

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_56576
Order Date	22/10/19

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:

The specific objectives of this project are to:

- Review approaches to measuring ecological connectivity, specifically considering agri-environment schemes.
- Assess the contribution of AES implementation to landscape ecological connectivity.
- Provide recommendations for ground truthing and future targeting of findings.

Tasks

The project will be entirely desk based.

Task 1 - Review approaches to measure AES connectivity of the landscape and identify approach to be used.

There are a number of different approaches to assess the connectivity of the landscape, and therefore the contribution of AES to ecological connectivity. The NE Ecological Network Handbook outlines a number of approaches, which should be considered here together with other approaches used within previous agri-environment monitoring & evaluation projects. Approaches to be considered include (but are not limited to):

- Approach 1 – [National Habitat Networks Maps](#) (2018)
A standard process has been used to create 18 separate habitat network maps for England which includes existing habitat data (priority habitat, associated (other) priority habitat, areas of habitat creation/restoration, restorable habitat) as well as a network enhancement zone. The latter includes areas connecting existing habitat which may or may not be suitable for habitat creation and identifies the degree of fragmentation of these areas.
- Approach 2 – Node mapping, [LM0464 CS Implementation Project](#)
The connectivity of options was assessed in the CS Implementation project at the national level (for granivorous birds in winter, Waders in summer and winter, Hares and Arable plants) and for the East of England (additionally for boundary nesting birds, field nesting birds, granivorous birds in summer, and pollinators). A network based model approach was used which linked appropriate options (represented by nodes on a graph) and could be sub-partitioned using distance thresholds to assess connectivity at different scales. The principle being the larger the number of options connected at a specific distance, the higher the connectivity. Option connectivity was subsequently assessed by three metrics; the total number of option networks, the mean network size and the number of isolated options.
- Approach 3 - [Condatis](#) (Hodgson et al., 2012)
Condatis models the flow of a species through a landscape based on electric circuit theory. The ability of the species (the electric current) to move through the landscape (the circuit board) varies depending on the configuration of habitat patches, species dispersal distance and fecundity (wires and resistors). This technique has been used to model the connectivity of priority habitats at the England scale (unpublished report Hodgson et al, 2018) but has not yet been applied to agri-environment implementation. The software allows the comparison of different landscapes (e.g. with and without restoration AES options), and identifies areas of fragmentation.
- Approach 4 – Least Cost Pathways e.g. Forest Research ([Watts et al., 2010](#))
This study by Forest Research used a least-cost pathway approach to assess the ecological function of a landscape under different land management scenarios for fragmented woodlands within primarily agricultural landscape. The approach was applied to a number of generic species, representing a range of dispersal distances, habitat preferences and barriers. The connectivity of the different land management scenarios were compared using an established connectivity indicator, which accounted for both within and between patch connectivity, patch size, and edge impacts.
- Approach 5 – [RangeShifter](#) (Bodeci et al., 2014)
RangeShifter is a tool which models the spread of a species across a landscape based on species dispersal behaviour, population dynamics and habitat suitability. The model outputs shows where species colonisation may occur and at what population density, and can be parameterised for real or hypothetical landscapes and species enabling the comparison of potential land management interventions.

The connectivity of the landscape is a relative concept, governed by the species or taxonomic group under investigation, for example the level of mobility of the species, and whether they are specialists or generalists. This task should therefore review

approaches to measuring AES contribution to connectivity specifically for the habitats (taken from NE National Habitat Network mapping) and species listed below (as taken from Landscape scale species project, LM0465, though where appropriate these may be amalgamated).

Priority Habitats

- Upland calcareous grassland
- Lowland calcareous grassland
- Reedbeds
- Lowland meadows
- Upland hay meadows
- Purple moor grass and rush pasture
- Lowland dry acid grassland
- Lowland heathland
- Upland heathland
- Upland fens and flushes
- Lowland fens
- Lowland raised bog
- Blanket bog
- Limestone pavements
- Coastal sand dunes
- Coastal vegetated shingle
- Maritime cliff and slope
- Saltmarsh

Species groups

- Pollinators (bumblebees, solitary bees, hoverflies)
- Butterflies
- Birds (breeding season and winter)
- Bats
- Moths
- Mammals (brown hare, field vole, harvest mouse, dormouse, hedgehog)
- Amphibians and reptiles

Task 2 - Assess the contribution of AES to ecological connectivity

Evaluate the extent to which current AES agreements are contributing to the ecological connectivity of the landscape. The contribution of AES options should be considered for the habitats and species groups listed in task 1 and in the context of the wider landscape (i.e. including protected sites/priority habitat that is not under AES agreement). The methodological approach should be informed by the literature review undertaken in task 1 and the methods must be documented and repeatable for future analysis as new habitat data becomes available (e.g. Living England maps), and as new agreements are set up.

Data available

Data will be provided on scheme uptake for active agri-environment schemes (Environmental Stewardship and Countryside Stewardship) but the contractor will be required to extract and categorise appropriate elements of this dataset (e.g. extracting the relevant options).

A range of other spatial datasets will be provided by Natural England. Potential datasets include:

- [Priority Habitat Inventory](#) as identified in the UK Biodiversity Action Plan (i.e. high value sites for biodiversity).
- [Site of Special Scientific Interest](#) (SSSI).
- [National Habitat Network](#) (location of habitat restoration-creation zones, network enhancement zones, fragmentation zones and potential network joins). Guidance document is available [here](#).
- Habitat fragmentation: based on the National Biodiversity Climate Change Vulnerability Assessment ([NBCCVA](#)) dataset, identifying priority areas for habitat creation to reduce fragmentation.
- [Utilisable Agricultural Area](#) (UAA) – dataset which delineates land areas that are considered able to support agriculture.
- [Land Cover Map](#) (2015) – Centre for Ecology and Hydrology

All data will be provided in GI layers in either vector or raster format, however some synthesis and interpretations will be required. The project will be limited to spatial information that Natural England can provide or access. Many of the datasets are available to download from the [Natural England Open Data Geportal](#).

The MS Excel Tool produced during project LM0448, grouping Environmental Stewardship options by variables relating to ecological resilience will be provided. This tool has also been updated to include Countryside Stewardship options.

Analysis

The extent to which AES options are located to improve ecological connectivity should be assessed, addressing the individual habitats and species groups listed. Questions to be answered are suggested below, however the analysis should not be limited to these. An overall discussion should evaluate the extent to which AES is contributing to connectivity and identify areas of improvements. This analysis should be in the context of the Lawton approach, (more, bigger, better and joined-up) which outlined five key approaches:

- Improve the quality of current sites by better habitat management.
- Increase the size of current wildlife sites.
- Enhance connections between, or join up, sites, either through physical corridors, or through ‘stepping stones’.
- Create new sites.
- Reduce the pressures on wildlife by improving the wider environment, including through buffering wildlife sites.

Habitat connectivity

The analysis of habitat connectivity should be considered at the national scale, as well as focussing on regional/landscape scale case studies where appropriate e.g. Nature Improvement Areas (NIAs). The analysis should answer the following questions, but should not be limited by these.

- What proportion of priority habitat is under appropriate AES option, and how does this differ between habitats?
- To what extent are creation/restoration options immediately adjacent or within a suitable distance of existing habitat patches?
- Where creation/restoration options are immediately adjacent to existing habitat patches, has the boundary:size ratio of patches improved?

- To what extent are maintenance and restoration options supporting existing habitat patches within the NE National Habitat Network?
- What proportion of maintenance/restoration options which are within enhancement zones/network joins of the NE National Habitat Network?

Species group connectivity

The extent to which the location of AES options improves the connectivity of the species groups listed in task 1 should be assessed. Contractors should consider the different resources provided by habitats and AES options for the species groups (e.g. foraging, nesting) and where possible, take into account barriers to connectivity, e.g. using the CEH Land cover map

Questions to be considered in this analysis, but not limited to:

- To what extent are AES option locations connected to at least one other location (complementary option or habitat) within a threshold dispersal distance, and the number of these isolated 'sub-networks' i.e. where the distance between sub-networks is beyond the distance threshold.
- Is the number of options/habitat patches within each sub-network sufficient to support the required ecological function of species/group?
- To what extent are options/habitat patches isolated i.e. there are no other complementary options or habitat within the distance threshold, and the reasons for this isolation (e.g. land use).
- The extent to which AES options provide a range of resources for species within a threshold dispersal distance (e.g. foraging, nesting and refugia) or whether there are resource gaps.

Task 3 – Evaluation & Recommendations

Given the reliance of this project on spatial datasets, and potential use for targeting future scheme implementation, the reliability of the findings should be evaluated and recommendations for developing this approach in the future. The evaluation should include, but is not limited to:

- Assumptions
 - What assumptions underpin the methodological approach used?
 - Are there ways to overcome these assumptions in future?
- Data
 - Is the underlying habitat and species data of sufficient spatial accuracy and resolution?
 - To what extent is ground-truthing (or Earth Observation) required to increase confidence in the approach used?
 - Is the underlying data valid and what is the longevity of the data used (i.e. will the data be 'out of date' soon)?
 - Are there any missing datasets (environmental/species/AES, local/national scale) which would improve future application of the approach used?
- Future use & improvements
 - To what extent can the approach used be reliably spatially upscaled?
 - To what extent can the approach used to applied to local decision making?
 - Can the outputs from this project reliably be used for targeting in future land management decision making? E.g. identifying and recommending actions in areas where schemes do not currently

increase/connect habitat patches. And if not, what are the steps required in order to do this?

- Can the approach be easily replicated as additional habitat/species data becomes available or for individual species?
- Is the approach reliant on specialist skills (for both implementation and interpretation)?
- Can the outputs be combined with other models/datasets to provide wider application?
- Recommendations for future study

Outputs

Specific outputs for this project are listed below, to be delivered within the 2019/2020 financial year.

- An interim project report [REDACTED] the format of which will be agreed with the Project Steering Group (PSG). The contractor should present the findings from task 1 to the project steering group. The approach to task 3 should also be presented for discussion to enable PSG input.
- A comprehensive final written report, externally peer-reviewed, covering all objectives and tasks of the project (Final draft due for comments: [REDACTED]).
- Steering group meeting to present/discuss the report.
- A '2-page summary' report, using format in attached Annex A 'Summary Template' summarising the aims, outcomes and implications of the project, for use by policy colleagues, and other non-specialists.
- An infographic, to be developed with the Natural England project manager, highlighting notable findings.
- The contractor will present a webinar to NE staff and interested parties, reporting the results and findings of the project.

The format of the final report will be agreed between the project manager and project leader. Natural England requires the opportunity to comment on the draft final report. The successful 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 of its funded research. All reports should be provided in MS Word and PDF format.

Bidders should be aware that Natural England and Defra intend to publish final reports. 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 is happy to encourage widespread publication, and welcomes the use of appropriate trade press, peer-reviewed journals and sector-specific journals. The contractor is also to be aware that Natural England requests that all publication (including oral presentations) of its funded research is notified to the project manager at least two weeks before publication.

Reporting & 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] Outline project plan to be submitted following the inception meeting.
- [REDACTED]: Interim report.
- [REDACTED]: Draft final report (with an accompanying draft 2-page summary). This should include full analysis, conclusions and discussion on the data analysed against the requirements. NE and Defra will require 4 weeks to provide comments on the final draft to the contractor.
- [REDACTED]: Final report, infographic and accompanying final 2-page summary will be provided to Natural England (please note, payment will not be released until the report has been reviewed and deemed satisfactory by the project manager).
- Produce and present a webinar outlining the main results of this project suitable for key staff at NE and the wider Defra group, [REDACTED]. The webinar will also be recorded for NE's skills port to deliver wider dissemination within Natural England and Defra.

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.

Project management & Timetable

Duration: 28 October 2019 - 31 March 2020.

- The successful contractor should appoint a project leader. 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.
- Natural England will establish a project steering group (PSG) to oversee the contract including representatives from NE and Defra and other relevant partners. A project initiation call between the contractor and the NE project manager will be required within one week of the start of the contract, and a face-to-face project inception meeting between the contractor and the PSG will be required within two weeks of the start of the contract (usually at a Defra/NE office to be agreed based on the location of the contractor and PSG members).
- The PSG will meet will meet three further times throughout the course of the project, by teleconference. The project officer/successful contractor (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, NE and the steering group, where applicable.
- The successful contractor will send a short (no more than 1 page A4) progress update to the NE project manager once a month. The form of these updates will be agreed in the inception meeting.
- The project is expected to start on 28 October 2019 and finish no later than 31st March 2020.
- 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.

(1.2) Commencement Date: 28/10/19
(1.4) Completion Date: 31/03/20
2. PERFORMANCE OF THE SERVICES AND DELIVERABLES
<p>(2.1) Key Personnel of the Contractor to be involved in the Supply of the Services</p> <p>Andrew Crowe – Project Leader Dave Skirvin – Deputy Project Leader Lucy Wilson – Task 2 Work package Lead Simon Conyers – Task 3 delivery Katie Threadgill – Task 1 delivery Ben Hockridge – Task 2 & 3 delivery</p>
<p>(2.2) Property rights, publication and confidentiality</p> <p>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.</p> <p>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.</p> <p>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) before publication or presentation.</p> <p>The Contractor(s) will be responsible for ensuring the quality of the work, the presentation of the final report and any other material to be published.</p>
<p>(2.3) Location(s) at which Services are to be provided: Sand Hutton York</p>
(2.4) Standards:
<p>(2.5) Contract Monitoring Arrangements</p> <p>For the avoidance of doubt the services required are being provided under Framework Agreement 22707</p>
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))

£73,100

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.

