**Research specification:** Climate driven threshold effects in the natural environment

Tender Reference Number: BF/0718

**Specification of Requirements**

Invitation to Tender for research: Research on threshold effects in the natural environment and the role of adaptation (natural and human responses) in moderating different types of risk

Tender Reference Number: BF/0718

Deadline for Tender Responses: **10th September 2018**

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# Introduction and summary of requirements / Preamble

The Adaptation Sub-Committee (ASC) of the Committee on Climate Change (CCC) is the government’s statutory advisers on preparing for climate change. Under the Climate Change Act (2008) the ASC has two main roles:

* To provide independent, expert advice on the UK climate change risk assessment (CCRA).
* To report to Parliament on progress with implementation of the National Adaptation Programme (England only).

To do this the ASC conducts independent analysis into climate change science, economics and policy, and engages with a wide range of organisations and individuals to share evidence and analysis. The CCC and ASC’s past reports are available at <http://www.theccc.org.uk/publications/>.

To inform the ASC’s Evidence Report for the third UK CCRA, the ASC is commissioning a range of research projects that aim to improve the evidence supporting, and impact of, the CCRA.

This project will produce new research on climate-driven threshold effects within the natural environment (in rural and urban ecosystems), and the role of adaptation (natural and human responses) in moderating the threshold effects. Thresholds in the context of this research refer to the point when a specific climate hazard (e.g. storm event[s], flooding, or more gradual changes in temperature and precipitation) reaches a level that results in the functioning of a given system falling below some tolerable or acceptable state.

# Background

The [second CCRA](https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2017) (CCRA2) was published in 2017 and was supported by a comprehensive [Evidence Report](https://www.theccc.org.uk/tackling-climate-change/preparing-for-climate-change/uk-climate-change-risk-assessment-2017/) from the Adaptation Sub-Committee (ASC). Defra and the devolved administrations are in the process of drafting updated national adaptation programmes in response to the risks and opportunities set out in the report.

The third CCRA will be published by the government in January 2022, and Defra have asked the ASC to produce an accompanying Evidence Report by summer 2021.To inform this Evidence Report the ASC are commissioning six research projects, funded by Defra, the devolved administrations and the research councils (NERC, ESRC and EPSRC). The ASC has been engaging with relevant stakeholders (e.g. researchers, funders, academies) with a view of addressing key evidence gaps from the CCRA2 report on a variety of timescales. The scientific literature is also being reviewed to identify work that may already exist in these areas.

A key knowledge gap identified in applying the urgency framework in CCRA2[[1]](#footnote-1) related to the fact that many current studies of future risk provide linear projections of change, when there is a high probability that some changes will be non-linear. The natural environment (in both rural and urban areas) is particularly vulnerable to crossing thresholds that can potentially result in non-linear changes to the stock of natural capital (e.g. soil, water, certain species) and following this, the delivery of ecosystem goods and services (e.g. food, water regulation, cooling). For instance, as resilience is reduced or lost, the buffering the natural environment provides against climate hazards can also reach a point where it is sharply reduced.

Examples of thresholds in the natural environment might include:

* the extent of sea level rise that would render agricultural production of high value crops in coastal zones economically unviable, through the intrusion of saline water into soils and aquifers, thereby forcing land managers to consider the need for land use change
* drought levels at which green infrastructure loses its cooling and water regulation capacity due to drying out and hardening of surfaces.

The crossing of thresholds can result in irreversible changes to the natural environment, with major implications for human well-being. Through identifying and analysing the effect of crossing such thresholds, and prioritising those which have the most impact on societal health and well-being, and economic stability, this project will help us better assess the nature of the risk (step 1 in the urgency method) the effectiveness of current adaptation strategies to manage the risks (step 2 in the urgency method), and what the effects of further potential adaptations might be (step 3 in the urgency method).

# Aims and Objectives

The aim of this project is to:

* provide improved evidence of possible climate risks in the natural environment that do not follow linear patterns of change;
* assess the resulting impacts of these effects on different areas of society (e.g. communities, industries, workforces);
* identify what aspects of society are most at risk; and
* assess the extent to which current and potential future adaptation strategies can address the risk, either through preventing the threshold impact from occurring or managing the impact when it does.

In the context of this project, the ASC is specifically interested in identifying thresholds that represent critical points where the change in the magnitude or rate of impacts is such that further effort to implement current management strategies can no longer meet their intended objectives.

# Method

The focus of this project will be the natural environment in both rural and urban areas, with an aim to produce more evidence on the potential implications to society of climate-driven threshold effects on the delivery of ecosystem goods and services (e.g. crop production, carbon sequestration).

**Research questions**

The project should be structured around the following research questions:

* What climate hazard thresholds represent points beyond which the effective functioning of key systems within the natural environment may be compromised, and why?
* What are the resulting impacts on the goods and services provided to society from the natural environment? What would be the quantified impact?
* Is there a risk of irreversible change in the ecosystems affected, or substantial time lags in recovery?
* What is the impact of current levels of adaptation at mitigating these risks?
* What additional adaptation management options could be undertaken, either in advance to reduce the risk of these thresholds occurring, or afterwards to manage the impacts?
* In what scenarios are there limits to adaptation?

**Method steps**

Bids should propose a methodology to achieve the above research questions, to include:

1. A literature review, drawing on both UK and, where appropriate, international research, on what threshold points there are for different systems within the natural environment and what the quantified impacts of passing the threshold are. The review should include quantified evidence on the implications of passing the thresholds identified, and information on management strategies which may or may not have been effective. Bids should include a list of relevant evidence sources where known. Bids should give some examples of thresholds that bidders are already aware of, to demonstrate their proposed methodology.
2. A method for assessing under what scenarios these thresholds might be crossed in the UK, based on assumptions of future climate and socioeconomic change. Bids should include what evidence sources would be used, for example the upcoming UK Climate Projections (UKCP18) and socioeconomic scenarios. There may be more than one combination of scenarios under which the threshold could be crossed.
3. A method for quantifying the implications to society of crossing a threshold. These should be presented in, where possible, environmental, economic and social terms and made consistent with the ASC’s urgency framework. This method should include a broad assessment of the areas of society (e.g. communities, workforces, industries) deemed most at risk from the impacts of crossing the thresholds identified. Bids should set out how the analysis could be done spatially.
4. A method for characterising ‘current’ levels of adaptation including how these would be extended into the future, so as to be consistent with the ASC’s urgency framework method. The method should assess the effect of the adaptation strategy on the likelihood of passing the threshold, or managing the impact once it is passed,
5. A method for characterising future potential levels of adaptation and their effect on the risk, so as to be consistent with the ASC’s urgency framework.

Following on from the steps above, bidders should then set out an approach to prioritising which threshold effects pose the greatest risk. Bidders should show how this approach will be aligned to the ‘assessment of urgency’ method outlined in Section 2. At this point the ASC will work with the contractors to assess the evidence gathered above. Results will feed into the selection and structuring of case studies to consider the thresholds in more detail.

1. Select a minimum of seven case studies to undertake more detailed analysis. Possible scenarios that will be assessed will cover the impact of crossing thresholds on areas of society that are most dependent on the effective functioning of the associated systems: industries/production; (e.g. agriculture, water, forestry); workforces (e.g. agriculture, services, tourism) communities (coastal, urban). Scenario analysis should identify: the quantified level of risk posed by passing the threshold; which areas of society are most exposed to the effects of crossing of a given threshold; and which parts of the UK are likely to be most at risk.
2. A detailed write up of all of the analysis and findings.

**Other issues for consideration**

For the scope of this research, in order to link the benefits received by society to the services provided by the respective systems within the natural environment, local case study areas need to be classified according to their broader land cover characteristics. For example, the UK National Ecosystem Assessment (NEA) classifies the UK into eight broad habitats (land covers). These comprise:

* Mountains, moorlands and heath
* Woodland
* Semi-natural grassland
* Coastal margins
* Freshwater – open waters, wetlands and floodplains
* Enclosed farmland
* Marine
* Urban

Threshold effects should be measured based on the change in the delivery of ecosystem flows (to society) from the systems impacted by a crossing of a given climate hazard threshold. Key service flows will, therefore, need to identified and prioritised based on the level of systemic impact within the respective natural environment land cover classification. For guidance on linking ecosystem service flows to natural environment categories, bidders are encouraged to refer to Figure 3.1 in Chapter 3 Natural Environment of the CCRA 2 Evidence report[[2]](#footnote-2).

The socioeconomic dimensions driving the project analysis must, in the first instance, be taken from another project commissioned by the ASC entitled “A consistent set of socioeconomic dimensions for the CCRA3 Evidence Report research projects”. If a wider range of socioeconomic dimensions are required then the successful bidder should liaise with the ASC and the socioeconomic dimensions project staff to develop those required dimensions.

In addition, to ensure consistency of assumptions and outputs this project should be undertaken in close collaboration with the other projects that will be commissioned simultaneously with this one, specifically:

* Future flood projections for the UK
* Future water availability projections for the UK
* Influence of behaviour change on the risks and opportunities from climate change
* Interacting risks

Where appropriate, contractors must work with the devolved administrations to source appropriate datasets and take account of current policy aspirations.

Successful bidders will also be given pre-release access to the ASC’s upcoming report on long-term land-use adaptation, and the UK climate projections (UKCP18).

# Outputs Required

The ASC expects that the project will deliver the following outputs:

* A report containing:

The approach taken

The results of the national-level assessment, including for each threshold effect; the type of hazard, what type of ecosystem functioning would be affected, the scenarios under which the threshold might be passed (climate and socioeconomic, where and under what timescales the threshold might be passed), what the quantified impacts would be and how these would manifest themselves, what the effects of current and potential adaptation would be, and whether there are potential limits to adaptation.

The results of the case studies; answering the same questions as above but in more detail for specific places.

Editable graphical representations, such as infographics, maps or charts that describe the results, with visuals optimised for use on social media. The ASC want access to the editable versions and to the text included, for example to allow for translated versions to be prepared

* + Supporting data in excel spreadsheet format and GIS layers

The final report will be published on the ASC’s website during January 2020.

# Ownership and Publication

The results of the analysis and all outputs produced will be owned by and published at the discretion of the Adaptation Sub-Committee.

All research publications arising from the contract must include a statement on how the supporting data and any other relevant research materials can be accessed.

# Quality Assurance

All research tasks and modelling must be quality assured and documented. Contractors should:

* Include a quality assurance (QA) plan that they will apply to all of the research tasks.
* Specify who will take lead responsibility for ensuring quality assurance and ensure that this responsibility rests with an individual not directly involved in the research, analysis or model development.
* Provide a QA log to demonstrate the QA undertaken, including who undertook the QA and the scope, type and level of QA that has been undertaken (e.g. a log entry only stating ‘the data was checked’ will not be sufficient).

Sign-off for the quality assurance must be done by someone of sufficient seniority within the contractor organisation to be able take responsibility for the work done. Acceptance of the work by the CCC will take this into consideration. The CCC reserves the right to refuse to sign off outputs which do not meet the required standard specified in this invitation to tender.

The successful bidder will be responsible for any work supplied by sub-contractors and should therefore provide assurance that all work in the contract is undertaken in accordance with the quality assurance expectation agreed at the beginning of the project.

For primary research, contractors should be willing to facilitate ASC staff to attend interviews or listen in to telephone surveys as part of the quality assurance process.

The consultant must demonstrate their ability to produce deliverables of quality, in particular following best practice regarding economic analysis and presentation of results.

# Timetable

An indicative timeline for deliverables is presented below. The contractors can propose modifications to the timeline to better suit their analysis if appropriate, though the final submission date must remain the same. Any proposed modifications should be set out in the bid and will require approval from the ASC secretariat.

| **Phase** | **Deliverable** | **Date** |
| --- | --- | --- |
| Bidding | Bids received | 10th September 2018 |
|  | Interviews conducted | w/c 24th September 2018 |
|  | Contract awarded | 28th September 2018 |
|  | Kick-off meeting with ASC  | w/c 8th October 2018 |
| Project development | Method development - Draft Method Document | w/c 29th October 2018 |
|  | Draft method: Review workshop | w/c 5th November 2018 |
|  | Method development - Final Method Document | w/c 26th November 2018 |
|  | National-level analysis undertaken | November 2018 to April 2019 |
|  | Breakpoint to assess evidence gathered in the national assessment | April 2019 |
|  | Remainder of analysis undertaken (case studies) | May 2019 to September 2019 |
| Reporting | Initial draft report for comments by ASC  | 23rd September 2019 |
|  | Draft report submitted for review by ASC, chapter authors, stakeholder group and academic peer review | 14th October 2019 |
|  | Final draft report submitted for high level review by ASC following peer review | 29th November 2019 |
|  | Final report submitted – project completed | 23rd December 2019 |

# In order to ensure smooth and rapid progress the project plan should allow for regular interactions and meetings where necessary between the contractors and the ASC project team. We would ask bidders to set out when would be appropriate to meet during the project (after the initial kick-off meeting), given the timetable above. We would expect this to include at least five face-to face meetings between the contractor and the ASC secretariat, and at least five face-to-face meetings with CCRA authors and other project teams.

In addition, the ASC will put together a stakeholder group of representatives of the funding organisations and wider customers of the CCRA (government departments, agencies and adaptation practitioners). Bids should price in attendance of the project team and taking minutes at three meetings of this group; one to discuss the method; one to show the interim results of the national-level assessment, and one other to be agreed. The ASC will lead on chairing the meetings and putting agendas together.

# Challenges

The specific challenges that the ASC envisage with this project include:

* The non-linear changes in risk need to be quantified, and a clear description of how this will be calculated should be outlined.
* The method used to identify the “thresholds” is non-trivial and needs to defined and justified within the bid.
* Using UKCP18 and other projections to consider the potential for particular thresholds being crossed.
* Providing a robust method of linking and quantifying the threshold effects on the areas of society most dependent on the efficient functioning of the system(s) impacted.
* Robust assumptions need to be made regarding the adaptation strategies that are currently planned, and those that can be implemented and their potential impact on the threshold occurring or being managed after it has occurred.
* This project needs to carefully incorporate findings from the other five CCRA research projects.

Bids should also set out other risks and challenges to successfully undertaking this work.

It is important that bidders clearly present their method to address to each of the risks and challenges listed above, and any they have separately identified.

# Ethics

All applicants will need to identify and propose arrangements for initial scrutiny and on-going monitoring of ethical issues. The appropriate handling of ethical issues is part of the tender assessment exercise and proposals will be evaluated on this as part of the ‘addressing challenges and risks’ criterion.

We expect contractors to adhere to the following GSR Principals:

1. Sound application and conduct of social research methods and appropriate dissemination and utilisation of findings
2. Participation based on valid consent
3. Enabling participation
4. Avoidance of personal harm
5. Non-disclosure of identity and personal information

# Working Arrangements

The successful contractor will be expected to identify one named point of contract through whom all enquiries can be filtered. An ASC project manager will be assigned to the project and will be the central point of contact.

# Skills and experience

The ASC would like you to demonstrate that you have the experience and capabilities to undertake the project. A primary focus and lead of the project should be environmental science as the research is centred on understanding the dynamics that link the ecosystem flows from the natural environment to the dependent areas of society, and identifying associated threshold points. In addition, the cross-cutting nature of the project would mean the research would involve a multidisciplinary approach across different systems and, therefore, also require collaboration between experts within the behavioural sciences, engineers and economics, in particular when assessing the impacts of adaptation options.

Your tender response should include a summary of each proposed team member’s experience and capabilities. Contractors should propose named members of the project team, and include the details on how each team member will contribute their expertise and experience to the relevant aspects of the project. Further, this should be clearly linked to the work programme, indicating the grade/ seniority of staff and number of days allocated to specific tasks.

Contractors should identify the individual(s) who will be responsible for managing the project.

# Consortium Bids

In the case of a consortium tender, only one submission covering all of the partners is required but consortia are advised to make clear the proposed role that each partner will play in performing the contract as per the requirements of the technical specification. We expect the bidder to indicate who in the consortium will be the lead contact for this project, and the organisation and governance associated with the consortia.

Contractors must provide details as to how they will manage any sub-contractors and what percentage of the tendered activity (in terms of monetary value) will be sub-contracted.

If a consortium is not proposing to form a corporate entity, full details of alternative proposed arrangements should be provided. However, please note CCC reserves the right to require a successful consortium to form a single legal entity in accordance with Regulation 28 of the Public Contracts Regulations 2006.

CCC recognises that arrangements in relation to consortia may (within limits) be subject to future change. Potential Providers should therefore respond in the light of the arrangements as currently envisaged. Potential Providers are reminded that any future proposed change in relation to consortia must be notified to CCC so that it can make a further assessment by applying the selection criteria to the new information provided.

# Budget

The budget for this project is up to £120,000 excluding VAT (£150,000 including VAT); 40% of the costs should fall in the 18/19 financial year and 60% in the 19/20 financial year.

Contractors should provide a full and detailed breakdown of costs (including options where appropriate). This MUST include staff (and day rate) allocated to specific tasks, and funding split by each deliverable. Please include the proposed number of days in the unpriced bid.

Cost will be a criterion against which bids which will be assessed.

Payments will be linked to delivery of key milestones. The indicative milestones and phasing of payments can be adjusted and agreed with the contractor and Project Manager. Please advise in your tender response how this breakdown reflects your usual payment processes.

In submitting full tenders, contractors confirm in writing that the price offered will be held for a minimum of 60 calendar days from the date of submission. Any payment conditions applicable to the prime contractor must also be replicated with sub-contractors.

The CCC aims to pay all correctly submitted invoices as soon as possible with a target of 10 days from the date of receipt and within 30 days at the latest in line with standard terms and conditions of contract.

# Evaluation of Tenders

Contractors are invited to submit full tenders of no more than 25 pages, excluding declarations. Tenders will be evaluated by at least three CCC staff.

The ASC will select the bidder that scores highest against the criteria and weighting listed below, see the ITT for further information.

**EVALUATION CRITERIA AND SCORING METHODOLOGY**

|  |  |  |
| --- | --- | --- |
| Criterion | Description | Weighting |
| 1 | **RELEVANT EXPERIENCE / DEMONSTRATION OF CAPABILITY OF THE PROPOSED PROJECT TEAM** | 30% |
| 2 | **QUALITY ASSURING THE SERVICES YOU PROVIDE** | 5% |
| 3 | **MANAGEMENT STRUCTURE AND MANAGING RELATIONSHIP WITH THE CCC** | 10% |
| 4 | **METHOD** | 35% |
| 5 | **UNDERSTANDING OF REQUIREMENTS** | 10% |
| 6 | **RISK AND CHALLENGES** | 10% |
|  |  |  |
|  | 100% |

**Scoring Method**

Tenders will be scored against each of the criteria above, according to the extent to which they meet the requirements of the tender. The meaning of each score is outlined in the table below.

The total score will be calculated by applying the weighting set against each criterion, outlined above; the maximum number of marks possible will be 100. Should any contractor score 1 in any of the criteria, they will be excluded from the tender competition.

|  |  |
| --- | --- |
| **Score** | **Description** |
| 1 | Not Satisfactory: Proposal contains significant shortcomings and does not meet the required standard |
| 2 | Partially Satisfactory: Proposal partially meets the required standard, with one or more moderate weaknesses or gaps  |
| 3 | Satisfactory: Proposal mostly meets the required standard, with one or more minor weaknesses or gaps. |
| 4 | Good: Proposal meets the required standard, with moderate levels of assurance |
| 5 | Excellent: Proposal fully meets the required standard with high levels of assurance |

**Structure of Tenders**

Contractors are strongly advised to structure their tender submissions to cover each of the criteria above and supply a price schedule specifying the daily rates (ex-VAT) you will charge for each level of your staff.

**Evaluation for Interviews, if held**

CCC reserves the right to award the contract based on applicants’ written evaluation only if one candidate emerges from the evaluation stage as significantly stronger than the others.

Should interviews go ahead, they are provisionally expected to be held on the week commencing 24th September 2018. If this date changes, the ASC will notify applicants.

The areas to be covered in the interview will be sent to the shortlisted supplier prior to interview.

Further details of interviews will be sent to successful applicants on selection.

**Feedback**

Feedback will be given by email.

1. [CCRA2, Chapter 2: Approach and context](https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Chapter-2-Approach-and-context.pdf) [↑](#footnote-ref-1)
2. [**UK Climate Change Risk Assessment 2017:** Evidence Report](https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Chapter-3-Natural-environment-and-natural-assets.pdf) [↑](#footnote-ref-2)