

Influence of man-made Structures InThe Ecosystem

Closing date	19 September 2019
Funding available	£4.2m
Funding mode/stream	Joint Strategic Response
NERC Core or UKRI/Collective Fund budget	NERC Core
Project duration	3 years
Funding partners (if applicable)	Cefas contribution of £600k to cover Cefas staff research costs on funded projects.
Start date requirements (if applicable)	The expected start date for projects funded under this Announcement of Opportunity is March 2020.
Call aims and objectives	<p>This programme will tackle the critical gaps in scientific understanding of the role that man-made structures play in marine ecosystems. The overarching question that this programme is looking to answer is “How critical are man-made structures in the North Sea to ecosystem structure and function?” This will be addressed through three Challenges:</p> <p>Challenge 1: Understanding the role of man-made structures as an inter-connected hard substrate network in the North Sea.</p> <p>Challenge 2: Understanding the role of man-made structures as artificial reefs in the North Sea.</p> <p>Challenge 3: Ecological monitoring and assessment of man-made structures as whole systems in the North Sea ecosystem.</p>
Eligibility criteria	Standard eligibility criteria apply with the exception that Cefas researchers are also able to apply to this call. Applicants can be on no more than 2 proposals and only 1 as PI
Call specific requirements	Research projects may request a combined maximum cost to NERC and Cefas of £700k at 80% FEC.
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UK Research
and Innovation

INfluence of man-made Structures InThe Ecosystem

Announcement of Opportunity

Issued on: 25 June 2019

Full Proposals deadline: 4pm on 19 September 2019

1. Summary

Proposals are invited for submission to this new research programme that builds on the outcomes of the [‘INfluence of man-made Structures In The Ecosystem’](#) (INSITE) Phase 1 (2016-2017). Despite a major programme of decommissioning of North Sea energy installations planned over the next 20 years and beyond there is a lack of robust scientific rationale and a limited evidence base to support environmental management strategies for decommissioning. This programme will address this by tackling critical gaps in scientific understanding of the role these man-made structures play in North Sea ecosystem. These gaps currently limit the potential for exploring a full range of decommissioning strategies and policy options for the management of man-made structures in the marine environment.

The overarching question that this programme will address is “How critical are man-made structures in the North Sea to the ecosystem?”

It is expected that this announcement will lead to the funding of at least six research projects each with a combined maximum cost to NERC and Cefas of £700k at 80% FEC.

Proposals for this call are invited from eligible UK researchers (see [NERC Grants Handbook](#) for standard eligibility criteria). Cefas scientists are also eligible for this call as additional co-funding from Cefas (up to a total of £600k) is available to cover their research costs. The interests of Cefas are outlined in the attached [document](#).

2. Background

The North Sea continues to have both high biological productivity and economic resource value supporting intense human activity across multiple sectors, such as oil and gas, offshore wind, fisheries, aggregate extraction and shipping. Since the 1970s, an increasing amount of hard infrastructure (e.g. oil/gas platforms and pipelines, offshore wind turbines and substations) has been installed in the North Sea, with limited research being done to understand and assess the effect of this man-made habitat upon the North Sea ecosystem. Understanding the ecosystem effects of structures has been furthered elsewhere,

particularly with the development of the US 'rigs-to-reefs' programmes that have been supported by research in the Gulf of Mexico and offshore California. Under these initiatives, the substructures of decommissioned facilities can be lifted and placed in designated sites to preserve habitat and enhance ecosystem services. Maintenance of these reefs is funded by savings in decommissioning costs associated with recovery and disposal onshore.

The gaps in scientific understanding of the North Sea ecosystem are becoming increasingly clear from both environmental and regulatory perspectives. A robust evidence base is urgently needed to support the most appropriate environmental management for decommissioning oil/gas infrastructure, which has been in place for up to 40 years, and the installation of new offshore wind infrastructure that will be in place for the next 25-50 years. The Oil and Gas Authority in the UK has estimated that the total cost of UK oil and gas decommissioning alone will be \$58 billion¹, with UK along with Netherlands and Norwegian governments carrying 50-80% of the total through tax relief on expenditure. Understanding how the ecosystem has responded to man-made, hard substrate infrastructure that has been in place for a significant period of time, and how it may respond to new infrastructure that could be in place for the next 50 years, will be fundamental to inform decision-making and ensure that the health of the North Sea is maintained.

The 2-year (2015-2017) foundation phase of the 'INfluence of man-made Structures In The Ecosystem' (INSITE) research programme was funded by the oil and gas industry. This initial phase helped to establish preliminary, independent and transparent science to understand the influence of man-made structures in the North Sea ecosystem. The guiding principles and research objectives for INSITE were defined by an Independent Scientific Advisory Board (composed of leading independent marine scientists) and [pilot projects](#) were funded following an open call and peer review process overseen by the board. These pilot projects, which have now come to an end, utilised existing datasets (e.g. industry marine growth surveys, renewable energy surveys) and established modelling approaches, and were required to put all data and science outcomes in the public domain (e.g. in peer reviewed journals). Further detail on the science undertaken as part of this phase can be found on the [INSITE webpages](#).

Whilst these pilot projects have advanced our initial understanding of the role of man-made structures in the North Sea ecosystem, they have highlighted critical gaps in understanding and the need for a strong programme of supporting fieldwork, which will both be addressed by this programme. For example, the minimal understanding of larval biology and behaviour of common fouling species on offshore platforms limits the reliability of larval dispersal modelling and therefore hampers our ability to understand processes associated to ecological connectivity between man-made structures and the wider ecosystem. These pilot projects also highlighted the significant opportunities for INSITE science to benefit from strong partnership with industry, primarily in the form of access to existing and new industry-owned data sets, and through access to industry equipment, vessels and installations for fieldwork. This access can be challenging as it is subject to contractual agreements being in place, which can take time. An industrial Data Initiative, funded by industry, is therefore underway with the objective of enhancing the science outcomes of funded projects through the provision of additional access to industrial data. The Data Initiative has produced an

¹ UKCS Decommissioning 2018 Cost Estimate Report, June 2018

inventory of the raw data available from industry – ‘[INSITE Interactive](#)’. Registration on the portal is required to view available data.

To view the inventory you will be asked to register, and agree to the attached non-disclosure agreement. Further details will be provided on the registration page.

Once a funding decision has been made, the Data Facilitator will link researchers to the data they require to undertake their planned research, see section 3.2 for further details.

This programme is designed to address the gaps and opportunities identified by INSITE Phase 1, to build on the outcomes, and provide the robust scientific knowledge base needed for operators and regulators to make the best and most cost-effective decisions as man-made structures are decommissioned, and new structures are designed and deployed.

3. Scope

3.1 Programme objectives

The next two decades will see an unprecedented industrialisation of the marine environment with the number of man-made structures set to expand dramatically. For example, 1,800 offshore wind turbines are currently installed in the North Sea, with projections for further installation ranging from 7,000 to over 16,000 in all European waters by 2030². Alongside this dramatic expansion in marine renewables, work to decommission the North Sea’s aging oil and gas infrastructure is underway. As recently articulated by the European Marine Board³, there is limited coherent scientific rationale or adequate evidence base upon which to base the long-term management of offshore structures.

The overarching question that this programme is looking to answer is “How critical are man-made structures in the North Sea to ecosystem structure and function?” This will be addressed through three challenges:

Challenge 1: Understanding the role of man-made structures as an inter-connected hard substrate network in the North Sea. This challenge builds upon connectivity analyses in INSITE’s foundation phase that have established a baseline understanding of what species are present on man-made structures, how they may disperse and how ecological networks may develop and establish through the presence of structures alongside natural hard substrate and wrecks. For example, the cold-water coral *Lophelia pertusa*, which is typically found in deep waters in the North Atlantic, was first reported on northern North Sea oil platforms in the late 1990s⁴. Subsequently, with evidence for a self-seeding population and larval biological parameters established^{5,6} larval dispersal modelling through

² [The European Wind Energy Association \(2015\) Wind energy scenarios for 2030](#)

³ European Marine Board (2017) Decommissioning of offshore man-made installations. EMB Policy Brief No. 3

⁴ Bell N, Smith J (1999) Coral growing on North Sea oil rigs. *Nature* 402: 601

⁵ Gass SE, [Roberts JM](#) (2006) The occurrence of the cold-water coral *Lophelia pertusa* (Scleractinia) on oil and gas platforms in the North Sea: colony growth, recruitment and environmental controls on distribution. *Marine Pollution Bulletin* 52: 549-559

⁶ Larsson AI, Järnegren J, Strömberg SM, Dahl MP, Lundälv T, Brooke S (2014) Embryogenesis and larval biology of the cold-water coral *Lophelia pertusa*. *PLoS ONE* 9, e102222

INSITE Phase 1 suggests this key deep-water ecosystem engineer has spread across the North Sea on man-made structures. These man-made structures therefore now seem to be playing a significant role in the regional ecology of this species. Projects are needed to fill gaps in understanding of the larval biology of this and other ecologically significant fouling organisms on appropriate spatial and temporal scales so that models of species dispersal and network connectivity can be developed and optimised. Projects should ground-truth such models with appropriate population genetic approaches taking advantage of the rapid development of next generation sequencing technologies (e.g. RADseq, RADTag, 2bRAD). Proposals tackling this challenge will therefore need to combine modelling and genetic approaches with field studies of larval biology, development and behaviour. Proposal teams will need to develop field work strategies, most likely working in strong partnership with North Sea stakeholders (e.g. oil and gas companies, government agencies), to ensure adequate spatial and temporal sampling is developed for population genetics and alongside additional ground-truth studies.

Challenge 2: Understanding the role of man-made structures as artificial reefs in the North Sea. The current role of man-made structures as artificial reefs in the North Sea has not been quantified and we have no understanding of what effects the projected future expansion of marine renewable structures may have upon ecosystem function. The INSITE foundation phase has revealed that such artificial reef effects may extend through the trophic system with evidence, for example, that top predator foraging by grey seals has been altered by the presence of man-made structures. Proposals targeting this challenge should address key questions including: What is the magnitude of effect of artificial substrates on biomass and composition of both sessile and mobile fauna including ecologically important fish and marine mammals? What is the role of platforms as *de facto* marine reserves and do they contribute to a coherent network along with other areas where human activities are limited? Specifically, can any benefits for the designated Marine Protected Area (MPA) network be quantified from past or future networks of hard infrastructure (e.g. oil/gas platforms and offshore wind infrastructure)? Work on this challenge will be informed by the knowledge available in other regions where the regulatory regime has allowed so-called rigs-to-reefs development rather than requiring platform removal. For example, in the US Gulf of Mexico and offshore California, the US Department of the Interior has approved approximately 400 rigs-to-reefs programmes since the mid-1980s. Proposals addressing this challenge will build upon understanding of artificial reefs worldwide and develop a robust new science evidence base for the present day and potential future role of man-made structures as artificial reefs in the North Sea.

Challenge 3: Ecological monitoring and assessment of man-made structures as whole systems in the North Sea ecosystem. Man-made structures have been installed across the North Sea from the shallower, current-swept south to the deeper northern North Sea where finer muddy sediments are more prevalent. Such natural gradients have profound effects on the environments surrounding the structures. For example, the seabed at the base of oil platforms in the deeper northern North Sea is frequently covered with piles of accumulated drill cuttings whereas cuttings in the southern North Sea have been dispersed in the more energetic near-bed currents. The ecological implications of disturbance to drill cuttings piles during platform decommissioning are poorly understood creating uncertainties on the best environmental options. The existing evidence base also relies primarily upon classical benthic ecological and geochemical assessment giving great scope for the

application of new methodologies including environmental DNA (eDNA) and *in situ* approaches to record contaminant mobilisation. In terms of marine renewable energy installations, the ability of industry and regulator to monitor and understand the ecological impact assessment of turbine footings and subsea electrical cables is limited, especially given the numbers of installations projected for 2030. Proposals addressing this challenge should use existing platforms and sensors to develop smart monitoring and assessment approaches that consider man-made structures as whole systems rather than focussing on subsets of the structures. Innovative *in situ* approaches for monitoring and the use of autonomous systems to expand the spatial and temporal domains of this ecological assessment will be needed to deliver on this challenge. Projects tackling this challenge should apply existing platform and sensor technologies.

3.2 Proposal requirements

Project proposals can bid for up to £700k (combined cost to NERC and Cefas at 80% FEC) and may contribute to one, or more, of the programme's three challenges.

Applicants are encouraged to consider developing links with research being carried out by other North Sea nations and to avoid proposing research in overlapping geographical locations.

Cefas scientists are eligible to apply to this call, with co-funding from Cefas (of up to £600k) available to cover their research costs on proposals. Applicants from Cefas can be named on a proposal as PI and/or Co-I as long as there is at least one PI or Co-I on the proposal from a research council eligible institution. Applicants wishing to work with Cefas are encouraged to discuss their plans and desired level of engagement with Cefas as soon as possible.

Applicants are encouraged to develop strong partnership with industry and government agencies and, based on the experience of the INSITE Phase 1, it is anticipated that research projects will secure significant in-kind support from partners.

Applicants are encouraged to take advantage of the raw data available from industry as identified in the data inventory, part of the industry funded Data Initiative, which can be found at '[INSITE Interactive](#)'. Researchers will be required to register on the site to be able to view the available data. Navigational guidance can be found on the site and contact details for the Data Facilitator are available for any questions.

Once proposals are funded the Data Facilitator will coordinate access to data between the Data Owner and funded researcher.

4. Programme requirements

4.1 Programme funding

This announcement aims to fund at least six projects, each at a maximum £700k combined cost to NERC and Cefas at 80% FEC. NERC is looking to fund a balanced portfolio across the three Challenge areas and a broad geographic range across the North Sea.

Proposals should include formal request (and access costs) for NERC Services and Facilities (e.g. HPC, isotope analyses) where relevant. No additional funding is available to cover NERC Service and Facilities costs, therefore all costs associated with the use of NERC Services and Facilities must be included within the funding limit of proposals.

If National Marine Equipment Pool (NMEP) equipment is required as part of a proposal contact must be made with Marine Planning and National Marine Facilities (NMF) as soon as possible to ensure availability of equipment. SME's requesting equipment must be submitted and approved by Marine Planning no later than 5 July 2019 to ensure that costs are received in time for inclusion in proposal budgets.

4.2 Implementation and delivery

Proposals should present a work plan of up to 36 months.

All proposals must include milestones and deliverables to ensure that delivery of the science outputs can be monitored.

4.3 Knowledge Exchange and Impact

Knowledge exchange (KE) is vital to ensure that environmental research has wide benefits for society, and should be an integral part of any research.

All applicants must consider how they will or might achieve impact outside the scientific community and submit this with their application as a [Pathways to Impact](#) statement, with associated delivery costs where relevant. Pathways to Impact activities do not have to be cost-incurring; it is not a requirement to include funded activities. Any funds required to carry out any proposed, outcome-driven activities identified within the Pathways to Impact **must** be fully justified within the Justification of Resources statement.

The Pathways to Impact will identify those who may benefit from or make use of the research, how they might benefit or make use of the research, and methods for disseminating data, knowledge and skills in the most effective and appropriate manner.

An acceptable Pathways to Impact is a condition of funding. Grants will not be allowed to start unless unacceptable Pathways to Impact are enhanced to an acceptable level within one month of notification of the panel outcome.

All funded projects may also be required to engage with programme-wide KE activities, in which case appropriate funding for which will be provided by the programme.

4.4 Data Management

The [NERC Data Policy](#) must be adhered to, and an [outline data management plan](#) produced as part of proposal development. NERC will pay the data centre directly on behalf of the programme for archival and curation services, but applicants should ensure they request sufficient resource to cover preparation of data for archiving by the research team.

4.5 NERC Facilities

Prior to submitting a proposal, applicants wishing to use a NERC service or facility must contact the facility to seek agreement that they could provide the service required. Applicants wishing to use most NERC facilities will need to submit a mandatory 'technical assessment' with their proposal. This technical assessment is required for aircraft but not for NERC Marine Facilities (NMF – Shiptime and/or marine equipment) and HPC. For NERC, this means a quote for the work which the facility will provide. A [full list](#) of the Facilities requiring this quote can be found on the NERC website. The costs for the service or facility (excluding NMF and HPC costs) must be included within the Directly Incurred Other Costs section of the Je-S form and also within the facilities section of the Je-S form. Further information on [NERC services and facilities](#) can be found on the NERC website.

No additional funding is available to cover NERC Service and Facilities costs, therefore all costs associated with the use of NERC Services and Facilities must be included within the funding limit of proposals.

4.6 Programme management

A Programme Advisory Group will be set up to aid in the delivery of the programme. There will be two Programme Advisory Group meetings a year, at which each Principal Investigator, accompanied by up to three members of their project team, will be required to attend to present an update report of their project's progress and respond to questions from the advisory group. Costs for attending these meetings must be incorporated into the total cost of proposals.

A Programme Management Group with responsibility for coordination across the programme and delivery of programme outcomes will be set up and will consist of:

- Principal Investigators from all funded projects;
- INSITE Programme Director, Richard Heard;
- NERC Senior Programme Manager, Jessica Surma.

4.7 Reporting requirements

As with all NERC grant holders, there will be a requirement to report through the UKRI reporting system; this is required annually and continues for up to five years post grant end.

Submission of progress reports to the Programme Advisory Group in advance of its meetings will be required every 6 months, plus exceptional reporting if required.

5. Application process

5.1 How to apply

5.1.1 Full Proposals

Closing Date: 19 September 2019

Full proposal must be submitted using the Research Councils' Joint Electronic Submission system (Je-S). Applicants should select Proposal Type - 'Standard Proposal' and then select the Scheme – 'Directed' and the Call – 'INSITE SEPT19'.

This call will close on JeS at 4pm GMT on 19 September 2019 and it will not be possible to submit to the call after this time. Applicants should leave enough time for their proposal to pass through their organisation's Je-S submission route before this date. Any proposal that is incomplete, or does not meet NERC's eligibility criteria or follow NERC's submission rules (see [NERC Grants Handbook](#)), will be office rejected and will not be considered.

All attachments, with the exception of letters of support and services/facilities/equipment quotes, submitted through the Je-S system must be completed in single-spaced typescript of minimum font size 11 point (Arial or other sans serif typeface of equivalent size to Arial 11), with margins of at least 2cm. Please note that Arial narrow, Calibri and Times New Roman are not allowable font types and any proposal which has used either of these font types within their submission will be rejected. References and footnotes should also be at least 11 point font and should be in the same font type as the rest of the document. Headers and footers should not be used for references or information relating to the scientific case. Applicants referring to websites should note that referees may choose not to use them.

Applicants should ensure that their proposal conforms to all eligibility and submission rules, otherwise their proposal may be rejected without peer review. More details on NERC's submission rules can be found in the [NERC research grant and fellowships handbook](#) and in the [submission rules](#) on the NERC website.

Proposals for this call should be submitted in standard grant format following the requirements outlined in Section F of the [NERC research grant and fellowships handbook](#).

Please note that on submission to council ALL non PDF documents are converted to PDF, the use of non-standard fonts may result in errors or font conversion, which could affect the overall length of the document.

Additionally where non-standard fonts are present, and even if the converted PDF document may look unaffected in the Je-S System, when it is imported into the Research Councils Grants System some information may be removed. We therefore recommend that where a document contains any non-standard fonts (scientific notation, diagrams etc), the document should be converted to PDF prior to attaching it to the proposal.

No associated studentships can be requested under this call.

The expected start date for projects funded under this Announcement of Opportunity is March 2020.

If you wish to submit a query to the Data Facilitator regarding data sets, this should be submitted via the [INSITE Interactive](#) portal directly to the Data Facilitator.

5.2 Eligibility

Normal individual eligibility applies and is in Section C of the [NERC research grant and fellowships handbook](#). Research Organisation eligibility rules are in Section C of the handbook.

For this programme, eligibility includes researchers at Cefas.

NERC research and fellowship grants for all schemes may be held at approved UK Higher Education Institutions (HEIs), approved Research Council Institutes (RCIs) and approved Independent Research Organisations (IROs). Full details of [approved RCIs and IROs](#) can be found on the UKRI website.

Investigators may be involved in no more than two proposals submitted to this call and only one of these may be as the lead Principal Investigator.

6. Assessment Process

Proposals will be internationally peer-reviewed and final funding recommendations made by a moderating panel consisting of independent experts and members of the NERC Peer Review College where possible. Applicants will be given the opportunity to provide a written response to peer review comments prior to the moderating panel.

The assessment criteria to be used will be as follows:

- Research Excellence
- Fit to Scheme

Feedback will be provided to both successful and unsuccessful applicants.

NERC will use the recommendations of the moderating panel along with the overall call requirements and the available budget in making the final funding decisions.

7. Timetable

- Announcement published: 25 June 2019
- Deadline for submission of full proposals: 19 September 2019
- Moderating panel meets: December 2019/January 2020

8. Contact

For enquiries relating to this announcement please contact:

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