

Call for evidence: *Shaping NERC's priorities*



Shaping our strategic priorities

In 2015 NERC expects to participate in a spending review that sets budgets for government departments, and ultimately research councils, for 2016-20. This call for evidence will help us make a strong case for the science budget.

In this context we seek views on how NERC investments in environmental science and innovation should continue to support UK priorities, balancing society's need to benefit from environmental resources whilst managing our environment responsibly.

Globally there is a high degree of consensus on the greatest environmental opportunities and challenges facing society, and these are reflected in NERC's strategy as over-arching 'grand challenges':

- Benefiting from natural resources;
- Building resilience to environmental hazards;
- Managing environmental change.

NERC will continue to build on its world-leading 50-year track record to deliver solutions to these grand challenges. Yet environmental science and technology, together with the social, political and economic landscape in which we operate, is ever-evolving. So we are now seeking to identify those priorities for our strategic investment that will deliver the most impact in tackling the grand challenges above.

In considering priorities, NERC recognises that environmental science cannot solve society's grand challenges by itself. We must and do work in partnership across economic sectors and research disciplines – with business, government, society and other funding agencies in the UK and internationally. So we also seek to identify the most relevant and willing partners to work with to deliver shared strategic priorities.

Example themes

As a guide to the kind of strategic themes NERC seeks to identify, we provide three examples in boxes below. These examples are not in any way intended to be comprehensive or restrictive or to imply any new priorities have been decided. They are provided simply to prompt thought and to illustrate the level of opportunity/challenge we seek to identify. We value all perspectives and evidence for potential priorities.

Example 1 - Ocean exploration

Ocean covers 70% of the Earth's surface and makes up 97% of all living space (the biosphere). We depend on the ocean for half the oxygen we breathe, a regulated and habitable climate (the top ten metres of sea contain more heat than the entire atmosphere above) and rainwater to grow food. Economically, the ocean provides 20% of the world's protein and carries 90% of world trade. Increasingly we look to the ocean to supply important minerals and energy (both renewable and non-renewable).

Our current understanding of the marine system predicts significant changes that will strongly impact on our climate and economy. As yet, the magnitude and speed of change is subject to large uncertainties. We need to improve understanding of global and regional sea-level change, how heat and carbon are penetrating the deep ocean, e deep-sea biodiversity and ecosystem resilience to human impacts.

UK marine industries are well placed to innovate and lead global markets, supported by our world-class marine science capability and development of new autonomous, robotic and sensor technologies. NERC leadership, coordination and funding of marine science helps us understand ocean processes and change, and reduce uncertainty, enabling the UK to seize opportunities and make better decisions for the future.

Potential priorities for NERC research and innovation investment, working in partnership with others, might include:

- **Marine natural resources** – to benefit from, and sustainably manage, the ocean for economically valuable food, energy and minerals as human activity moves into the extreme environments of the “deep sea frontier”.
- **Resilience to marine hazards** – to protect lives and sub-sea, offshore and coastal economic infrastructure by transforming knowledge of deep sea processes responsible for catastrophic events like earthquakes and tsunamis.
- **Marine environmental change and variability** – to understand and manage global- and regional scale impacts on people, places, infrastructure and business by understanding causes of major impacts such as ocean acidification, habitat loss and seafloor methane release.

Example 2 - Urban living

The world is urbanising rapidly. By 2050 nearly three-quarters of the population will be urban and in the UK more than 80% of us already are. The urban environment is critical to our future as population growth interacts with environmental change to produce resource crunches.

At their best, cities bring together people, culture, knowledge and resources to drive creativity, innovation and economic activity. At the same time cities face significant pressures from overheating, congestion, threats to safe food and water, pollution, waste removal, inequality, poverty and ill health.

Through its world-class research base, businesses and systems approach the UK has the capability to lead the world in developing innovative, integrated solutions for urban living. NERC environmental science is essential for us to understand and balance the benefits and challenges of urban living to enhance social well-being, resilient infrastructure and economic growth.

Potential priorities for NERC research and innovation investment, working in partnership with others, might include:

- **Natural resources** – to sustainably manage the supply of food, water and energy for urban areas and their hinterland.
- **Resilience the environmental hazards** – to provide a healthy environment (eg air, water and soil quality) and resilience of people and infrastructure to extreme weather (eg wind, heat, drought, flood).
- **Mitigate and adapt to environmental change** – to maintain essential natural capital, green infrastructure, biodiversity and ecosystem services for social and economic well-being.

Example 3 - Flooding

Extreme weather and flood events are increasing in frequency and severity. The exceptionally stormy weather in winter 2013/14 set new records for wind-speed, wave energy, coastal storm surges, rainfall, groundwater levels, river flows and flood levels. Apart from human safety and misery, flooding costs the UK £2.2 billion each year in building defences and restoring damage, while insurance pay-outs run into £billions.

World-class NERC science helps predict the occurrence and impact of extreme rainfall and storm surges, river and groundwater flows, and floods. It provides the essential capability for the Met Office and UK Flood Forecasting Centre to give earlier and more accurate warnings, and enables emergency responders such as the Thames Barrier to act – saving lives, homes, essential infrastructure and businesses.

However we still experience uncertainty in understanding and predicting extreme weather and floods, particularly in forecasting time, place and volumes more accurately. Potential priorities for NERC research and innovation investment, working in partnership with others, might include:

- **Better understanding of flood processes** – to improve our ability to predict the time, place and volume of rainfall and floods, and mitigate their impact.
- **Linking meteorological models with river, groundwater, tide and storm surge models** – to better understand occurrence, severity and duration of extreme weather, to provide earlier and more accurate forecasts and flood warnings, and to develop flood defence strategies.
- **Understanding how climate change will affect the frequency and intensity of extreme weather events** – to develop our future resilience to extreme weather and flooding.

Who we are

NERC – the Natural Environment Research Council – is the UK’s leading public funder of environmental science. We invest £330 million each year in cutting-edge research, postgraduate training, and innovation in universities and research centres.

Scientists funded by NERC study the physical, chemical and biological processes on which our planet and life itself depends – from pole to pole, from the deep earth and oceans to the atmosphere and space.

We partner with business, government, the public and the wider research community to shape the environmental research and innovation agenda. We then fund excellent science to provide knowledge, skills and technology that deliver sustainable economic growth and public wellbeing.

Our vision is *to place environmental science at the heart of responsible management of our planet*. You can see NERC’s strategy at <http://www.nerc.ac.uk/latest/publications/strategycorporate/strategy/>.

Who should read and respond to this call for evidence

This open call for evidence supplements NERC's usual advisory and discussion forums¹, and provides an opportunity for us to listen to all our stakeholders. We welcome views from anyone with an interest in UK environmental science funded by NERC:

- Beneficiaries of our research, knowledge and skills – including business, government, non-governmental organisations, the public.
- Co-funders of environmental science and innovation – including Research Councils, Innovate UK², other public bodies and charities.
- Research organisations – including the universities and research centres we fund.

Questions

We seek considered views in response to the following questions, and we ask you to bear in mind:

- The scope of NERC's environmental science remit:
<http://www.nerc.ac.uk/research/portfolio/remit/>.
- The three over-arching societal challenges set out in NERC's strategy: benefiting from natural resources; building resilience to environmental hazards; managing environmental change.
- We seek to identify high-level strategic themes. Such themes are likely to transcend specific funding mechanisms.
- By 'impact' we mean any kind of benefit to the UK society and economy, including but not confined to wellbeing, prosperity and sustainability.
- The inevitable constraints on NERC's budget, and hence the need for clear priorities.
- Please provide evidence and justification to support your views and to help NERC make the case for investment priorities.

Q1 What emerging research and innovation opportunities promise to make the biggest impact on societal challenges? (Please identify a maximum of three themes)

Q2 How should NERC ensure that our research and innovation investments deliver the most impact? (See meaning and broad scope of impact above)

Q3 Given the priorities identified in your answer to questions 1 and 2, who are key partners NERC should be working with?

Q4 How could NERC's research and innovation investments best support innovation and growth at a regional/local scale?

Q5 Do you have any other comments about NERC's strategic investment priorities?

¹ NERC routinely seeks advice on priorities through a range of advisory mechanisms such as: community meetings; public dialogues; calls for strategic research ideas; partner meetings; and independent advisory boards.

² Innovate UK is the new name for the Technology Strategy Board.

Submitting your response

NERC would prefer that you submit a single consolidated response from your organisation rather than multiple individual responses. (Whilst individual responses may be submitted, experience shows us that consolidated responses are often more helpful for providing a strategic perspective and weight of evidence.)

All responses should be submitted on [the template](#) provided.

The closing date for responses is **Monday 23rd March 2015**.

We will consider all submissions and we will publish all responses we receive, together with a summary. Alongside our routine advisory mechanisms, your submission will help to shape our investment plans for 2016-2020.