FRAMEWORK AGREEMENT SCHEDULE 4

ORDER FORM/
WORK PACKAGE ORDER

FROM

Authority	Secretary of State for Environment, Food and Rural Affairs
Address	Defra Group Commercial 2nd Floor, Foss House 1-2 Peasholme Green York YO1 7PX
Contact Ref:	Via Bravo messaging or Email: Network.Procurement@Defra.Gov.uk
Order Number	Ref: ECM 53749
Order Date	5th December 2018

TO

Contractor	University of Gloucestershire
For attention of:	Name: [redacted] Phone: 01242 [redacted] E-mail: [redacted]
Address	The Park Cheltenham Gloucestershire GL50 2RH

1. SERVICES REQUIREMENTS

(1.1) Services and deliverables required:

1. Objectives

The aim of this project is to assess whether the current AE schemes provide sufficient flexibility to respond effectively to both the gradual impacts of climate change and changes to the severity and frequency of extreme weather events in their ability to deliver their environmental outcomes.

Two aspects will be assessed.

- Is there evidence that climate change impacts are affecting the ability of agreement holders to deliver AES prescriptions and indicators of success?

- Is the operation (both the design and implementation) of AES sufficiently flexible to ensure that the schemes can accommodate changes to the natural environment as a result of climate change, without adverse impact on the desired environmental outcomes of schemes?

The objectives of the project are:-

- To describe any impacts that climate driven gradual change and extreme weather events have had in recent years on the ability of agreement holders to; manage their land according to the required prescriptions, meet the indicators of success and, achieve the desired environmental outcomes. This description should take the form of an overarching narrative, supported by an analysis broken down by option/prescription type and indication of which options/prescriptions were most affected by which type of event/gradual change and in which areas.

- To determine how; scheme design, targeting and compliance, options and prescriptions could be altered to help reduce the identified risks due to climate change. This could be changes to scheme operation and compliance, advice & guidance, eligibility criteria, prescriptions and Indicators of Success.

2. Tasks and Requirements

To achieve these objectives the following tasks are proposed.

Task 1 – AES Prescription Review in relation to climate change induced gradual change

A suite of no less than 30 AES options (from HT, MT & Cross-compliance) (to be agreed with the steering group (see section 5 Governance and Timescale)) will be reviewed in relation to ecological events and projected change to these. Those options with fixed dates are likely to be the focus of this assessment. This may include measures set out in cross-compliance such as the dates for hedge cutting.

The management requirement set out in the prescriptions will be compared to ecological events known to be impacted by climate change, such as bird breeding and bud-burst.

Key weather driven ecological events to be evaluated include but should not be limited to:-

- Bird breeding season: ground nesting, hedge & tree nesting
- Plant growing season: hedges, grassland, heathland

National and regional climatic and ecological data covering the last 20 years should be the basis of the analysis, but consideration should be given to using climate change projections to model future changes to ecological events in relation to current AES prescriptions.

Task 2 - Survey of stakeholders in relation to extreme weather events

A semi-structured survey of stakeholders, including advisors, agreement holders and agronomists is required in locations that have experienced an extreme weather event to investigate the degree to which climate change driven extreme weather events impacts on; the ability of agreement holders to adhere to the prescribed management within the current compliance and operational regime; deliver the indicators of success and desired environmental outcomes.

The Contractor will design the survey (to be agreed with the project steering group prior to fieldwork) and carry out interviews focussing on three case studies where extreme weather events have been recorded in the last 5 yrs. In each case a particular climatic event/theme will be the focus of the survey (see below), but holistic information should be collected covering the full range of weather events experienced.

Views to be gathered by the survey should include but not be limited to:

- Impacts of gradual or extreme climate change/weather events on farming practice;
- impacts on the delivery of scheme prescriptions and objectives;
- issues relating to compliance
- Effectiveness of derogations (formal or informal) and adviser guidance as tools to enable AES to respond to climate change impacts;
- Agreement design flexibility (option choice, location and prescriptions) to enable pragmatic responses and deliver scheme outcomes under extreme weather events.
- Scheme design, operation and compliance regime flexibility in response to extreme weather events.

Quantitative and qualitative approaches are likely to be required to gather the desired data.

The total number of AES agreements in each case study areas is likely to be less than 500 with 10-30 advisors.

It is proposed that the survey is structured into an initial screening to determine whether climate change impacts have been experienced, followed by more in-depth questions where impacts are evident. A statistically robust sample size will be required within each case study area, we suggest a minimum sample size of 30 in-depth respondents per case but tenderers are invited to suggest suitable sampling approaches.

Contractor to issue an 'information note' agreed with the steering group to agreement holders identified from the initial screening exercise, to inform that they may be contacted regarding an interview. Prior to initial contact.

Contractor is invited to propose the method by which surveys will be undertaken based on their understanding of the desired outcomes of the project, noting that *NE will be able to provide the address and phone numbers of agreement holders* within the case study areas. Bids should highlight how low response rates will be addressed to ensure rigorous results are obtained. We anticipate that individual or group face to face interviews are unlikely to represent a cost effective approach.

Potential themes and locations include.

South East – High temperature / low rainfall: May-Aug 2018 [arable]

South West – High temperature / low rainfall: May-Aug 2018 [livestock]

North West – Heavy winter rainfall: December 2015 [livestock]

Potential additional case studies can be identified through a review of the Met Office site

https://www.metoffice.gov.uk/climate/uk/interesting

Case study areas should be selected to ensure the widest coverage of farming system and option type.

Agreement holders from the different tiers of Environmental and Countryside stewardship should be sampled. The number of agreements from the different schemes will vary according to the case study area and time of the event but in combination should aim to achieve robust results from both schemes and tiers.

The location of the case studies, final design of the survey and the nature of the questions posed will be agreed with the steering group, however Contractor should highlight the range of questions that they believe would provide full answers to the objectives posed.

The task will be separated into two elements; developing and finalising the survey design (Task 2a) and (Task 2b) completion of the survey fieldwork and analysis.

Task 3

The results and findings of the analysis of climate change driven gradual change and the survey into extreme weather events will be written up as a report (in Word and PDF) and additional communication products set out in section 3 outputs.

Analysis

In addressing the tasks, the tender should incorporate full proposals for data analysis to include the following:

- Presentation of the findings of the analysis of climate change driven changes in ecological events in relation to current prescriptions.
- Analysis of projected future change to ecological events in relation to current prescriptions and scheme operation.
- Descriptive and statistical analysis of the results of the surveys from the different case studies.

3. Outputs

The outputs of this contract will be:

1. A comprehensive report drawing on the findings of the analysis of climate change driven gradual change and the survey into extreme weather events. The report will address the project objectives listed. Conclusions should be drawn on the operational capacity of schemes to respond to extreme events, the ability of agreement holders to deliver the prescriptions set out in current options, and the ability of options to deliver their desired environmental outcomes under a changing climate. The report will be supported by input from members of the project steering group and other key specialists within Natural England and Defra.

2. A ‘2-page summary’ report, as per format in attached Annex A, summarising the aims, outcomes and implications of the project, for use by policy colleagues, and other non-specialists.

3. All data and metadata collected during the survey, including any hard copies of field sheets and associated spreadsheets populated with data will be provided to Natural England/Defra at the completion of the project.

4. The Contractor will present a webinar via the NE climate change network to present the results and findings. Details will be provided at the inception meeting and the webinar will be facilitated by NE.

4. Reporting and milestones

The project will run from Dec 2018 – March 2020 (See comments under section 5 Governance and Timescale).

- An interim report summarising the results and findings of the analysis of gradual change (Task 1) and finalised details of the approach to the survey (Task 2a) by 20 Mar 2019.

- An interim report summarising the results of the completed stakeholder survey into the impact of extreme events (Task 2b) by 1 Nov 2019.

- A draft final report will be provided to Natural England by 1st January 2020 and a meeting to present/discuss the results will be arranged soon afterwards (Task 3).

- The finalised, peer-reviewed report, and accompanying final 2-page summary, will be provided to Natural England by 1st March 2020.

- A presentation to key Natural England and Defra staff (providing an opportunity to discuss the key findings) of the results and findings of the report will be given by 30th March 2020.

The contract should be completed by the end of March 2020 with the presentation of the results in a webinar. Tenders should include a project plan detailing the activities required to complete the contract together with proposed milestones linked to invoice points.

Draft final reports will be submitted to Natural England for comment. The appointed Contractor will be responsible for ensuring both the quality of the work as well as the presentation of the material (e.g. proof reading, ensuring clear English). The appointed Contractor is also to be aware that Natural England requests acknowledgement in the publication (including oral presentations) of its funded research, and that the project manager is notified at least two weeks prior to publication. All reports should be provided in MS Word and PDF format.

The final report will be externally peer-reviewed (note: the Contractor will be responsible for arranging peer-review by two appropriate reviewers, to be agreed with the Natural England project officer) and be suitable for publication as a Defra science report. Tenderers should be aware that Natural England and Defra will publish final reports. The final report will be structured in a format that, if appropriate, facilitates rapid conversion into one (or more) papers suitable for submission to an appropriate peer-reviewed scientific journal.

Natural England is also happy to encourage widespread publication and welcomes the use of appropriate trade press, peer-reviewed journals, sector-specific journals and appropriate use of social media.

Note: If the findings of the work are deemed suitable, the Contractor will aim to submit a manuscript to a peer-reviewed journal as soon as possible after completion of the report, co-authored by staff from the Contractor and Natural England, as appropriate. A proposed timetable for submission of manuscript and publication timeline will be agreed with Natural England.

5. Governance and Timescale

It is anticipated the contract will be awarded during Nov 18 and be completed in Mar 20. It is envisaged that the analysis of the impact of gradual change (Task 1) will take place during the first 3 months of the project as will the development and finalisation of the stakeholder survey (Task 2a). The contract should be completed by the end of March 2020 with the submission of the final report. Tenders should include a project plan detailing the activities required to complete the contract together with proposed milestones linked to invoice points.

The first phase of the project (completion of Tasks 1 and 2a), are to be completed by 20th March 2019. The second phase will be subject to confirmation of available funding for and successful delivery of the first phase. The second phase shall involve carrying out tasks 2b-3. Confirmation of the second phase will be communicated to the Contractor before March 2019 and confirmed by both parties via a change control note extending the contract from 31 March 2019 to 31 March 2020. The Contractor should be aware that any work undertaken before an electronically approved CCN is approved by both the Customer and the Contractor is undertaken at the Contractor's own risk.

Natural England will establish a steering group to oversee the contract. It is anticipated that the steering group will meet four times during the course of the contract, at the project inception stage (Dec 2018), following submission of the two interim reports (Apr 2019, Nov 2019) and following submission of the draft final report (Jan 2020). It is envisaged that up to two of the four meetings could be via Skype. Additional meetings with the project team via Skype or teleconferencing are likely to be required in the first three months of the project to assist the development of the suite of questions for the stakeholder survey.

The Contractor will be responsible for writing up the notes from the steering group meetings. The project manager within Natural England will be [redacted] who will be

the first point of contact within Natural England. The Contractor must also appoint a project leader who will be responsible for the management and delivery of the project, be authorised to act on behalf of the Contractor and act as the liaison point with the NE project officer. The contract project leader will provide a short (no more than 1 page A4), written monthly progress note and any interim updates as necessary via catch up calls. The form of these updates will be agreed in the inception meeting.

As the project is being funded through the Rural Development Programme for England, there will be particular requirements around the submission of invoices, and the Contractor will be required to supply supporting information on time used and expenses incurred with the invoice. This will be clarified at the inception meeting.

6. IPR and data sharing

All data resulting from this project, project documents, Intellectual Property Rights and other materials will be the property of NE.

Natural England will provide a preliminary list of agreement holders and advisors in the case study areas. The Contractor will augment the list in the process of the stakeholder surveys to the requisite numbers. Data on AE options, ecological and climatic events are available externally.

All agreement information provided to the Contractor for the purposes of this project, shall be kept securely, confidentially and disposed of at the end of the project. It must not be used elsewhere without prior consent. The Contractor will be required to follow Natural England's data protection policy and only act on information provided under our instruction.

Any data collected will be made openly and publicly available, as per Natural England's Access to Information statement (http://publications.naturalengland.org.uk/publication/6430783876628480?category=5927398087327744)

7. Survey Requirements

As a survey is to be undertaken as part of this study, approval will need to be gained from the Survey Control Liaison Unit (SCLU) in Defra. Any structured approach made by or on behalf of the Government in order to obtain aggregated data is classed as a statistical survey and should be referred to Defra's Survey Control Liaison Unit (SCLU). This also applies to customer satisfaction surveys.

NE and Defra are strongly committed to minimising the burden they place upon businesses and local authorities. As a result proposals for new surveys must be assessed by the Survey Control Liaison Unit (SCLU). In order to undertake the survey of agreement holders, proposed as part of this project, approval will need to be gained from the SCLU. NE has made the initial application, but, following outline approval the Contractor will be required to provide a draft questionnaire to be agreed and approved. A period of at least 6

weeks should be built into the project plan to accommodate this survey approval process. The NE project officer will facilitate the submission and any subsequent liaison with SCLU.

It is the responsibility of the Contractor to ensure that the survey is provided in accordance with the time requirements of this project for SLCU approval.

Natural England will be able to provide the addresses and telephone numbers for agreement holders in the case study areas. Email is not the preferred contact method for the majority of agreement holders and Natural England does not have access to email addresses in the majority of cases.

Contractor's Approach and Methodology

See Annex D

(1.2) Commencement Date: 05 December 2018

(1.3) Completion Date: 31 March 2019

(1.4) Extension, via Contract Change Note, to 31 March 2020
Subject to availability of funds and satisfactory Contractor performance.

2. PERFORMANCE OF THE SERVICES AND DELIVERABLES

(2.1) Key Personnel of the Contractor to be involved in the Supply of the Services

[redacted] – Contractor's Project Leader (Project Manager).

[redacted] – Deputy Project Lead

[redacted] Internal Quality Control Lead

(2.2) Performance Standards

Natural England will establish a steering group to oversee the contract. It is anticipated that the steering group will meet four times during the course of the contract, at the project inception stage (Dec 2018), following submission of the two interim reports (Apr 2019, Nov 2019) and following submission of the draft final report (Jan 2020). It is envisaged that up to two of the four meetings could be via Skype. Additional meetings with the project team via Skype or teleconferencing are likely to be required in the first three months of the project to assist the development of the suite of questions for the stakeholder survey.

The Contractor will be responsible for writing up the notes from the steering group meetings. The project manager within Natural England will be [redacted], who will be

the first point of contact within Natural England. The project leader [redacted] will be responsible for the management and delivery of the project, be authorised to act on behalf of the Contractor and act as the liaison point with the NE project officer. The contract project leader will provide a short (no more than 1 page A4), written monthly progress note and any interim updates as necessary via catch up calls. The form of these updates will be agreed in the inception meeting.

(2.3) Location(s) at which Services are to be provided:

At the Contractor's premises as appropriate and as agreed with Natural England for steering group meeting.

(2.4) Standards:

Compliance with Health & Safety Policy, as per Framework Agreement.
Contingencies as outlined in Risk Management table, see Annex B

(2.5) Contract Monitoring Arrangements

For the avoidance of doubt the services required are being provided under Framework Agreement 23735

3. PRICE AND PAYMENTS

(3.1) Contract Price payable by the Authority excluding VAT, payment profile and method of payment (e.g. Government Procurement Card (GPC) or BACS))

£83,000 for the entirety of the contract, divided:

[redacted] 2018-2019 (Delivery of tasks 1 & 2a)
2019-2020 (Delivery of tasks 2b & 3)

See Annex C for full pricing schedule

(3.2) Invoicing and Payment

The Contractor shall issue an electronic invoice in arrears following completion of tasks 1 and 2a.
On the proviso the contract is extended for 2019-2020 the Contractor shall issue a second invoice in arrears following completion of tasks 2b and 3.

4. Invoicing Requirements

All invoices should be sent, quoting a valid purchase order number (PO Number), to: Accounts-Payable.neg@sscl.gov.uk or Shared Services Connected Limited, PO Box 790, Phoenix House, Celtic Springs Business Park, Newport, Gwent, NP10 8FZ. Within 10 Working Days of receipt of your acceptance of this Work Purchase Order via Bravo, we will send you a unique PO Number. You must be in receipt of a valid PO Number before submitting an invoice.

To avoid delay in payment it is important that the invoice is compliant and that it includes a valid PO Number, PO Number item number (if applicable) and the details (name and telephone number) of your Customer contact (i.e. Contract Manager). Non-compliant invoices will be sent back to you, which may lead to a delay in payment. If you have a query regarding an outstanding payment please contact our Accounts Payable section either by email to Accounts-Payable.neg@sscl.gov.uk or by telephone 0845 603 7262 between 09:00-17:00 Monday to Friday.

BY APPROVING THIS ORDER FORM THE CONTRACTOR AGREES to enter a legally binding contract with the Authority to provide to the Authority and natural England the Services specified in this Order Form, incorporating the rights and obligations in the Call-Off Contract that are set out in the Framework Agreement entered into by the Contractor and Defra on 03 Oct 2018.

Electronic Signature

Acceptance of the award of this Contract will be made by electronic signature carried out in accordance with the 1999 EU Directive 99/93 (Community framework for electronic signatures) and the UK Electronic Communications Act 2000. Acceptance of the offer comprised in this Contract must be made within 7 days and the Agreement is formed on the date on which the Contractor communicates acceptance on the Customer's electronic contract management system ("Bravo"). No other form of acknowledgement will be accepted.

[Title in the form of a question]?

ANNEX A

Agri-environment monitoring theme: [INSERT THEME AREA]

What are the issues?

[insert text]

What are the aims of the project?

[insert text]

Figure 1: [caption text] (Source: [insert]) [Delete above picture and replace]

Which policy areas will the research inform?

[insert text]

Department for Environment Food & Rural Affairs

This project is supported by the Rural Development Programme for England (RDPE) for which Defra is the Managing Authority, part financed by the European Agricultural Fund for Rural Development: Europe investing in rural areas

What are the results from the project and how will they be used?

[insert text which will automatically follow over to the second column]

Figure 2: [caption text] (Source: [insert]) [Delete above picture and replace]

Where can I find further information about this and related research?

[insert particulars to the contract on where details can be found]

Alternatively, please contact Defra's Sustainable Land and Soils Unit

Defra Science – did you know?
At any one time Defra manages over 1000 research projects covering a wide range of topics. For more information on current research see **http://randd.defra.gov.uk**.

ANNEX B

Updated Risk Matrix Table

Risk	Severity	Likelihood	Impact on project delivery	Example strategy to mitigate and avoid
Capacity and skills				
Loss of key staff.	Med	Low	Delay and disruption to delivery.	Project is within core business, meaning staff available for permanent or temporary filling of roles.
Poor quality of evidence and interpretation of results on SSSIs	High	Low	Misleading conclusions or inability to address project needs.	Use high quality experienced staff and established techniques. Set up small independent expert review team to assess results of the evidence review and valuation
Possible loss of institutional knowledge	High	Medium	Loss of access to data relevant to AES and / or SSSI	Early and wide spread agreement of where key data lie and how to access these.
Co-ordination and programme management				
NE change of personnel	Low	Med	May lead to interruptions in project communication and reporting.	Time needed to build relationships and understanding needs to be allowed for in project reporting timetable.
Poor understanding of AES schemes and SSSIs	High	Low	Poor quality results and final analysis	Ensure key staff have relevant experience and knowledge Use expert review team to ensure high quality output
Lack of time for a full analysis due to slow availability of data sources and data	High	Med	Difficulty in meeting full delivery requirement	Ensure an efficient project start and an effective project plan that sets out what is

				required from all stakeholders and data holders

Risk

Risk identification and management is a key project management task. We will identify and agree key risks and maintain an appropriate risk register through the life of each contract we are commissioned to complete. These are detailed in the risk matrix table attached, along with a summary of mitigating actions.

With experience we know and understand the impact of these risks on service delivery. Our approach to managing the provision of any projects that we are successful in winning will be to:

- Identify and agree risks at project initiation
- Agree approach to mitigation and formulate a plan to identify those stakeholders who can have most impact on mitigation measures

During the course of the project we will work with Defra/Natural England and other stakeholders, following our agreed mitigation plan, to try and ensure risks do not impact on project delivery. Any new risks that emerge during the project will be identified and added to the risk register, and additional mitigation measures agreed. Contingencies may be necessary to handle unforeseen issues and risks that occur during the life of a project that may impact upon final delivery. The project manager will monitor project delivery and achievement of milestones. If there is a risk that milestones may not be achieved, extra resource may be available to avoid delay in project delivery.

ANNEX C

Pricing table for Assessment of the adaptive capacity of Agri-Environment Schemes to respond the impacts of climate change

Costs	Task 1			Task 2a			Task 2b			Task 3		
	2018/19						2019/20					
	Daily Rate	No of days	Total	Daily Rate	No of days	Total	Daily Rate	No of days	Total	Daily Rate	No of days	Total
Senior project manager	£ [redacted]	[redacted]	£ [redacted]	£ [redacted]	[redacted]	£ [redacted]	£ [redacted]		£ [redacted]	£ [redacted]		£ [redacted]
Project Manager	£ [redacted]	[redacted]	£ [redacted]	£ [redacted]	[redacted]	£ [redacted]	£ [redacted]	[redacted]	£ [redacted]	£ [redacted]	[redacted]	£ [redacted]
Technical / Specialist	£ [redacted]	[redacted]	£ [redacted]	£ [redacted]	[redacted]	£ [redacted]	£ [redacted]	[redacted]	£ [redacted]	£ [redacted]	[redacted]	£ [redacted]
Technical / Project support	£ [redacted]	[redacted]	£ [redacted]	£ [redacted]	[redacted]	£ [redacted]	£ [redacted]	[redacted]	£ [redacted]	£ [redacted]	[redacted]	£ [redacted]
Travel and Subsistence			£ [redacted]			£ [redacted]			£ [redacted]			£ [redacted]
Other (e.g. peer review)										£ [redacted]	[redacted]	£ [redacted]

ANNEX D

E01: Approach and methodology (60%)

1. Project team

In this proposal, we set out our technical and intellectual merit, methodological approach, proposed work programme and total budget for this submission. In addition, the assembled team brings significant added value to this commission, including:

- A sound understanding of the issues pertaining to farmer agri-environmental decision-making concerning both Environmental Stewardship and Countryside Stewardship.
- Extensive knowledge and experience in monitoring and evaluation of AES and option-level analysis.
- A solid track record of delivering high quality commissioned research to time and within budget to a diverse range of funders, including the UK government and its agencies, the European Commission, Research Councils, UK charities and local government.
- Substantive, long-standing experience in social and natural science issues relating to agri-environment schemes.
- A strong collective expertise in climate change covering the impact on farming and farmers (CCRI), modelling databases on the impact of climate change (ESL) and AES options and prescriptions and the links to climate change (CCRI and LUC).

CCRI is a collaboration between the University of Gloucestershire, the Royal Agricultural University and Hartpury College for the purposes of research, education and knowledge exchange. We are the largest specialist rural research centre in the UK, working at the interface of agriculture, society and the environment on issues relevant to rural and urban development. Our principal research interests are to work with those engaged in agriculture, food and environmental management as well as rural communities. The researchers included in this bid have excellent expertise in AES and the impact of climate change on farming and land management.

LUC is a multidisciplinary environmental consultancy offering services in landscape character assessment, landscape planning and management, ecology, landscape design, environmental assessment, planning and spatial analysis. Our services include the design and implementation of monitoring schemes, field survey, creative analysis of spatial and statistical data, stakeholder engagement and reporting. The contributors to this project have excellent ecological skills that are connected to AES options and prescriptions.

Environment Systems is an environmental and agricultural data company. We are trusted providers of environmental and agricultural evidence and insight to governments and industry across the world. Our consultancy delivers bespoke advice and solutions for land management, monitoring and policy. Our data services deliver always-on, accessible data insights from satellite earth observations. The experts in this bid will provide a link between the climate change databases and AES options.

2. Rationale and Key Issues for consideration

Agri-Environment Schemes (AES) were originally set up and designed to reduce the impact of human activity on the agricultural environment, through encouraging the sensitive management of important habitats, the restoration of degraded habitats and features and the creation of new habitats, to benefit the habitats themselves, the species that inhabit them and the human interface with those habitats. This has been achieved through agreements with farmers and landowners, and

implemented through a series of prescriptions with target outcomes that can be both measured and monitored.

More recently it has become clear that one of the key influences on habitat and species condition is climate change, both gradual change and especially changes to the severity and frequency of extreme weather events, such as excessive rainfall, storm events, excessive heat and drought. For example this summer's drought has brought into focus the vulnerability of moorland areas to damaging fires in periods of drought. These are encompassed in the 2 challenges highlighted in the project specification.

AES prescriptions were developed over a period of years with specific environmental objectives and outcomes in mind. In total there are many different prescriptions across the current Environmental Stewardship Scheme. Prescriptions cover habitat and feature management, habitat creation, or specific interventions on farms to benefit specific species or with specific environmental outcomes (such as reduced chemical input in river catchments) as well as landscape character, historic environments, educational access and water quality.

We understand that, through this project, Defra/NE are looking for a contractor to assess whether the current AES provide sufficient flexibility to respond effectively to both the gradual impacts of climate change and changes to the severity and frequency of extreme weather events in their ability to deliver their environmental outcomes.

Two aspects will be assessed.

- Is there evidence that climate change impacts are affecting the ability of agreement holders to deliver AES prescriptions and indicators of success?
- Is the operation (both the design and implementation) of AES sufficiently flexible to ensure that it can accommodate changes to the natural environment as a result of climate change, without adverse impact on the desired environmental outcomes of schemes?

Specific objectives are:-

- To describe any impacts that climate driven gradual change and extreme weather events have had in recent years on the ability of agreement holders to; manage their land according to the required prescriptions, meet the indicators of success and, achieve the desired environmental outcomes. This description should take the form of an overarching narrative, supported by an analysis broken down by option/prescription type and indication of which options/prescriptions were most affected by which type of event/gradual change and in which areas.
- To determine how; scheme design, targeting and compliance, options and prescriptions could be altered to help reduce the identified risks due to climate change. This could be changes to scheme operation and compliance, advice & guidance, eligibility criteria, prescriptions and Indicators of Success.

The project is to run from late November 2018 until the end of March 2020.

3. Proposed Approach and Methods

The proposed methodology will comprise three main stages and incorporates all the specifications as set out in the Request for Quotation. It is clear that this project is an applied project where close liaison with the project team will be required as well as a flexible and adaptive approach to enable

the assessment of a range of options under, Environmental Stewardship (ES), Countryside Stewardship (CS) and potentially the Single Payment Scheme (SPS) in order to assess the impact of climate change on current option prescriptions. Information from advisers, agronomists and agreement holders will inform the development of a stronger narrative regarding changes to current schemes to make them more adaptive to climate change while still remaining robust in their environmental outcomes.

Task 1: AES Prescription Review in relation to climate change induced gradual change (LUC to Lead with ESL contributing)

This part of the work will draw together three strands of information to consider the extent to which climate trends raise issues for AES options.

- Firstly, we will review AES options (mid and higher tier options and cross compliance measures) to identify a sample of no less than 30 options, which specify dates for required operations and where these relate to particular ecological events (e.g. ensuring tree or hedgerow work is carried out while trees are dormant or before the nesting period starts and grass cutting dates). Our brief review of CS options suggests cross compliance defines an operational calendar, mid-tier options tend to have standard timing requirements, while higher tier timing tends to be defined at agreement level. Wherever appropriate, we will 'calendarise' option requirements.
- Secondly, we will carry out a detailed review of literature and relevant studies into the effect of climatic variables (typically temperature, sunshine and rainfall) on the timing of ecological events such as budburst, the length of the growing season, arrival and departure dates for migrant birds and nesting/hatching dates for breeding birds. Key sources are likely to include Met Office and Woodland Trust phenology research (2016), exploring the link between temperature and budburst for a range of tree species across the UK, BTO surveys of spring and autumn migration patterns and early breeding data. Wherever possible we will identify how these trends respond to changes in climatic conditions, noting that the relationship may not always be linear, with other factors also having an influence, particularly on mobile species.
- Thirdly, we will draw on past records and climate projections (including UKCP18 once available), to track past and likely future climate trends for each of the key climate variables above. For future projections we will agree appropriate emissions scenarios and probability levels. Key measures would include mean monthly temperature, rainfall, soil moisture and growing season.

Drawing these three areas of information together will allow us to track the likely change in the timing of ecological events in response to past and future climate changes. This is likely to focus on mean responses to changes, but wherever possible will describe the envelope of likely variability around this figure.

The changing date of ecological events will be compared with the 'calendarised' requirements of AES options. This will allow us to identify those options where dates for operations are likely to be unaffected by changes in the timing of ecological events in the long term, and operations where there could be a conflict with ecological events in the long, medium or shorter terms. It might be appropriate to define the likely 'headroom' in terms of °c or % increase in rainfall at given dates.

We would explore the value in adding a spatial dimension to this analysis, both in terms of evidence on the timing of ecological events and differences in past and projected climate trends.

It is clear that not all of England will be affected in the same way by climate change. The Met Office in their climate change predictions acknowledge this and try to quantify differences across the country. We understand that UKCP18 climate projections will be available from November 2018. In broad terms, the new projections will follow a similar approach to that used in UKCP09. UKCP09 and UKCP18 projections provide best estimates of change in key climatic variables across the UK, together with a guide to uncertainty in the predictions. They give users a range of scenarios from which to undertake impact assessments

UKCP09 had a 25km resolution across the UK, UKCP18 is expected to have a 5km resolution in places, with averages for administrative areas and river basin catchments. This has been suggested as particularly relevant in showing the likely occurrence of localised heavy rainfall events in summer which are often associated with flash flooding.

To use these climate projections within this project, we will download appropriate GIS shapefiles from UKCP18, for England at a national level, against which to compare the spatial impact of key climate change variables against the spatial distribution of key AES options (for which we will need shapefiles of the distribution of AES options from Natural England). The aim will be to try and assess spatial variation in impact across England, to help focus attention on those areas of England where certain AES options are likely to be most affected by climate change, and where least affected (and indeed potentially areas where climate change may be most felt, but where AES options are least well developed). This will enable the assessment of whether there may be a requirement in future for certain AES prescriptions (such as cutting dates) to be defined regionally rather than nationally.

There is of course the issue of confidence in climate projections which will need to be taken into account. The level of confidence in the projections is affected by the scale, time period and climate variable in question. We understand that there is relatively less confidence in local-level climate projections as compared with the continental scale. Confidence in the climate change information also depends on the climate variable in question. For example, there is higher confidence in projections of mean temperature than in those of mean precipitation. We will take this into account in our reporting of likely climate change impacts of AES measures.

We will prepare an interim report setting out the key findings from this part of the analysis, maintaining a distinction between the effects of past and projected climate trends on ecological events and AES options. The former will be particularly relevant to the survey of stakeholders which, in addition to exploring the impact of extreme weather events could be used to gauge awareness and impact of more gradual change in the timing of ecological events.

Task 2: Survey of stakeholders (CCRI to lead)

The survey of agreement holders, advisers and stakeholders will gather evidence regarding the impact of climate change driven extreme weather events on the ability of agreement holders to adhere to AES prescriptions within the current compliance and operational regime; and their ability to deliver indicators of success and desired environmental outcomes.

We propose three key elements to Task 2:

- Survey design and selection of 3 case study areas
- A focused online survey in the three selected regions (quantitative focus)
- In-depth telephone interviews with advisers, agronomists and agreement holders (qualitative focus).

The overall survey design (Task 2a) will be agreed with the Project Steering Group (PSG) but we suggest that the preference would be to secure a spread of extreme events and farm types, which can be represented geographically.

Suggested themes and locations would be:

- North West – Heavy winter rainfall: December 2015 [livestock & upland]
- South East – High temperature / low rainfall: Summer 2018, 2016, July 2015 [arable]
- South – High Summer rainfall: April to July 2012 [mixed]

The summer of 2018 has been dry and hot across most regions causing moorland fires and lack of grass growth and may have affected potential respondents in all of the proposed case study areas. Including high summer rainfall within the mix is important as this is a time of high AES activity and therefore has a high impact, although the 2012 date is 6 years ago.

The decision to focus on an online survey to collect quantitative data and an in-depth telephone survey to focus on qualitative questions is based on our experience of the difficulties of mixing these two sources within one survey. It is the most cost effective approach since face-to-face interviews have been suggested as being inappropriate. Both the online survey and the in-depth telephone interviews would form the core of Task 2b.

The online survey (Task 2b) will be developed to target all eligible farmers and land managers in the case study areas in order to establish the impact of extreme weather events on existing schemes. We suggest that all schemes are be considered ES, CS and SPS. This will enable the full scope of the impact of climate change to be assessed and the knowledge of respondents regarding the schemes in which they participate. The survey will contain filtered sections with a focus on closed questions using JISC online surveys[1]. The survey will be for a limited time and will aim to secure a large number of respondents in each study area (at least 50 (10%)) in order for analysis to be statistically valid. Respondents will be recruited via advisers, agronomists and other key stakeholders, as well as promoting through social media and events and using the anticipated list of AES agreement holders from NE. CCRI has considerable expertise in developing such surveys, current example can be viewed here [redacted]

The aim for a minimum 10% response rate is to ensure some statistically valid responses with a larger sample size, which is important given the small nature of the total population in each of the proposed case study areas.

The analysis would include the experiences of agreement holders (ES (HLS and ELS) and CS (HT and MT)) and potentially those in SPS relating to extreme weather and whether this had any impact on their ability to comply with existing prescriptions or their need to request derogations. The ability of options within schemes to mitigate against the impact of extreme weather would also be included. Responses to these questions may be observed or inferred, and will include respondents' perception about the ability of the AES schemes and SPS to be flexible. One area to be explored will be the agreement holder's priorities in responding to extreme events such as protecting life, income, production as well as meeting scheme requirements.

The in-depth telephone interviews (Task 2b) with advisers, agronomists and agreement holders would secure specific details on particular cases and incidents of AES options and prescriptions being

[1] JISC Online Surveys is a secure online survey facility utilized by over 300 organisations, and numerous national level surveys. It offers the facility to track and/or control who completes the survey – which can be discussed with the PSG.

inflexible. Respondents would be selected on the basis of experiences expressed in the online survey, scheme (ES or CS) and tiers (HLS/ELS, MT/HT) in order to provide robust results on both schemes and tiers. High quality qualitative information and some specific quantitative data can only be collected through direct conversations with agreement holders, advisers and agronomists. For this we [redacted]

We envisage that Natural England would be able to provide a list of farmers to interview and this can be linked to their responses to the online. This can be discussed with the PSG checking to ensure that this approach is able to provide a robust sample for the in-depth interviews.

A key element of the in-depth interviews is to focus the discussions about particular options and prescriptions. The in-depth interviews would gather data on the following:

- Issues relating to the delivery of scheme objectives;
- Examples of issues requiring derogation or special advisory guidance;
- Agreement holder's priorities during extreme events and the associated decision making process concerning protecting, life, income production and scheme regulations;
- Positive impacts of scheme options on land management coping with extreme events (e.g. margins reducing soil erosion, EK21 mitigating against impact of drought);
- Potential adjustments to option prescriptions and scheme flexibility.

While we understand the principal focus of Task 2 is on extreme weather events, there is also an opportunity to explore stakeholders' awareness and response to the more gradual patterns of climate change and the timing of ecological processes analysed in Task 1, as well as the changing consumer behaviour on food choices. We would therefore draw out findings in terms of:

- Key past changes in the timing of ecological events
- Examples where past changes in the timing of ecological events could be raising practical issues in terms meeting the requirements of AES prescriptions, or where there is a risk of ecological impacts.
- Farmer/land manager responses to consumer preferences such as less red meat, increased plant-based diet.
- Impact of climate change of farming systems (e.g. dropping of some crops from rotations).

The project team are aware that both surveys will need to be approved by the Survey Control Unit. Three weeks have been allowed for this in each case, although they could be considered together.

At the end of this stage we would review the level of stakeholder support for / awareness of the impacts of gradual climate change on ecological processes and AES prescriptions. This would allow us to highlight, for example, where particular issues are identified in terms of:

- Types of AES option or prescription
- Specific ecological processes (e.g. growing season or breeding times)
- Climate variables (e.g. temperature or rainfall)
- Geography (e.g. English regions) or farm types.

Task 3 Analysis and presentation of findings (LUC to lead)

We will draw together the findings from the desk based analysis of the effects of gradual climate change and the stakeholder engagement in relation to extreme weather events to provide an overall assessment of the whether current AES schemes provide sufficient flexibility to respond to gradual and more sudden climate changes, particularly in terms of their ability to deliver environmental outcomes.

Key aspects to consider will include:

- Climate variables where past patterns of climate change have already started to impact on the implementation of AES schemes. This will highlight any key conclusions in terms climate variables, types of AES prescription, types of ecological process, habitat and any evident spatial patterns;
- Climate variables where projected future patterns of change could impact on the implementation of AES schemes. Again, it will highlight differences by climate variable, types of AES prescription, ecological process, habitat and spatial pattern;
- Stakeholders' awareness of gradual climate change, its impact on key ecological processes and the implications for their land management practices in general, and implementation of AES option prescriptions more specifically;
- Stakeholders' experience of more extreme weather events and the implications for their land management practices in general and implementation of AES option prescriptions more specifically.

Drawing on this, we will prepare a narrative, exploring and describing the implications of past and future gradual climate change and more extreme weather events on the operation of current AES prescriptions. This will highlight where climatic factors currently or could potentially impact on delivery of AES scheme objectives, including impacting on ecological assets or processes.

In practice this is likely to distinguish between:

- Types of AES measure where there is sufficient headroom to accommodate past and projected gradual climate change;
- Types of AES measure where there is already, or could in the future, be a conflict between prescriptions and the timing of ecological events;
- Types of AES measure considered particularly vulnerable to particular types of extreme weather event and the implications of this for scheme objectives, land management practice and environmental outcomes.

As far as the climate change data allows, we will assess these implications spatially across England. Many AES options are, in any event, focused spatially, following the type of farming system in which they operate. Upland AES prescriptions, such as moorland grazing dates and upland hay meadow cutting, differ to largely lowland prescriptions such as hedge cutting dates. We will try and use the UKCP18 climate projections to assess whether there are differences within those broad farming types, whether, for example, moorland areas in the north of England are likely to be impacted by climate change more or less than similar areas in the south-west, and whether grasslands on the Welsh border are likely to be impacted more or less than similar areas in eastern England. It might also be possible to assess which catchments are likely to be most impacted by high rainfall events, and where flood mitigation would deserve a higher priority in future.

Where there is evidence that climate is already a factor influencing land managers' ability to deliver AES options, we will describe how subsequent issues have been addressed in terms of compliance and scheme objectives. We will highlight areas where capacity to respond to the challenges of gradual and more rapid climate change is most limited, and draw out the reasons for this.

Where appropriate we will recommend ways of making AES prescriptions more resilient to climate change, for example by:

- Reviewing timings for specific operations
- Defining timings at regional or agreement level
- Building flexibility into agreements to allow for changed circumstances resulting from extreme weather events.

There may also be an opportunity to broaden and deepen the evidence base regarding the relationship between climate change and critical ecological processes and events.

We will produce draft, draft final and final versions of the project report. We will also prepare a 2 page summary report as set out in the project specification, and will present the findings at a NE climate change network webinar.

4. Project Plan and Risk Matrix (CCRI to lead)

The project plan will ensure that all the required output are delivered to time. CCRI have a single point of contact approach to NE projects and [redacted] will be the key contact for this project should we be successful. [redacted] will be responsible for the monthly update reports and liaising with the NE project Officer. It is understood that the pr0oject will commence in late November and run until March 2020, provided the funds can be secured in the next financial year. The main deliverables are:

An interim report on Task 1 and Task 2a will be delivered to the PSG by 20 March 2019.

An interim report on Task 2b will be delivered to the PSG by 1 Nov 2019.

A draft final report will be provided by 1st Jan 2020. As well as addressing the overall project aims the report will contain.

- Comprehensive report and executive summary drawing on Tasks 1-3 that addresses the project objectives. Conclusions will be relevant to the operational capacity of the schemes to respond to extreme events and the ability of agreement holders to deliver these associated prescriptions.
- An Excel based RAG assessment of option vulnerability
- A '2-page summary' report and all project data.

The project team would be delighted to offer a webinar via the NE climate change network and a presentation of results to key NE and Defra staff (with opportunity to discuss the key findings).

The work will be peer reviewed and for this task we suggest someone like [redacted] or [redacted]

It is highly likely that the project team will seek to publish the results, possibly in a journal such as *Land Use Policy* or *Environmental Science and Policy*.

The risk register below identifies all risks that reasonably can be anticipated at this point in the process. These risks will be monitored during the course of the project for ongoing likelihood, impact and applicability of mitigating measures.

Of particular relevance to our capacity to deliver are those risks relating to availability/loss of staff and the viability/availability of planned sub-contractors. For our own staff, mitigation may take the form of rescheduling, allocation of additional staff or reallocation of time for committed staff, whilst our sub-contractors will be required under their contracts to ensure that they take appropriate steps to be able to commit the necessary resources.

Risk Description	Like-lihood	Impact(s)	Mitigation	Mitigation Owner
Data availability	MEDIUM	HIGH The project relies on immediate data availability and the right data format.	CCRI and ESL are experienced in data handling of agri-environmental scheme monitoring databases and would request the data early and in the most appropriate format. We will work closely with NE using established knowledge of the data to mitigate any loss of time in accessing datasets. Likely impact is to re-schedule work programme	UoG, Defra/NE
Staff absence / availability	MEDIUM	HIGH The project relies on the right balance of staff skills and practical experience.	Access to a large number of staff with skills and experience to plan and reallocate time to cover most eventualities. Time identification and management through our time systems. In the event of the loss of a member of staff with a core skill set required for the work, we reserve the right to broaden or extend our supply chain to enable us to retain access to that individual with the agreement of their new employer.	UoG/LUC/ESL
Lack of participant engagement	LOW	HIGH - Low number or variety of responses detrimental to analysis and validity of results	Stakeholder and communications planning and management (PMS processes), supporting identification of the required population and samples, awareness raising, use of a dedicated staff to communicate with interviewees and key stakeholders	UoG
Supply chain failure – loss of sub-contractor	LOW	LOW Delivery of work	Pre-contract assessment of sub-contractors, relationship management; contracting of individuals or other suppliers if required.	UoG

Access to respondents - A national emergency (e.g. Biosecurity alerts, severe weather) may limit availability of agreement holders as they have other priorities.	LOW	LOW Delivery of work	Scheduling will seek to minimise such risks and ensure some flexibility is built-in to reduce the impact of issues arising. Where necessary, methods may be adapted to enable work to continue e.g. online rather than telephone interviews.	UoG
Survey Control	MEDIUM	MEDIUM Delay to data collection	Extensive experience in the survey control process minimises this risk. We note that there may be time pressures within that unit which are beyond our control as a supplier.	UoG, Defra/NE
ICT / Estate failure	LOW	LOW Delivery of work	Business Continuity planning (University level)	UoG
Data Quality -	MEDIUM	HIGH Delay to delivery of dependent tasks	Customer QA of data provided, rescheduling of dependent tasks if development work required.	Defra/NE
Health & Safety	LOW	LOW Delivery of work, legal	Risk Assessment and mitigation as per H&S policy	UoG
Conflict of Interest	LOW	LOW Integrity / profile, legal	Compliance with HR and Financial polices e.g. procurement, gifts, relationships, data protection	UoG

The project team are aware of the **potentially sensitive nature of the research** and will meet this by using an experienced team of telephone interviewers. CCRI have had experience of similar situations. The types of issues that might arise are:

- Impact on farm business from extreme events such as high winter or summer rainfall
- Loss of crops through drought or high temperatures
- Loss of habitat from extreme events such as moorland fires
- Loss of livestock due to flooding or high rainfall.

The key aspect to focus on is the potential for the project to effect change in the current structures and the associated fear of inspections and deductions.

CCRI undertook the social science research that underpinned the Bovine Tuberculosis (bTB) research, which included speaking to and interviewing farmers who have lost their herd to bTB (see [redacted] This required a great deal of sensitivity and was undertaken with great care. A similar approach will be used in this project. One approach that the CCRI utilised in this project was to have a list of helplines and appropriate networks,

provided to interviewers, which could be passed on to farmers if appropriate to their area and situation.

CCRI recently delivered the agreement holder interviews on a recent NE project assessing the implementation of the Countryside Stewardship (CS) scheme (ECM43222). CS has had a troubled introduction with many of those contacted, both successful and unsuccessful applicants, reporting some concerning experiences of delays in agreements and payment but the response rate, especially in the second phase of the project remained high. The key aspect to focus on was the potential for the project to effect change in both CS and inn future schemes in terms of the current structures.