



Natural  
Environment  
Research Council

# Strategic Delivery Plan Overview of progress

2022–2023





**Our strategic objectives provide the framework for how we will achieve our vision and realise our principles, through world-class:**

People and careers	Places	Ideas	Innovation	Impacts
<ul style="list-style-type: none"> <li>• Balancing our funding to attract and retain global scientific leadership; and building communities of solutions-focused researchers.</li> <li>• Collaborating across UKRI to develop a collective approach to talent that nurtures disciplinary and interdisciplinary working.</li> <li>• Developing a deep understanding of our communities and using their insights to evolve our portfolio and to shape new funding practice.</li> <li>• Working with our community to promote greater diversity and inclusion across environmental science.</li> </ul>	<ul style="list-style-type: none"> <li>• Embedding an approach to place-based funding at local and regional level.</li> <li>• Creating and upgrading environmental infrastructures that unlock innovation and economic potential.</li> <li>• Maximising our investment within the UK through partnerships which allow research communities to work together at scale and develop clusters of expertise and investment.</li> <li>• Supporting UK environmental scientists to work with local communities internationally.</li> </ul>	<ul style="list-style-type: none"> <li>• Focusing our discovery science portfolio on excellent, ambitious and high-risk science; working in partnership across UKRI to develop a collective, interdisciplinary discovery science programme.</li> <li>• Pursuing strategic programmes that address the critical environmental challenges of climate change, biodiversity and habitat loss, and pollution.</li> <li>• Co-creating scientific exploration of large-scale, complex interactions within the Earth system.</li> <li>• Increasing our investment in public engagement with environmental science.</li> </ul>	<ul style="list-style-type: none"> <li>• Building the resilience of businesses, infrastructure and supply chains to environmental impacts and changing consumer opinion.</li> <li>• Pursuing positive outcomes for business and the environment that minimise the environmental impacts of consumption.</li> <li>• Realising the potential of sensing and monitoring technologies, artificial intelligence and digital twinning, autonomous and remote sensing, and high-performance computing to create new information services.</li> <li>• Creating the world's first national system to measure the UK's total greenhouse gas emissions.</li> </ul>	<ul style="list-style-type: none"> <li>• Embedding environmental science within UKRI's Strategic Themes.</li> <li>• Sustaining the UK's sovereign capability to advise and inform UK Government policy on the state of UK and global environment.</li> <li>• Determining the effectiveness and accelerating the adoption of nature-based solutions.</li> <li>• Maintaining the UK's position as a leading nation in international environmental science.</li> </ul>

Supported by **a world-class organisation:**

- Acting as one UKRI, as part of the new operating model, stripping out bureaucracy and becoming more efficient to deliver NERC and shared priorities.
- Ensuring NERC commissioning is informed by high quality, diverse scientific expertise and advice.
- Demonstrating the ongoing impact of NERC funding.
- Becoming environmentally sound across our head-office and institute operations while enhancing scientific productivity.

**We will embed the principles of diversity, resilience, connectivity and engagement across all our work, to support an outstanding research and innovation system**



# Approach to reporting

This report covers the period April 2022 to March 2023 inclusive. The report tracks performance against our ambitions as set out in the [2022 Strategic Delivery Plan](#), including identifying the learning from the delivery period and actions to improve our performance.

The structure follows the NERC Strategic Delivery Plan, itself informed by the [UKRI Strategy 2022–2027](#). Each of the six strategic objectives (world class people, places, ideas, innovation, impacts and organisation) has a summary page, followed by a page for each of the four ambitions identified as part of the strategic objective.

Each ambition is given a Red, Amber, Green (RAG) rating. This is based on an assessment using quantitative and qualitative indicators (including what the indicator tells us about progress); and learning and action (plans to maintain or achieve a Green rating). Quantitative indicators use data selected to add value to assessment of progress and potential to indicate a direction of travel. They are chosen for their insight into each ambition, aligning to UKRI measures where possible. This year's report will establish a baseline for future reports. We also include a financial summary page (Page 4) as a key part of this performance assessment.

# Financial overview

	£'m	Budget	Actuals	Variance
<b>NERC Core R&amp;D</b>				
Discovery Science		59.4	57.59	1.8
Strategic Research & Innovation		57.4	56.75	0.6
Postgraduate Training & Fellowships		36.03	35.53	0.5
National Capability		112.4	115.71	-3.3
Public Engagement		0.6	0.55	0.0
Enabling Change		3.1	5.43	-2.3
<b>TOTAL Core R&amp;D</b>		<b>268.9</b>	<b>271.6</b>	<b>-2.6</b>
<b>Other R&amp;D</b>				
Antarctic Logistics & Infrastructure		46.1	48.3	-2.2
UKRI Funds*		57.1	50.6	6.5
Operational Expenditure		12.5	12.1	0.4
<b>TOTAL Core R&amp;D</b>		<b>115.7</b>	<b>111.0</b>	<b>4.7</b>
<b>NERC Capital</b>				
Core capital		33.6	36.3	-2.8
Antarctic Logistics & Infrastructure		44.3	44.3	0.0
Infrastructure and DRI Funds		24.4	24.5	-0.1
<b>TOTAL NERC CAPITAL</b>		<b>102.3</b>	<b>105.1</b>	<b>-2.9</b>
<b>TOTAL NERC</b>		<b>486.9</b>	<b>487.7</b>	<b>-0.8</b>


\* Includes SPF, FIC, GCRF, Newton, NPIF, C-19 interventions, Carbon Fund, Tactical fund and Copernicus

Figures are subject to audit before spend is finalised.






# Delivery Plan: Overall summary tracker

## RAG definitions

-  **RED** – Significant gaps in the portfolio with significant activity required to achieve research priority / operational commitment.
-  **AMBER** – Activity towards achieving the ambitions is progressing but further activity is required to build the portfolio.
-  **GREEN** – Well balanced portfolio of activity with the potential to deliver the ambitions of the research priority / operational commitment assuming adequate portfolio management.

## Key

-  Maintaining the ambition
-  Progress towards ambitions
-  Backwards step

## Ambitions

		March 2023	Forecast March 2024
<b>People</b>	<b>Balance portfolio; Solutions-focused researchers</b>	Amber	Amber 
	<b>Interdisciplinary talent</b>	Amber	Green 
	<b>Insight</b>	Green	Green 
	<b>Diversity &amp; Inclusion</b>	Red	Amber 
	<b>Places</b>		
	<b>Place-based funding</b>	Amber	Amber 
	<b>Infrastructure</b>	Amber	Green 
	<b>Clusters</b>	Green	Green 
	<b>International partnerships</b>	Amber	Amber 

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## Ambitions

Ambitions		March 2023	Forecast March 2024
<b>Ideas</b>	Discovery Science	Green	Green 
	Climate change, biodiversity, pollution	Green	Green 
	Co-create large-scale science between our Centres and other research institutes	Green	Green 
	Public engagement	Amber	Green 

Innovation		March 2023	Forecast March 2024
Resilience		Green	Green 
Minimise impacts of consumption		Green	Green 
Digital		Amber	Amber 
GHG measurement		Amber	Green 



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## Ambitions

Ambitions		March 2023	Forecast March 2024
Impact	UKRI Strategic Themes	Green	Green 
	Sovereign capability	Green	Green 
	Nature-based solutions	Amber	Green 
	International leadership	Green	Green 

Organisation		March 2023	Forecast March 2024
Efficiency	Amber	Amber 	
Expertise	Amber	Amber 	
Impact	Green	Green 	
Sustainability	Green	Green 	

# People and careers: Summary & highlights

UKRI is transitioning to a unified approach to fellowships and studentships to develop and retain world-leading interdisciplinary talent in the UK. NERC is supporting this collective approach to talent by aligning our funding streams and current investments to the UKRI programme.

NERC has also played a leading role in developing interdisciplinary training in collaboration with other councils, launching the OneZoo Centre for Doctoral Training with BBSRC and MRC, and embedding environmental science considerations into collective funding such as the UKRI AI CDTs.

**In the past year, we have:**

- Launched the OneZoo CDT, a £4.8M investment in a consortium, led by Cardiff University, which brings together a wide range of research disciplines alongside non-academic partners to take a whole-systems view of zoonotic threats. The CDT will equip the next generation of world-leading scientists with the skills and insight necessary to prevent and control the spread of disease.

- Developed the *Changing the Environment* awards, supporting their governance, learning and evaluation, and facilitating connections between the early career researchers they support.
- Invested £3m in discipline hopping awards, designed to share perspectives and build collaborations which reach beyond the expected disciplinary partnerships towards environmental solutions.
- Developed our analytical capability, finding new ways to interrogate the corpus of publications in environmental science and deepen our understanding of our community and emerging areas of interest.
- Adjusted our criteria for discovery science funding to ‘capability to deliver’, helping to open up our funding and ensure that we support the development of scientific leadership across our community.

**Learning and Action:**

As part of our evaluation of the *Strategic Priorities Fund* programmes delivered through NERC, we have considered a range of approaches to designing and managing multi, inter- or trans-disciplinary programmes. These include the effective setting of objectives, the overall balance of programme funding and the resources and support needed to make the best use of champions. We will draw on these learnings to maximise the value of our current and future investments in interdisciplinary working.

We have not made the progress we hoped to make under diversity and inclusion. We are committed to enhancing diversity and inclusion in our community, including taking the time to build evidence and carefully consider our work and any interventions we might make. This remains a priority for NERC, and in the coming year we will further improve our data, engage with our community and identify suitable mechanism to boost diversity.

Responsible director: Susan Waldron



## Case study

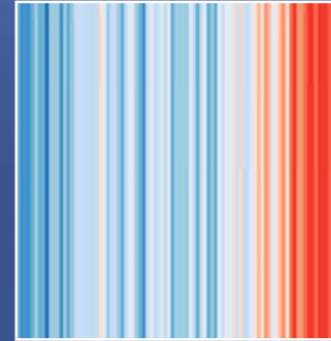
NERC’s postgraduate training portfolio delivers highly-skilled people who are prized by employers and deliver economic, societal and environmental impact. PhDs help to maintain a competitive science sector, which is crucial for the UK’s knowledge economy, and increase UK productivity through higher salaries and by driving innovation in firms<sup>1</sup>.

Research users from a variety of sectors value our training highly:

- 823 additional studentships funded by partners investing in NERC Doctoral Training Programmes, worth ~£73M
- 41% of NERC PhD graduates go on to roles in business or UK government<sup>2</sup>

The value of NERC’s support for Fellowships came through clearly in impact case studies submitted to REF2021<sup>3</sup>. NERC Fellowships played a key role in the following, for example:

1. <https://webarchive.nationalarchives.gov.uk/ukgwa/20201014041408/https://www.ukri.org/skills/reports-and-data-sources/impact-of-doctoral-careers/>
2. Of 860 2016–2021 graduates traced via LinkedIn. Broken down the data are Doctoral Training Partnerships: 40% of 795 graduates, Centres for Doctoral Training : 52% of 65 graduates.
3. Research Excellence Framework: a 7-yearly evaluation of the



Science-based standards and knowledge exchange drive sustainable palm oil production, protecting rainforests and reducing carbon emissions<sup>7</sup>  
*Knowledge Exchange Fellowship 2015–16: Jen Lucey, University of Oxford (left)*

Climate Spirals and Warming Stripes engage millions with climate change worldwide by delivering a clear, simple and locally-relevant message based on the latest science<sup>6</sup>  
*Advanced Fellowship 2012–17: Ed Hawkins, NCAS and University of Reading (right)*

- excellence and impact of higher education institutions [www.ref.ac.uk](http://www.ref.ac.uk)
4. REF 2021 Impact case study
  5. REF 2021 Impact case study
  6. REF 2021 Impact case study. Advanced Fellowships pre-dated Independent Research Fellowships
  7. REF 2021 Impact case study



Improved scientific methods for reporting greenhouse gases and ozone depleting substances lead to international emissions reductions<sup>4</sup>  
*Independent Research Fellowship 2015–22: Anita Ganesan, University of Bristol (left)*

Solutions for nitrogen pollution and peatland restoration deliver biodiversity gains and increase UK carbon stores<sup>5</sup>  
*Knowledge Exchange Fellowship 2015–16: Chris Field Manchester Metropolitan University (Peatlands – right)*

# Balance our funding to attract and retain global scientific leadership; and build communities of solutions-focused researchers

Current RAG rating  
Amber

2023/24  
Amber

## Narrative

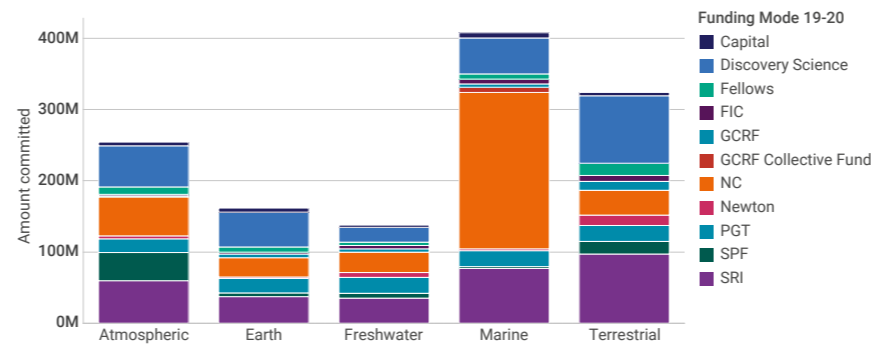
At the March 2023 meeting, Council supported the proposal to alter the balance of postgraduate training portfolio investment, directing a greater proportion of studentships into challenge-led training (primarily NERC Centres for Doctoral Training, CDTs) from academic year 2024/25 onwards. This rebalance would increase the new student starts across all active CDTs from 24 per year in 2023/24 to 96 per year by 2026/27. Representing a third (~34%) of NERC’s investment in studentships in 2026/27, and a 25% increase overall.

This will enable us to foster the next generation of researchers and leaders able to deliver solutions to societal challenges. The funding stream will also flex to support the emerging cross-UKRI collective talent training. Core NERC investment in at least one CDT per annum will be retained. The remaining balance of NERC CDTs vs. across UKRI collective training will be determined by: evaluation of the training opportunity relevance to the NERC strategy, and then competitively in response to excellence in training need and offer.

NERC continues to mature its portfolio of research programmes focussed on creating new interdisciplinary communities and capability to solve complex environmental challenges. The Changing the Environment awards are well established with teams and governance in place. We successfully delivered the first cross-award workshop, Programme Executive Board meeting and partnership forum bringing together leadership of NERC and the four host HEIs. A workshop on interdisciplinary approaches for environmental solutions, sharing best practice and learnings, brought together 100 participants from the CtE awards and the 39 institutions that received discipline hopping awards (£3M) to build expertise and agility to work across disciplinary boundaries.

## Quantitative indicators

### Indicator 1: Balance of NERC funding



### Indicator 2: £4.7M funding approved for 33 grants

- £1.4M supporting 11 new Knowledge Exchange Fellowships & 1 Innovate UK Studentship
- £2.3M from Strategic Research & Innovation Budget
- £1M from UKRI Infrastructure fund

## Qualitative indicators

### Indicator 1: Testimonial

“The Discipline Hopping Workshop hosted by NERC in September 2022 was a valuable way of sharing experience with interdisciplinary practitioners based on a wide range of projects and learning about how various projects have tackled interdisciplinary barriers to meet broader challenges. Learning more about NERC’s future plans in this area was also very helpful and further outreach and info sharing is encouraged.”

*Daniel Black – Population Health, University of Bristol*

### Indicator 2: Early career Discipline Hopping

70% of the ~200 interdisciplinary projects supported via the discipline hopping awards to 39 institutions were led by or involved early career researchers.

### Indicator 3: Panel Evaluation

The Embedded Researchers scheme developed as part of the UK Climate Resilience SPF Programme, was highly commended by the evaluation panel as a “novel and innovative way” of ensuring co-production and collaboration with non-academic partners and uptake of project outputs.

## Learning and Action:

As we continue to evolve the talent and skills and environmental solutions portfolio, we will continue to monitor progress and gather evidence to inform future activities in this space. As part of the cross-Council Talent Leadership team, we will ensure the development of challenge-led NERC CDTs is aligned with the maturing Collective Talent offering and balanced against disciplinary skills needs in environmental sciences. Work will continue to maximise the outcomes of the Changing the Environment programme including rolling out the evaluation, monitoring and learning framework, facilitating connections between early career researchers across the programme, and embedding the strategic partnerships with the HEIs. We will draw on insights and learnings from the evaluation of interdisciplinary programmes such as the SPF programmes, including the different interdisciplinary approaches.



# Collaborate across UKRI to develop a talent programme that nurtures disciplinary and interdisciplinary working



## Narrative

In May 2022, UKRI announced that we will transition to collective funding across our talent initiatives. As a first step we have brought together the research councils spending for talent, largely for fellowships and studentships, into a single budget line of £2 billion, covering the 2022 to 2025 spending review period.

The transition to collective talent funding will take a number of years. At the September 2022 meeting NERC Council supported extending DTP2 funding for 1 year (one additional cohort). This has aided aligning investment timings across UKRI to support opportunities for collective working and the New Deal for Postgraduate Research. NERC have further sought to increase flexibility within our portfolio to allow us to engage fully with collective talent working as it matures by increasing the proportion of our studentship budget that is delivered through the CDT mechanism, which has traditionally been an effective vehicle for supporting cross-UKRI challenge led training.

By way of example, this year we have commissioned the NERC/BBSRC/MRC funded OneZoo CDT, a £4.8M investment funding a consortium, led by Cardiff University, which will equip the next generation of world-leading scientists with the skills and insight necessary to tackle current and future zoonotic threats. The CDT spans disciplines from Anthropology to Zoology, offering both breadth and depth of knowledge in environmental, veterinary, biomedical, humanities and human clinical research. The training has been designed to encourage a translational approach by uniting academic and non-academic partners around common challenges and will enable an integrated systems approach to environmental prevention and control strategies.

The £117m UKRI AI CDT Call is in progress and includes a priority area on ‘environment and energy’ to train students at the interface between AI and environmental science. Outcomes are anticipated in autumn 2023 for new/renewed CDTs starting in 2024. Two of the current 16 UKRI AI CDTs are in the NERC remit. The continued investment at this interface may or may not be realised with potential implications for future environmental science.

## Quantitative indicators

### Indicator 1: Number of studentships/fellowships supported

- 230 notional student starts within DTPs in the reporting period
- 24 notional student starts within CDTs in the reporting period

### Indicator 2: £11M funding approved for 82 grants

- £9.8M for Fellowships
- £0.7M for Advanced post graduate training
- £0.5M for Globalink placements – UKRI-Fund for International Collaboration

### Indicator 3: Additional CDT funding

- £2.7M funding leveraged from across UKRI (MRC/BBSRC) for additional studentships in the NERC-led OneZoo CDT

## Qualitative indicators

### Indicator 1: Testimonial

“Predicting, detecting and controlling zoonotic infections represents one of the greatest challenges faced by humanity. These challenges are heightened by a historical lack of interaction among different disciplines studying these diseases, which slows progress on identifying key drivers of zoonoses and in developing pragmatic mitigation strategies. This £7.8M cross council (NERC, BBSRC and MRC) funded OneZoo CDT provides a unique opportunity for us to train the next generation of researchers to tackle zoonotic infections with an unprecedented level of diversity and transdisciplinarity.” *Joanne Cable, Director of the OneZoo CDT*

### Indicator 2: Interdisciplinary working

“Interdisciplinary working is essential to address the complexity of the challenges we face today. However, to achieve this aspiration we must first have excellence at a disciplinary level. A core aspect of interdisciplinary working is taking time to understand other fields, but this is quite different from actively applying disciplines beyond a researchers training which can risk poor quality research. Whilst a broad understanding is certainly valuable, expecting individuals to be an expert in numerous disciplines is challenging, particularly at an early career stage. Interdisciplinary working should not be at the cost of excellence or disciplinary endeavour, indeed, if carefully orchestrated it can boost single discipline advancements through broadening thought processes and enhancing ingenuity.” *Prof Nicola Beaumont, PML and Science Committee*

## Learning and Action:

The focus of the next reporting period will be to work with our advisory bodies and with colleagues across UKRI to shape the transition to collective talent funding. We will seek to embed the principles of collaborative working within upcoming opportunities as appropriate and as the collective talent programme matures. We are actively engaging on the AI CDT call and we will run a new open competition for CDTs, with 4 new investments starting in 2024/25. We will trial a new approach to CDT commissioning that provides increased opportunity for our communities to coalesce around environmental challenges and to equip the next generation of environmental scientists with both critical disciplinary knowledge and the skills required to work across disciplines.

# Develop a deep understanding of our communities and use their insights to evolve our portfolio and to shape new funding practice



## Narrative

NERC continues to establish capacity and expertise in understanding our communities to generate strategic insight. This year we have consolidated NERC’s capability to evidence how our investments have moved the field forward, through qualitative and quantitative approaches that provide a new perspective on the environmental science community.

Three new case studies were added to a portfolio of evidence that describes the scientific impact of NERC funding. This year we have explored co-authorship and collaboration networks for the first time to understand the evolution of communities over time and tried an outcome-focussed approach to understanding the role of NERC funding, e.g.: mapping publications back to funding instead of measuring ££ out the door. This builds our more holistic understanding of how and where NERC investments influence and sustain the communities we serve.

We commissioned analysis across a large corpus of papers from a UK industry expert in bibliometrics (Clarivate). This analysis used a machine-learning method to group environmental science papers by themes and subject, providing an understand the landscape from the ‘bottom up.’ This activity is novel for NERC and we do not have the computing power for topic discovery on this scale. This work has provided learnings and a wealth of new data, and understanding its potential to generate strategic insight for NERC is ongoing.

This work continues to generate insight of the key people and areas of interest in the ES community, used to build the pipeline of Honours nominations and speakers for Council/NERC advocacy events. We have engaged directly with our community to inform case studies and Insight from these conversations is systematised in a new Insight Directory hosted on the NERC Insight Hub.

We have implemented a new approach to Executive Chair engagement, designed to build and maintain relationships with senior leadership of HEIs of strategic importance to NERC (reaching our top-20 funded HEIs over a five-year period). The insight from these visits will be disseminated across NERC to help shape our strategy development and approaches to delivery.

## Quantitative indicators

### Indicator 1: HEI visits

- During 2022/2023, the NERC Senior leadership Team visited 13 HEIs, which included 177 participants, led by the Director of Research and Skills joined by colleagues across NERC. Held virtually, the visits are an opportunity for strategic discussions around priorities and opportunities.
- Two Exec Chair visits, to Birmingham and Sheffield, have been held in 2023.

### Indicator 2: Honours nominations

- Eight Honours were awarded to NERC nominees across the 2022 Queen’s Birthday Honours and the 2023 New Year Honours, of which six were awarded to women. Improving the gender balance ensures the impact of excellent research across the field is recognised.

## Qualitative indicators

### Indicator 1: New Insight

Three new case studies have been produced that describe NERC’s role in scientific advances in understanding on microplastics, the causes of the K-PG mass extinction event and tropospheric ozone. These case studies help NERC advocate for curiosity-driven investments, for example, at the SDP launch event, in the NERC advocacy pack, and submitted as evidence to UKRI, and understand how our funding has been successful.

### Indicator 2: Testimonial

“Visits such as these allow us to obtain feedback on our key research areas, to gain insights on the direction of travel and current thinking at the most senior level within our funders, and provide us an opportunity to feed in to future thinking through our partnership with the funder.”

*Steve Taylor, University of Birmingham Assistant Director of Research Strategy and Services*

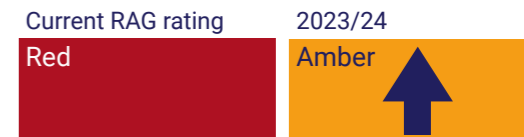
### Indicator 3: Testimonial

“NERC provides very strong candidates in the Honours process. They have been working hard to improve diversity in the number of female candidates in a predominantly white-male led field. There has also been a marked increase of nominations for individuals who identify as coming from an ethnic minority.”

*Vivian Snell, Honours Secretary at GO Science*

**Learning and Action:**  
Retaining our explorative, iterative approach, this reporting year we will focus on consolidating the capability we have developed, engaging with relevant internal and external audiences to explore how the range of insight on our communities – from bibliometric analysis, qualitative enquiry and Exec Chair visits – can benefit NERC over the long-term and begin to influence our portfolio and funding. This will involve reviewing the products we have created and our recent commission to focus more clearly on delivering this ambition. We will deliver a scheme of HEI engagements for NERC’s new Exec Chair and ensure strategic insights are disseminated.

# Work with our community to promote greater diversity and inclusion across environmental science



## Narrative

The new NERC Future Leaders’ Council will bring a diversity of voices that will advise and inform the NERC Executive and help build a diverse talent pipeline for the future. Members are drawn from a wide variety of backgrounds and experiences, not typically seen in our current governance structure. Recruitment has been completed, and the FLC will meet for the first time in June 2023.

In December 2022, we published our report: [NERC funding investments: community diversity and prevalence of differential outcomes for gender and ethnicity 2014–15 to 2019–20](#). We will review applicant data from our funding portfolio and compare it with the composition of the baseline community (HESA data) to understand whether there is evidence of underrepresentation and propose targeted actions to support engagement.

Throughout 2022, we have been working with our training grant holders to improve our annual diversity data. Next steps: Drawing on the full dataset for 2021–22 and 2022–23, we will analyse diversity data provided by our training grant holders and compare it with the composition of the baseline community (HESA data) to understand whether there is evidence of underrepresentation and propose targeted actions to support engagement.

During 2022, NERC has been exploring milestones for positive action that complement a UKRI-wide approach. We now have a clear understanding of the evidence base and what steps we would need to take to put positive action in place. We will develop a roadmap of foundation actions to support possible positive action in the future.

In November 2022, we held a NERC Diversity and Inclusion Knowledge Exchange event, sharing and disseminating outcomes, learning and good practice arising from projects funded under two initiatives: making environmental science equal, diverse and inclusive and digital technologies to open up environmental sciences. The event focused on: co-designing inclusive fieldwork; improving diversity in postgraduate research; decolonising the curriculum; and opening up environmental science to underrepresented communities.

## Quantitative indicators

### Indicator 1: £1.5m D&I focused funding

- We have agreed a ringfenced fund of £1.5m for D&I focused activity. This has now been allocated for 23/24, and we are developing the focused funding mechanism in place to maximise the benefits of this funding in future years.

### Indicator 2: Grants analysis

- Analysis of the UKRI data set for NERC (2014 to 2020) shows that there is no statistical difference in outcome for different populations of protected characteristics for Discovery Science, Highlight Topics, Strategic Programme Areas, and research programmes NERC delivered funded by the UKRI Strategic Priority Fund. The data covers 8 funding streams and 3 fellowship funding streams across the breadth of funding processes we use to assess competitive funding, providing an aggregated data set of 26,735 applicants.

## Qualitative indicators

### Indicator 1: Testimonial

“The funding we were awarded for the CULTIVATE project was a real kick-starter for brining a community of practitioners together to co-develop solutions and address inclusion and accessibility in undergraduate fieldwork. We were able to produce a handy little guide with the sole aim of getting conversations started and pointing people in the direction of shared advice and top tips. The feedback from the community has been overwhelmingly positive, with many institutions utilising our guides or a simple approaches to raising awareness amongst colleagues. Our ideas and outputs from CULTIVATE have started to gain traction with teachers in secondary and further education, who want to make their fieldwork more inclusive.

It was a wonderful opportunity to be part of, and contribute to the Diversity and Inclusion KE event last year. Not only were we able to share some of our takes on the process as well as the issues we were aiming to address, it was wonderful to see what other colleagues worked on and what their approaches were. It was a value event that really helped to break us out of the silos we all operate in.”

*Lynda Yorke, Bangor University commenting on the D&I KE event*

## Learning and Action:

Although we have made progress in our governance structures and improved our understanding of the diversity of our community, real change will take time, effort and thoughtful reflection over the longer term. We have an additional associate director taking responsibility for key workstreams under this ambition, and activities to further improve our data, engage with our community and identify suitable mechanisms to boost diversity remain a priority for the coming year.



# Places: Summary & highlights

NERC continues to have a high proportion of its funding allocated outside the greater south east (approximately 70% in total), and approximately 75% of World Class Labs funding is also outside the greater south east to ensure our Centres and infrastructures across the UK retain their leading capabilities. We are considering how to manage our portfolio to ensure that we continue to invest in excellent environmental science, while also delivering economic and social benefit to the regions and communities across the UK. Challenges also remain in delivering the international aspect of place as uncertainties remain over the funding landscape.

## In the past year, we have:

- Invested over £2.8M capital in 2022–23 into the NERC Scientific Support and Facilities portfolio across the UK and £50m in six multidisciplinary partnerships that will make a significant contribution to meeting NERC's research and innovation priorities including a cluster that will develop the improved predictive capabilities for UK extreme weather.

- Supported efforts to ensure that as the four awards within the Regional Impact from Science of the Environment (RISE) programme come to an end over the next 18 months, they can develop a self-sufficient model which ensures the legacy of RISE.
- Used the learnings from RISE to inform a cross-Council placed based research programme on coastal communities.
- Secured funding for the Floods and Droughts Research Infrastructure and begun work to identify potential catchment areas in the Thames, Tweed and Severn river basins.

## Learning and Action:

We will continue to evolve our contribution to the Place agenda, specifically understanding the economic impact of our regional investments in infrastructures and Centres. We will use our experience of regionally-focused investments to support the UKRI Themes in developing programmes which draw on environmental science to boost prosperity and resilience across the county. We will remain agile and open to opportunities to lead or join collaborative projects to ensure the UK's environmental science community benefits from international working and can respond to environmental challenges at continental or global scales.

Responsible director: **Iain Williams**

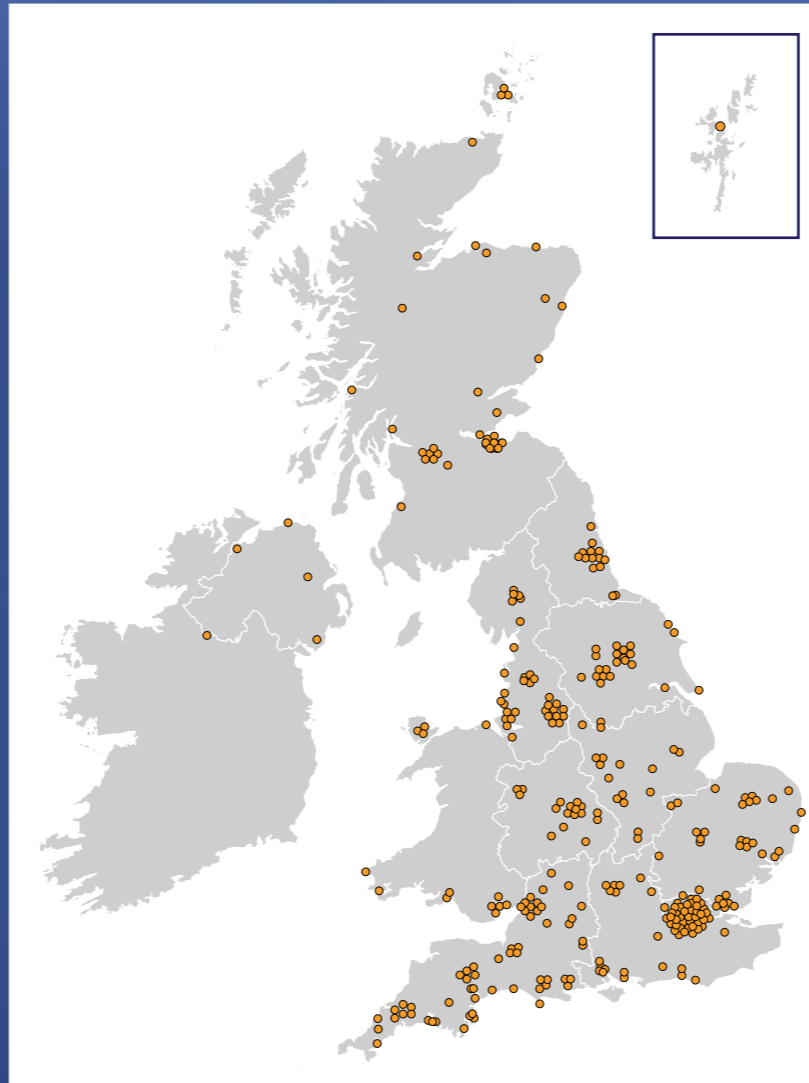
## Case study

NERC invests in outstanding infrastructure, people, research and innovation across the UK. Around 70% of our funding in the last decade was invested outside the Greater South East.

Our scientists work with other experts, such as engineers, economists, and innovators to bring environmental solutions to where they are needed. This includes working with industries such as aquaculture, renewable energy, and utilities, benefitting local economies and communities.

Through our Research Centres and partners we deliver national capabilities for the UK in critical and sensitive areas of environmental science, such as geological records and marine resources.

*Locations that have benefitted from NERC science. Source: Impact case studies*



# Embed a sustained approach to place-based funding at local and regional levels

Current RAG rating  
Amber

2023/24  
Amber

## Narrative

Council has endorsed a set of principles to embed an approach to place-based funding and NERC investments to meet the commitments in the Strategic Delivery Plan and UKRI place-based objective:

- Improve understanding of the regional economic and place-based impact, diffusion and value of NERC investments into the community/place.
- Maximising the regional economic and environmental impacts of environmental science.
- Place considerations in NERC funding and governance.

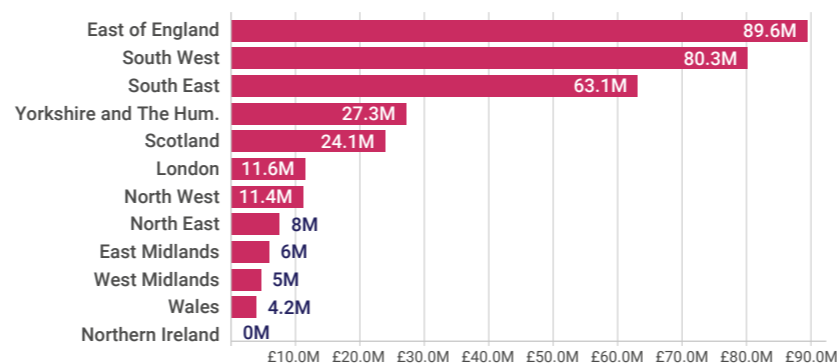
Analysis was undertaken to understand NERC’s regional spend 2012–2021 (approximately 70% outside of the Greater South-East) to inform discussion at Council and the development of the principles. An approach to monitor future regional spend is currently being developed to get a clearer picture of the diffusion of significant NERC investments into places (first principle).

Work is underway across multiple functions in NERC to implement these principles. The cross-directorate team will develop and operationalise activities to support delivery of these principles. For example, ensuring geographical representation across our governance and advisory structures and developing place-based considerations in future commissioning of new infrastructure, capital, and services & facilities calls

As the four awards within the Regional Impact from Science of the Environment (RISE) programme come to an end over the next 18 months, we are supporting their efforts to move to a self-sufficient model ensuring legacy of RISE. iCASP for example has evolved its vision and already secured £1.3M towards its sustainability. A programme level evaluation has been agreed to capture the learnings and outcomes from RISE. Early learnings have already informed the design of new cross-Council place-based investments including Resilient Coastal Communities and Seas and Local Policy Innovation Partnerships via the *Creating Opportunities, Improving Outcomes* Strategic Theme.

## Quantitative indicators

Indicator 1: Distribution of NERC funding in UK, 2022–23



Indicator 2: £1.2M funding approved for 1 award

- Resilient UK Coastal Communities and Seas

## Qualitative indicators

Indicator 1: Testimonial

“NERC are one of the only funders considering how place-based research investments can bring considerable environmental and community benefits to the South-West and the UK. The SWEEP programme delivered over £20 of benefits for each £1 NERC invested.”

*Ian Bateman, Director of the RISE award South West EEP (SWEEP)*

Indicator 2: Natural Flood Management

As part of the Yorkshire Integrated Catchment Solutions Programme, outputs from the Upper Rother project have been used by the Don Catchment Rivers Trust (DCRT) to prioritise interventions that provide soil health improvements and reduce flood risk. DCRT stated “The study has increased the credibility of Natural Flood Management (NFM) proposals, but we believe it to have enhanced the profile of DCRT as a deliverer of NFM. Therefore, this makes the Trust a more attractive partner in the eyes of funders.”

**Learning and Action:**

Focus in the coming year will be translating these principles and implementing into practice across relevant activities, remaining aligned to UKRI’s place work. As the RISE awards come to an end the NERC programme team will work to ensure evidence, legacy and learnings continue to inform ongoing developments and future investment opportunities and not lose the momentum created by the RISE programme (e.g. embedding environmental sciences into regional growth plans, resilience and adaptation to climate change). The NERC team will also work closely with a small number of Centres to pilot an approach to capture their place related economic benefits, value and diffusion of NERC investments into the community/place.



# Create and upgrade environmental infrastructures that unlock innovation and economic potential



## Narrative

NERC has invested £6.6 million in its 2022 Strategic Capital Call to improve the UK’s national research infrastructure by funding the purchase of 10 state-of-the-art pieces of equipment across the UK. Scientists researching ways to tackle climate change and other environmental challenges facing the UK will benefit from a major upgrade of research equipment. This new infrastructure will, for example:

- enable scientists to better monitor volcanoes
- respond to floods and droughts
- advance their understanding of the effects of climate change on the atmosphere
- trace minerals in the earth

FDRI Catchment selection is underway. The three basins that are being investigated further at this time are (1) Thames, (2) Tweed and (3) Severn. These have been selected based on their scientific merits with these three basins representing end members in terms of physiographic characteristics.

The locations for the Carbon Storage Research Facility are being scoped further within North East England on to near shore in the south North Sea, within the geology that will be used by the Government announced Track 1 clusters in the Humber and Teesside locations.

NERC has awarded a five year £45m contract to Babcock International, based in Rosyth Scotland to maintain and upgrade our three research ships. The shipbuilding industry supports more than 40,000 jobs across the UK and this contract will secure jobs and specialist skill base in the local area.

## Quantitative indicators

### Indicator 1: £7.8M funding awarded for world-class labs

UK Region	Facilities funded	Awarded (£M)
East Midlands	3	£1.84M
East of England	1	£0.45M
London	1	£0.67M
North West	2	£1.46M
South East	3	£1.97M
South West	1	£0.65M
Wales	1	£0.75M

### Indicator 2: Progress of FDRI and CO<sub>2</sub> storage

The Floods and Droughts Research Infrastructure was awarded £38m from the UKRI Infrastructures Fund following business case approval. NERC invested £800k in 22/23 to complete the business case with infrastructure spend starting 23/24.

UKRI and NERC invested £886k in 22/23 to further scope a geological CO<sub>2</sub> Storage Research Facility that will enhance regulation and drive innovation through fundamental and applied research.

## Qualitative indicators

### Indicator 1: Testimonial

“I am thrilled that UKRI have allocated funds – for field monitoring, digital infrastructure and innovation testbeds for technology development – to transform our understanding of river basin hydrological processes and system dynamics. Such new fundamental research is vital to underpin sustainable catchment management, and enhance ecosystem and human resilience to flood and drought impacts in a changing water world.”

*Professor David Hannah, Director of the Birmingham Institute for Sustainability and Climate Action at the University of Birmingham, Chair of the FDRI scoping study steering committee and Chair of NERC Science Committee*

### Indicator 2: Testimonial

“This exciting scoping study has shown the need for a world-leading, deep geological CO<sub>2</sub> storage research facility in the UK. Working closely with a range of stakeholders, we established a list of science questions that this facility would address in order to develop applied research and innovation to help the UK progress towards net zero.”

*Michelle Bentham, BGS Chief Scientist for Decarbonisation and Resource Management*

**Learning and Action:**  
To deliver the NERC Place agenda ambitions the Strategic Capital Call 2024 will consider place for the first time in new capital investments. As part of the call, applicants can explain their choice and contribution to place and location. This can be considered during assessment as part of the overall balance of the portfolio. Further consideration will be made to narrow down the locations for new major investments of Floods and Droughts Research Infrastructure and the Carbon Storage Research Facility.

# Maximise our investment within the UK through partnerships which allow research communities to work together at scale and develop clusters of expertise and investments



## Narrative

NERC continues to commission capabilities and facilities which are designed to support the environmental science community across the UK. These capabilities and facilities provide the additional benefit of building up a critical mass of research capability in specific locations across the country.

In preparing to recommission several National Capability investments, NERC is working closely with NERC Centres and providers to understand priorities and what capability can feasibly be provided based on available budgets, to enable financially sustainable National Capability provision in the longer-term. This will inform recommissioning of, for example, a suite of NERC Scientific Support and Facilities (S&F) across the UK, an investment of £70M over the next seven years.

Independent evaluation of five of the facilities in the NERC Scientific Support and Facilities (S&F) portfolio, located across the UK, confirmed all are meeting or exceeding their core requirements, and particularly acknowledged efforts to provide continued support to NERC research during the COVID-19 pandemic.

Development of a set of eleven independent recommendations to keep NERC Centres at the cutting edge and ensure that NERC continues to maximise its investment in its Centres across the UK.

As part of continued NERC support to enable UK researchers to access international partnerships and forums, NERC has renewed its status as a Public Sponsor of Global Earthquake Model (GEM) until 2025.

## Quantitative indicators

### Indicator 1: £47m Multi-Centre Science investment

NERC has invested in six multidisciplinary partnerships that will make a significant contribution to meeting NERC's research and innovation priorities including a cluster that will develop the improved predictive capabilities for UK extreme weather necessary to enable development of robust adaptation and resilience strategies by the UK government and businesses.

### Indicator 2: Capital Investment

NERC has invested over £2.8M capital in the 2022–23 FY into the NERC Scientific Support and Facilities portfolio across the UK, to maintain service provision, reduce carbon emissions and develop capability, to enable the UK scientific community to conduct cutting edge research in environmental science.

### Indicator 3: REF 2021 Case Studies

Out of 419 Impact case studies submitted that were linked to NERC, 49% were directly linked to the NERC funded Research Centres or facilities – demonstrating that NERC's underpinning National Capability enables the UK's Higher Education Institutes to bring about tangible change or benefit to the UK economy, society, culture, public policy or services, health, the environment or quality of life.

## Qualitative indicators

### Indicator 1: Testimonial

Recent independent panels have recognised the efforts of NERC facilities in the drive towards net zero. Specifically, feedback from the NOC midterm review panel included that “the drive and lead provided towards net zero oceanography is excellent and pioneering”, and an independent review of the Facility for Airborne Atmospheric Measurements (FAAM) Airborne Laboratory's annual report noted that the facility's forward vision embraced “opportunities to take a lead in studying the future of sustainable aviation”.

### Indicator 2: Expert Panel

An expert panel with UK and international representation was convened to review the present portfolio of UK Scientific Sustained Ocean Observations – to identify which are important, both to domestic and global ocean observations, and why. The panel commended NERC for recognising the importance of funding systematic sustained ocean observations as part of its entire environmental research portfolio. The panel also commented that ‘the UK is to be commended for undertaking this exercise and sharing its findings with a wide international audience would be very beneficial’. Domestic sustained observations enable the UK to understand the seas of the Exclusive Economic Zone.

## Learning and Action:

NERC will continue to work with NERC Centres and National Capability providers to ensure investments are sustainable in the longer term. As an example, NERC will review the comparative costs vs. scientific need/effectiveness of its sustained ocean observations portfolio, to determine the balance of future investments and to ensure the long term financial sustainability of high priority monitoring systems.

We will also work with NERC centres to better understand the place based impacts of our investments, and to embed place considerations into National Capability commissioning processes where appropriate.

# Support UK environmental scientists to work with local communities internationally

## Narrative

As part of the Spending Review, BEIS (now DSIT) designed a new International Science Partnership Fund (ISPF) to replace previous international funds (Newton, GCRF and FIC) which have been discontinued. Progress with ISPF to date has been delayed due to the uncertainty of funding following the Ukraine situation (ODA review pending) and Horizon Europe. For this year, NERC awarded £36.3M of funding approved for 93 awards.

In 2022 the international team enabled award holders from NERC’s Newton Fund LATAM Biodiversity programme to gain access to over £1M follow-on funding from Defra’s fund for Global Centre on Biodiversity for Climate (GCBC). Funded projects which looked to improve our understanding of Latin American biodiversity including biodiversity sensitivity to climate change, management of invasive species affect timing biodiversity, effects of intensive agriculture, and pacts of kelp harvesting for marine biodiversity.

A new proposed programme on Nature based solutions (NbS) in Sub Saharan Africa is currently being planned with several scoping workshops held with local communities – Key research priorities include:

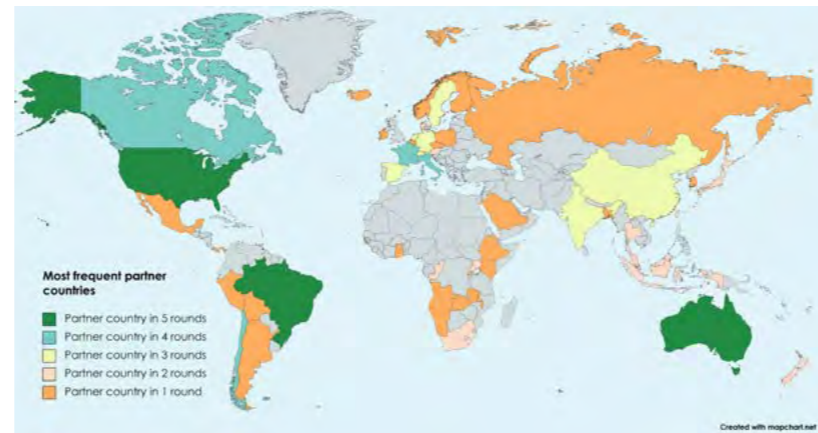
- producing an open evidence base of NbS impacts that makes use of new methods and technologies to quantify the diverse impacts of NbS
- understanding the scalability (or spatial scale) and contextualisation of NbS
- whole-system valuation and optimisation of NbS
- empowering community-driven governance of NbS (Page 36 gives details)

The Global Partnership Seed Fund (GPSF) funded 12 new projects for 2022. This brings the total number of projects funded to 84 grants since 2018. Research covers the whole of NERC remit and grants have included research on sea ice carbon storage, magma and volcanic behaviour studies, landscape ecology, and lightning effects in tropical forests. Many of the outcomes of the research have been used by policy makers and local communities e.g. to detect volcanic activity early and prevent loss of life.

## Quantitative indicators

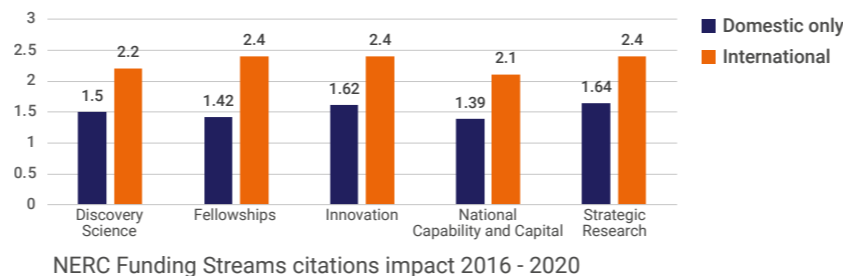
### Indicator 1: Geographical range of partner countries for GPSF

The global reach of GPSF has seen collaborations with USA, Australia and Brazil funded for every round. Note: the Russian project is not current.



### Indicator 2: Co-authorship of papers internationally

NERC analysis of citation impacts demonstrates the additional impact generated by papers with international co-authors.



Current RAG rating  
Amber

2023/24  
Amber



## Qualitative indicators

### Indicator 1: Testimonial

“The NbS scoping process has had impact in several areas.... integrating the local voice into the funding call development process will help to give beneficiaries of the call more ownership and make the call more focussed on contextual challenges on the ground.”

*Bart Hill Loughborough University and Alice McClure, Climate System Analysis Group at the University of Cape Town*

### Indicator 2: Workshop

NERC co-hosted an Indo/UK workshop in Delhi, January 23, on solid Earth hazards. This was a successful and high profile in India, opened by the Minister of Science and reaching several main news outlets. Programme officially announced on Wednesday 26 April by the Science Ministers of both countries.

## Learning and Action:

Due to the changing priorities within new and existing funding streams, there have been limited opportunities to take forward any new strategic international programmes. NERC will need to be agile in finding new opportunities, including working in partnership with convenors such as Belmont Forum and FCDO to build our priorities into collaborative calls which can secure support from a range of funders in the UK and internationally. The NbS call, for example, is looking to leverage additional funding from the UKRI themes and FCDO.



# Ideas: Summary & highlights

NERC retains a strong portfolio of research focused on critical environmental challenges such as climate change, biodiversity and pollution. By encouraging communities of researchers to collaborate on these important problems, we both draw on and build expertise within the UK to provide global leadership in these shared challenges. We have also increased our investment in the adventurous discovery science which pushes at the frontiers of environmental science, developing new tools, methodologies and discipline-shifting discoveries.

We have invested in new approaches to environmental science, rewarding ambitious, high-risk research and encouraging discipline hopping. As well as delivering excellent science, these approaches will help our community prepare for the collective interdisciplinary funding and strategic investments which will come through UKRI in the coming years.

## In the past year, we have:

- Invested £47m to support NERC's research centres to work collaboratively to tackle some of the most significant environmental challenges facing the UK.
- Invested £5.5m, matched by the Met Office, to improve forecasts of extreme weather events at kilometre and sub-kilometre scales and help the UK better manage weather-related risks.
- Trialled a new approach to randomised funding within our discovery science portfolio, simplifying the assessment process by ranking proposals into bands. Awards were made to projects within the highest bands and the remaining budget was then allocated randomly to projects in the next band.
- Commissioned a substantial Public Dialogue to explore what matters to the public about environmental science to inform future strategy and planning across NERC.

## Learning and Action:

We will continue to review the revised approaches to discovery science funding, using the learnings to develop NERC and UKRI funding streams. We will carry out an evaluation of our Public Engagement funding, to understand how the landscape is shifting and responding to NERC's continuing investment and leadership.

Responsible director: Susan Waldron

## Case study

### Why do microplastics matter? Pioneering understanding on harm caused to sea life

NERC-funded research and facilities have underpinned our understanding of the harm microplastics cause to marine life and the wider marine ecosystem. Pioneering research on marine organisms at the bottom of the food web and novel application of bioimaging techniques have provided a blueprint for microplastics research beyond the ocean, where NERC-supported research is revealing their presence in fresh and waste-water, on land and in the atmosphere.

The term “microplastics” was coined in a 2004 seminal paper describing the long-term accumulation of plastic fragments, smaller than sesame seeds, at the sea surface and on shorelines. Drawing on 60 years of data from the NERC-funded Continuous Plankton Recorder, University of Plymouth researchers uncovered some of the earliest records of plastic entanglement and confirmed for the first time a significant increase in open ocean plastics in recent decades. This discovery opened a new field of scientific enquiry and laid the foundation for nearly two decades of pioneering research into the effects of microplastics on our marine environment and beyond



This body of work has provided compelling evidence that has underpinned changes to policy and legislation including the ban on microplastic beads from the manufacture of wash-off cosmetics and the UK plastic bag tax.

# Focus our discovery science portfolio on excellent, ambitious and high-risk science; work in partnership across UKRI to develop a collective, interdisciplinary discovery science programme

Current RAG rating  
Green

2023/24  
Green

## Narrative

We have embedded our refreshed discovery science, replacing standard grants with Pushing the Frontiers (PtF), which has sought to support researchers to be adventurous and ambitious with funding for high-reward larger scale projects. We have undertaken and evaluated a pilot call, Exploring the Frontiers, focused on supporting dynamic exploration of ideas that advance the discipline or lead to future paths of discipline-shifting discovery.

This period has seen a strong focus on reducing unnecessary bureaucracy, enabling researchers to focus on making ground-breaking discoveries and developing cutting-edge innovations by simplifying and streamlining our processes.

We have trialled a new approach to peer review and assessment as part of its EtF. The time-intensive system of ranking proposals was replaced by scoring proposals and assigning them to bands. Awards were made to projects within the highest bands and the remaining budget was then allocated randomly to projects in the next band. Only projects that reached the 'fundable' threshold received awards. This pilot was designed to reduce the burden on reviewers, and potentially to increase the diversity of award recipients. NERC will assess the pilot against these aims, and share its findings across UKRI to support the review of peer review. In the next period we roll out this approach to our PtF assessment and will trial a streamlined panel assessment in PtF.

In preparing our communities to respond to collective interdisciplinary discovery science we have provided funding through our Discipline Hopping for Discovery Science initiative to facilitate exciting new collaborations for our community that will build momentum towards true discipline integration and enable adventurous and ambitious curiosity-driven, high-risk and high-reward projects that push the boundaries of Discovery Science. In the next period we will continue to work with colleagues across UKRI to develop opportunities to fund interdisciplinary discovery science.

## Quantitative indicators

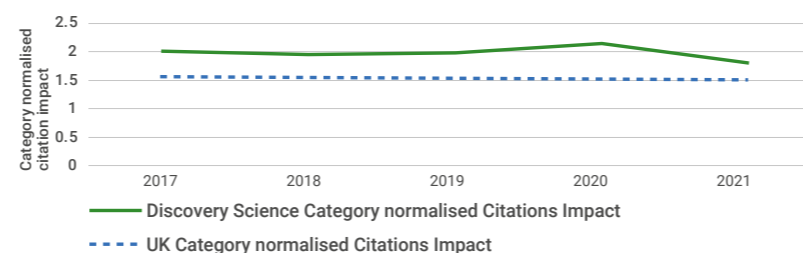
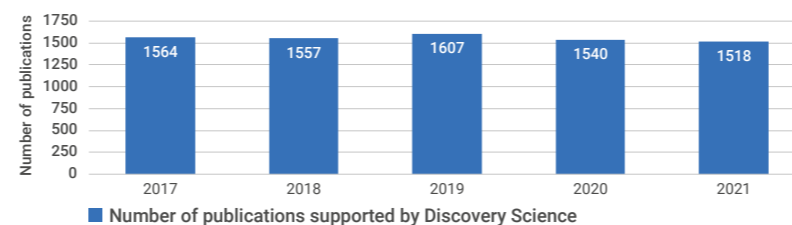
### Indicator 1: £99M of funding approved for 306 awards

- £90.5M from Discovery Science budget

	Grants #n	£M	Average £K
Standard grants	59	31.7	537
Pushing the frontiers	47	30.6	651
Large grants	20	13.6	680
Exploring the frontiers	109	8.0	73
Discipline hopping	38	3.8	100
Lead agency agreement	13	2.4	185
Urgency	7	0.4	57

- £8.4M from Fellowship budget of which £4.2M supports other ambitions

### Indicator 2: Publications & citation impact (CNCI)



## Qualitative indicators

### Indicator 1: Exploring the Frontiers pilot panel member comments

"Panel review was generally well received by the panel, no strong desire to have scheme like this be externally reviewed. The process accentuated the differences in style and approach of panel members that perhaps is not so apparent when moderating external reviews."

*Chair's feedback, Panel 1*

"...comparing this to reviewing the old Standard Grant format discovery science proposals, I think that this was really a lot easier. The proposals are much simpler to digest and get through..."

*Member, Panel 4*

"I do feel that some of the proposals that ended up scoring quite highly were perhaps not quite in the spirit of an exploration of something. They were very good, but it did feel to me a little bit like they were squeezing out, if you like, the more truly explorative proposals. So, I think I would like to see a much clearer distinction between what is in the exploring scheme versus the pushing scheme"

*Member, Panel 1*

## Learning and Action:

In the next period we will reflect on the evaluation of our EtF pilot, using recommendations to shape any longer-term offer of this nature. We will also undertake a review of the effectiveness of the new, streamlined assessment process for PtF. It will be important to continue to monitor success rates across all aspects of our communities. It will also be important to continually seek new ways to review excellence to reduce burden on the expert review community and working with the approaches across UKRI to enable this.



# Pursue strategic programmes that address the critical environmental challenges of climate change, biodiversity and habitat loss and pollution

Current RAG rating **Green**      2023/24 **Green** 

## Narrative

Overall progress remains strong with new initiatives led by NERC being awarded or commissioned over the past 12 months including some of which are described elsewhere in this report (e.g.s include Economics of Biodiversity, Hydrogen, Circular Fashion, Nature +ve Future, Changing the Environment, BIO-Carbon and all Theme initiatives, etc.)

Improving model representation of turbulent atmospheric processes is a joint programme between NERC (£5.5m) and the Met Office (£5.5m in-kind) supporting 5 awards that started February 2023.

Their initiation involved a key integration workshop focussed on understanding dependencies to inform an additional activity to ensure project coordination and to maximise outcomes over the lifetime of the programme. The investment will improve forecasts of extreme weather events at kilometre and sub-kilometre scales and help the UK better manage weather-related risks.

NERC has appointed champions and awarded 5 awards under the Understanding changes in quality of UK freshwaters initiative. These investments will seek to improve understanding of how pollutants enter and interact with freshwater ecosystems and how this might be affected by climate change. The finding will in turn inform decision-making tools and monitoring to clean up UK rivers.

Commissioning of the Derisking geological disposal of radioactive waste call is in progress and award will start later this year. This £4m investment, co-funded by Nuclear Waste Services, will fund a consortium to undertake fundamental research that will advance our understanding of the potential effects that the introduction of a Geological Disposal Facility (GDF) for radioactive waste might have on lower strength sedimentary host rock. Understanding these impacts is a key requirement to safely use nuclear energy as part of the UK’s route to net zero by 2050.

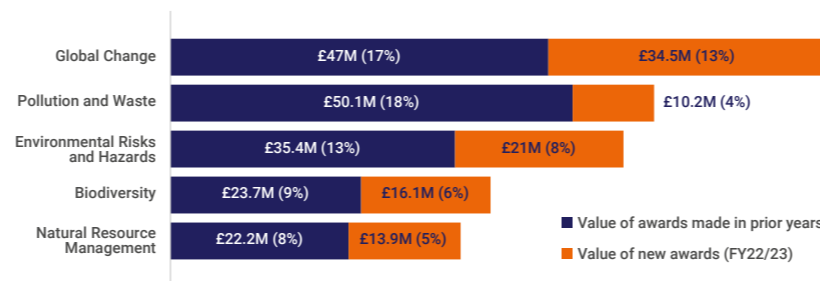
See pages 28 and 36 for investments linked to addressing biodiversity and habitat loss.

## Quantitative indicators

### Indicator 1: £101.8M of funding approved for 138 awards

- £38.9M from National Capability budget of which £19.45M supports other ambitions
- £55.2M from Strategic Research and Innovation budget of which £16.1M supports other ambitions
- £7.8M from UKRI Strategic Programme budget of which £3.5M supports other ambitions

### Indicator 2: Award value by issue (ENRI)



### Indicator 3: £8.1M leveraged for research programmes

- £4M from other UKRI research councils; £1.5M from UK Government Departments; and £2.6M from UK Government arms-length bodies of which £1.4 M supports other ambitions

## Qualitative indicators

### Indicator 1: Testimonial

“The stresses that are placed on our rivers are many and complex, from growing urban development to farming practices, increased diversity of chemicals and pharmaceuticals used by society, and pollution pressure from transport. We are going further and faster than any other government to protect and enhance the health of our rivers, including taking action to end the environmental damage caused by sewage spills. ... This knowledge will be used to improve the water quality in our rivers, bringing benefits now and into the future.”

*Rebecca Pow, Minister for Environmental Quality and Resilience*

### Indicator 2: Alignment with the Met Office

The Turbulent Processes initiative will build on and augment to the Met Office Wessex Convection Experiment (Wescon) field work/flight campaign to be undertaken in summer 2023.

**Learning and Action:**  
 NERC directs approximately 1/5<sup>th</sup> of its budget per annum to invest in strategic research and innovation (SRI) programmes via three equally funded sub-strands: community developed Highlight Topic ideas, Strategic Programmes funded by NERC alone and strategic programmes co-funded with partners. These mechanisms provide the breadth and specificity needed to support the NERC core disciplines and remit reported here. The SRI budget also supports delivery of more applied and solution-focussed research reported elsewhere in this report. To ensure this ambition remains ‘green’, NERC retains a healthy pipeline of emerging research areas and investment ideas identified through multiple channels including business and policy partnership engagement, Public Engagement, the Highlight Topic and Big Idea calls, and Insights.

# Co-createscientific exploration of large-scale, complex interactions within the Earth system



## Narrative

NERC awarded funding for the gap analysis stage of the Biological influence on future ocean storage of carbon (BIO-Carbon) programme. The main cruise-based call for research proposals closed at the end of March having received 6 applications for 3 awards. These will investigate the current and future impact of climate change on deep ocean carbon storage. The dynamics of deep ocean carbon dynamics is a major gap in global climate change models.

£47m National Capability Science was awarded to the NERC research centres to work collaboratively to tackle some of the most significant environmental challenges facing the UK. These programmes bring together the wide ranging expertise and specialist facilities from across NERC’s centres to enable a more ambitious, integrated approach to large-scale research challenges than any single research centre can deliver alone. Programmes include:

- ‘Biogeochemical processes and ecosystem function in a changing polar system’ (BIOPOLE), a £9 million programme led by the British Antarctic Survey to understand the full implications of sea ice loss and glacial melting brought about by rapid climate change at the poles, for the polar regions themselves and for the wider Earth system.
- ‘Climate change in the Arctic-North Atlantic region and impact on the UK’ (CANARI), a £12 million programme led by the National Centre for Atmospheric Science, to understand the impacts on the UK arising from climate variability and change in the Arctic-North Atlantic region, focusing on extreme weather and the potential for rapid, disruptive change.

## Quantitative indicators

### Indicator 1: £55.4M of funding approved for 14 awards

- £50.2M from National Capability Budget of which £25.1M supports other ambitions
- £5.2M from Strategic Research and Innovation budget of which £2.6M supports other ambitions

### Indicator 2: £10M leveraged for research programmes

- £10M from UK Government arms-length bodies of which £5M supports other ambitions

### Indicator 3: Bio-Carbon Cruise budget

- The BIO Carbon cruise-based budget has been augmented with £1m capital investment to fund use of autonomous sensors and vehicles as a step towards more sustainable marine research.

## Qualitative indicators

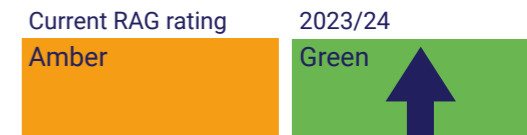
### Indicator 1: Science Committee Review

Science Committee considered the NC Science Multi Centre scheme to have generated ambitious proposals that had the potential to achieve far more scientific impact than any single centre bid, and identified some outstanding science that builds upon the existing research within the Centres.

## Learning and Action:

We will review our monitoring and evaluation approaches for our National Capability investments.

# Increase our investment in public engagement with environmental science



## Narrative

Following a successful case to NERC Council, the NERC funding line dedicated to public engagement with environmental science research will increase from £500k to £700k over 2 years. Subsequently, the 2022/23 budget was £600k, stepping up to £700k in 2023/24. This additional funding has enabled the commissioning of a substantial £130k Public Dialogue to explore what matters to the public about environmental science to inform future strategy and planning across NERC – currently underway, and will support a shift to longer, larger awards in the engaged research space through the planned Engaged Research Exemplars call currently under planning.

Through the annual ‘Growing Roots’ initiative to seed fund engaged research proof of principle projects that engage communities, a further £133k was committed in 2022/23 funding 16 projects funded in total. These range from Royal Botanic Garden Edinburgh working with adults with learning difficulties in Manchester, to Cardiff University engaging with a youth group to do citizen science.

Our £100k investment in Public Engagement Mentor Cohorts has enabled 28 researchers to be mentored through two cohorts, focussing on (1) engagement and impact in leadership and (2) working in partnership.

Our continuing investment in the Operation Earth programme with the Association of Science and Discovery Centres has expanded reach a total of 600,000 school aged children and their families. And our multi-year programme investment in ‘Engaging Environments’ has enabled several notable outputs this year including: training NERC Doctoral Students on community-centred approaches; the launch of a microsite linking citizen science volunteers to NERC projects; giving evidence to Defra social science sub-committee review; Impacts upon researchers and publics through community engagement practices.

Our Hold.This.Space interactive digital experience co-designed with young people and researchers to explore feelings about climate change, and, through stories of NERC research, identify how participants might take action. Included live events / experiences around COP26.

## Quantitative indicators

### Indicator 1: Budget uplift from £500k to £700k

- NERC has produced and begun delivery of robust plans to deliver a substantial increase to the PE budget in a way that will also support wider uptake of public perspectives to shape strategy and planning across the organisation through a public dialogue approach. The increased budget will enable NERC to commission longer, larger engaged research grants, responding to growing capacity in the research community as demonstrated by uptake of a doubling of the PE budget in 2021/2.

### Indicator 2: Audience reached

- Since 2018, Operation Earth, delivered through the Association of Science and Discovery Centres, has reached over 600,000 school aged children and their families. The first phase (2018–2020) reached 200,000, phase two built on that with a further 340,000 reached through blended delivery (2020–2021), and phase 2.5 (2021–2022) reached 70,000. Equivalent to £1 per person reached over the programme’s lifetime.

## Qualitative indicators

### Indicator 1: Operation Earth Participant Testimonials

“I am more aware of what eating cheese does to the planet. So try and find alternatives.”

*Family participant with children at National Space Centre*

“It helps us understand how our lives impact on the planet.”

*Parent, Oxford University Museum of Natural History*

“Change climate change so we can all live a happy life and not worry about anything” *Lily-Mae, age 10*

### Indicator 2: Public Dialogue Participant testimonials

“I think the most empowering aspect in the whole research program was the fact that our opinions were not only being listened to but actually being heard by the commissioners and we can help inform and impact policy” *Saba Iftikhar, Pennine Oaks*

### Indicator 3: REF case study example

Iceberg A-68 became globally famous in 2017 thanks to scientists at Swansea University who coupled their research predicting the iceberg’s calving and movement with a sustained media campaign and interactive website. Their campaign reached >50 million people, raising awareness of climate change and prompting behaviour changes.

## Learning and Action:

In order to continue the development of capacity and capability in the environmental science community to conduct engaged research, the NERC Public Engagement Team will be seeking to understand how the landscape is shifting and responding to NERC’s continuing investment and leadership. The Team will conduct an evaluation of the programme as a whole (recently commissioned), seeking to draw together evaluations at the project level, alongside data and insight at the whole NERC level to understand whether and how the current NERC PE strategy has delivered the changes set out in its ambitions. The Team will use this evaluation and the current Public Dialogue outcomes to inform future strategy development, investment and capacity building, and hone in on NERC delivery plan to identify where public involvement has the most potential to shape research agendas and how.



# Innovation: Summary & highlights

Delivery of the NERC digital strategy continues to build momentum, including securing HMG funding for investment in NERC's Earth Observation programmes, and the recommissioning of the Environmental Data Service, resulting in the development of a future-facing EDS, to deliver against the current and future data infrastructure needs of environmental science. Additional funds have also been secured from the UKRI Digital Research Infrastructure fund for broadening of JASMIN and the EDS.

NERC has also grown its portfolio of green finance research and innovation programmes, including the CGFI, and Integrating Finance and Biodiversity programmes, ensuring that environmental data, risks and opportunities can be integrated into business decisions.

## In the past year, we have:

- Commissioned £12M investment to deliver GHG emissions estimate through a unique collaboration delivered by the National Physics Laboratory (NPL), the Met Office, two of NERC's Centres (NCAS & NCEO) and the University of Bristol to transform national-scale monitoring and attribution of greenhouse gas emissions.
- Launched the £15m circular fashion and textiles programme with AHRC and InnovateUK, beginning with a £6m Network+ call.
- Developed a new collaboration with three government departments on hydrogen in the environment.

## Learning and Action:

There will need to be continued investment and development of the digital research programme (where possible in partnership with others). There is a highly timely opportunity to develop the environmental science of the future using data and digital technologies, but this will need proactive management and investment. Next year we will commission research and innovation investments in sensing systems, in collaboration with others.

Responsible director: Iain Williams

## Case study

### Geological science is enabling action to secure critical minerals

Mineral raw materials such as lithium and cobalt are essential components of many modern technologies including electric vehicles, wind turbines, mobile phones and medical devices. They are vital to our wellbeing, security, and journey to net zero, as well as a growth opportunity for businesses and the economy. However, these minerals are often produced thousands of miles away, and global demand is growing rapidly.

Decades of NERC investment in research, data collection, infrastructure and training at the British Geological Survey (BGS), has provided the whole-system, independent science that the Government and business needs to deliver the UK Critical Minerals Strategy. A recent [grant](#), for example, is developing a new quantitative understanding of the geology of lithium, which is vital for batteries. The Government regularly seeks BGS advice to inform policy development and requested that BGS establish the UK Critical Minerals Intelligence Centre (CMIC), which was launched in July 2022. The CMIC is helping



Courtesy of LiFT Project and BGS, Natural History Museum, University of Edinburgh, University of Exeter and University of Southampton © LiFT Project 2021

the Government and industry to understand future UK critical minerals demand and potential chain supply chain risks. BGS also produces and curates a range of openly accessible resources that inform Government and industry decision-making, including the UK's first, government-commissioned, mineral [Criticality Assessment](#).

# Build the resilience of businesses, infrastructure and supply chains to environmental impacts and changing consumer opinion



## Narrative

Through NERC and Innovate UK £10m Climate and Environmental Risk Analytics for Resilient Finance programme, NERC invested in the UK Centre for Greening Finance and Investment (UK CGFI). Launched in 2021 UKCGFI aims to accelerate the adoption and use of climate and environmental data and analytics by financial institutions. CGFI is now entering its third year and is progressing well to meet the needs of the financial services sector and to enhance the resilience of the financial system to the increasing impact of climate change and more recently nature-related risks.

NERC has funded 12 seed corn projects in the first phase of the Integrating Finance and Biodiversity for a Nature Positive Future (£1.8M) and established the co-ordination function. These are intended to explore gaps and initiate improving how biodiversity is accounted for in financial systems. They will also start to build a multi-stakeholder community that can drive the development of knowledge, tools and a skilled community to incorporate biodiversity in reporting, planning and decision-making for the finance sector. NERC is working with Innovate UK to deliver the second phase of the call.

The Economics of Biodiversity programme (£6m) joint with ESRC has funded 9 short synthesis projects, 7 main projects and coordination. The programme will explore how economies are embedded in nature, and how nature and biodiversity are integrated into economic models and decision making processes through three research themes:

- Biodiversity values in decision making
- Biodiversity, natural capital and resilience
- Management tools for decision makers

As part of the SPF SWIMMR (Space Weather Instrumentation, Measurement, Modelling and Risk) programme, the University of Surrey have developed an aviation radiation model (MAIRE+) in readiness for operational implementation at the Met Office for forecasting purposes. Space weather atmospheric radiation events can present a hazard to aviation microelectroincs as well as undesirable levels of effective dose to aircrew and passengers.

## Quantitative indicators

### Indicator 1: £10.7M of funding approved for 33 awards

- £8M from Strategic Research and Innovation budget of which £4M supports other ambitions
- £2.7M from National Capability budget

### Indicator 2: RISE impacts

The Regional Impact from Science of the Environment (RISE) programme's South West Partnership for Environmental and Economic Prosperity (SWEEP) award has led to:

- £25 million cost savings to business and public funding
- 327 Jobs supported by funding leveraged (to 2028)
- 38 Regulations policies and legislation influenced or informed
- £115 million Partner investments influenced
- 2,464 People trained in the use of SWEEP tools
- 3,626 km2 Natural space designed for health and wellbeing

### Indicator 3: Partnerships

- 18% of awards approved in financial year 22/23 have support from non-academic partners declared on application.

## Qualitative indicators

### Indicator 1: Testimonial

"...major new academic research carried out by the UK Centre for Greening Finance and Investment, which finds that 55% of industry participants agreed that there are sources of climatic financial risk that are not fully represented in the Climate Biennial Exploratory Scenarios and that could represent a material financial risk over just the next 10 years."

*Baroness Worthington*

*In the House of Lords debate on the Financial Services and Markets Bill (via Hansard)*

### Indicator 2: CGFI events

The UK Centre for Greening Finance and Investment (CGFI) participated in 8 events around COP27 in November 2022. CGFI's experts shared insights, outputs and thought leadership across a range topics (details can be found [here](#)).

### Indicator 3: Space weather monitoring system

MAIRE+ nowcasts were showcased at an international workshop on space weather aviation impacts held in October 2022 in the USA, and the model received very positive feedback from US airlines and other end users.

## Learning and Action:

An ongoing priority to maximise the impact of the three finance-related investments will be continued work to help the awardees work together both within and across investments. The success of these three initiatives is critical to enable businesses take steps to tackle biodiversity loss by providing decision grade data to help them incorporate biodiversity-related risks and opportunities into their strategic planning, risk management and investment decisions, including along their global supply chains.

Resilient investments in other parts of the portfolio remain on track – with clear links to Nature-based Solutions and UKRI Theme investments.



# Pursue positive outcomes for business and the environment that minimise the environmental impacts of consumption



## Narrative

NERC, Innovate UK and AHRC have collectively developed and are in the process of commissioning a trilateral research and innovation investment (£15m) on circular fashion and textiles. The suite of investments seeks to transform the fashion and textiles sector to adopt economically viable and scalable circular models by 2032 and enabling net zero targets to be met for this sector before 2050. NERC are leading the commission of a 2 year, £6m, Network Plus to support the fashion and textiles sector to reform to protect and restore the environment. The Network will bring the right expertise together from across the UK to begin to establish environmental and design baselines, standards and principles. These will be necessary to inform and assess future innovations and solutions to reduce fashions environmental footprint.

Environmental response to hydrogen emissions: NERC in partnership with DESNZ, Defra and DfT have commissioned three awards (£2.5m) over 48 months from October 2022 to investigate uncertainties and gaps in knowledge regarding hydrogen’s environmental behaviour. Addressing these gaps is critical to understand the implications of hydrogen use and to minimise any unintended consequences of the delivery of a hydrogen economy. The outcomes of this work are important and are intended to feed in to mid-decade policy decisions

The Sustainable mining in the Philippines programme is progressing well and will hold a translation focussed workshop in the Philippines in September 2023. This workshop, 6 months before the collaborative awards cease, was incorporated into the programme design. This activity is intended to enable grant awardees and stakeholders to meet, share learning and for the awardees to understand how their findings can be developed to meet real world challenges faced by key stakeholders to improve their environmental and societal footprints. This will ensure that the programme makes real differences to mining communities in the Philippines and wider region.

## Quantitative indicators

### Indicator 1: £34.5M of funding approved for 46 awards

- £14.1 M from National Capability budget of which £5.7M supports other ambitions
- £20.4M from Strategic Research and Innovation budget of which £9.1M supports other ambitions

### Indicator 2: £30.4M leveraged for research programmes

- £9.8M from UK Government Departments of which £4.7M supports other ambitions
- £2.6M from Government arms-length bodies of which supports other ambitions
- £13M from other UKRI research councils of which £1.5 supports other ambitions
- £5M from UKRI Strategic Themes of which £2.5M supports other ambitions

### Indicator 3: Partnerships

- 25% of awards approved in financial year 22/23 have support from non-academic partners declared on application.

## Qualitative indicators

### Indicator 1: Working with Government

Environmental response to hydrogen emissions awardees attended a workshop hosted by DESNZ in March 2023. This served to draw out interdependencies and links into policy among the research plans. It was the first step to ensure that findings will feed into policy as required.

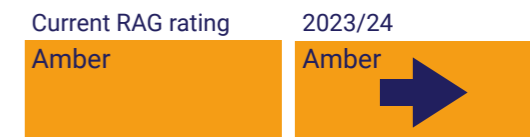
### Indicator 2: Unexpected leverage

The ECO-Wind programme, seeks to understand the ecological impacts of large scale deployment of off-shore windfarms, secured an additional £2m co-funding from the Crown Estates enabling support to 4th consortium award following the panel assessment. This demonstrates the value this new partner sees in working with NERC.

## Learning and Action:

NERC retains a healthy pipeline of emerging solution-focused research and investment ideas. These are identified through multiple channels including direct approaches to the discipline leads, International, business and policy partnership engagement, Public Engagement, and Futures. We will be hosting a series of business roundtables in 23–24 to understand the needs of business and the opportunities to co-create programmes.

# Realise the potential of sensing and monitoring technologies, artificial intelligence and digital twinning, autonomous and remote sensing, and high-performance computing to create new information services



## Narrative

From the launch of the NERC [Digital Strategy](#) in May 2022 we have built significant momentum and partnership working. This has included establishing two new stakeholder and governance groups for NERC's digital activities, including colleagues from across and beyond the NERC landscape.

Significant additional investment has been brought into NERC, particularly in Earth Observation, with ~£19.5M of additional funding secured for NERC/NCEO from the HMG. Additional funds have also been secured from UKRI DRI for broadening of JASMIN and the EDS, and to develop the data infrastructure to underpin development of Digital Twins. Furthermore, we have grown our leadership role across UKRI in both EO and DRI.

Partnership development and collaborative delivery has been a key focus in delivering on our digital aspirations. This includes a £3m joint call with EPSRC to deliver novel quantum sensors for environmental science, and collaborative delivery of the recent ~ £13m UKRI AI for net zero call, and the current £117m UKRI AI CDT call. We have developed strong and exciting new partnerships with DEFRA and IUK around environmental monitoring systems, and with the Met Office on Digital Twins; both will result in calls and investments in 2023/24.

Despite success in attracting funding and building partnerships, we have limited NERC-led research activity in this space. Our foundational digital strategic investment 'Constructing a Digital Environment' comes to an end in 2023, and this leaves a substantial gap in the NERC portfolio.

The recommissioning of the Environmental Data Service is a key achievement of 22/23. Substantial effort and notably successful collaboration has resulted in the development of a future-facing EDS, seeking to deliver the current and future data infrastructure needs of environmental science. This work will be built upon to ensure we have future capabilities for effective data access and use.

NERC's support for large scale computing (LSC) is an area of challenge. There are current financial pressures within the portfolio, which NERC is actively seeking to address. Looking forward we will develop evidence for NERC's LSC needs to enable improved strategic action.

## Quantitative indicators

### Indicator 1: £27.2M of funding approved

- 8 awards of which £12.5M also supports creating and upgrading environmental infrastructures that unlock innovation and economic potential (includes sum below).

### Indicator 2: £19.5M additional funding leveraged from government

- Earth Observation Support Package for EO Data Hub, UKEO-CIS and uplift to SENSE CDT

### Indicator 3: £11M of leveraged (co)Investment

Investment which has been brought in from elsewhere to support NERC delivery from:

- 'Innovation in Environmental Monitoring' programme (Defra £6M, IUK £2M, BBSRC £1M (expected))
- TWINE programme (MO £2M)

Note that this leverage is in addition to the HMG EO package in indicator 2.

## Qualitative indicators

### Indicator 1: Digital Research & Infrastructure Group Testimonial

"Delivering an ambitious digital strategy requires partnerships, collaborations and effective communications with diverse stakeholders, the DRIG team ensures that DEID have access to these communities but also adds value by bringing foresight to how the strategy needs to evolve in a fast-changing landscape".

*Professor Marion Scott, Co-Chair of the NERC Digital Research & Infrastructure Group*

### Indicator 2: Environmental Data Service Panel

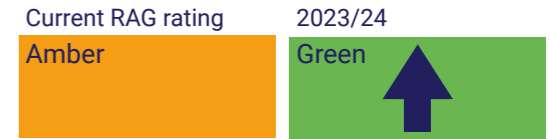
During the recommissioning of the EDS the panel commended NERC on their ambition to drive change forwards within the EDS. In addition, the PI of the EDS commented on the strength of the collaborative relationship between NERC and the EDS that was pivotal to the success of the recommissioning.

## Learning and Action:

This year significant progress has been made and momentum built in this key strategic area for change and growth. We have been successful in raising the profile of digital, building key relationships, and leveraging additional non-NERC funding. However, an amber rating is given and anticipated for 23/24 as we must maintain and build upon our momentum across NERC and our community, and this requires more NERC-led ambition, particularly as gaps grow in our portfolio. There is a highly timely opportunity to develop the environmental science of the future using data and digital technologies, and we need to act to take hold of this opportunity for the UK.

This will require us to support the development of leading-edge data science, digital technologies, digital infrastructures, and digital skills across our portfolio. We will need to actively drive change and set new expectations and challenges for our community, through both targeted strategic investment and effectively embedding expectations and ambitions across our activities. We must move away from a bounded focus on digital infrastructure as the only way to deliver our digital ambitions (whilst acknowledging its foundational importance).

# Create the world's first national system to measure the UK's total greenhouse gas emissions



## Narrative

NERC has commissioned a new collaboration delivered by the National Physics Laboratory (NPL), the MetOffice, two of NERC's Centres (NCAS & NCEO) and the University of Bristol to transform national-scale monitoring and attribution of greenhouse gas emissions. This will be the first national scale system globally.

The two year Greenhouse Gas Emissions Measurement and Modelling Advancement (GEMMA) programme will start in April 2023 and builds on an initial NERC capital investment of £5m in 2022/23 for equipment and associated costs to bring the equipment into service in readiness to support delivery of the dashboard.

The overall (£12m) investment will deliver GHG emissions estimates one month in arrears for the reported GHGs (net CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, priority F-gases) in an operational UK GHG Emissions Dashboard. Furthermore, the data will be resolved sub-nationally and enable sectoral apportionment. The granularity of the data will create opportunities to support place-based net zero innovations and provide the scientific foundation to support developing countries "top down" capability (particularly Earth Observation based), whose "bottom-up" inventories suffer from unreliable economic data.

The outcome from the investment will be a globally unique national emissions dashboard that:

- provides a top-down integrated quantification of net zero to assess overall progress, whether deliberate, un-intended or unforeseen
- enables the most challenging areas of net zero to be addressed, particularly ones not linked to known combustion emissions, such as agriculture, land use, or fugitive emissions
- sets the standard through UK leadership in supporting other nations to deliver on their net zero commitments necessary to achieve the Paris Agreement

## Quantitative indicators

### Indicator 1: £1.8M funding approved

- For 2 awards of which £900K supports other ambitions

### Indicator 2: £4.6M leveraged for The Emissions Dashboard to drive Net Zero

- £2M UKRI Building a Green Future Strategic Theme
- £2M National Physical Laboratory (NPL)
- £600K UK Met Office

## Qualitative indicators

None, not yet launched

## Learning and Action:

Funded by NERC and the Building a Green Future Theme, this initiative was commissioned at pace in close collaboration with the delivery agencies. GEMMA is about to start with no progress to date, we will continue to work with the delivery partners to ensure the programme moves forward as planned to ensure its green status.



# Impacts: Summary & highlights

NERC have engaged with all five UKRI Strategic Themes, successfully embedding environmental science to, for example, improve environmental and economic resilience in the UK, and improve health outcomes by integrating environmental considerations through a 'Planetary Health' approach. NERC has provided leadership for the Building a Green Future theme, and led programme design for key initiatives, including developing a system to measure the UK's greenhouse gas emissions.

As research programmes into nature-based solutions reach maturity, we ensuring that we accelerate and amplify the reach and impact of their research, for example through a knowledge exchange call to generate resources and tools for policymakers and other practitioners based on knowledge generated from the Future of UK Treescapes programme.

## In the past year, we have:

- Completed a joint FCDO-ARA scoping process, and secured partner funding, for a new initiative focused on Nature-based Solutions for Equitable Climate Resilience in Sub-Saharan Africa.
- Secured fast track funding from the International Science Partnership Fund for Climate Consequences of Rapid Ocean Changes (CCROC), building on existing UK-US partnerships to better understand and predict the rapid changes in the circulation of North Atlantic Ocean.
- Continued work to upgrade our internationally significant infrastructure, including the FAAM airborne laboratory and the new Discovery building at the Rothera Antarctic base.

## Learning and Action:

As the UKRI Themes finalise their programmes and investment plans, NERC will share its expertise and demonstrate the value of environmental science to these collective programmes, ensuring that our community can contribute to finding solutions to pressing societal challenges. We will review the balance of our capital funding to ensure that the UK has the capability and expertise it needs to deliver large-scale science of global significance.

Responsible director: Alison Robinson

## Case study

### Protecting global data flows: scientific breakthrough increases reliability of seabed cables

Quick action by NERC and its support for high risk research has resulted in more reliable international data flows. Undersea cables carry over 99% of the world's data traffic including internet, financial and cloud data storage services but can be damaged or broken by powerful seafloor flows of sediment, called turbidity currents. Cable companies can now better predict and mitigate these risks thanks to NERC support for the first ever measurements of major turbidity currents in action and their effects on deep-sea cables.

In early 2020 turbidity currents in a deep submarine canyon at the mouth of the Congo River broke two seafloor telecommunications cables and sent NERC-funded sensors floating away into the Atlantic Ocean. The sensors had been installed to capture such events, funded by two NERC discovery science grants and installed by the NERC vessel RRS *James Cook*. Despite the challenge of international COVID-19 lockdowns, swift action by NERC Head Office, the National Oceanography Centre (NOC) and the project team at Durham and Hull Universities ensured this



unique sensor data was retrieved and provided funding to identify the precise trigger of the cable-breaking sediment avalanche.

Findings have transformed understanding of the risks to underwater cables and highlighted measures to reduce future breakages. In a world first, NERC scientists in collaboration with cable companies and French and German science partners showed how deep-sea cable breakages are linked to major river floods. Based on this data, leading cable companies are re-routing planned new cables, and investing in longer cable to avoid potentially hazardous areas of seabed.

# Embed environmental science within UKRI’s Strategic Themes



## Narrative

NERC representatives were involved in each of the five themes, successfully embedding environmental science where appropriate, even where NERC has not contributed funding. For example NERC led a UKRI wide initiative on Planetary Health, which has informed two initiatives. These are on the [Centre for Climate & Health](#) (ca £10m) under the Health Aging and Wellbeing Theme, and phase 3 of the [Mobilising Community Assets to Tackle Health Inequalities](#) (£20m) under the Creating Opportunities Theme. NERC also helped to shape the Modelling UK supply chains as complex systems to strengthen resilience call under the Building a Secure and Resilient World (due early May 2023).

For Building a Green Future, NERC led the Greenhouse Gas Emissions Measurement and Modelling Advancement (GEMMA, see page 31) commission and codesigned the £20.25m Land use for Net Zero initiative with BBSRC, Defra, DAERA and Scottish Government. The [Hub call](#) is currently open with a call for research projects to follow later in the year. The programme aims to deliver transformational findings and outcomes to reduce the environmental impacts of land use. The programme will fund research that feeds directly into policy and decision-making in three interlinked themes of soil health, agricultural systems and land use change.

NERC were instrumental in the *Creating Opportunities and Improving Outcomes* theme investment [Resilient UK coastal communities and seas](#) led by ESRC (£11m). This is the first ESRC-led investment in marine research and seeks to understand the dependencies between coastal communities and their context, especially their marine ecosystems.

NERC are leading on developing two initiatives jointly supported by both Building a Green Future and Building a Secure and Resilient World themes: Nature-based Solutions for Equitable Development (NbS, see page 36) and a follow up to the UK Climate Resilience programme. The latter (ca £15m) including matched funding from Defra (ca £7.5m) will address challenges and gaps identified in latest [Climate Change Committee National Adaptation Programme report](#).

## Quantitative indicators

### Indicator 1: £32.5M of additional support secured for environmental science as part of the Themes

£2.5M from NERC alongside £17.8M for Transforming land use for Net Zero, nature & people

- £5M UKRI *Building a Green Future* Strategic Theme
- £9.75M Government departments
- £3M other UKRI Research Councils

£1M from NERC alongside £10.1M for Resilient UK Coastal Communities & Seas

- £6.1M UKRI *Creating Opportunities, Improving Outcomes* Strategic Theme
- £3M other UKRI Research Councils
- £1M Government Departments

£5M from NERC alongside £4.6M for The Emissions Dashboard to drive Net Zero (GEMMA)

- £2M UKRI Building a Green Future Strategic Theme
- £2M National Physical Laboratory (NPL)
- £600K UK Met Office

## Qualitative indicators

### Indicator 1: Theme leadership

Through NERC’s strategic leadership of *Building a Green Future*, an additional £125m of funding has been leveraged against the £75m investment in the Theme. This demonstrates the partnerships UKRI is building with government departments to deliver on national priorities.

## Learning and Action:

UKRI Theme funding development and initiation has been a dynamic process over the last year with funded initiatives starting to be commissioned from late December / early January onwards. Continued green rating is dependent on successful delivery of those investments in train and securing funds for, and delivering the NbS and UK Climate Resilience follow-on investments.

To achieve the necessary spend profile, the Themes had to commit funds rapidly over a short time frame, leading to a flurry of commissions. Within NERC we will work to ensure that our investment and decision making processes are agile and robust enough to engage with these fast-paced opportunities. Future commitments are likely to be at a more measured pace; NERC will continue to engage with and influence new initiatives.



# Sustain the UK’s sovereign capability to advise and inform UK Government policy on the state of UK and global environment

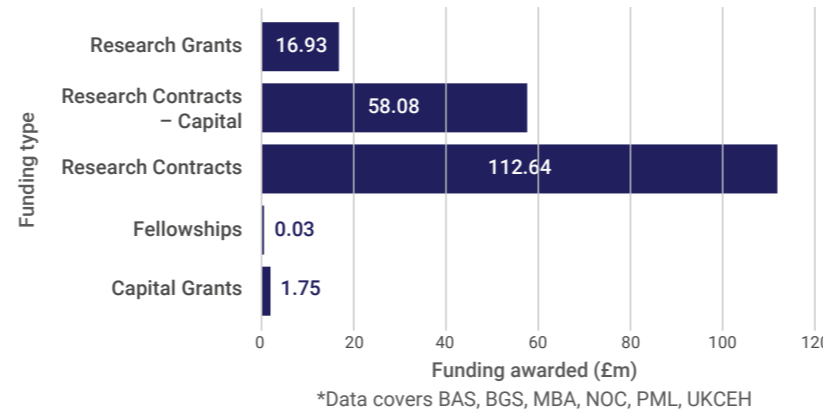
## Narrative

NERC has completed an exercise to assess and rebalance its National Capability funding. Supported by an expert group, and approved by Council, the proposed funding levels from 23/24 onwards will ensure that we continue to support the UK’s sovereign capability such as, for example, world-class marine science (see page 37).

NERC continues to provide the Secretariat function for the RIDE Forum, with 24 public sector organisations (including the devolved administrations) currently engaged. RIDE is a mechanism through which Government partners can engage with NERC-UKRI investments and serves as a forum through which members can align and leverage resources. RIDE has informed the development of NERC investments and activities, including: the Freshwater Quality programme (resulting in co-funding from Defra and the funding of an additional project), the Talent and Skills Cohort Training Review, NERC capital investments and the ‘Nature Positive Future’ programme. RIDE has also supported the development of activities under the UKRI Strategic Themes, for example, through coordinating policy partner input to the scoping of the Centre in Climate Change and Health (building on NERC’s planetary health work) and engagement with the transdisciplinary network funding to tackle antimicrobial resistance (AMR).

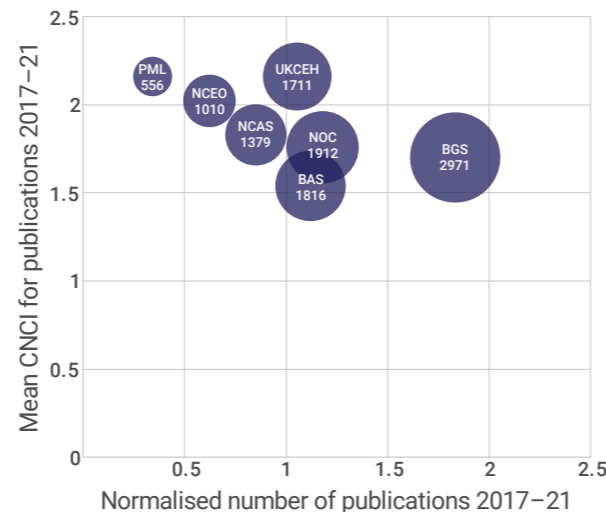
## Quantitative indicators

Indicator 1: Breakdown of Centre funding 2022–23



Indicator 2: Citations Impact

- NERC Centres produce a high number of publications, with their overall impact between 1.5 and 2.5 higher than average.



## Qualitative indicators

Indicator 1: Testimonial

“RIDE continues to provide a forum where those funding and using environmental research can work together to accelerate the translation of research into practice to support the UK’s response to the twin crises of nature decline and a changing climate.”  
*Peter Singleton (SEPA and RIDE Chair)*

Indicator 2: Testimonial

“The RIDE Forum provided its members with valuable opportunities in co-designing environmental science and wider aspects of UKRI’s Strategic Delivery Plans. The most recent forum provided timely updates on the UKRI strategic themes, which has enabled a more coordinated and collaborative approach with government partners, such as Defra, in the development of new transdisciplinary research and innovation programmes, that address major societal challenges. This has ensured programmes are not only co-funded, but co-designed, with policy makers and end users in mind, leading to programmes that seek to maximise the potential policy impacts from UKRI funded activities”.  
*Lucy Falkner, UK Research Partnerships Manager (Defra)*



## Learning and Action:

To ensure the most efficient use of NERC capital funding to balance our portfolio, build capacity and support the Place agenda, NERC will review the ongoing annual world class labs allocation to its institutes. The outputs will be discussed at NERC Management Board and recommended adjustments will be made to future allocations.

# Determine the effectiveness and accelerate the adoption of nature-based solutions



## Narrative

NERC have led on and completed a joint FCDO-ARA scoping process for new initiative focused on Nature-based Solutions for Equitable Climate Resilience in Sub-Saharan Africa (NbS). NERC have secured financial and in-kind contributions to the pending call from FCDO, and from the UKRI Themes of Building a Secure and Resilient World and hopefully Building a Green Future (see pages 19 and 34).

Key research priorities arising from the NbS call scoping process include:

- producing an open evidence base of NbS impacts that makes use of new methods and technologies to quantify the diverse impacts of NbS
- understanding the scalability (or spatial scale) and contextualisation of NbS
- whole-system valuation and optimisation of NbS
- empowering community-driven governance of NbS

Research priorities will be finalised in the near future with a call opportunity planned to go live in early June 2023 (call value ca £10–12m).

The final opportunity of the £15.6m Future of UK Treescapes closes on 25th May. The Knowledge Exchange awards will accelerate and amplify the impact of the programme. They will work to maximise the benefits of the most dramatic increases in tree and forest planting in generations to both achieve net zero greenhouse gas emissions by 2050 whilst also benefitting biodiversity, and society as a whole.

The Natural Flood Management projects held an end of Programme policy event and generated a report outlining the programme’s main findings and their implications for future land use policy and NFM investment, including:

- more spatial targeting in new farm payment schemes to ensure benefits of NFM are maximised and avoid negative impacts on the ecology of rivers

- actions that have multiple benefits, like woodland planting and peatland restoration, to be prioritised as these increase the flood risk benefits tenfold
- new evidence on effectiveness of NFM to be incorporated into planning tools like the Environment Agency’s ‘Flood map for planning’ to enable more private investment

## Quantitative indicators

### Indicator 1: £3M of funding approved for 10 awards

- £3M from SRI Budgets of which £1.5M supports other ambitions.

### Indicator 2: Grant Partner contributions

- The future of UK Treescapes programme leveraged £3.5m of additional funding

## Qualitative indicators

### Indicator 1: Testimonial

“The NbS scoping process has had impact in several areas.... priority themes have been identified that are locally relevant.... the network of stakeholders across Sub-Saharan Africa has been strengthened through engagements.... integrating the local voice into the funding call development process will help to give beneficiaries of the call more ownership and make the call more focussed on contextual challenges on the ground.”

*Bart Hill and Alice McClure, members of the UK-South Africa NbS call scoping team*

### Indicator 2: Growing NERC influence

Engagement with FCDO on the NbS call has led to NERC joining X-HMG working group (FCDO, Defra and DSIT). This is to ensure other climate-environment focussed international calls launching at similar times under REDAA and GCBC are complementary to ours.

### Indicator 3: Landscape Decision report

The Landscape decisions programme issued a report on ‘Making Landscape Decisions to meet net zero’. The report recommends approaches and mechanisms to support optimal and ethical decision-making around land use.

## Learning and Action:

The current rating is amber but this simply reflects that funding and investment scope for the NbS call is not finalised and any unexpected delay may put Theme investment in doubt. Other investments with a NbS focus including Landscape Decisions SPF, Treescapes and Natural Flood management are ramping down but beginning to deliver tangible real world impacts.

# Maintain the UK’s position as a leading nation in international environmental science

Current RAG rating  
Green

2023/24  
Green



## Narrative

The fleet of three NERC research vessels undertook twelve scientific research cruises delivering against thirteen NERC funded grants, enabling world-leading science from the Southern Ocean to the Northern Atlantic, and the Eastern Pacific to the North Sea. A highlight was a tripartite activity in the Eastern Pacific where a NERC vessel delivered for a UK and German science collaboration (funded through the International Ocean Discovery Programme) in part using Spanish geophysical equipment, emphasising the benefit of NERC’s international ship barter relationships to enable world-leading seagoing science delivery. In addition, the Sir David Attenborough successfully delivered a series of Polar Water Trials in the Southern Ocean, demonstrating key scientific capability which will be vital for furthering our understanding of our planet’s oceans, marine life and climate system.

An independent midterm review of NERC’s marine vessels and National Marine Equipment Pool, managed and operated by the National Oceanography Centre (NOC) in Southampton, concluded that NOC are providing effective service delivery in all areas.

As part of the International ISPF programme, Climate Consequences of Rapid Ocean Changes (CCROC) has been approved for Fast Track funding. The programme builds on the UK’s partnership with US agencies (NSF, US NOAA) to better understand and predict the rapid changes in the circulation of North Atlantic Ocean that, as a critical component of the climate system, strongly influence both weather and climate in the UK, and other regions surrounding the Atlantic. CCROC will mobilise world leading teams of UK and US ocean and climate scientists to conduct research that takes advantage of a unique opportunity to utilise a decade of co-incident large-scale observations in the North Atlantic (arising from US and UK investments). This will inform future RAPID investment.

The Canada-Inuit Nunangat-United Kingdom Arctic Research Programme (CINUK) is a joint programme between NERC, Inuit Tapiriit Kanatami (ITK), Polar Knowledge Canada (POLAR), National Research Council of Canada (NRC), Parks Canada (PARKS), and the Fonds de Recherche du Quebec (FRQ) which supports 13 projects covering themes connected to climate-driven changes to the terrestrial, coastal and near-shore marine environments in Inuit Nunangat, as well as the impacts on Inuit and community health and well-being. Specific outcomes are expected in areas including wildlife health monitoring, sea ice mapping, plastics and heavy metal pollution mapping.

## Quantitative indicators

### Indicator 1: £19.9M funding approved for 26 awards on infrastructure

- £19.4M from UKRI Infrastructure fund of which £9.2M supports other ambitions.
- £1.4M from Strategic Research & Innovation budgets

## Qualitative indicators

### Indicator 1: Testimonial

The annual report of the Cruise Programme Review Group recognised the excellent collaboration between NERC Marine Planning, and NOC and BAS ship operators to minimise impacts on seagoing science from the pandemic.

## Learning and Action:

We will review our marine operations governance to ensure that our structures continue to be effective and fit-for-purpose, ensure engagement with our stakeholders, and align with our vision for future oceanographic capability and our net zero goals.



# World-class organisation: Summary & highlights

NERC has launched a 'Ways of Working' programme, an organisational refresh which will ensure that we continue our core business of supporting world-class environmental science despite the constraints on our resource. The programme will ensure that NERC is structured appropriately to deliver as part of UKRI, that we work in an open and collaborative fashion, and that we have the tools and trust to enable all parts of the organisation to deliver on our shared goals.

NERC continues to support the development of activities across UKRI to make us a more effective and efficient organisation. We have supported the development of the new Funding Service by trialling high volume calls such as Highlight Topics and Pushing the Frontiers. This work is helping to test and improve the new funding system while ensuring the flow of grant funding to our community remains unbroken.

## In the past year, we have:

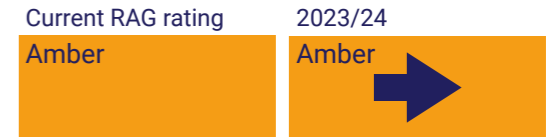
- Recruited the chair and membership of the Future Leaders Council, with the first meeting taking place in June 2023.
- Developed dashboards for NERC Management Board and Council, ensuring that key decision-making bodies have access to relevant, up-to-date information to inform their discussions.
- Refreshed the Peer Review College with a more diverse membership which provides expertise across all of our disciplines.
- Delivered 26 carbon reduction projects, including a large-scale solar array at Bird Island encompassing 300 solar panels (more than 100kWp in total) with accompanying battery storage and a new geothermal heating system at the British Geological Survey in Keyworth.
- Launched our Impact Awards competition, to celebrate the work of our community in improving society, economy and environment.

## Learning and Action:

We will embed our ways of working programme to ensure we deliver the core mission of NERC in as agile and efficient a manner as we can. We will ensure that we have the data and programme management tools to actively manage the change activities needed as part of UKRI's transition to a more unified organisation. We will consider how we balance the need for high-quality advice on our science, capital and organisational structures with the impact on NERC and the community of recruitment processes and information management

**Responsible director: Alison Robinson**

# Act as ‘one UKRI’, as part of the new operating model, stripping out bureaucracy and becoming more efficient



## Narrative

NERC faces the challenge of a reducing operational expenditure budget. To meet our organisational objectives with reduced resource, we have introduced a Ways of Working programme to ensure that we have the right structures, tools and processes across NERC to deliver for our community.

UKRI, itself facing a more constrained organisational picture than in recent years, continues to drive efficiency by achieving greater alignment across the organisation. The new Operating Model will review and optimise processes across UKRI, from funding services, infrastructure and institute investment, to governance and data. NERC is providing leadership and engagement to workstreams under this programme to deliver cost savings and productivity gains across UKRI.

NERC has been a leader in onboarding calls to The Funding Service (TFS) under the Simpler and Better Funding Programme (SBF). Following a successful initial pilot focused on the NERC Large Grant outlines, a further initial entry into TFS with the Highlight Topic call 2023 and the Pushing the Frontiers call will be key volume calls to test through the new TFS. Despite the additional workload that this entails, NERC teams have been committed to trialling TFS whilst ensuring that the flow of grant funding to our community remains unbroken. In quarter 2 and 3 of 23/24 NERC will scale up opportunities going through TFS as we pursue the transition from Je-S.

Our own NERC People Living action plan aligns to this with the aim of creating a more diverse and inclusive workforce and providing staff with development opportunities they need. Through various staff surveys we have gained greater understanding of our NERC colleagues and the development of the People Living Action Plan sets out our commitment to addressing issues raised.

## Quantitative indicators

### Indicator 1: Workforce planning and budgets

- NERC has achieved its targets to reduce headcount and operational expenditure 2022–23 through targeted recruitment and budget efficiencies.

## Qualitative indicators

### Indicator 1: NERC leadership of UKRI programmes

NERC is providing leadership for UKRI change programmes including the new Funding Service, environmental sustainability, Open Access, and infrastructure investment.

## Learning and Action:

We have already started to generate insight into our working practices through the Ways of Working programme, and identified processes that can be streamlined or automated to free up staff time. Over the coming year we will progress the programme to identify and deliver the structural and cultural change within NERC to improve efficiency and productivity at all levels of the organisation. We will improve our understanding of the resources required for NERC and UKRI change activities, and how to proactively manage these against core business to make them a success.

# Ensure NERC commissioning is informed by high quality, diverse scientific expertise and advice



## Narrative

The first chair and cohort of members to the Future Leaders Council has been recruited, the peer review college membership has been refreshed and NERC has sought to introduce and build the rotator model into the programme and strategy development process.

The establishment of the Future Leaders Council is a significant highlight for this period. The competitive, diverse and engaged recruitment process led to the invitation of a highly engaged, competent and encouraging set of future leaders to form this key governance function for NERC. The use of the recruitment agency Gatenby Sanderson helped achieve a diverse membership.

NERC has also successfully refreshed the Peer Review College (PRC) membership over the autumn 2022 into spring 2023. The Executive sought to ensure a broadened invitation to increase the diversity level of the college members and sees the constituency of the college move forward in terms of improved key indicators of gender, ethnicity and disability whilst maintaining the breadth of disciplinary coverage that is fundamental to the college’s operation.

Further, for the first time, NERC has managed to capture and analyse the diversity characteristics of the expert review base that is used to assess and commission research funding. We will use this baseline in future years to enable specific action to be taken to broaden the base of expert review.

Beyond formalised mechanisms, NERC has sought to employ several modes as and when required for specific advisory purposes – for example, the use of task and finish groups to inform the balance of National Capability funding strategy, as well as the introduction of the rotator process to bring in specific scientific expertise and advice in shaping, developing and forming commissioning approaches for strategic research. This has been used to a limited extent in 22/23 to inform the scientific scope of future strategic research with the commissioning of one catalyst rotator in the area of spillover effects. There have been challenges around the recruitment for the longer-term Agenda Setting Fellows, with two positions advertised which have failed to recruit.

## Quantitative indicators

### Indicator 1: Rotators/Agenda setting Fellows

- 1 Catalyst Rotators (£9.9K, direct commission)
- 0 Agenda Setting Fellows (2 positions advertised but no recruitment)

### Indicator 2: Diversity of FLC recruitment

- Male 37%, Female 50% Prefer not to say 13%; African 12.5%, other Black background 12.5%, British 12.5%, any other white background 25%, Black Caribbean and White 12.5%, Chinese 12.5% prefer not to say 12.5%

### Indicator 3: PRC recruitment

- The call attracted 184 applications and the expected diversity composition of the college from spring to 2023 compared to the 2022 levels in brackets is as follows:  
 Gender; Male 71% (74%), Female 27% (25%), Not Disclosed 2% (1%).  
 Ethnicity; Asian 4% (3%), Black 1% (0%), Chinese 4% (2%), Mixed 3% (1%), Not disclosed 12% (9%), White 76% (86%).  
 Disability; 90% (91%) of the members consider themselves as an individual without disability.

## Qualitative indicators

### Indicator 1: Testimonial

The PRC Chair, reflecting on the recruitment diversity and office support on the PRC Chair recruitment process said: “I think the Office’s suggestions for chair are excellent and I have no problems at all with them. Like me they’ll find the experience colourful in the beginning but you learn so much and its great to help the process.”

## Learning and Action:

The introduction of rotators has been partly successful but will require attention to improve the recruitment success and perhaps target a different approach to Agenda Setting fellows overall. There is further work to do to achieve an improvement in the diversity balance of the Peer Review College. However, the issue is not necessarily a quick fix without the potential to consider positive action. This will require a more significantly robust understanding of the community and links to other work within NERC on the composition of the community.



# Demonstrate the ongoing impact of NERC funding



## Narrative

NERC has a healthy pipeline of evidence demonstrating the impact and outcomes of our funding and how NERC Head Office adds value.

Highlights this year include:

- The impact case studies submitted by Higher Education Institutions to the Research Excellence Framework 2021 exercise, which were published this year and provide a wealth of evidence of the impact of NERC funding as well as an opportunity to gain insight on broader topics such as funding and impact pathways. We led a cross-UKRI approach to linking the case studies to UKRI funding using grant data and research outcomes information collected via researchfish®, then a more detailed analysis of the 419 case studies linked to NERC. This enabled us, for the first time, to trace impact case studies back through to grant information. We produced a self-service version of this information that is already being used by teams across the office including public engagement, national capability and training.
- Designing and launching the NERC Impact Awards 2023 competition. The Impact Awards is the flagship strategic advocacy initiative for this year, and will also deliver valuable new evidence of NERC’s impact.
- A push to increase the use of NERC’s impact and outcomes evidence by colleagues and Board members to support strategic advocacy. Included producing visually-appealing single-slide summaries of Impact Series instalments (in response to feedback on content format), and making impact and outcomes case studies and data resources available to use in self-service format on the new NERC Insight Hub.

## Quantitative indicators

### Indicator 1: volume of new evidence produced

- 1 new Impact Series instalment completed, demonstrating that NERC science delivers benefits to every region of the UK. Another new instalment, focussing on human health, is nearing completion
- 1 new added value case study completed: Radioactivity and the Environment Programme
- 25 new short impact case studies completed in priority evidence areas: NERC’s impact on business, net zero, COVID-19, energy, levelling up, health

### Indicator 2: NERC in the REF impact case studies

Data on the REF impact case studies demonstrates the breadth and significance of NERC’s impact:

- 419 were linked to NERC (underpinning research was funded by NERC and/or NERC-supported Centres played a role) = 6% of total
- 79% of Units of Assessment (UoAs) contained NERC-linked case studies
- Proportion linked to NERC in specific UoAs:
  - Earth Systems and Environmental Science: 75%
  - Geography and Environment Studies: 42%
  - Biological Sciences: 31%
- Of NERC-linked case studies:
  - 69% also linked to other UKRI Councils
  - 49% linked to NERC Centres and/or facilities

## Qualitative indicators

### Indicator 1: New evidence

Evidence produced this year demonstrated that:

- NERC science delivers benefits in every region of the UK, driving our journey to net zero while spreading prosperity, building resilience and protecting the environment
- An innovative collaboration instigated by NERC has addressed major uncertainties around the environmental safety of nuclear power and trained a new generation of researchers

### Indicator 2: use of evidence

- Included in UKRI UK regions factsheets, which are communicated widely in DSIT and shared with MPs
- Presented to Government departments and devolved governments during NERC bilaterals
- Included in [UKRI Annual Report](#)
- Included in [UKRI/British Business Bank report](#) on spinout companies
- Included in responses to parliamentary questions, UKRI and DSIT briefing requests e.g. for the new ministerial teams, UN Day, new Green Finance Strategy, UKRI balanced scorecard
- Included in the [NERC Strategic Delivery Plan](#)
- Showcased at the November 22 NERC Strategic Delivery Plan launch event in Parliament

## Learning and Action:

Targeted individual sharing is an effective way to share our evidence with key stakeholders e.g. UKRI, DSIT, Chief Scientific Advisers. Over the next year we will work with the colleagues to identify further opportunities to increase the use of our evidence to ensure that we most effectively make the case for environmental science through NERC and UKRI.

# Become environmentally sound across our head-office and institute operations while enhancing scientific productivity



## Narrative

The NERC Responsible Business statement (refreshed in 2022/23) sets out our public commitment to Environmental Responsibility.

Carbon reduction is a key priority set out within the statement. Alignment of innovative projects related to NERC’s operational carbon emissions, as part of the Carbon Pathway programme, is creating a pathway towards reaching NERC’s 2025 interim target of 40% reduction in carbon emissions.

In 22/23 we established the NERC Net Zero Delivery Group which collectively delivered 26 carbon reduction projects over the year, including our first low carbon fuel flight, completion of the solar array at Bird Island and new marine planning digital tools. Enhanced carbon project monitoring, tracking and forecasting approaches now inform 6 monthly performance updates to NERC Management Board against our carbon reduction targets.

Laboratory sustainability champions at both BAS and BGS have helped reduce environmental harm through improvements to waste management and reduction in energy use. In 22/23 BAS and BGS both progressed against the Laboratory Environmental Assessment Framework (LEAF). Both centres also maintain ISO14001 – the international standard for environmental management.

The approval and first year implementation of the NERC Climate Change Adaptation plan in 22/23 has helped us to better understand the climate risk to our research activities (e.g. flooding of sites) and we have taken a number of practical actions to build resilience in the UK and at our polar sites.

NERC recognises that it can maximise the value of its estate to wildlife and this is reflected within the new NERC Estates Principles and the support provided to ‘on the ground wildlife groups’ e.g. the Bee group at BGS Keyworth.

NERC continues to play a leadership role for environmental sustainability within UKRI; sharing skills and expertise from NERC to support organisational level policy change and the development of environmental professionals.

## Quantitative indicators

### Indicator 1: Pathway to Net zero

- 180 individual projects identified over 6 work packages that will help NERC to achieve net zero emissions by 2040

### Indicator 2: Carbon reduction activities

- NERC have invested £4,065,000 in carbon reduction activities in 22/23

### Indicator 3: Climate Change Action Plan

- The plan sets out 21 dedicated activities to help NERC adapt to operating within a warmer world.

## Qualitative indicators

### Indicator 1: Testimonial

“NERC has made a clear commitment to environmental sustainability which is reflected by the actions of staff across the council”.

*Susan Simon, UKRI Environmental Sustainability Programme Director*

### Indicator 2: Carbon Trust – Route to Zero

NERC has maintained certification against the Carbon Trust Standard since 2010. In 22/23 NERC was one of the first organisations to certify against the new Carbon Trust Route to Net Zero standard after an extensive assurance review of our carbon pathway programme and emissions.

### Indicator 3: Biodiversity Enhancement on the UK Estate

In 22/23, NERC funded a range of biodiversity improvement programmes across the UK estate including pond restoration, surveys and new wildlife friendly planting regimes.

### Indicator 4: Testimonial

“As one of the masters of the SDA, I strongly support the ‘digital twin tool’ and look forward to enabling the integration of the Route Planner on the bridge”.

*Master, RRS Sir David Attenborough following demonstration in June*

## Learning and Action:

Over the last year key learning has included: The need for effective governance and assurance processes to deliver the carbon pathway programme, and the importance of buy in from across NERC and NC operators to sustain continual environmental improvement.

To maintain a green rating we will continue to work with our National Capability investments in pursuit of net zero operations, including better understanding the scope 3 carbon emissions of NERC funded facilities, services and data centres, and trialling low carbon fuel on the NERC research vessels. NERC Directors and Carbon Pathway leads will need to ensure activities to reach our carbon reduction targets complement and support long term research delivery – enabling world leading research in a low carbon way.