

FRAMEWORK AGREEMENT SCHEDULE 4

ORDER FORM/ WORK PACKAGE ORDER

FROM

Authority	Secretary of State for Environment, Food and Rural Affairs
Address	Defra Group Commercial 3 rd Floor, Mallard House 1-2 Peasholme Green York YO1 7PX
Contact Ref:	[REDACTED]
Order Number	Ref: ecm_56528
Order Date	03/10/19

TO

Contractor	Fera Science Ltd
For attention of:	[REDACTED]
Address	Sand Hutton York North Yorkshire YO41 1LZ

1. SERVICES REQUIREMENTS

(1.1) Services and deliverables required:

To evaluate and clarify the extent to which different factors may be inhibiting or masking the progress of upland dwarf shrub heath SSSIs in AES to favourable condition, with a view to improving the implementation of current schemes and informing the development of future AES.

There are several steps in the process chain of using AES to bring SSSIs into Favourable Condition, and this project aims to get an understanding of the relative importance of these different factors in terms of their impact on the outcome for upland dwarf shrub heath SSSI:

- Setting up the agreement – are the right options, supplements and capital items being selected and targeted at the correct habitat / features, and is the specified management (Prescriptions and Indicators of Success) ambitious enough to address all the factors required for favourable condition and bring about the required level of change?
- Implementing the specified management – are all aspects of the agreement being implemented in line with the prescriptions?

- Achieving measureable change in habitat condition – if the first two stages are successful but habitat condition is not improving, the scientific basis of the AES management may be inadequately understood e.g. timescales for recovery may be slower than allowed for in IoS trajectories, or other factors that AES cannot address such as climate change may be having an impact. Also, moorland ‘grazing or management units’ tend to include a range of habitats and associated species which often have different management needs, especially in terms of grazing. This can make it difficult to manage for all features and hence requires prioritisation of objectives and/or temporal or spatial variation in grazing management.

The project also aims to identify any patterns at the level of the attributes required for favourable condition. All attributes must be met for a site to reach favourable condition, therefore the failure of one attribute could hold back the condition of a habitat which is otherwise favourable. If there is evidence that certain attributes or issues are consistently causing upland dwarf shrub heath sites to fail to meet favourable condition this would indicate where to concentrate efforts to improve scheme effectiveness for this habitat. The unpublished Critchley *et al.* report (detailed in the ‘Background’ section above) provides evidence that certain attributes are more likely than others to be holding back an upland dwarf shrub heath SSSI habitat from achieving favourable condition, and it will be useful to test whether this survey supports those findings.

Research questions:

1. To what extent is the lack of change in the percentage of SSSI land in Favourable and Recovering condition since 2013 attributable to slow recovery trajectories, at least for upland dwarf shrub heath? Is there evidence that sites are progressing towards favourable condition and we need to adjust our expectations (and IoS) to reflect the pace of recovery, or are current schemes failing to address all the factors required to achieve favourable condition?
2. On which stages of agreement set up and implementation should we be focussing our efforts to make AES more effective for upland dwarf shrub heath SSSIs?
 - Are habitats being identified correctly? Wet and dry dwarf shrub heath and blanket bog often occur in a complex mosaic and previous studies have found that the habitats are not always identified correctly, which can lead to inappropriate management.
 - Are the right options, supplements and capital items being selected and targeted at the correct habitat / features?
 - Are Prescriptions and Indicators of Success appropriate, measurable and achievable?
 - Does the evidence support the findings of the Staley *et al.*, 2018 study that a significant proportion of agreements are unlikely to achieve their objectives from the outset due to deficiencies in agreement set-up, especially the tailoring of IoS?
3. What is the evidence for AES leading to changes in management practice as well as change in site attributes?
 - Does the evidence suggest agreements are being implemented effectively?

- Are SSSIs in AES subject to more positive management activity, even if this is not yet translating to measurable condition improvement?
4. Are there particular variables or management practices we should be focussing on where AES is currently being less effective? Are these the same variables and management practices identified in the unpublished Critchley *et al.* report?
 5. Is there evidence of other factors outside the scope of AES which are significant in inhibiting progress towards Favourable Condition?

Project Scope and Requirements

Work is required to plan and deliver a desk analysis of agreement documentation and field re-survey of upland dwarf shrub heath SSSI sites based on the methodology developed for Integrated Site Assessments, and also to conduct an email survey of selected Natural England Advisers. The work will include sampling, field survey, data collection, analysis and reporting.

It is envisaged the project will be carried out in two phases aligned with financial years, to enable the field survey work for Task 3 to take place at an appropriate time of year for the habitat (Jan – Mar).

Phase One will involve data collection for Tasks 1, 2, 3 and 4 and preliminary analysis for Tasks 2 and 4, and for Task 3 as far as is possible given the timing of the fieldwork. It will also include the production of an interim report as detailed in Task 5, all to be completed by 31st March 2020.

Phase Two will include the analysis of data from Task 3 and all final analysis and reporting as detailed in Task 5, to be completed by 30th June 2020.

The second phase will be subject to confirmation of available funding and successful delivery of the first phase. Should the second phase be required it will be communicated to the Contractor before April 2020 and confirmed by both parties via a change control note.

Natural England maintains and publishes data on the condition of all SSSIs on the Designated Sites System:

<https://designatedsites.naturalengland.org.uk/SiteSearch.aspx> with records going back several decades in some cases. However, it is usually just the condition of each feature and the overall unit and site condition that is published rather than the raw survey data, though there may be a qualitative summary of the survey findings. Between 2011 and 2017 a system of Integrated Site Assessments (ISAs) was used, where data was collected on a standardized form which was then digitised for storage on an IT platform called ISAT. The intention was that where SSSIs were in AES, progress towards option objectives would be assessed at the same time as the SSSI feature condition. At that time SSSI features would usually be managed in the higher tier (HLS) of Environmental Stewardship (ES). Data from ISAT has now been archived but can still be accessed. This is considered to be the best source of data to use as a baseline against which to assess change because it is more detailed and standardised than earlier survey data.

Over 6000 ISAs were carried out but when these are filtered to select sites with the HLS habitat features upland heath (M04) or fragmented heath (M02) recorded, which are also in HLS management options, the sample population is 122 ISAs covering units across 23 SSSIs. The dates of these ISAs range from 2012 to 2015, so enough time should have elapsed to be able to detect some change/trends in variables if not in overall condition category.

Task 1 – Identify a representative sample of sites and arrange access for fieldwork

The first task is to identify a representative sample from these 122 ISAs to use for this study. 75 ISAs are clustered around Northern England (Yorkshire, Cumbria and Northumberland). There is another cluster of 32 ISAs in the South West, then 15 more scattered across the West and Midlands. To give a more detailed indication of the distribution of relevant ISAs, the table below shows which National Character Areas (NCAs) the ISAs fall within.

NCA	#ISAs
Black Mountains and Golden Valley	8
Bodmin Moor	6
Border Moors and Forests	1
Bowland fells	10
Cheviots	1
Exmoor	12
North Pennines	11
North York Moors and Cleveland Hills	5
Northumberland Sand stone Hills	3
Quantock Hills	14
Shropshire Hills	6
Southern Pennines	13
White Peak	1
Yorkshire Dales	31

The project should aim to sample a minimum of 50 out of these 122 sites and the sample should be stratified to take account of the geographical spread of sites and generate robust results for each analysis group. The tender will need to specify and justify an appropriate sampling approach, though the detailed list of sites to include can be agreed at the Inception Meeting.

Natural England will supply the agreement holder contact details, ISA form, agreement document, and FEP and HLS maps for each of the selected sites. The successful contractor will need to collate a file for each site and make contact with the agreement holder to arrange access for fieldwork.

Task 2 – Conduct a desk assessment to evaluate the suitability of agreement options

The second task is to carry out a desk study to assess the suitability of the agreement for achieving/maintaining favourable condition of the upland dwarf shrub heath SSSI feature. This will require the contractor to compare the agreement documents (including the Farm Environment Plan and Agreement Schedules) with the Favourable Condition Table (FCT) for each site (obtained from the publicly available Designated Sites System: <https://designatedsites.naturalengland.org.uk/SiteSearch.aspx>) and assess the following:

- Does the agreement contain the right options, supplements and capital items relating to the land parcel(s) in question, to address all the attributes required to achieve favourable condition of the upland dwarf shrub heath feature?
- How well are prescriptions and indicators of success (IoS) aligned with Favourable Condition Table targets and how appropriate, measureable and achievable are they?

Task 3 – Carry out a field re-survey of the selected sites to assess change in environmental attributes and/or management practices.

The third task is to design and carry out field surveys which will yield data that can be compared to the previous Integrated Site Assessment, and enable an assessment of:

- Whether there has been any change in the environmental attributes
- Evidence of positive management taking place
- The tender will need to demonstrate how it will address the above objective by recommending a detailed plan for the delivery of the field survey, analysis of the data collected and associated reporting.

The methodology should be based on and adapted from the ISA Operational Manual (attached at Annex 2), in order to ensure comparability with the ISA baselines. Section 7 – Collecting the Data, details the field survey methodology. To ensure consistent and robust data collection, for the re-survey the detailed methodology should always be used with a minimum of 28 stops within the target habitat (see 7.5 in the manual). Note that Natural England is currently reviewing how it assesses the condition of Protected Sites so links in the ISA Manual to producing ISA forms etc. are no longer live. Instead, an example ISA form is attached at Annex 3. The baseline ISA form will be provided to the successful contractor for each site selected for survey.

Tables at Annex 1 indicate the standard variables for dry and wet upland dwarf shrub heath, and compare how these variables are expressed in ISA forms, Common Standards Monitoring and the Indicators of Success used in HLS agreements. The JNCC Common Standards Monitoring Guidance for Upland Habitats may also be helpful: <http://archive.jncc.gov.uk/page-2237>

In addition to the variables in the tables, it will also be necessary to record the GPS co-ordinates for each sampling point and the peat depth using a peat stick to identify whether it is on wet (peat depth >20cm) or dry (peat depth <20cm) heath, and therefore determine which habitat assessment should be used. Where peat depth is over 50cm the habitat would be classed as blanket bog which is not the target habitat for this study so the GPS co-ordinates should be noted but another sampling point selected. This information will be used to answer parts of research question 2 and assess whether wet and dry heath has been identified correctly and therefore whether appropriate management has been specified.

The aim of re-surveying sites for this project is to detect change, rather than to produce overall condition assessments of the sites, therefore minor modifications to the methodology may be proposed where efficiency or effectiveness can be improved without impacting on the objectives of the project. Any modifications should be fully justified.

Task 4 – Evaluate the effectiveness of management implementation through an email questionnaire for NE advisers

The fourth task is to design and carry out a questionnaire survey of relevant NE advisers by email, to gather their views on whether agreements have been implemented effectively and help answer Research Question 3. The objective is to evaluate to what extent implementation rather than agreement set-up is the critical stage in AES success or failure on upland dwarf shrub heath.

Natural England will supply a list of relevant advisers to contact (estimate max. 25 individuals). Where possible, NE will identify an adviser with specific knowledge of each site in the sample, and questions will cover both the implementation of prescribed management (of both AES options and supplements) on particular sites and adviser's views on implementation of AES on upland dwarf shrub heath in general.

The detail of the survey questions will need to be agreed with the Project Steering Group but the tender should demonstrate an understanding of what the questionnaire is aiming to achieve. Questionnaires should be designed to take no more than 20-30 mins to complete. Both quantitative and qualitative analysis of the responses is likely to be required.

Task 5 – Reporting

It is envisaged this project will be delivered in two phases aligned with financial years 2019/20 and 2020/21. This is to enable the Task 3 fieldwork to take place at an appropriate time of year for the habitat (Jan – Mar), recognising that some analysis and reporting will then have to take place after March 2020.

An interim report is therefore required by end March 2020 detailing the methodologies used and presenting the data collected for each of Tasks 1-4. The interim report should also contain the preliminary analysis and summary of the main findings for Tasks 2 and 4, and for Task 3 as far as is possible given the timing of the fieldwork. It must contain sufficient detail and information to allow completion of the analysis of Task 3 and all final reporting to be carried out as a separate project at a later date if funding is not available for Phase 2 in 2020/21.

Phase 2 is the production of a comprehensive final written report covering all objectives and tasks of the project, to be finalised by 30th June 2020. This should include:

- Context – brief background and objectives of the project
- Methodology (including any caveats and assumptions used)
- A section on each of Tasks 2-4 which presents and analyses the data and summarises the main findings from each Task.

- A synthesis and analysis of findings across all the tasks which addresses the research questions 1-5 set out in this specification.
- Conclusions and suggestions for improvements to current AES delivery and future scheme design based on the evidence from this project.
- Executive summary – a brief overview of the project and its main findings. This should be suitable for a Policy audience. Bullet points to highlight the key points may be useful.

Bidders should be aware that Natural England and Defra intend to publish final reports on Defra science web pages. All reports should be provided in MS Word and PDF format.

Outputs

The outputs of this mini-tender are:

- The successful bidder will be required to provide the NE project manager with short written updates (approx. 1 side A4) of progress on a monthly basis.
- All raw data to be supplied to the NE project manager in an Excel-compatible format [REDACTED]
- An interim report [REDACTED] detailing the methodologies used and presenting the data collected for each of Tasks 1-4. The interim report should also contain the preliminary analysis and summary of the main findings for Tasks 2 and 4, and for Task 3 as far as is possible given the timing of the fieldwork. It must contain sufficient detail and information to allow completion of the analysis of Task 3 and all final reporting to be carried out as a separate project at a later date if funding is not available for Phase 2 in 2020/21.
- A comprehensive, externally peer-reviewed final written report suitable for publication as a Defra science report, covering all objectives and tasks of the project. The contractor will be responsible for arranging peer-review of the final report by 2 appropriate reviewers, to be agreed with the Project Steering Group. Costs for the peer review should be itemised separately in the tender. Natural England and Defra require the opportunity to comment on draft final reports (allow approx. 4 weeks). The report must be finalised by 30th June 2020, therefore a first draft must be submitted [REDACTED] to allow time for review and revision.
- A 2-page summary document detailing key outcomes and conclusions of the project (to be produced using the template attached at Annex 4) [REDACTED]
- A presentation of final results to key Natural England and Defra staff, probably in the form of a webinar.

Property rights, publication and confidentiality

All data resulting from this project, project documents and other materials will be the property of Natural England. Any data collected will be made openly and publicly available.

Natural England and Defra intend to publish the final project report as a Defra science report. The published report will be made available on the Natural England and Defra Science websites. It is likely to be shared directly with partners as part of regular liaison over the progress of Countryside Stewardship and wider RDPE Delivery.

Natural England encourages widespread publication, and welcomes the use of appropriate trade press, peer-reviewed journals and sector-specific journals, but it is a requirement that all plans to communicate outcomes, including publications and oral presentations, from funded research are agreed with the project manager (who will ensure Natural England and Defra QA requirements are met) at least 2 weeks before publication or presentation. The appointed contractor is also to be aware that Natural England and Defra request acknowledgement in the publication of their funded research.

- The Contractor(s) will be responsible for ensuring the quality of the work (e.g. proof reading, ensuring clear English), the presentation of the final report and any other material to be published.

Resources

- The project is expected to start on 21st Oct 2019 and finish no later than 30th June 2020. Bidders are reminded that cost is one of the factors that will be considered when assessing bids.
- Research contracts are let on a firm price basis (excluding VAT). This is an all-inclusive price for the contract and, so long as the scope of the contract remains the same, it is not subject to any review, amendment or alteration.

Milestones

In order to assist the NE project manager to observe the progress we request that you include sufficient milestones within the project that will demonstrate the progress of the research.

Compulsory milestones are as follows:

- [Redacted milestone]

■ In addition, this project will be paid by achievement of milestones. However, not all milestones need to be associated with payment; and it may be appropriate to include additional milestones that are not related to payment but are used to indicate progress within the project. The frequency of milestone payments should be determined by the contractor, however, we request that they are appropriate and not at a frequency greater than every month.

(1.2) Commencement Date: 21/10/19

(1.4) Completion Date: 30/06/20

2. PERFORMANCE OF THE SERVICES [AND DELIVERABLES]

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

Simon Conyers: Project Manager

Dr Naomi Jones: Project Manager support

Chris Forster Brown: QA and Field Team

James Towers: Desk based assessments and Field Team

Roy Macarthur: Sample selection & statistical analysis

Lee Butler: Data Management & Database development
Moray Taylor: Field Survey Preparation
Dr Yiyang Cao: Questionnaire Design & Analysis
Hannah Adamson: Data Collection & Analysis

(2.2) Performance Standards

The successful contractor should appoint a project leader who must have sufficient experience, authority to act on behalf of the contractor and time allocated to manage the project effectively. The project leader will be responsible for the management and delivery of the project and will act as the liaison point with the Natural England project manager. A project initiation call between the contractor project leader and the NE project manager will be required within one week of the start of the contract. Natural England will establish a project steering group (PSG) to oversee the contract including representatives from NE and Defra and other partners if applicable.

The contractor project leader will be responsible for convening and chairing two face-to-face PSG meetings. These will be held at the Defra/NE office that is most convenient for the PSG and contractor. The face-to-face meetings will be convened at project initiation and submission of the first draft final report.

In addition to the face-to-face meetings, the PSG and contractor will meet by teleconference at key points in the course of the project (likely 2-3 calls required). The contractor project lead/NE project manager (as appropriate) will be responsible for setting up these meetings.

Secretariat and production of minutes from meetings is the responsibility of the successful contractor who will share meeting minutes with the project team and steering group where applicable.

The contractor project leader will send a short (approx. 1 side A4) progress update to the project officer once a month.

Invoices against project milestones should be submitted to the NE project officer by email. Invoices will need to include supporting evidence relating to spend incurred (e.g. brief summary of time input, travel and subsistence incurred etc.).

The Natural England project manager will provide copies of all the relevant agreement and baseline assessment documentation once the sample has been agreed (agreement holder contact details, ISA form, agreement document, and FEP and HLS maps for each of the selected sites.) The contractor will be responsible for obtaining relevant information which is publicly available such as the Favourable Condition Tables for the SSSIs.

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

**Sand Hutton
York**

(2.4) Standards:

(2.5) Contract Monitoring Arrangements

For the avoidance of doubt the services required are being provided under Framework Agreement 22707

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))

£129,384

For full pricing schedule see Appendix 1

Payable by BACS

(3.2) Invoicing and Payment

The Supplier shall issue electronic invoices in arrears following completion of appropriate milestones.

4. Invoicing Requirements

Invoices against project milestones should be submitted to the NE project officer by email. Invoices will need to include supporting evidence relating to spend incurred (e.g. brief summary of time input, travel and subsistence incurred etc.).

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 [insert commencement date].

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.

Annex 1 - Tables of attributes for dry and wet upland dwarf shrub heath

Sub alpine dry dwarf shrub heath		
Variable in ISA forms	Related CSM attribute and <i>generic target</i> (* denotes mandatory attribute)	Related HLS Indicators of Success
Extent of feature	* Feature extent <i>No measurable decline</i>	Extent of habitats/features as identified in the FEP/management plan
Presence of lichens (any)	* Frequency of bryophytes and lichens <i>At least 1 species of moss, liverwort or lichen should be present(at a sampling point)</i>	none
Presence of liverworts (any)	* Frequency of bryophytes and lichens <i>At least 1 species of moss, liverwort or lichen should be present(at a sampling point)</i>	none
Presence of bryophytes (any)	* Frequency of bryophytes and lichens <i>At least 1 species of moss, liverwort or lichen should be present at a sampling point</i>	none
Cover of dwarf shrubs	* Cover of dwarf shrubs At least 50% (50-75% on herb-rich heaths)at a sampling point	Cover of dwarf shrubs
Cover of specific species (individual)	* Cover of <i>Genista anglica</i> , <i>Myrica gale</i> , <i>Salix repens</i> , <i>Ulex gallii</i> <i>Less than 50% of the dwarf shrub cover at a sampling point</i>	Cover of Common/ Western Gorse
Frequency of dwarf shrubs	* Dwarf shrub frequency <i>At least 2 species present at a sampling point (excluding Genista anglica, Myrica gale, Salix repens, Ulex gallii)</i>	Frequency of dwarf shrubs
Cover of non-native vegetation (all)	* Cover of non-native species <i><1% at a sampling point</i>	Cover of Rhododendron
Cover of bracken/ bracken litter	* Cover of bracken <i><10%</i>	Cover of bracken
Cover of trees and scrub (all)	* Cover of scattered native trees and scrub <i><20%</i>	Cover of scattered scrub
Cover of negative indicator species	* Cover of invasive 'weedy' species <i><1% at a sampling point</i>	Cover of invasive weeds

Cover of <i>Juncus</i> (specific spp)	* Cover of <i>Juncus effuses</i> <10% at a sampling point	none
Evidence of burning	* Signs of burning <i>No signs of burning inside the boundaries of the sensitive areas</i>	Area of heath (including sensitive areas) showing evidence of burning
Presence of all Heather growth phases	* Heather growth phases <i>All growth phases should occur throughout the area</i>	Age range of Heather
Proportion of dwarf shrub or heather in late mature/ degenerate stage	* Proportion of late mature phase heather <i>At least 10%</i>	Cover of mature/degenerate Heather
Proportion of dwarf shrub shoots browsed/grazed (pioneer heather)	* Signs of browsing on dwarf-shrub shoots (excluding <i>Betula nana</i> and <i>Myrica gale</i>) <i><33% of shoots browsed at a sampling point</i>	Proportion of Heather shots showing evidence of grazing
Proportion of dwarf shrub shoots browsed/grazed (non-pioneer heather)	* Signs of browsing on pioneer stage dwarf-shrub shoots (or where there is <i>Betula nana</i> and <i>Myrica gale</i>) <i><66% of shoots browsed at a sampling point</i>	Proportion of Heather shots showing evidence of grazing
Cover of bare ground	* Cover of disturbed bare ground (not recently burnt ground) <i><10%</i>	Area of disturbed ground

Upland wet heath		
Variable in ISA forms	Related CSM attribute and generic target (* denotes mandatory attribute)	Related HLS Indicators of Success
Extent of feature	* Feature extent <i>No measurable decline</i>	Extent of habitats/features as identified in the FEP/management plan
Frequency of individual species	* Frequency of <i>Erica tetralix</i> <i>Present at a sampling point</i>	none
Cover of positive indicator species	* Cover of positive indicator species <i>At least 50% at a sampling point</i>	none
Cover of dwarf shrubs	* Cover of ericoid species <i>At least 20-75% at a sampling point</i>	Cover of dwarf shrubs
Cover of trees and scrub (all)	* Cover of scattered native trees and scrub <i><20%</i>	Cover of scattered scrub
Cover of bracken/ bracken litter	* Cover of bracken <i><10%</i>	Cover of bracken
Cover of non-native vegetation (all)	* Cover of non-native species <i><1% at a sampling point</i>	Cover of Rhododendron
Cover of negative indicator species	* Cover of weedy species <i><1% at a sampling point</i>	Cover of invasive weeds
Cover of Juncus (specific spp)	* Cover of <i>Juncus effuses</i> <i><10% at a sampling point</i>	none
Cover of graminoids	Cover of graminoids <i><75% at a sampling point</i>	none
Proportion of dwarf shrub shoots browsed/grazed (pioneer heather)	* Signs of browsing on dwarf-shrub shoots (excluding <i>Betula nana</i> and <i>Myrica gale</i>) <i><33% of shoots browsed at a sampling point</i>	Proportion of Heather shots showing evidence of grazing
Proportion of dwarf shrub shoots browsed/grazed (non-pioneer heather)	* Signs of browsing on pioneer stage dwarf-shrub shoots (or where there is <i>Betula nana</i> and <i>Myrica gale</i>) <i><66% of shoots browsed at a sampling point</i>	Proportion of Heather shots showing evidence of grazing
Evidence of burning	* Signs of burning <i>No observable signs of burning into the moss, liverwort or lichen layer or exposure of peat surface due to burning</i> <i>No signs of burning inside the boundaries of the sensitive areas</i>	Area of heath (including sensitive areas) showing evidence of burning
Presence of drainage	* Signs of active drainage <i><10% of total feature area should show signs of active</i>	Related to prescriptions

	<i>drainage from ditches, heavy trampling or tracking</i>	
Proportion of Sphagnum damaged	* Damage to Sphagnum through disturbance <i><10% of Sphagnum cover should be crushed broken and/or pulled up</i>	Proportion of bog mosses (Sphagnum) damaged or dead
Cover of bare ground	Cover of disturbed bare ground <10%	Area of disturbed ground
Presence/evidence of erosion	Area of eroding peat/mineral soil <i>The area of eroding peat/mineral soil should be less than the area of re-deposition and re-vegetation within the feature</i>	Related to prescriptions

Annex 2 – ISA Operational Manual

As provided in the RFQ attachments

Annex 3 – Example of an ISA form for upland heath

As provided in the RFQ attachments

Annex 4 – Template for the 2-Page Summary

As provided in the RFQ attachments

Appendix 2 – Fera Science Ltd: Bid

E01 Fera led consortium. Factors affecting upland dwarf shrub heath SSSIs in AES. ITT 6166

Introduction

Through this project Natural England is seeking to identify causes behind the slow rate of progress in achieving favourable condition on upland heathland SSSIs which are subject to Agri-environment Scheme (AES) measures. Complex habitat mosaics make assessment of change at the unit level difficult, therefore the study will focus on upland heathland (wet and dry) only through its distribution in England across National Character Areas (NCAs). In particular, patterns in the attributes of the features found on upland dwarf shrub heaths will be related to land management at long-term SSSI monitoring sites under AES agreement. It will explore which aspects of agreement set up and implementation are important in realising positive change.

Outcomes can be compared with previous ISA surveys and with past monitoring studies, (e.g. Critchley et al. 2016¹) to detect any change at the site level. These will then be related to site-specific factors that may be driving the pace of recovery such as: suitability of option choice and application to appropriate habitat, capital item selection, grazing level, targeting of management prescriptions, Indicators of Success (IoS) and quality of option implementation. Previous studies have found that dwarf shrub heath cover and/or diversity of age structure are the most constant factors where change is potentially slow (and difficult to determine). This is particularly the case for parcels in poor FEP condition (C)². Other factors included low cover values and numbers of dry heath indicator species, and abundance of mosses, liverworts and lichens.

The findings of the project will inform future land management and implementation as HLS transitions to CS or a new Environmental Land Management Scheme. This project requires high quality, efficient delivery over a short timescale. In order to achieve this, we have identified a team of highly experienced, skilled botanists with considerable previous experience of moorland monitoring, grazing assessments and upland condition assessments, to carry out the field surveys, plus expertise in all aspects of the specification. Allied to this, we have other skilled individuals, highly practiced in the interpretation of botanical and habitat management data, in targeted desk study and in the production of appropriate questionnaires.

Task 1: Identify a representative sample and arrange access

We propose to sample 50 of the 122 localities from across the set of NCA regions identified by Natural England. Selection of sites for sampling will prioritise:

- coverage of the north to south distribution and geological types of NCA regions within the UK (e.g. heaths overlying granite, limestone, sandstone and/or slate),
- the class of management actions applied,
- the distribution of habitat types,
- and the Condition of the units (to ensure a mix of Favourable and Non-Favourable sites).

NCAs with unique geologies or management practices may be excluded in favour of increasing the generality of conclusions from the modelling. The final sampling scheme will be agreed with Natural England prior to the commencement of work and will include at least the majority of the well sampled NCA regions. Due to the limited number of locations with adequate baseline data we anticipate being unable to comment extensively on management practices within NCA regions. Hence the discussion will largely focus on regional or geological aggregations.

¹ Critchley N et al., 2016.

<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=19196&FromSearch=Y&Publisher=1&SearchText=LM0431&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

² Staley J et al., 2018.

<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=19360&FromSearch=Y&Publisher=1&SearchText=LM0445&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

Once appropriate documentation has been provided, access will be arranged at an early stage and sites replaced if required. This will avoid unnecessary data collation and field planning.

Task 2 - Desk assessment to evaluate the suitability of agreement options

This task requires a detailed review of two key data sources for each site: the agreement documents (including the Farm Environment Plan and agreement schedules) and the Favourable Condition Table (FCT) for each site. The desk study will be used as an opportunity to evaluate both the agreement documents and the FCT for each site in terms of their specificity and applicability. The more generic each of these documents is, the more scope there is for poor tailoring of management (and hence slow rate of progress in condition improvement). Thus, the desk study will evaluate whether the agreement contains the right options, supplements and capital items and relate these to attributes required to achieve favourable condition. Critical in terms of specificity of agreement documentation are the Indicators of Success (IoS). How specific are these and are they aligned with the FCT targets? Are they appropriate, measurable and achievable? A 'blanket list' of IoS, applied indiscriminately to a site, is only likely to result in non-specific and hence inappropriate management. This situation is compounded when the site in question features a mosaic of upland habitats (dry and wet heath, acid grassland and blanket bog) a common scenario across the majority of NCAs.

A central component of the desk study should also be to determine if there is any divergence between the agreement documents and the FCT. This could be in terms of habitat identification, baseline habitat condition and suggested habitat management. The desk study will provide an opportunity to elucidate any obvious and important differences between NCAs and potentially between ISAs within NCAs. Any areas of particularly successful management or obviously poor management could be determined through the review.

Task 3 – Field re-survey to assess change in condition and/or management practices

Field survey of 50 units will include detailed data collection at 28 points and unit-level assessments. Survey preparation will include selection of random sample points, with GPS points (including reserve points) prepared for field surveyors. Since only M02 and M04 are habitats of interest, other Priority Habitats (PH) present in the unit will be excluded using the PH Inventory spatial layers. Other habitats, not relevant to this study, will be excluded from survey once the habitat is identified in the field and a reserve sample point selected.

Initial mapping of the extent of the feature (M02 & M04) will assess accuracy of documentation. This will be achieved through comparison with a baseline map (both OS and aerial). Burnt ground will be assessed for extent (<4 ha) with particular attention paid to sensitive or other no-burn areas. Other site-wide assessments will include evidence of peat erosion (including tracks), cover of scattered trees and scrub, non-native vegetation (including conifers) and other negative indicators such as bracken and *Juncus effusus* recorded individually. An assessment of the capital items associated with each parcel will be made alongside evidence of grip blocking.

Twenty eight pre-selected points will be assessed on each site, following the ISA protocol. On arrival at the sample point, the 2 m x 2 m quadrat will be set out using a standard procedure to prevent subjective bias when placing the quadrat. Peat depth and habitat type will be recorded (dry heath/wet heath/non-target habitats) for the location and points which are not target habitat will be replaced from the reserve sample. A digital photograph of each sample point will be taken.

The variables to be recorded at each sample location will include 'core' heather/grazing-related and condition assessment variables for the target habitats. Additional 'optional' variables may be recorded depending on the characteristics of the site and previous recording (consultation with the previous ISA/Natural England Project Officer). The dwarf shrub cover will be assessed at 4 m² scale and frequency and cover of all plant species and bryophytes will be included. Different recording sheets will be used for each of the target habitats to ensure the key details for each type are captured:

- Dry heath - the range of age classes of *Calluna vulgaris* and cover values³,
- Wet heath - frequency of *Erica tetralix* (within 20 m) positive indicator species and proportion of *Sphagnum* spp. damaged.

Bare ground created by natural abiotic processes (erosion, exposure) for recruitment⁴ will be assessed and disturbed bare ground (herbivore and human activity⁵) will also be recorded separately.

The assessment of grazing intensity will be an important part of the assessment. The last complete growing season's shoots of dwarf shrub species present will be assessed for the proportion lost to browsing.

At the end of each day's survey, surveyors will also assess whether the overall habitat at the site level is likely to pass or fail a suite of targets that are normally assessed at the visible extent scale. This may include for example, the presence of small amounts of scrub, an important component of upland heath diversity⁶. Similarly, extent of bracken/bracken litter, particularly in fragmented heath, is an important consideration. This may have been caused by colonisation after fire (any evidence). Discussion will take place with NE in relation to recording variables. For example, it is suggested that grasses may need separate cover values, rather than being included more generally under negative indicators.

Electronic data entry will be used to maximise efficiency of data collection and storage. Fera have developed methodology to collect survey data electronically and spatially in the field using various handheld devices running Esri Mobile Data Collection Software. Multiple collection devices can run simultaneously and feed data directly back to a single database in an Excel-compatible format, either in real time or when a connection is established at the end of the day. The Data Manager will check all data for completeness. Any anomalies will be corrected in consultation with the field surveyor at the earliest opportunity.

Task 4 - Evaluate the effectiveness of management implementation

This task requires a questionnaire survey of relevant NE advisers. We understand that the principal objective is to contribute to research question 3. Therefore, the questionnaire will be designed to evaluate to what extent implementation as opposed to agreement set-up is at the heart of the success or failure of agri-environment measures on upland heathland. NE advisers are likely to be at the 'sharp end' of habitat management and are therefore best placed to comment on positive and negative experiences in relation to implementation. The tender specification suggests that a sample of 25 NE advisers should be sufficient and this is entirely in keeping with our previous experience. Email has been suggested as a good medium to elicit responses. We have recently gained very good responses via online survey formats. This would entail the design and distribution of a questionnaire through an online survey portal and subsequent analysis completed using both quantitative and qualitative information collected through the online survey. Online survey will meet the need for the questionnaire to be streamlined, and to take no more than 20 – 30 minutes to complete.

NE will supply a list of relevant advisers. Ideally, these would comprise a range of individuals with specific experiences of management implementation. This range would encompass a wide geographical spread. For example, problems and issues encountered in the Yorkshire Dales may be entirely different from those on Bodmin Moor or the Black Mountains. This may be in terms of the availability of appropriate stock for grazing, control of these stock (e.g. fencing), unregulated burning and specificity of management in terms of habitat mosaics. It is suggested that advisers will be chosen in relation to agreements for which there are greater numbers (e.g. HL9, HL10) and not where there are only one or two agreements (e.g. HL13, HR2). Questionnaires will also cover individual advisers

³ FEP manual 3rd Edition March 2010 Figure 6, p. 96

⁴ Mainstone CP et al., 2018 Natural England Research Reports, Number 071

⁵ JNCC, 2009 http://jncc.defra.gov.uk/pdf/CSM_Upland_jul_09.pdf

⁶ Mainstone, C.P et al. 2016: <http://publications.naturalengland.org.uk/publication/6524433387749376>

views on implementation of AES on upland dwarf shrub heath, both on their specific site/s and more generally. There will be an emphasis on what exactly has changed, in the adviser's opinion, since the implementation of AES. Where appropriate, questionnaire responses will be subjected to both qualitative and quantitative analysis, the latter including statistical analysis where relevant.

Task 5 – Overarching data analysis and final reporting

Joint analysis of data collated under Tasks 2 and 3 will focus on two related statistical approaches. The first is aimed at identifying the factors associated with progress towards favourable conditions across the sampled sites based on the completed management actions identified in Task 2. Staley et al.⁷ model success based on the probability of a location maintaining or improving in status relative to the baseline survey. This approach, while explicit in terms of statutory action, limits the resolution of modelling when applied to a case where there is a lack of change in the favourability status of many locations. To resolve this, we propose constructing a more continuous measure of *progress* towards favourable conditions based on the measured values (and/or pass/fail status) of the underlying quantities observed at sites within each locality. For example, a potential measure of progress may be the change, relative to the baseline survey, in the average number of variables that would be considered to have exceeded their target value at points within a location. By making the measure of progress more finely resolved we aim to increase the power of modelling approaches (based on Generalised Linear Mixed Models, probably with a regional random effect) to distinguish between the impacts of the different management actions and assessment of the indicators of success identified.

A second set of aggregated analyses is focused on identifying the relationships between the individual management success criteria and their relationship with the overall favourability classification of a locality. This will focus on understanding the extent of redundancy in the set of criteria that feed into an overall assessment and aim to identify the most important criteria in terms of masking favourability status. These can then be modelled in terms of the management actions identified under Task 2.

These directed modelling approaches will support a more exploratory investigation into the combined dataset, examining similarities between sites based on regional, management and geological features. This is largely focused on understanding the distribution and indicators of success for management actions and their association with AES. Where appropriate this will be supported with statistical analysis to reveal the significance of identified differences in the sampled sites. Full visualisation and discussion of the observed relations will be incorporated into the final report with discussion of the relevance and policy implications of the models.

Reporting

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

In addition, progress updates will be provided on a monthly basis to the NE project manager. Two face to face meetings have been allowed for at project inception and draft final report submission. Data collected during the project will be supplied in an excel or compatible format (March 2020).

⁷ Staley J et al., 2018

<http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=19360&FromSearch=Y&Publisher=1&SearchText=resurvey&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

E02 Fera led consortium. Factors affecting upland dwarf shrub heath SSSIs in AES. ITT 6166

Introduction

The Fera led consortium has reviewed the specification and in particular the timing of the work and

the resourcing required and has the availability and capability necessary to deliver the work. Upon contract award we will confirm a project team, using team members outlined in [Project Team below](#). An initial meeting of the Steering Group will be arranged and a Project Plan (based upon the work packages outlined below) will be expanded upon.

[Project Plan](#)

[Redacted content]

[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
	[Redacted]	[Redacted]	[Redacted]	[Redacted]
	[Redacted]	[Redacted]	[Redacted]	[Redacted]
	[Redacted]	[Redacted]	[Redacted]	[Redacted]
	[Redacted]	[Redacted]	[Redacted]	[Redacted]
	[Redacted]	[Redacted]	[Redacted]	[Redacted]
	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
	[Redacted]	[Redacted]	[Redacted]	[Redacted]

The fieldwork will be delivered by six field surveyors based in different geographical areas and working from local bases, surveyors will work in teams of two at each site with up to three teams of surveyors out in the field at any one time. Each team will survey five sites in a week. Thus the survey will encompass four weeks within the nine week survey window (Jan-Mar). Critically, this will ensure that the field survey work is completed within the required period, but also provides sufficient flexibility to account for the geographical spread of sites and the likelihood of inclement weather. If significant delays occur due to e.g. extended poor weather, we will call on additional experienced field surveyors.

[Project management](#)

At project set up, project monitoring spreadsheets are created to see a monthly and whole life summary of project finances, milestones and deliverables. All projects at Fera undergo a fortnightly review with programme heads and management accountants. The project manager completes a highlight report which RAG scores the project against delivery milestones and identifies any issues that may affect the project. Any changes to the agreed delivery of milestones will be discussed with the Natural England (NE) project officer and confirmed by email. In the unlikely event that serious issues arise, a procedure is in place to escalate to senior management for resolution.

The project will begin with an Inception Meeting between the NE project steering group and the lead staff from the Consortium including the Study Director and Project Manager. As part of the inception meeting we will seek to achieve the following:

- A common understanding of project scope and objectives
- Agreed project management and liaison arrangements
- Finalise the work plan, future dates for teleconference calls and key project milestones
- Agree communication plan and protocols
- Refine and agree risk log
- Confirm requirements for background documentation and data.

The scope, format and content of all outputs will be agreed in advance with NE. The project manager will keep Natural England informed of progress made throughout the course of the project via regular calls and monthly summary reporting.

Quality Control

Quality will be a key part of the project planning and management of the work. By quality of data, we mean collection of the right data (scientific robustness, relevance to the question being asked and with accuracy and replication necessary to allow statistical analysis), secure data collation and data security and the use of appropriate data transformation and analysis. Overall responsibility for quality management sits with **Project Manager** Simon Conyers assisted by Quality Managers in ADAS and Fera. Quality checking will take place at protocol, field data collection, data entry, data capture and analysis stages.

The field survey will be delivered by experienced field ecologists, most of whom undertook similar work previously (LM0431). Therefore to maximise resource efficiency, field training will be delivered in the form of a webinar. Training will ensure that surveyors are familiar with the particular requirements of this project, the detailed survey protocol and health and safety requirements.

Field surveys will be delivered by teams of three ecologists, based across the country to minimise travel time. Each field team will be led by a **Fieldwork Manager** who will implement a QA process for individual field surveyors to ensure consistent and accurate data collection. On a weekly basis, the surveyors will assess at least one sample point together and will survey another point together but independently. Any inconsistencies will be resolved by discussion with the field survey leader.

Data entry will be controlled by protocols to ensure consistency and will provide quality checks to ensure confidence of observations at an early stage. Electronic data entry will be used (with hard copy backup) to ensure data are input consistently and reduce error at data entry. Data collation will either be in real time or when internet connection is established on return from the field each day.

Reports will be prepared by the lead specialists and reviewed by the **Study Director** (Naomi Jones) to ensure high quality, suitably organised data derived from survey work, and publishable quality reports.

Examples of Recent Project Delivery

Countryside Stewardship baseline. Natural England (2016-2019). This multi-disciplinary study developed detailed methodology for assessing CS agreements against all scheme objectives (biodiversity, resource protection, historic environment, landscape and climate change). Field survey of 500 agreements was completed over two field seasons. A complex fieldwork programme was implemented across England considering suitable assessment times for different agreement types and option combinations. Quality of agreement establishment was also assessed.

Moorland habitat monitoring: resurvey of selected agri-environment agreement sites (2014-2016). This project involved a resurvey of 20 HLS sites using standardised methods to record a range of variables associated with grazing intensity and habitat condition. Change in habitat condition at individual sites was determined by formal statistical analysis or, where sampling methods were not compatible with previous surveys, by reference to data and conclusions from previous site reports.

Evaluation of Countryside Stewardship Facilitation Fund (FF). Natural England (current). This project developed a framework and indicators to evaluate the impact of the FF with respect to quantitative and social capital outcomes. It included an online survey of facilitators to assess their perception of the value of group activities. The survey of facilitators involved the design and distribution of a questionnaire through an online survey portal. Analysis was completed using both quantitative and qualitative information collected in the online survey. The survey responses were also linked to the existing monitoring data of the FF programme and further explored through case studies.

Project Team

The consortium of partners who will undertake this contract have a wealth of experience in monitoring and evaluating agri-environment schemes across the UK. Between them, they can call upon a large pool of staff with expertise in all aspects of the work: project management, field survey, data management, evaluation, statistical analysis and online surveys.

Simon Conyers as Project Manager will liaise with Task leads on a fortnightly basis, where relevant or more frequently where appropriate against the project work plan. Naomi Jones will oversee all aspects of the project. Task leads will be responsible for delivery of tasks on time and to budget.

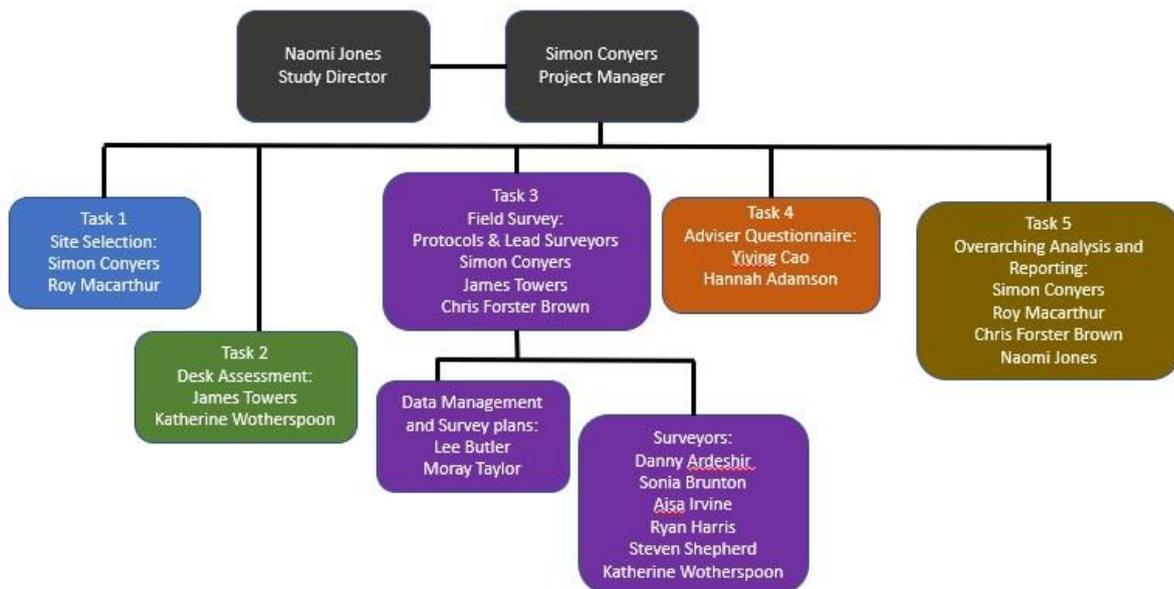


Figure 1 Project team structure and responsibilities

Staff Skills and Experience

The Project Manager, Study Director and Field Survey Leads all have extensive experience of developing methods and managing large, complex and multi-disciplinary field survey projects for environmental monitoring, as evidenced by the CS Baseline and Moorland monitoring projects delivered for Defra/NE (detail below). We routinely organise ecological fieldwork and coordinate large field teams working in geographically dispersed areas and under challenging circumstances similar to those presented by this study (winter fieldwork, hazardous terrain).

Sampling design and data analysis will be delivered by a specialist statistician with experience of similar work on the impact of management and assessment of change in botanical composition, including sampling design (e.g. CS Baseline). A project Data Manager will oversee data collation. Fera have developed methodology to collect survey data electronically and spatially in the field using various handheld devices running Esri Mobile Data Collection Software. Multiple collection devices can run simultaneously and feed data directly back to a single database in an Excel-compatible format.

An experienced team of field surveyors has been assembled, most of whom have been involved extensively in previous upland condition monitoring programmes for NE (e.g. LM0431). Surveyors have wide experience in similar upland survey and monitoring through Phase I, NVC and previous AES monitoring. They are thus highly familiar with all upland habitats and in making key distinctions between e.g. dry and wet heath and blanket bog. In addition they are aware of the issues associated with working in the remote and potentially hazardous environments that the uplands represent. Surveyors regularly undertake interviews to understand farmers' and managers' views on environmental management and thus understand farming systems and management practice. Further experienced ecologists can be called upon if circumstances (e.g. inclement weather) reduce

the timeframe for delivery of the fieldwork. Surveyor training will ensure quality control of field survey data and each field team will be led by a senior field surveyor who will regularly monitor outputs.

The research team routinely develops and delivers bespoke surveys of different groups (land managers, stakeholders and those delivering AES). These explore a range of issues such as attitudes to schemes, motivation for uptake and quality of implementation. A recent survey of Facilitators (CS Facilitation Fund) involved the design and distribution of a questionnaire through an online survey portal and the analysis was completed using both quantitative and qualitative information collected.

Desk assessments of AES agreement documents have formed an important component of many recent studies (e.g. CS Baseline) delivered by the project team. All senior members of the team routinely deliver project outputs in a range of formats including full technical reports suitable for the scientific community or policy customer, refereed papers, talks at conferences, project dissemination meetings with clients/stakeholders and to landowners.

[REDACTED]

Identifying and dealing with risks

An assessment of potential risks to the successful delivery of the project have been made (Table 2) with strategies to minimise and manage these risks. A Risk Register will be produced and agreed upon at project inception.

Table 2 Project Risks and Mitigation

Risk	Mitigation/ Response Strategy	Level of Risk and Impact
Bad weather	The fieldwork programme has been designed to allow flexibility in the programme of visits. Local weather forecasts will be consulted on the morning of each field visit and any risks will be assessed. Surveyors will be alert to changes in weather conditions during the field visit. All surveyors will have suitable protective clothing against cold and wet conditions.	Medium Risk Potentially medium impact - interruption to survey progress.
Key project team members are ill or leave	Additional staff resource with required ecological skills have been identified and contingency time has been built into the programme.	Medium/ low Risk Low impact
Difficult terrain	The habitats in question have inherent risks for health and safety. Only highly experienced ecologists who have all worked in upland areas will deliver the surveys. Working in teams of three will minimise risk. Both Fera and ADAS have in place robust Health and Safety protocols overseen by senior H&S staff.	Medium Risk Potentially medium impact – Interruption to survey progress
Delay in obtaining site information from Natural England	In the event of a delay, agree revised timetable with Natural England. Start work on sites where information has been provided and have a rolling programme of pre-survey preparation work. Additional resource can be deployed on desk assessments if required.	Low Risk Potentially medium impact if delay to survey start
Access problems	Discuss with local Natural England staff as soon as a problem becomes evident and agree how it will be resolved. Reserve sites will be identified in Task 1. Greatest impact will arise from grouse moors, therefore these sites will be prioritised for early survey.	Medium Risk Potentially medium impact - interruption to survey progress.
Lack of clarity over roles and responsibilities	A project plan will be confirmed with the Natural England project officer at Project Inception. The project plan will include the work plan and identify clear roles, responsibilities and job descriptions for team members to achieve it. A Field Protocol will be produced for the surveyors. The fieldwork is using an established method.	Low Risk Low Impact
Delay in contract agreement	The early agreement of the contract would be given high priority to not incur serious delays in the project. Additional resource is available to do some aspects of the work in a shorter period of time if necessary.	Medium Risk Low Impact unless significant delay
Data storage and management	Esri Mobile Data Collection Software allows efficient and effective data collection and storage and can be updated in real time (where signal exists) or downloaded at the end of the day.	Low Risk Medium Impact

