**Addressing environmental challenges: NERC highlight topics 2023**

Apply for funding to address 1 of 6 environmental ‘highlight topic’ research challenges.

We encourage multidisciplinary research and collaborations with other UK organisations. Other international and non-academic collaborators can be involved as project partners.

We encourage applications from diverse groups of researchers.  
The inclusion of researcher co-investigators is encouraged where they have made a substantial intellectual contribution to the development of the application and will be engaged with the ensuing research.

Your application must address issues within only 1 of these topics.

The maximum cost of your project (100% full economic cost) can be between £3 million and £6 million, depending on the topic you choose.

Your project can last up to 4 years.

You must notify NERC of your intent to submit by 4:00pm on 15 February 2023.

Before applying for funding, check the following:

* [NERC eligibility guidance for applicants](https://www.ukri.org/councils/nerc/guidance-for-applicants/check-if-you-are-eligible-for-funding/)
* [eligibility of your organisation](https://www.ukri.org/apply-for-funding/before-you-apply/check-if-you-are-eligible-for-research-and-innovation-funding/eligibility-as-an-organisation/)
* [your eligibility as an individual](https://www.ukri.org/apply-for-funding/before-you-apply/check-if-you-are-eligible-for-research-and-innovation-funding/eligibility-as-an-individual/)

You may be involved in no more than 2 applications submitted to this funding opportunity. Only 1 of these can be as principal investigator.

### International applicants

Co-investigators based in International Institute for Applied Systems Analysis (IIASA) and in eligible organisations in Norway can be included under specific agreements.

Read about the [Money Follows Cooperation agreement with Norway](https://www.ukri.org/opportunity/collaborate-with-researchers-in-norway/) and international co-investigators in [NERC’s eligibility guidance for applicants](https://www.ukri.org/councils/nerc/guidance-for-applicants/check-if-you-are-eligible-for-funding/).

We encourage multidisciplinary research and collaborations with other UK organisations. Other international and non-academic collaborators can be involved as project partners.

### Equality, diversity and inclusion

We are committed to achieving equality of opportunity for all funding applicants. We encourage applications from a diverse range of researchers.

We support people to work in a way that suits their personal circumstances. This includes:

● career breaks  
● support for people with caring responsibilities  
● flexible working  
● alternative working patterns

Find out more about [equality, diversity and inclusion at UK Research and Innovation](https://www.ukri.org/what-we-offer/supporting-healthy-research-and-innovation-culture/equality-diversity-and-inclusion/) and [NERC’s diversity and inclusion action plan](https://www.ukri.org/publications/nerc-diversity-and-inclusion-action-plan-2022-2025/).

### Highlight topics

We have selected 6 highlight topics of equal priority for this funding opportunity.

Your application must address issues within a single highlight topic. We will not accept applications addressing more than 1 highlight topic.

If there are multiple successful applications within a highlight topic, they must be independent applications that deliver stand-alone projects.

The highlight topics in this funding opportunity are:

* A: risks and impacts of climate tipping points
* B: climate feedbacks from physical disturbance of the seafloor
* C: temperature and health: towards environmental solutions in a changing climate
* D: risks and co-benefits of ocean alkalinity enhancement and related carbon dioxide removal strategies on marine ecosystems
* E: impacts of extreme weather events in Antarctica
* F: building understanding of natural coastal protection by gravel barriers in a changing climate

### Topic A: risks and impacts of climate tipping points

#### Objective

To build climate tipping point (TP) theory and state-of-the-art Earth system modelling (ESM) to understand the potential impacts of passing climate TPs.

#### Strategic context

It is now widely accepted that TPs, where a small change triggers a large, abrupt and sometimes irreversible (hysteresis) response in a nonlinear system, contribute significantly to overall climate change risk. Although the likelihood of such events may be low, their potential impact is so high that the associated risk can easily become the dominant concern (where risk equals to likelihood multiplied by impact).

Human and natural systems can build resilience to climate change through exposure to climate variations, but such high impact low likelihood (HILL) events are too rare for that sort of adaptation to be effective.

The recent Intergovernmental Panel on Climate Change 6th Assessment Working Group 1 Report (IPCC AR6 WG1) acknowledged the importance of climate TPs, but only cited the small number of published studies with complex models, recognising that, ‘it is not currently possible to carry out a full assessment of proposed abrupt changes and tipping points’.

The IPCC Working Group 2 Report and 3rd UK Climate Change Risk Assessment (CCRA3) were both very limited in their coverage of the impacts of passing TPs due to the sparse literature. It is clear that more robust early warning systems for TPs are critically needed to inform both climate adaptation and mitigation efforts.

#### Scope

To develop assessments of the impacts of plausible climate TPs and identify system-specific precursors of TPs based on process knowledge, mathematical theory, measurements (for example, remote sensing, ground-based observations) and ESM projections, for the purpose of informing adaptation and mitigation efforts.

TPs are difficult to predict using mechanistic state-of-the-art ESMs because they occur in narrow regions of climate parameter space, which differ between ESMs. The projections from multiple ESMs across multiple shared socioeconomic pathways (SSPs), available via the Coupled Model Inter-comparison Project phase 6 (CMIP6) can help. However, they have not yet been systematically analysed for abrupt changes and TPs, nor linked to nonlinear dynamical systems theory. This highlight topic will address these deficiencies.

Despite the challenges of mechanistic prediction, there is huge potential for developing early warning indicators (EWIs) through analysis of climate fluctuations. In many systems, the approach to a bifurcation threshold is marked by longer and larger fluctuations of the system (‘critical slowing down’).

This highlight topic will develop more physically based EWIs and impact assessments for individual TPs through model hierarchy approaches: simple models can be used to explore the conditions under which tipping is likely, allowing limited ESM experiments to be targeted in parameter regimes of most value.

#### Research questions to address

1. What are the global and regional impacts and risks associated with key climate TPs?
2. Is there evidence for abrupt changes and TPs in the latest ESMs?
3. How do the risks of TPs vary in scenarios that overshoot the Paris 1.5°C and 2°C targets?
4. Where is there evidence of changing system resilience in observational records?
5. How do we design the best early warning systems for specific TPs such as Atlantic meridional overturning circulation shutdown, ice-sheet collapse, or forest dieback?

#### Delivery

There can be up to 2 projects looking at this topic. Each project should:

* tackle all research questions
* be up to the value of £3 million (100% full economic cost)

### Topic B: climate feedbacks from physical disturbance of the seafloor

#### Objective

To quantify how bottom-trawl fishing modifies carbon cycles in seabed sediments and influences greenhouse gas exchange, and to better understand the role of trawling in climate mitigation and the achievement of net zero.

#### Strategic context

Carbon stocks in seabed sediments are a large natural asset (0.52Pg of organic and 2Pg of inorganic carbon in UK waters). Bottom-trawl fishing provides one quarter of global seafood but is also the most extensive anthropogenic physical disturbance to these sediments.

Evidence suggests that seabed disturbance could result in greenhouse gas release (for example, carbon dioxide, methane). There is however major uncertainty in the magnitude of the effects of seabed disturbance by trawling on the storage and fluxes of carbon and greenhouse gases into or out of seabed sediments. Consequently, current estimates for the global release of carbon resulting from trawling are widely criticised and are thought to be 1 or 2 orders of magnitude too high.

Governments need to make decisions on how to combat climate change, and an understanding of how seabed disturbance affects carbon storage is needed to be able to achieve this.

This highlight topic will:

* provide a step change in understanding trawling impacts on carbon dynamics in shelf sea
* reduce the risk of the value of the natural environment being ignored in decision making
* enable a more comprehensive cost-benefit analysis and risk assessment for the sustainable management of marine ecosystem services

#### Scope

The overall aim of this highlight topic is to quantify on regional scales the effects of trawling on sediment particulate organic carbon and inorganic carbon and the resulting release of greenhouse gas to the water column and the atmosphere.

As the distribution of both fishing activity and seabed carbon stocks are patchy, only spatial management can reduce greenhouse gas emissions from the seabed and to the atmosphere without disproportionately affecting food production. Therefore, impacts on different sediment types by different bottom trawl gears need to be differentiated.

This requires context-dependent estimates and incorporation of several processes where there is currently a lack of understanding, such as:

* sediment resuspension
* the removal of benthic fauna which would normally bioturbate and bioirrigate the sediment
* mixing of labile and refractory carbon within the sediment
* changes in the oxygen, nutrient, dissolved inorganic carbon concentrations and alkalinity of pore and pelagic waters

Detailed in-situ measurements and experiments are needed to quantify how each of these processes changes the reactivity of seabed carbon stocks and how this depends on the environmental settings and type of trawl gear used.

Outcomes of projects are required to push the frontiers of understanding and management of the trawling impacts on climate change, and be relevant to the UK.

#### Research questions to address

1. How do trawl type, trawling frequency, and sediment type affect the potential for marine sediments to act as a net source of greenhouse gas?
2. What is the fate of resuspended sediment and how does this modulate local seawater chemistry?
3. How do vertical mixing, water column production, and respiration affect the potential for trawl-driven biogeochemical change to result in measurable impact on air-sea exchanges?
4. Will management interventions result in the recovery of seabed sediment carbon stocks and additional carbon storage?

#### Delivery

There can be up to 2 projects looking at this topic. Each project should:

* tackle all research questions
* be up to the value of £3 million (100% full economic cost)

You should predominantly address research questions 1, 2 and 3 in your application, and include an element that addresses research question 4.

If you need to use NERC’s marine facilities, the costs associated with completed online ‘ship-time and marine equipment (SME) or autonomous deployment (ADF) application forms’ do not need to be included within the full economic cost limit of £3 million.

Applicants wishing to use NERC’s marine facilities must complete an online ‘SME or ADF application form’ available from [Marine Facilities Planning](https://www.marinefacilitiesplanning.com/).

If your project will require access to NERC’s marine facilities, you should consider that the start date for grants will be 1 November 2023 and access to NERC’s marine facilities is unlikely to be possible before the 2025 to 2026 NERC marine facilities programme.

You therefore need to engage with NERC’s head of marine planning at [marineplanning@nerc.ukri.org](mailto:marineplanning@nerc.ukri.org) no later than 13 January 2023. This will make sure that a realistic assessment of the availability of marine facilities in the year or years required is central to the development of your science plans.

Early engagement with NERC’s head of marine planning will also mean that you can submit the associated SME and ADF applications by 22 February 2023 (1 month before the funding opportunity deadline).

### Topic C: temperature and health: towards environmental solutions in a changing climate

#### Objective

Using both climate and health data to take a holistic approach to understand how different measures of climate variability translate to health, by determining how hot and cold temperature and temperature-relevant variables, such as humidity, impact human-health outcomes in the UK, both now and in the future.

#### Strategic context

Gaps in our understanding of how changes in climate (specifically temperature) impact health vulnerabilities have been identified in several recent major reports, including [CCRA3](https://www.ukclimaterisk.org/independent-assessment-ccra3/technical-report/), [IPC AR6 WG2](https://www.ipcc.ch/report/ar6/wg2/) and [Royal Society](https://royalsociety.org/topics-policy/projects/climate-change-mitigation-human-health/). The reports concluded integrating climate science and health data is required to effectively plan for a climate resilient future and its impact on health outcomes, particularly around the impact of temperature on health.

While UK climate and health data are of high quality and quantity, we do not have a holistic view on how temperatures and their extremes impact human health outcomes, for example physiological stress, migration of vector-borne diseases, and mental health. Furthermore, we do not know how different measures of climate variability translate to health outcomes.

Temperature can stress societal health in complex ways, with critical sectors changing in the UK (for example ageing population and frailty, population density, and the obesity crisis). Climate models are developed independently of the impact community.

This highlight topic is intended to interface the climate models and health data at higher granularity, enabling the health community to input into environmental high-resolution modelling to address the theoretical, practical, and methodological gaps in existing literature and practice for temperature-health outcomes.

#### Scope

This highlight topic is focused on the environmental science, but requires the expertise and data from the health communities. This interdisciplinary approach will help understand:

* the effects of temperature on health outcomes within the UK both now and in the future
* a range of adaptation and mitigation solutions at different scales
* interventions that prevent temperature-health problems and should address the net zero agenda

#### Research to address

You should explore how temperature and its extremes evolve at differing spatial scales, and within land types of the UK. You should look at how these extremes impact on health outcomes (for example, hospital admissions, injuries, inequalities, and prevalence of vectors).

Research must include extremes of temperature (hot and cold) and the temperature-relevant variable humidity. Health data incorporated into environmental data must be used to explore temperature-health outcomes over the coming decades and at policy-relevant levels of global warming.

This includes considering increases of temperature of 1.5˚C and 2˚C to better understand how temperature adaptation options can be integrated with climate mitigation policy, and how effective these adaptation options are as temperature increases in the future.

You should demonstrate how new understanding would facilitate and inform:

* tool development
* early warning and response plans for extreme temperatures
* urban planning
* net zero implementation
* approaches for working with crucial stakeholders (for example, public health authorities, local government, and business and community leaders)

#### Delivery

There can be up to 2 projects looking at this topic. Each project should:

* tackle all research questions
* be up to the value of £3 million (100% full economic cost)

### Topic D: risks and co-benefits of ocean alkalinity enhancement and related carbon dioxide removal strategies on marine ecosystems

#### Objective

To improve our understanding of the risks and co-benefits of ocean alkalinity enhancement and related carbon dioxide removal strategies on marine ecosystems and to enhance model capabilities for future climate response projections.

#### Strategic context

To achieve the Paris Agreement goal of limiting global mean temperature increases to 1.5˚C above pre-industrial levels by 2100 and to reach UK net zero carbon emissions by 2050, it is considered that alongside significant reductions in anthropogenic carbon, there may be a role for carbon dioxide removal (CDR) strategies in extracting excess carbon dioxide from the atmosphere.

Meeting these targets requires the rapid implementation of an array of terrestrial and ocean-based CDR methods. Research into terrestrial CDR methods is already well underway. However, despite the potential of ocean-based CDR, little is known about the effectiveness and impacts of these techniques.

Model studies suggest that increasing the alkalinity of seawater (termed ocean alkalinity enhancement or OAE) through electrochemical or chemical weathering techniques may be capable of removing more than 10% of current annual global carbon dioxide emissions while simultaneously helping to mitigate the impacts of ocean acidification.

However, CDR efficacy and associated impacts or co-benefits of OAE on the marine environment and ecosystem services remain uncertain. For example, the effects of OAE on primary producers, such as shifts in community composition, community structure, and the potential for increased metal accumulation remain unknown, even though any such impacts may cascade through the wider marine ecosystems.

Understanding the carbon dioxide sequestration potential and response to OAE (and equivalent CDR strategies) by biological communities and biogeochemical processes in marine systems, over different timescales, is imperative to inform how and whether such approaches could be utilised on a large-scale to meet global net zero targets.

#### Scope

The potential of OAE and related ocean-based CDR strategies in supporting efforts to remove atmospheric carbon dioxide has primarily been explored through modelling studies as only a limited number of laboratory and mesocosm studies have been conducted. The efficacy and impacts of OAE are yet to be tested through in-situ trials.

New observations and assessments across a range of scales are consequently needed to improve our ability to ascertain the risks and co-benefits of this approach, and to enhance model capabilities for future climate response projections.

Full understanding of the response to OAE prior to large-scale commercial application is imperative, to ensure a proper regulatory framework is in place to enable its safe implementation, particularly as the interconnectivity of marine environments means that impacts or benefits of the approach may be realised outside national boundaries.

#### Research questions to address

1. Does OAE represent an effective mitigation strategy to reduce atmospheric carbon dioxide concentrations over meaningful timescales?
2. What is the impact of enhanced alkalinity on macro and micronutrient biogeochemistry in seawater?
3. How do marine ecosystems respond to nutrients and metals released through enhanced weathering?
4. How can ocean observing infrastructure support long-term monitoring of the efficacy and impacts of OAE operations, and what developments are required to facilitate this?

#### Delivery

There should be 1 project looking at this topic. The project should:

* tackle all research questions
* be up to the value of £6 million (100% full economic cost)

If you need to use NERC’s marine facilities, the costs associated with completed online ‘ship-time and marine equipment (SME) or autonomous deployment (ADF) application forms’ must be included within the full economic cost limit of £6 million. Applicants wishing to use NERC’s marine facilities must complete an online ‘SME or ADF application form’ available from [Marine Facilities Planning](https://www.marinefacilitiesplanning.com/).

If your project will require access to NERC’s marine facilities, you should consider that the start date for funding will be 1 November 2023 and access to NERC’s marine facilities is unlikely to be possible before the 2025 to 2026 NERC marine facilities programme.

You therefore need to engage with NERC’s head of marine planning at [marineplanning@nerc.ukri.org](mailto:marineplanning@nerc.ukri.org) no later than 13 January 2023. This will make sure that a realistic assessment of the availability of marine facilities in the year or years required is central to the development of your science plans.

Early engagement with NERC’s head of marine planning will also mean that you can submit the associated SME and ADF applications by 25 January 2023 (2 months before the funding opportunity deadline).

### Topic E: impacts of extreme weather events in Antarctica

#### Objective

Through studying past weather events in the Antarctic region, to understand the drivers of extreme weather events, quantify the impact of these events on the physical environment, and allow improved predictions of weather extremes and their impacts.

#### Strategic context

In recent years there has been an unexpected increase in weather extremes across Antarctica, for example, temperature records being broken and increased occurrences of unusual liquid precipitation in East Antarctica. The [latest IPCC report](https://www.ipcc.ch/report/sixth-assessment-report-cycle/)states that in a warming climate, globally it is expected that there will be an increase in frequency and intensity of weather extremes. It is therefore a high priority to quantify the impact of extreme weather events on the physical environment in Antarctica.

The Antarctic Peninsula has warmed more than any other location in the southern hemisphere in the second half of the twentieth century, with an increase in extreme high temperature events that has led to ice shelf disintegration. The rest of Antarctica has been shielded from this warming by the ozone hole, but as the hole recovers, the impact of increasing greenhouse gases will manifest as a widespread warming. We are likely to see an increase in extreme events which will impact on ice shelf loss rates and thus global sea level rise.

#### Scope

This highlight topic will deliver analysis of observations of past extreme weather events and modelling, in combination with artificial intelligence techniques, to understand the relative contributions of drivers of extreme weather events, how these will change in frequency or intensity against a background of warming climate, and their impact on the Antarctic.

To determine the contributions from the drivers of extreme weather events and their variability the following needs to be done:

* use extensive existing observations and high-resolution modelling to understand the relationship between drivers such as cyclonic activity, atmospheric rivers, and extreme events
* use a rapid attribution framework with existing climate models to test the anthropogenic contributions to these events
* resolve the role of the Southern Annular Mode (SAM), tropical teleconnections and ozone hole recovery on the frequency or intensity of extreme events impacting Antarctica

This highlight topic should use a range of existing datasets and data products such as:

* NERC routine meteorological observations (for example, Antarctic automatic weather stations)
* international observations by Antarctic partner nation
* the Reference Antarctic Data for Environmental Research (READER) meteorological database, which is accessible through the Scientific Committee for Antarctic Research (SCAR)
* European Centre for Medium-Range Weather Forecasts reanalysis data products (ERA5)

#### Research questions to address

1. What are the relative contributions of drivers of extreme weather events in the Antarctic?
2. What are the key model improvements needed to improve the reliability of extreme event prediction on climate timescales?
3. What are the trends and variability in extreme events associated with the Antarctic?
4. What are the future impacts of these extreme events on the Antarctic?

#### Delivery

There can be up to 2 projects looking at this topic. Each project should:

* tackle all research questions
* be up to the value of £3 million (100% full economic cost)

### Topic F: building understanding of natural coastal protection by gravel barriers in a changing climate

#### Objective

To deliver enhanced understanding and modelling capability of gravel barrier systems to support more sustainable coastal management, increasing coastal resilience and reducing vulnerability to climate change.

#### Strategic context

Beach and barrier systems with a dominant gravel fraction, including ‘pure’, ‘compound’ and ‘mixed sand-gravel’ systems (hereafter collectively referred to as ‘gravel barriers’), are common in the UK and throughout the world. At many locations they act as natural coastal defences and are unique ecosystems, especially in association with back-barrier marsh or lagoonal systems.

Maintenance, improvement and creation of these coastal systems through sediment recycling and beach nourishment is part of the nature-based solution suite of adaptation approaches and represents sustainable coastal management that contributes positively to coastal resilience.

Despite their relevance and widespread occurrence, understanding of the behaviour of gravel barriers with their back-barrier ecosystems, especially their response to sea-level rise, extreme storms and changes to wave conditions related to climate change, is mainly qualitative. For example, gravel barriers migrate landward due to sea-level rise by storm-induced overwash, but the rate of migration is poorly constrained.

Similarly, changes in the predominant wave direction induces beach rotation along many gravel barriers, but the ability to robustly predict beach rotation due to climate change is lacking.

The important role gravel barriers have in providing coastal protection is understood, but there is evidence that some management practices negatively impact barrier stability. Therefore, consistent and reliable rules for designing and optimising these natural protection features are needed.

#### Scope

This highlight topic will draw together the UK research capacity to deliver a step-change in the management of gravel coastlines. Research will:

* enhance quantitative process understanding of the response of gravel barriers
* develop new gravel-specific coastal numerical models and tools
* inform future management decisions related to the backshore and back-barrier ecosystems and habitats supported by gravel barriers
* include case study sites, with involvement of relevant stakeholders at a local, regional and national level to demonstrate transferability of the results and serve as blueprint for managing gravel coastal systems

Research may encompass different time scales, including:

* short-term storm response (overwash)
* medium-term shoreline adjustment (beach rotation)
* long-term coastal evolution due to sea-level rise (transgression)

#### Research questions to address

1. How do decadal-scale morphodynamics of gravel barriers respond to changes in sea level, storminess and sediment supply, and influence coastal evolution? How will this impact the ecosystems they support?
2. Under future climate change, will the coastal protection role of gravel barriers be compromised, potentially triggering management interventions?
3. When and how does sediment transport on gravel barriers differ from the more well studied sand cases?
4. What is the internal structure and composition of gravel beaches and how do variations in composition influence beach morphology and dynamics?
5. What is the role of hydraulic conductivity in influencing barrier behaviour?
6. Can we quantify the critical interactions between gravel barriers and the back-barrier environment (marsh, lagoon, estuary), as well as the interplay between gravel barriers and coastal structures?

#### Delivery

There can be up to 2 projects looking at this topic. Each project should:

* be up to the value of £3 million (100% full economic cost)
* address research questions 1 and 2
* address at least 2 of the other 4 research questions

### Duration

The maximum duration of this award is 4 years for all highlight topics.

Projects must start by 1 November 2023.

### Funding available

See each highlight topic for details of available funding.

### What we will fund

We will fund 80% of the full economic cost for UK organisations:

* directly incurred costs such as staff payroll, travel and subsistence, and consumables
* directly allocated costs such as investigators’ salaries, estates costs and shared resources
* indirect costs such as research organisation administration

We will fund UK equipment at 50% full economic cost.

You cannot request associated studentships under this opportunity.

Eligible international co-investigator costs (under the International Institute for Applied Systems Analysis or Norway agreement) are funded at 100% for eligible direct costs and can be a maximum of 30% of the full economic cost value for all international costs.

For eligible international co-investigators, we will fund:

* co-investigator salaries
* directly incurred costs (for example, travel and subsistence, consumables)
* research assistants

We will not fund:

* estates and other indirect costs
* capital costs
* equipment over £10,000 (anything under £10,000 can be requested under directly incurred costs)

Costs associated with any international co-investigators should be entered as an exception and using a specific format:

* the University of XXX
* country: travel and subsistence
* 4 x flights to partners

### Services and facilities

You can apply to use a facility or resource in your funding application.

You should discuss your application with the facility or service at least 2 months before the opportunity’s closing date to:

* discuss the proposed work in detail
* receive confirmation that they can provide the services required within the timeframe of the funding

The facility will provide a technical assessment that includes the calculated cost of providing the service. NERC services and facilities must be costed within the limits of the funding.

You should not submit the technical assessment with the application, but you must confirm you have received it.

For more information, go to the [NERC research grants and fellowships handbook](https://www.ukri.org/councils/nerc/guidance-for-applicants/handbooks-guidance-and-forms/).

Read the full list of [NERC facilities that require a technical assessment](https://www.ukri.org/councils/nerc/facilities-and-resources/find-a-nerc-facility-or-resource/).

High Performance Computing, [Ship-Time or Marine Equipment (SME)](https://www.ukri.org/councils/nerc/facilities-and-resources/find-a-nerc-facility-or-resource/how-to-apply-for-marine-facilities/) and the large research facilities at Harwell have their own policies for access and costing.

### Antarctic logistic support

If you need Antarctic logistic support from NERC British Antarctic Survey, you must complete a pre-award ‘operational support planning questionnaire’ (OSPQ). This is an online form.

You should contact the Antarctic Access Office (AAO) at [afibas@bas.ac.uk](mailto:afibas@bas.ac.uk) as early as possible to discuss your request, stating your:

* name
* institution
* application title

AAO will set up a new, numbered pre-award OSPQ form and send the link to you along with instructions for completion.

You should submit the pre-award OSPQ form to AAO by 25 January 2023 (2 months before the funding opportunity deadline) and include it as an attachment with your full application.

We will not accept any funding applications that request Antarctic logistic support without having received prior logistic approval. All other services and facilities should be costed and included within the ‘directly incurred-other’ budget line on the costing template.

### Data management

You must adhere to [UK Research and Innovation’s open research policy and NERC’s data policy](https://www.ukri.org/manage-your-award/publishing-your-research-findings/making-your-research-publications-open-access/). You should include an outline data management plan under the data management and sharing section in your application.

Read [NERC’s data management planning guidance](https://www.ukri.org/councils/nerc/facilities-and-resources/find-a-nerc-facility-or-resource/data-management-planning/) for more information.

Find details of data centres in [NERC’s Environmental Data Service](https://www.ukri.org/councils/nerc/facilities-and-resources/find-a-nerc-facility-or-resource/).

We will pay the data centre directly on behalf of the programme for archival and curation services but you should ensure that you request sufficient resource to cover preparation of data for archiving by the research team.

You will need to discuss additional services from the data centres (such as database development or a specialist in project data management during your project) with the relevant data centre before you submit your application. You will need to include costs for additional services in your application.

### UK Research and Innovation (UKRI) Funding Service

We are running the NERC highlight topics 2023 funding opportunity on the new UKRI Funding Service. You cannot apply for this opportunity on the Je-S system.

If you do not already have an account with the UKRI Funding Service, you will be able to create one by selecting the ‘start application’ button at the start of this page. Creating an account is a 2-minute process requiring you to verify your email address and set a password.

If you are a member of an organisation with a research office that we do not have contact details for, we will contact them to enable administrator access. This provides:

* oversight of every UKRI Funding Service application opened on behalf of your organisation
* the ability to review and submit applications

Research offices that have not already received an invitation to open an account should email [support@funding-service.ukri.org](mailto:support@funding-service.ukri.org)

To find out more about the role of research office professionals in the application process, watch a [recording of a recent research office webinar](https://www.youtube.com/watch?app=desktop&v=trU5yAwxOeo&feature=youtu.be).

### Applying for this opportunity

#### Stage 1: notification of intent

You must give notification of intent to submit by 4:00pm on 15 February 2023. You should include:

* the focus of your proposed research project
* institutions, investigators, and project partners you expect to be involved
* a title and abstract of your planned work

[Notify NERC of your intent to submit](https://reg.nerc.ac.uk/highlight-topics-9th/).

We will not assess the abstract but will use the information to plan the assessment of your application.

If you submit a full application without a notification of intent to submit, we will reject your application.

#### Stage 2: full application

You must submit your full application by 4:00pm on 22 March 2023. The funding opportunity will close on the UKRI Funding Service at this time and it will not be possible to submit after then.

You should leave enough time for your application to pass through your organisation’s submission route before this date. We will reject any application that is incomplete, does not meet our [eligibility criteria](https://www.ukri.org/councils/nerc/guidance-for-applicants/check-if-you-are-eligible-for-funding/), or follow our submission rules.

### UKRI Funding Service: section guidance

#### Project summary

In plain English, provide a summary of your application. Describe your proposed work in terms of its:

* context
* aims and objectives
* fit to the scope of this opportunity

This summary may be made publicly available on external facing websites. Write with disclosure in mind and make sure readers of all levels can understand it.

Word count: 550

#### Applicants

List the key members of your team and assign them roles, for example:

* principal investigator
* co-investigator
* researcher (equivalent to researcher co-investigator)
* technician (research technical professional)
* other

You should only list 1 individual as principal investigator.

The UKRI Funding Service does not currently list ‘researcher co-investigator’ as a role. Instead, select ‘researcher’ for team members carrying out that role.

The UKRI Funding Service does not currently list ’international co-investigator’ as a role. Instead select ‘co-investigator’ for team members carrying out that role.

#### Vision and approach

Question: upload a case for support, explaining the vision and approach of the project

##### What the assessors are looking for in your response

What is the vision for your proposed research?

You should:

* introduce the focus of your research and explain its academic and wider context in respect of your chosen highlight topic
* describe your overall aims explaining their relevance to the highlight topic

In respect of your vision also describe how, if successful, your application will:

* generate novel hypotheses, concepts, approaches or methodologies, beyond what is currently regarded as state-of-the-art in the field
* lead to a distinctive advance in the current field or will open entirely new research directions
* have a positive impact on the field in the longer term

How are you going to deliver your proposed work?

You should:

* provide clearly defined, ambitious, and adventurous objectives
* describe a suitable programme of work to achieve the project aims, indicating the experimental and data analytical research you will undertake
* identify any particularly innovative or unconventional methodologies or approaches that you will explore
* describe key milestones where you may need to make decisions, track, or evaluate progress
* demonstrate your awareness of any potential challenges, risks, or limitations of the proposed project
* describe any alternative approaches, or the learning potential in the event of negative results
* show that you will carry out your research in an ethical and appropriate manner

You should attach a single PDF case for support of maximum 8 A4 pages including figures and references no bigger than 8MB.

#### Team capability

Question: demonstrate how your team and your research environment are suited to the delivery of the proposed research?

##### What the assessors are looking for in your response

This section focuses on describing specific capabilities. The team includes the investigator or investigators, named researchers and project partners as appropriate. Do not attach any further CVs.

For each team member you have named in the ‘applicants’ section demonstrate how they have the appropriate expertise, considering their current career stage, and capability to successfully execute the proposed project.

Using the principles of [Résumé for Research and Innovation](https://www.ukri.org/apply-for-funding/before-you-apply/resume-for-research-and-innovation-r4ri-guidance/), provide evidence for where team members have:

* made an outstanding contribution to the generation of new understanding (ideas, tools methodologies or knowledge)
* the appropriate leadership and management skills to deliver the work and develop others, including mentoring researchers and maintenance of effective working relationships
* contributed to the wider research and innovation community (for example, contributions to improving research culture)
* contributed to broader society and audiences and generated wider societal benefit

Additionally you should describe:

* the facilities, equipment, or resources that are available to deliver the proposed work
* the role of any other collaborators, project partners or subcontractors

If you have project partners, you should provide further details in the ‘Project partners: contributions’ section.

Word count: 1000

#### Project partners: contributions

Question: provide details about any project partners’ contributions using the template provided

##### What the assessors are looking for in your response

If you have project partners, enter the project partner contact name and organisation name in the textbox provided on the Funding Service.

Download and complete the project partner details template as instructed on the Funding Service.

Ensure you have obtained prior agreement from project partners that, should you be offered funding, they will support your project as indicated in the template.

Word count: 500

#### References and resources

Question: list the references you have used to support your application

##### What the assessors are looking for in your response

In this section you can include any additional references for sections not included in the vision and approach section (case for support), for example, from the team capability section.

Only include references that are essential to provide evidence for written narratives within sections other than your case for support.

You may include hyperlinks to relevant publications or online resources. However, assessors are not obliged to access the information they lead to, or consider it in their assessment of your application.

You must not include links to web resources in order to extend your application. If you do link to web resources, then include digital object identifiers where possible to ensure the information’s integrity is maintained.

#### Full economic cost and justification of resources

Question: what will you need to deliver your proposed work and how much will it cost?

##### What the assessors are looking for in your response

Complete a cost template for each component grant provided in the Funding Service that is part of this application. Summarise the total costs of all component grants once in the ‘Total costs’ table on the last page. Combine all component templates and total costs overview into a single PDF and upload, as instructed.

If there are multiple component grants, make sure the total cost requested does not exceed the highlight topic limit or the application will be rejected.

You should use the textbox on the Funding Service to explain why the resources requested are appropriate, considering the nature and complexity of the proposed research.

Word count: 1000

#### Data management and sharing

Question: how will you manage and share data collected or acquired through the proposed research?

##### What the assessors are looking for in your response

Provide an outline data management plan, identifying data sets of long-term value that should be made available to NERC data centres to archive and reuse at the end of the funding.

Clearly show how you will comply with [NERC’s data policy](https://www.ukri.org/about-us/nerc/our-policies-and-standards/nerc-data-policy/), which includes detailed guidance notes.

Indicate:

* which NERC data centre is required to archive the data
* whether the total volume of data is likely to be larger than 1TB
* any other detail on how you will comply with NERC data policy

Word count: 500

#### Ethical considerations

Question: what are the ethical considerations associated with your proposed research?

##### What the assessors are looking for in your response

If there are no ethical implications or issues relating to the proposed research, then explain why.

Otherwise, provide information on, and justification for:

* research involving animals
* research involving human tissues or biological samples, including the nature and quantity of the material used and its source
* research involving human participation, including the numbers and diversity of the participants involved and any procedures
* potential impacts of the proposed research on the environment or society in general

How will the identified ethical considerations be managed?

State the names of any bodies you will require approval from and whether you already have it. If it is not yet in place, then give an indicative timeframe for when it will be.

Word count: 500

#### Facilities

Question: does your proposed research require the support and use of a research council facility?

##### What the assessors are looking for in your response

If not, then enter ‘N/A’ into the text box, mark this section as complete and move on to the next section.

If you will need to use a research council facility, then you should follow your proposed facility’s normal access request procedures. Where prior agreement is required, ensure you obtain their agreement that, should you be offered funding, they will support the use of their facility on your project

Provide in the textbox on the Funding Service for each requested facility:

* the name of facility, copied and pasted from the list provided in the Funding Service
* the proposed usage, costs or units where indicated on this list
* confirmation you have their agreement where required

Word count: 500

File upload guidance: if you have to attach a facility form (for example, NERC ship-time and marine equipment or Antarctic logistics), then upload it as a PDF. If you need to upload multiple forms, then combine them into a single PDF.

### Assessment process

We will assess your application using the following process.

#### Peer review

We will invite experts to review applications independently, against the specified criteria for this opportunity. This will include consideration by the highlight topic panel.

The panel will be comprised of [NERC Peer Review College](https://www.ukri.org/councils/nerc/guidance-for-reviewers/peer-review-college/membership-of-nerc-peer-review-college/) members, augmented if necessary, by relevant experts from outside the college. Our aim is to use at least half from the core membership of the college, expertise and conflicts of interest allowing.

The panel will allocate a final score and rank applications based on:

* the ambition and research excellence of the proposed project
* fit to the highlight topic area
* suitability and ambition of the approach
* team capability to successfully execute the project and contribute more broadly; this includes the strength of the management arrangements and whether the resources requested are appropriate

We will use the recommendations of the panel along with the overall funding opportunity requirements, funding portfolio and the available budget in making the final funding decisions. The funding limit specified for each highlight topic will be applied.

Find out more about [NERC’s assessment process](https://www.ukri.org/councils/nerc/guidance-for-applicants/what-happens-after-you-submit-your-proposal/).

### Assessment criteria

There are 2 assessment criteria.

#### Research excellence

To what extent does the application identify or demonstrate:

* novelty, specifically where the proposed work sits in relation to related activity internationally
* high scientific quality (including technical feasibility, objectives and deliverables)
* potential risks with any mitigation strategies. We understand that risk-taking is very often necessary to answer the challenging questions in environmental science. Reviewers will comment on how appropriate these are for the stated objectives, how effectively potential risks have been identified and managed, and whether the potential for failure is balanced against the potential reward
* appropriate plans for project implementation and management, the team’s capability to deliver including strength of the team (both academic and project partners where relevant), and the appropriateness of the team for carrying out and successfully delivering the proposed work

#### Fit to topic area

Explain how and to what extent the proposed research aligns to the detailed highlight topic area.

### Additional guidance on the use of the review scoring scale for this opportunity

Reviewers will use a scoring scale from 1 to 6 with 1 being poor and 6 being exceptional.

For this opportunity we expect reviewers to only allocate the highest score (6) to applications that fully address both the fit to topic area and research excellence criteria.

### Timescale

You can expect to hear about the outcome of your application in October 2023.

If you are successful, you may be required to provide us with some additional information. Collecting this information from successful applicants is intended to lessen the burden at the application stage.

### Feedback

We will give feedback to all applicants.

### Principles of assessment

UK Research and Innovation (UKRI) supports the [San Francisco Declaration on Research Assessment (DORA)](https://sfdora.org/read/) and recognises the relationship between research assessment and research integrity.

Find out about the [UKRI principles of assessment and decision making](https://www.ukri.org/publications/ukri-principles-of-assessment-and-decision-making/).

We reserve the right to modify the assessment process as needed.