7.36	7.36
Dorset	3.33	3.33	48.01	48.81	51.34	52.14
Essex			22.26	31.30	22.26	31.30
Gloucestershire			51.41	54.20	51.41	54.20
Lincolnshire			11.58	12.12	11.58	12.12
Milton Keynes			1.64	12.64	1.64	12.64
Norfolk	68.27	72.76	13.66	61.49	81.93	134.26
North Yorkshire			0.69	33.74	0.69	33.74
Northamptonshire			29.58	40.86	29.58	40.86

County	Higher Tier		Mid Tier		Total Sum of QUANTITY	Total Sum of HECTARAGE
	Sum of QUANTITY	Sum of HECTARAGE	Sum of QUANTITY	Sum of HECTARAGE		
Northumberland	56.21	58.26	77.34	80.39	133.55	138.65
Oxfordshire	15.71	7.86	68.53	90.36	84.24	98.21
Shropshire			19.95	20.95	19.95	20.95
South Gloucestershire	10.29	11.29			10.29	11.29
Warwickshire	31.83	22.81			31.83	22.81
Wiltshire	41.72	44.82	47.59	48.85	89.31	93.66
Worcestershire			4.83	4.83	4.83	4.83
Grand Total	**3,848.42**	**5,629.65**	**2,829.14**	**4,171.33**	**6,677.56**	**9,800.97**

APPENDIX 5: HAR FEATURES AT RISK TABLES

Table 5-4 HAR features at risk on agricultural land (all vulnerabilities) by NCA area

National Character Area	Area of HAR (ha)
Arden	626
Avon Vales	20
Bedfordshire and Cambridgeshire Claylands	374
Bedfordshire Greensand Ridge	18
Berkshire and Marlborough Downs	1950
Black Mountains and Golden Valley	3
Blackdowns	312
Blackmoor Vale and Vale of Wardour	342
Bodmin Moor	460
Border Moors and Forests	1
Bowland Fringe and Pendle Hill	2
Bristol, Avon Valleys and Ridges	467
Cannock Chase and Cank Wood	236
Carnmenellis	32
Central Lincolnshire Vale	13
Central North Norfolk	572
Charnwood	192
Cheshire Sandstone Ridge	7
Cheviot Fringe	117
Cheviots	641
Chilterns	292
Clun and North West Herefordshire Hills	74
Cornish Killas	301

Cotswolds	1376
Cumbria High Fells	150
Dark Peak	13
Dartmoor	1004
Derbyshire Peak Fringe and Lower Derwent	0
Devon Redlands	354
Dorset Downs and Cranborne Chase	479
Dorset Heaths	130
Dunsmore and Feldon	46
Durham Coalfield Pennine Fringe	676
Durham Magnesian Limestone Plateau	326
East Anglian Chalk	610
Eden Valley	79
Exmoor	105
Forest of Dean and Lower Wye	11
Greater Thames Estuary	235
Hampshire Downs	294
Hensbarrow	15
Herefordshire Lowlands	30
High Leicestershire	3
High Weald	866
Holderness	58
Howardian Hills	7
Humber Estuary	40
Humberhead Levels	52
Isle of Porland	16
Isle of Wight	271
Isles of Scilly	123
Kesteven Uplands	357

Lancashire and Amounderness Plain	379
Lancashire Coal Measures	2
Lancashire Valleys	223
Leicestershire and Nottinghamshire Wolds	27
Leicestershire Vales	0
Lincolnshire Coast and Marshes	23
Lincolnshire Wolds	1662
Low Weald	23
Lundy	24
Manchester Conurbation	31
Manchester Pennine Fringe	6
Marshwood and Powerstock Vales	4
Mease/Sence Lowlands	60
Mendip Hills	15
Mersey Valley	4
Merseyside Conurbation	1
Mid Norfolk	189
Mid Northumberland	23
Mid Severn Sandstone Plateau	30
Mid Somerset Hills	2
Midvale Ridge	26
Morecambe Bay Limestones	92
Morecambe Coast and Lune Estuary	24
Needwood and South Derbyshire Claylands	0
New Forest	152
North Downs	270
North East Norfolk and Flegg	24
North Kent Plain	63
North Northumberland Coastal Plain	144

North Pennines	106
North West Norfolk	21
North York Moors and Cleveland Hills	665
Northamptonshire Uplands	43
Northamptonshire Vales	69
Northern Lincolnshire Edge with Coversands	108
Northern Thames Basin	2447
Northumberland Sandstone Hills	29
Nottinghamshire, Derbyshire and Yorkshire Coalfield	747
Orton Fells	66
Oswestry Uplands	36
Pennine Dales Fringe	168
Potteries and Churnet Valley	416
Quantock Hills	13
Rockingham Forest	3
Romney Marshes	8
Salisbury Plain and West Wiltshire Downs	223
Sefton Coast	90
Severn and Avon Vales	719
Sherwood	24
Shropshire Hills	42
Shropshire, Cheshire and Staffordshire Plain	412
Solway Basin	124
Somerset Levels and Moors	95
South Coast Plain	72
South Cumbria Low Fells	70
South Devon	477
South Downs	830

South East Northumberland Coastal Plain	48
South Hampshire Lowlands	40
South Herefordshire and Over Severn	207
South Norfolk and High Suffolk Claylands	15
South Purbeck	71
South Suffolk and North Essex Clayland	594
South West Peak	1
Southern Lincolnshire Edge	112
Southern Magnesian Limestone	829
Southern Pennines	171
Suffolk Coast and Heaths	98
Tees Lowlands	92
Teme Valley	1
Thames Basin Heaths	1018
Thames Basin Lowlands	311
Thames Valley	269
The Brecks	159
The Broads	5817
The Culm	72
The Fens	461
The Lizard	20
Trent and Belvoir Vales	307
Trent Valley Washlands	178
Tyne and Wear Lowlands	932
Tyne Gap and Hadrian's Wall	383
Upper Thames Clay Vales	287
Vale of Mowbray	46
Vale of Pickering	26
Vale of Taunton and Quantock Fringes	323

Vale of York	39
Wealden Greensand	128
West Cumbria Coastal Plain	65
West Penwith	62
Weymouth Lowlands	20
White Peak	12
Wirral	43
Yardley-Whittlewood Ridge	9
Yeovil Scarplands	142
Yorkshire Dales	9679
Yorkshire Southern Pennine Fringe	176
Yorkshire Wolds	363
(blank)	17
Grand Total	**50,072**

Table 5-5 HAR features on agricultural land at risk from scrub encroachment by NCA

National Character Area	Option				Total HAR (ha), at risk of scrub encroachment
	HS3		HS4	HS9	
	Higher Tier	Mid Tier	Mid Tier	Mid Tier	
Arden					2.2
Bedfordshire and Cambridgeshire Claylands					9.0
Black Mountains and Golden Valley					2.0
Blackdowns					14.6
Blackmoor Vale and Vale of Wardour					0.7
Bodmin Moor					101.4
Bowland Fringe and Pendle Hill					0.3
Bristol, Avon Valleys and Ridges					3.5
Carnmenellis					22.0
Cheviot Fringe					1.7
Cheviots					0.2
Clun and North West Herefordshire Hills					6.8
Cornish Killas					48.6
Cotswolds		0.2			7.4
Dartmoor					0.9
Devon Redlands					1.3
Dorset Downs and Cranborne Chase					54.5
Dorset Heaths					65.2
Dunsmore and Feldon					5.6
East Anglian Chalk					8.2

Exmoor					0.6
Forest of Dean and Lower Wye					1.2
Hampshire Downs					16.6
Hensbarrow					13.9
Herefordshire Lowlands					9.2
High Weald					1.0
Holderness					2.9
Howardian Hills					0.3
Humberhead Levels					8.3
Isle of Porland					1.0
Isle of Wight					3.2
Isles of Scilly					10.4
Lancashire and Amounderness Plain					1.9
Lancashire Coal Measures					2.0
Lancashire Valleys					0.0
Lincolnshire Coast and Marshes					3.1
Lincolnshire Wolds					1.1
Mease/Sence Lowlands					32.1
Mendip Hills					0.7
Merseyside Conurbation					0.9
Mid Northumberland					7.0
North Downs					1.4
North Northumberland Coastal Plain					1.3
North Pennines					2.3
North York Moors and Cleveland Hills					18.5

Northamptonshire Uplands					7.6
Northern Thames Basin					17.4
Nottinghamshire, Derbyshire and Yorkshire Coalfield					23.3
Oswestry Uplands					0.2
Quantock Hills					0.1
Salisbury Plain and West Wiltshire Downs					7.3
Severn and Avon Vales					6.9
Shropshire Hills					5.7
Shropshire, Cheshire and Staffordshire Plain					10.7
Somerset Levels and Moors					0.4
South Coast Plain					1.3
South Cumbria Low Fells					2.7
South Devon					25.0
South Downs					0.2
South Herefordshire and Over Severn					5.4
South Purbeck					0.0
Tees Lowlands					0.2
Thames Basin Heaths					1.2
Thames Valley					4.8
The Culm					7.6
The Lizard					19.6
Tyne and Wear Lowlands					0.7
Tyne Gap and Hadrian's Wall					1.8
Vale of Taunton and Quantock Fringes					14.5

Wealden Greensand					7.2
West Penwith			8.8		45.9
Weymouth Lowlands					1.2
White Peak					9.3
Wirral					0.5
Yeovil Scarplands					9.8
Yorkshire Southern Pennine Fringe					1.0
Grand Total		**0.2**	**8.8**		**736.2**

Table 5-6 HAR features on agricultural land at risk from cultivation by NCA

National Character Area	Option				Total HAR (ha) at risk of cultivation
	HS3		HS4	HS9	
	Higher Tier	Mid Tier	Mid Tier	Mid Tier	
Arden					2.8
Avon Vales		6.9			18.3
Bedfordshire and Cambridgeshire Claylands					43.1
Bedfordshire Greensand Ridge					18.2
Berkshire and Marlborough Downs	0.4			0.1	72.8
Blackdowns					10.6
Blackmoor Vale and Vale of Wardour					17.7
Bristol, Avon Valleys and Ridges					26.9
Central Lincolnshire Vale					4.3
Cheshire Sandstone Ridge					6.9

Cheviot Fringe					7.2
Chilterns				18.6	64.3
Cornish Killas					17.1
Cotswolds		0.9			120.7
Devon Redlands					17.9
Dorset Downs and Cranborne Chase	4.1	4.5		0.6	300.4
Dorset Heaths					0.5
Dunsmore and Feldon					34.6
Durham Coalfield Pennine Fringe					73.5
Durham Magnesian Limestone Plateau					26.4
East Anglian Chalk		1.1			110.2
Eden Valley					1.2
Exmoor					6.3
Greater Thames Estuary					0.1
Hampshire Downs		0.8			20.6
Herefordshire Lowlands					1.9
High Leicestershire					3.1
High Weald					31.6
Holderness					20.7
Howardian Hills					0.5
Humber Estuary		3.7			21.5
Isle of Wight					0.6
Kesteven Uplands		1.1			178.7
Leicestershire Vales					0.3
Lincolnshire Coast and Marshes					0.3

Lincolnshire Wolds		26.3			60.4
Low Weald					1.1
Marshwood and Powerstock Vales					0.1
Mendip Hills					6.8
Mersey Valley					0.1
Mid Norfolk					10.8
Mid Northumberland					5.1
Mid Severn Sandstone Plateau					9.0
Midvale Ridge					1.3
Needwood and South Derbyshire Claylands					0.1
North Downs	6.5				19.9
North Kent Plain					48.5
North Northumberland Coastal Plain					4.7
North West Norfolk					5.2
North York Moors and Cleveland Hills					12.6
Northamptonshire Uplands					17.2
Northamptonshire Vales		9.4			25.5
Northern Lincolnshire Edge with Coversands		9.7			76.5
Northern Thames Basin					89.2
Nottinghamshire, Derbyshire and Yorkshire Coalfield					1.0
Oswestry Uplands					31.2
Pennine Dales Fringe					0.1
Potteries and Churnet Valley					0.1
Romney Marshes					7.3

Salisbury Plain and West Wiltshire Downs	0.0	2.9			194.3
Severn and Avon Vales					79.7
Sherwood					4.4
Shropshire Hills					5.5
Shropshire, Cheshire and Staffordshire Plain					10.3
Solway Basin					1.7
Somerset Levels and Moors					45.9
South Coast Plain					8.8
South Devon					10.7
South Downs					48.7
South Herefordshire and Over Severn					18.8
South Norfolk and High Suffolk Claylands					2.1
South Purbeck					1.0
South Suffolk and North Essex Clayland					22.8
Southern Lincolnshire Edge		11.2			12.6
Southern Magnesian Limestone					80.5
Southern Pennines					0.7
Suffolk Coast and Heaths					39.0
Thames Basin Heaths					0.4
Thames Valley					18.0
The Brecks					78.2
The Broads				6.1	40.8
The Culm					42.6
The Fens					126.0
The Lizard					0.8

Trent and Belvoir Vales		1.1			56.4
Trent Valley Washlands					24.0
Tyne and Wear Lowlands				0.3	17.9
Tyne Gap and Hadrian's Wall					100.2
Upper Thames Clay Vales					134.3
Vale of Mowbray					0.0
Vale of Pickering					15.1
Vale of Taunton and Quantock Fringes					9.7
Vale of York					1.8
Wealden Greensand					8.0
West Penwith					0.9
Weymouth Lowlands					0.2
Yardley-Whittlewood Ridge					8.7
Yeovil Scarplands					7.3
Yorkshire Wolds	0.9			0.0	122.3
Grand Total	**11.8**	**79.6**		**25.7**	**3116.5**

APPENDIX 6: SHINE FEATURES AT RISK FROM CULTIVATION TABLES

Table 5-6 SHINE features at risk from cultivation by NCA area

NCA	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land, 50% Arable/Scrub)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Arden							**6,494**							**3,772**
Avon Vales	10.5						**1,944**	10.5						**877**
Bedfordshire and Cambridgeshire Claylands	1.9	13.3					**21,330**	1.9	13.3					**12,663**
Bedfordshire Greensand Ridge							**3,351**							**2,325**
Berkshire and Marlborough Downs	82.7	28.7					**7,543**	81.7	27.0					**5,640**
Black Mountains and Golden Valley							**788**							**208**
Blackdowns							**2,260**							**980**
Blackmoor Vale and Vale of Wardour	1.7	4.7				0.5	**1,377**	1.7	4.7					**142**
Bodmin Moor							**7,304**							**1**
Border Moors and Forests							**1,465**							**234**
Bowland Fells							**144**							**133**
Bowland Fringe and Pendle Hill							**508**							**455**
Bristol, Avon Valleys and Ridges							**934**							**276**
Cannock Chase and Cank Wood							**3,909**							**3,209**
Carnmenellis				8.4			**521**							**13**
Central Lincolnshire Vale	16.6	2.5					**3,177**	7.7						**1,961**
Central North Norfolk						0.1	**4,333**							**3,546**

NCA	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land, 50% Arable/Scrub)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Charnwood							**363**							**92**
Cheshire Sandstone Ridge				2.0			**518**							**202**
Cheviot Fringe							**1,609**							**671**
Cheviots							**1,072**							**7**
Chilterns	8.8	0.0				0.8	**7,653**	8.8	0.0				0.8	**5,908**
Clun and North West Herefordshire Hills							**3,262**							**1,720**
Cornish Killas		0.6		0.3			**6,159**							**843**
Cotswolds	23.2	37.1		0.1	1.3	15.0	**13,282**	21.1	37.1		0.1	1.3	15.0	**5,629**
Cumbria High Fells							**5,843**							**993**
Dark Peak							**3,181**							**1,115**
Dartmoor				0.3			**8,330**				0.3			**1,207**
Derbyshire Peak Fringe and Lower Derwent							**990**							**318**
Devon Redlands							**2,375**							**1,053**
Dorset Downs and Cranborne Chase	36.1	49.1	0.4			2.2	**4,903**	35.9	45.7	0.4			2.2	**1,590**
Dorset Heaths			0.1				**136**							**24**
Dunsmore and Feldon		55.3			2.2		**7,631**		55.3			2.2		**3,872**
Durham Coalfield Pennine Fringe						1.6	**378**						1.6	**163**
Durham Magnesian Limestone Plateau							**459**							**176**
East Anglian Chalk	51.9	30.1				4.0	**3,678**	43.2	30.1				4.0	**3,105**
Eden Valley		1.4					**930**		1.4					**199**
Exmoor							**14,440**							**3,083**

NCA	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land, 50% Arable/Scrub)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Forest of Dean and Lower Wye							**1,541**							**1,251**
Greater Thames Estuary							**1,650**							**479**
Hampshire Downs	5.5	3.8					**1,371**	5.5	3.8					**895**
Hensbarrow							**631**							**4**
Herefordshire Lowlands							**4,736**							**2,176**
Herefordshire Plateau							**2,141**							**1,230**
High Leicestershire							**5,497**							**598**
High Weald							**9,018**							**7,718**
Holderness							**7,369**							**4,976**
Howardian Hills				0.4			**1,614**				0.4			**1,613**
Howgill Fells							**217**							**83**
Humber Estuary							**581**							**332**
Humberhead Levels							**11,083**							**9,289**
Isle of Porland							**1**							**1**
Isle of Wight							**1,495**							**641**
Isles of Scilly							**421**							
Kesteven Uplands		0.4					**3,889**		0.4					**2,606**
Lancashire and Amounderness Plain				0.2			**33**							**20**
Lancashire Coal Measures							**18**							**3**
Lancashire Valleys							**224**							**210**
Leicestershire and Nottinghamshire Wolds							**3,052**							**691**

NCA	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land, 50% Arable/Scrub)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Leicestershire and South Derbyshire Coalfield							**463**							**243**
Leicestershire Vales				10.1			**3,686**							**817**
Lincolnshire Coast and Marshes							**4,006**							**2,141**
Lincolnshire Wolds		3.9				12.1	**4,682**		3.9					**2,419**
Low Weald							**7,349**							**4,555**
Lundy							**16**							
Malvern Hills							**829**							**522**
Manchester Conurbation							**17**							**9**
Manchester Pennine Fringe							**31**							**5**
Marshwood and Powerstock Vales							**445**							**145**
Mease/Sence Lowlands							**1,387**							**757**
Melbourne Parklands							**437**							**223**
Mendip Hills							**2,708**							**783**
Mersey Valley							**414**							**96**
Merseyside Conurbation							**8**							**8**
Mid Norfolk							**3,735**							**2,526**
Mid Northumberland		5.1					**4,064**		2.8					**360**
Mid Severn Sandstone Plateau						0.0	**3,114**						0.0	**2,489**
Mid Somerset Hills	2.4						**1,713**	2.2						**482**
Midvale Ridge	67.6	26.7					**3,898**	67.6						**1,827**
Morecambe Bay Limestones							**246**							**108**

NCA	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land, 50% Arable/Scrub)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Morecambe Coast and Lune Estuary							**14**							**2**
Needwood and South Derbyshire Claylands							**5,350**							**1,903**
New Forest							**582**							**76**
North Downs	28.6						**3,462**	23.3						**2,275**
North East Norfolk and Flegg							**1,121**							**1,071**
North Kent Plain		10.6					**1,117**		10.6					**999**
North Norfolk Coast							**717**							**24**
North Northumberland Coastal Plain					1.0		**1,510**					1.0		**185**
North Pennines							**5,816**							**442**
North West Norfolk					31.1		**4,556**					27.2		**2,845**
North York Moors and Cleveland Hills							**6,979**							**6,972**
Northamptonshire Uplands	24.8	12.3			1.7	7.3	**10,625**	16.7	4.7				7.3	**1,934**
Northamptonshire Vales	20.9	2.1			0.9		**5,906**	19.3				0.9		**2,268**
Northern Lincolnshire Edge with Coversands	27.3	0.9					**2,801**	26.6	0.9					**2,215**
Northern Thames Basin		2.5				0.2	**4,547**		2.0				0.2	**3,518**
Northumberland Sandstone Hills							**3,027**							**385**
Nottinghamshire, Derbyshire and Yorkshire Coalfield	3.3						**2,405**	3.3						**1,345**
Orton Fells							**1,524**							**225**
Oswestry Uplands							**601**							**107**
Pennine Dales Fringe							**3,455**							**3,264**

NCA	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land, 50% Arable/Scrub)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Pevensey Levels							**250**							**14**
Potteries and Churnet Valley				1.3			**1,633**							**368**
Quantock Hills							**703**							**326**
Rockingham Forest		0.0					**2,767**		0.0					**1,466**
Romney Marshes							**346**							**95**
Salisbury Plain and West Wiltshire Downs	6.6	17.9	8.6	41.2	0.2		**4,532**	6.6	6.6			0.2		**1,422**
Sefton Coast							**12**							**2**
Severn and Avon Vales	13.3					11.7	**14,387**	13.3						**5,223**
Sherwood							**4,240**							**3,919**
Shropshire Hills							**6,201**							**1,244**
Shropshire, Cheshire and Staffordshire Plain	4.2		0.0			0.0	**16,288**	4.0		0.0			0.0	**5,308**
Solway Basin							**1,801**							**683**
Somerset Levels and Moors							**3,461**							**833**
South Coast Plain							**1,589**							**687**
South Cumbria Low Fells							**1,604**							**852**
South Devon							**2,287**							**746**
South Downs	402.8	17.8					**17,934**	402.8	17.8					**13,293**
South East Northumberland Coastal Plain	0.2	5.5					**842**		5.5					**429**
South Hampshire Lowlands							**179**							**170**
South Herefordshire and Over Severn							**1,748**							**1,274**
South Norfolk and High Suffolk Claylands							**5,685**							**4,156**

NCA	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land, 50% Arable/Scrub)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
South Purbeck							**622**							**78**
South Suffolk and North Essex Clayland		17.6					**6,008**		17.6					**4,904**
South West Peak							**1,028**							**99**
Southern Lincolnshire Edge							**1,697**							**1,239**
Southern Magnesian Limestone		0.6					**7,097**		0.6					**6,708**
Southern Pennines							**843**							**230**
Suffolk Coast and Heaths							**3,475**							**2,087**
Tees Lowlands							**1,532**							**940**
Teme Valley							**971**							**424**
Thames Basin Heaths	2.2						**1,791**	1.5						**815**
Thames Basin Lowlands							**189**							**112**
Thames Valley							**1,986**							**1,181**
The Brecks							**6,773**							**3,920**
The Broads						7.4	**4,108**						7.4	**2,737**
The Culm			0.0				**3,186**							**974**
The Fens		23.0				0.0	**8,175**		23.0				0.0	**6,971**
The Lizard			12.6				**1,845**							**18**
Trent and Belvoir Vales		7.0					**7,405**		0.9					**4,487**
Trent Valley Washlands							**2,028**							**997**
Tyne and Wear Lowlands							**702**							**407**
Tyne Gap and Hadrian's Wall	3.6					2.4	**1,251**	3.6						**370**
Upper Thames Clay Vales	71.5	155.1					**15,858**	48.8	133.3					**6,744**

NCA	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land, 50% Arable/Scrub)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Vale of Mowbray							**1,797**							**1,792**
Vale of Taunton and Quantock Fringes							**2,293**							**1,246**
Vale of York							**6,391**							**5,736**
Wealden Greensand	0.4						**6,439**	0.4						**4,554**
West Cumbria Coastal Plain							**1,114**							**120**
West Penwith				4.4			**3,185**							**51**
Weymouth Lowlands				12.0			**494**							**30**
White Peak							**8,743**							**383**
Wirral							**103**							**25**
Yardley-Whittlewood Ridge		15.9					**2,625**		15.9					**1,712**
Yeovil Scarplands		2.2			1.6		**4,209**							**982**
Yorkshire Dales							**16,007**							**15,536**
Yorkshire Southern Pennine Fringe							**266**							**137**
Yorkshire Wolds	125.1					6.5	**19,244**	125.1					6.5	**18,103**
(blank)							**260**							**54**
Grand Total	**1,044**	**554**	**22**	**81**	**40**	**72**	**562,298**	**983**	**465**	**0.5**	**0.9**	**33**	**45**	**296,752**

Table 5-7 SHINE features at risk from cultivation by county

County	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Barking and Dagenham							**3**							
Barnet														
Barnsley	3.3						**762**	3.3						**616**
Bath and North East Somerset							**1,245**							**274**
Bedford	1.9	29.1					**7,922**	1.9	29.1					**5,847**
Bexley							**21**							**3**
Birmingham							**152**							**148**
Blackburn with Darwen														
Blackpool														
Bolton							**22**							**4**
Bournemouth							**0**							
Bracknell Forest							**27**							**5**
Bradford							**269**							**10**
Brent							**27**							**27**
Brighton and Hove							**1,403**							**656**
Bristol, City of							**0**							**0**
Bromley							**409**							**380**
Buckinghamshire	8.8	26.7					**18,256**	8.8						**6,289**
Bury							**14**							**3**
Calderdale							**43**							**15**
Cambridgeshire	48.7	9.5			0.9	3.6	**10,076**	47.1	9.5			0.9	3.6	**7,749**
Camden														

County	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Central Bedfordshire							**8,371**							**6,099**
Cheshire East							**3,255**							**1,306**
Cheshire West and Chester	4.2		0.0	2.0			**3,918**	4.0		0.0				**698**
City of London														
Cornwall		0.6	12.6	13.1			**20,476**							**3**
County Durham						1.6	**1,135**						1.6	**281**
Coventry							**36**							**14**
Croydon							**234**							**202**
Cumbria		1.4					**18,439**		1.4					**3,595**
Darlington							**171**							**27**
Derby							**227**							**103**
Derbyshire							**14,926**							**3,246**
Devon			0.0	0.3			**21,400**				0.3			**5,197**
Doncaster							**5,396**							**4,729**
Dorset	16.5	49.1	0.4	12.0	1.6	2.7	**6,717**	16.3	45.7	0.4			2.2	**1,745**
Dudley														
Ealing														
East Riding of Yorkshire	15.4					0.4	**30,829**	15.4					0.4	**25,703**
East Sussex							**10,205**							**6,581**
Enfield							**32**							**29**
Essex	0.1					0.2	**5,723**	0.1					0.2	**4,309**
Gateshead							**490**							**403**
Gloucestershire	9.9	58.0		0.1		25.2	**10,840**	7.9	45.7		0.1		13.5	**4,070**
Greenwich														

County	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Hackney														
Halton							**84**							**64**
Hammersmith and Fulham														
Hampshire	6.8	3.8					**2,190**	6.8	3.8					**1,094**
Haringey														
Harrow														
Hartlepool							**209**							**20**
Havering							**59**							**22**
Herefordshire, County of							**11,613**							**6,371**
Hertfordshire	24.0	43.3				0.4	**8,042**	15.3	42.8				0.4	**5,584**
Hillingdon							**42**							**4**
Hounslow							**3**							**3**
Isle of Wight							**1,495**							**641**
Isles of Scilly							**421**							
Islington														
Kensington and Chelsea														
Kent	29.0	10.6					**5,480**	23.7	10.6					**4,038**
Kingston upon Hull, City of							**22**							**3**
Kingston upon Thames							**3**							**3**
Kirklees							**134**							**8**
Knowsley							**0**							**0**
Lambeth														
Lancashire							**548**							**48**

County	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Leeds							**1,021**							**728**
Leicester														
Leicestershire							**11,757**							**2,263**
Lewisham														
Lincolnshire	1.2	20.7				12.1	**21,762**	0.5	18.2					**13,168**
Liverpool														
Luton							**50**							**43**
Manchester							**6**							**6**
Medway							**62**							**19**
Merton							**71**							**71**
Middlesbrough														
Milton Keynes							**480**							**98**
Newcastle upon Tyne		5.5					**433**		5.5					**222**
Newham														
Norfolk					31.1	7.5	**28,601**					27.2	7.4	**20,270**
North East Lincolnshire							**650**							**459**
North Lincolnshire	42.7						**4,609**	33.8						**4,011**
North Somerset							**38**							**2**
North Tyneside							**218**							**129**
North Yorkshire	109.8	0.6		0.4		6.1	**41,954**	109.8	0.6		0.4		6.1	**41,834**
Northamptonshire	3.9	14.4				0.8	**16,964**	3.6	4.7				0.8	**5,479**
Northumberland	3.8	5.1			1.0	2.4	**15,054**	3.6	2.8			1.0		**2,452**
Nottingham							**1**							**1**
Nottinghamshire		7.0					**11,270**		0.9					**8,807**

County	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Oldham							**22**							**7**
Oxfordshire	168.1	132.1			1.7	8.8	**17,110**	137.6	122.6				8.8	**12,541**
Peterborough		7.5					**1,794**		7.5					**1,561**
Plymouth							**1**							
Poole			0.1				**0**							
Portsmouth							**0**							**0**
Powys							**10**							
Reading							**1**							**0**
Redbridge							**2**							**2**
Redcar and Cleveland							**373**							**373**
Richmond upon Thames							**45**							**34**
Rochdale							**40**							**5**
Rotherham							**442**							**363**
Rutland							**2,135**							**560**
Salford														
Sandwell														
Sefton				0.2			**22**							**10**
Sheffield							**714**							**282**
Shropshire						0.0	**16,956**						0.0	**5,623**
Slough							**2**							**2**
Solihull							**675**							**470**
Somerset	2.4	6.9					**26,925**	2.2	4.7					**7,682**
South Gloucestershire					1.3		**501**					1.3		**76**
South Tyneside							**268**							**21**

County	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
Southampton							**16**							**16**
Southend-on-Sea							**2**							**0**
Southwark														
St. Helens							**10**							**4**
Staffordshire				1.3			**15,198**							**6,762**
Stockport							**53**							**5**
Stockton-on-Tees							**307**							**115**
Stoke-on-Trent														
Suffolk							**9,065**							**5,282**
Sunderland							**165**							**121**
Surrey							**2,556**							**1,393**
Sutton														
Swindon		2.5					**653**		2.5					**258**
Tameside							**5**							**2**
Telford and Wrekin							**624**							**559**
Thurrock							**275**							**119**
Torbay							**7**							**7**
Tower Hamlets														
Trafford							**3**							**0**
Wakefield							**774**							**300**
Walsall														
Waltham Forest							**75**							**75**
Wandsworth							**15**							**15**
Warrington							**362**							**96**
Warwickshire		55.3		10.1	2.2		**19,675**		55.3			2.2		**8,620**

County	SHINE, Area (ha) covered by parcel belonging to option						Total Area of SHINE Features (Agric Land)	SHINE, At risk of cultivation, Area (ha) in option						Total Area of SHINE Features (Agric Land)
	HS3		HS4		HS9			HS3		HS4		HS9		
	Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier		Higher Tier	Mid Tier	Higher Tier	Mid Tier	Higher Tier	Mid Tier	
West Berkshire	12.4	6.9					**3,341**	11.7	6.9					**1,731**
West Sussex	402.8	17.8					**28,023**	402.8	17.8					**21,221**
Westminster														
Wigan							**3**							**1**
Wiltshire	114.7	39.2	8.6	41.2	0.2		**10,420**	113.7	26.3			0.2		**4,476**
Windsor and Maidenhead							**75**							**59**
Wirral							**25**							**12**
Wokingham							**138**							**108**
Wolverhampton														
Worcestershire	13.3						**13,014**	13.3						**6,076**
Wrexham							**179**							
York							**359**							**350**
(blank)							**32**							**0**
Grand Total	**1,044**	**554**	**22**	**81**	**40**	**72**	**562,298**	**983**	**465**	**0**	**1**	**33**	**45**	**295,730**

APPENDIX 7: ONLINE SURVEY TABLE OF RESULTS

APPENDIX 8: IN-DEPTH NON-BENFICIARY SURVEY TABLE OF RESULTS

APPENDIX 9: IN-DEPTH BENEFICIARY SURVEY TABLE OF RESULTS

APPENDIX 10: HS9 FIELD SURVEY SUMMARY REPORT

Contacts

Total contacts received	**38**
Opted Out (mailing stage)	2
Opted out (telephone stage)	4
Incorrect contact details (unable to find alternative)	4
Heavy snow prevented site visits	6
Waterlogged fields prevented site visits	2
Not contacted	5
Interviewed	15
TOTAL	**38**

Comments

15 farmers were interviewed and 27 fields were site assessed from those 15 farms.

Interviews by County

County	Number
Buckinghamshire	1
Cambridgeshire	4
Dorset	1
Essex	1
Gloucestershire	1
Hertfordshire	1
Norfolk	2
Oxfordshire	4
TOTAL	**15**

Interviews by Farm Size

County	Number
0-50ha	
51-100ha	1
101-150ha	
151-200ha	1
201-250ha	2
251-300ha	2
>300ha	9

Interviews by Agreement Type

Agreement Type	Number
Mid Tier	12
Higher Tier	3

Where to use this option

Interviews by Feature Type

Agreement Type	Number
Scheduled Monument	13
SHINE Feature	2

Comments

Parcel eligibility for HS9 is defined differently for MT & HT with the option specification stating the following: -

Where to use this option:

It's available for Mid Tier and Higher Tier.

In Mid Tier you can use this option only:

- *on Scheduled Monuments on arable land or temporary grassland*
- *with the written approval of Historic England as confirmed on your Historic Environment FER (HEFER) consultation response*

In Higher Tier you can use this option:

- *on Scheduled Monuments where approved by Historic England and on historic or archaeological features identified in your HEFER.*

As such two (farms 1 & 5) of the three Higher Tier (HT) agreement holders had parcels managed using HS9 with SHINE features present, rather than Scheduled Monuments (SMs). If these were Mid Ter (MT) agreements then the parcels would not be eligible for HS9.

One MT agreement holder (farm 6) had three parcels managed using HS9 but did not have any SMs, only SHINE features, which, according the option rules should not have been eligible under MT.

Option Area in Each Parcel

Option Area	Number
Whole Parcel	12
Part Parcel	3

Comments

Six farmers (farms 3, 9, 10, 11, 13 & 15) had placed the HS9 option only on the area of the feature (SM or SHINE) whereas the remainder had placed the option over the entire parcel thus ensuring that they would be paid for their management across the whole field and not just the feature area. Farmers using the option as a part parcel option still managed the remainder of the field as HS9, as it would not be practical to split cultivation method and depth on a part parcel basis, but were not being paid to do so unlike the whole parcel farmers. Farmers who had entered part fields had done so because they and / or their advisors did not realise that the whole parcel could be included. The eligibility criteria from the HS9 specification in the previous does not provide clarity on whether the option can be included across the whole parcel or only on the feature; it is evident that the former is correct as the whole parcel farmers all had the option across the whole parcel even when, in some cases, the feature only covered a very small area of the parcel.

Where this item cannot be used

Risk of Soil Erosion or Runoff

Parcel	Farmer Answer	MJH Assessment
	Have you ever noticed signs of runoff or erosion?	Risk of Runoff or erosion (moderate or high)
1	No	Yes
2	Yes – some water movement	Yes and noted on visit
3	Yes – some water movement	Yes and noted on visit
4	No	Yes
5	No	No
6	No	Yes
7	No	Yes
8	No	No
9	No	No
19	No	No

Parcel	Farmer Answer	MJH Assessment
	Have you ever noticed signs of runoff or erosion?	Risk of Runoff or erosion (moderate or high)
11	No	No
12	No	Yes
13	No	Yes
14	No	No
15	No	Yes
16	No	Yes
17	No	No
18	No	Yes
19	No	No
20	No	No
21	No	No
22	No	No
23	No	Yes
24	No	Yes
25	No	No
26	No	No
27	No	No

Comments

The option specification for HS9 states the following: -

When this option cannot be used:

On parcels at risk of soil erosion or runoff, as identified in the Farm Environment Record (FER)

One farmer (farm 2) said that he had noticed signs of some water movement in the two fields managed using HS9 and as such these parcels should not be eligible for HS9 according to the specification. All the other 14 farmers (encompassing 25 parcels) sad that they had not noticed signs of soil erosion or runoff. At all the site visits a visual assessment of the risk of soil erosion or runoff on each parcel was undertaken using the Defra risk assessment guide taking into account the following types of risk: -

1. Inherent risk
   - soil texture

- steepness of slope
- slope length

2. Proximity and connection to a waterbody
3. Managed risk
   - valley features
   - long unbroken slopes
   - current land use

The Defra risk assessment guide usually also includes flooding frequency, soil structure, soil organic matter content, ongoing land use and rainfall intensity but these could not be taken into consideration on the site visits.

The site risk assessments highlighted that 14 of the 27 parcels had a Moderate or High risk of soil erosion or runoff and as such would not be eligible under the current HS9 option specification. Actual visible signs of soil erosion and runoff were noted on 2 out of the 27 parcels and these were the 2 parcels where the farmer had confirmed that there had been issues with water movement (farm 2).

Prohibited activities

The option specification for HS9 states the following: -

*To achieve the aims and deliver the environmental benefits, **do not** carry out any of the following activities.*

- *Use equipment trains that are longer than 6 metres (m)*
- *Grow the following crops on the option area:*
  - *maize*
  - *lucerne*
  - *root and tuber crops (excluding non-harvestable root crops such as grazed fodder beet and forage turnips)*
  - *short rotation coppice*
  - *miscanthus*
- *Carry out drainage works, including modifying existing drainage, without written permission before work starts*
- *Locate vehicle or stock access routes within 6m of the feature (existing surfaced tracks can be used)*
- *Carry out the following field operations to deeper than 15cm:*
  - *tillage*
  - *soil management*
  - *planting*
  - *Harvesting*

Prohibited activity	Number of parcels non-compliant	Comments
Equipment trains longer than 6m	0	A number of farms had equipment trains that could easily exceed 6m but legs and packers were removed as they were not needed for crop establishment. Equipment could not be examined or measured on farm due to face to face visit restrictions.
Growing prohibited crops	0	No prohibited crops were seen in any parcels on site visits nor mentioned as having been grown by any farmers.
Drainage works	0	No recent drainage works were observed in any parcels on site visits, nor mentioned as having been carried out by any farmers.
Access routes within 6m of the feature	0	No access routes were observed on any option parcel.
Field operations deeper than 15cm	0	No field operations were described by the farmers interviewed as having been deeper than 15cm.

Method of establishment	Total Number of Fields
Plough	0
Min till	18
Direct drill (including strip till)	36
TOTAL	**54**
Cover crops grown	**10**

Comments

- One HS9 part field feature area was in temporary grass which was established prior to the agreement commencing.

- Two HS9 part field feature areas are used as another MT option AB9 Winter bird food (established by min till every 2 years) on the same area. The HS9 specification does not state that HS9 can be combined with AB9.

- Two HS9 part field feature areas are used as another MT option AB11 Cultivated areas for arable plants (established by min till every year) on the same area. The HS9 specification does state that HS9 can be combined with AB11.

- The cover cropping is a recommendation rather than a requirement.

Barriers to AES and HS9 Participation

Farm Ref.	Barriers - AES Participation			Barriers - HS9 Participation	
	Income (delays in payment)	Income (less than income forgone)	Knowledge (application process complicated)	Farming practices/rotation/ infrastructure (equipment)	Compulsory option
1	X	X	X		X
2	X	X	X		
3	X	X	X	X	X
4	X	X	X	X	X
5		X	X	X	X
6		X	X	X	
7	X		X	X	
8	X	X	X		X
9	X		X	X	
10	X		X	X	
11	X		X	X	
12			X	X	X
13	X	X	X		X
14			X	X	X
15			X	X	X

Comments

- The table summarises the most commonly occurring themes across all 15 interviews in relation to barriers to AES and HS9 participation.

General Comments

Farm Ref.	General Comments
1	• More carrot & less stick - encourage, educate & persuade farmers instead. • Have a single point of contact instead of a 'call centre' type system.
2	• Make the scheme more straight forward. • More flexibility in management of options is needed.
3	• There should an advisor on the ground who can give definitive answers to questions. • I hope there is the opportunity to mix & match options in ELMS.
4	• Dates are really too stringent – farming is so reliant on weather that dates can't be adhered to but if outcomes can still be met it shouldn't matter. • It would be much easier to have advisors like the old fashioned ADAS who could visit farmers and advise on options and eligibility.
5	• Funding through MT & HT is assisted funding, contributing towards the cost, but not actually paying for the work being carried out. • There should be more support for sustainable farming practices and less for intensive farms that are carrying damaging practices - intensive farms have short term gains with long term consequences.
6	• Communication is very poor with NE/RPA, 3 fields were accepted for HS9 but not 1 & other options were excluded with no reason given. I had to reduce HS9 because I had AB8 – why should it be excluded when HS9 is about reduced depth cultivation & some options can be included such as AB10 & AB14, why so inconsistent?
7	• The key to a successful AES is to keep it simple and straight forward.
8	• I hope that regenerative farming will be better supported in the future.
9	• I want to understand more what ELMS will be about.
10	• AES options should be considered as another farming enterprise like a cash crop - cash crops produce food & options provide environmental benefits but both should be treated the same with equal importance.

11	• The poor payment timing and threat of inspections is very off-putting.
12	• There is too much paperwork & records to keep each year.
13	• Payment rates do not reflect the loss of production and the cost of late payments.
14	• Pleased to be accepted for HT again which will hopefully allow a smooth transition into ELMS.
15	• Can't plough to control blackgrass is a big problem.