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Call for evidence: Shaping NERC's Priorities

IES submission, March 2015

1. What emerging research and innovation opportunities promise to make the biggest impact on societal challenges?

1) *Advances in data collection and sharing*

Technological advances now mean that researchers can now collect vast quantities of data on nature and the environment to inform their research. However, to maximise the potential of this data, which (due to data-logging and other advanced collection technologies) is now being collected in greater quantities than ever before, NERC should also be promoting enhanced and more intuitive approaches to data sharing, which enable scientists to better investigate big environmental challenges and phenomena and therefore better inform policy and decision-makers.

As recognised by the European Commission, in their work to develop a 'Shared Environmental Information System', there is a need to design systems "to ensure that environmental information is organised as effectively as possible, and in particular to ensure that the investments currently allocated towards monitoring and other information-gathering processes lead to the greatest possible benefits in terms of the use that is made of the resulting data"¹.

2. How should NERC ensure that our research and innovation investments deliver the most impact?

• *Adopting a systems approach*

NERC should be promoting research which adopts a holistic approach to investigating and tackling environmental challenges and problems, in recognition of the fact that natural systems are complex and interconnected. A systems approach allows researchers to develop a much more complex and nuanced understanding of human interactions with the natural world, based on an appreciation of the importance of feedbacks and thresholds. In this way science can better inform decision-making and planning, and help build resilience to environmental hazards.

• *Promoting interdisciplinarity and cooperation*

Further to the need to embed a systems approach in NERC's strategic planning, research which embraces interdisciplinarity is vital to understanding socio-environmental systems, and thus to tackling environmental problems. As has been increasingly recognised by large groups of leading international researchers, in particular from a growing school of 'resilience thinkers', understanding the 'tipping points' in highly inter-connected socio-ecological

¹ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0046:FIN:EN:PDF>



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systems is vital² and studies have shown that “integrated studies of coupled human and natural systems reveal new and complex patterns and processes not evident when studied by social or natural scientists separately”³. As such, to deliver most impact, NERC should take action to increase cross-Research Council collaboration in its work, to deliver excellent interdisciplinary research which will improve our understanding of these complex systems.

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

For successful knowledge exchange during investment and research planning as well as during and after research, NERC will need to engage with a wide network of stakeholders and experts, across government, professional bodies, research institutions and NGOs. Given the importance of interdisciplinary research and a systems approach identified above, this network is key, but it is particularly important that NERC increases its current engagement and collaboration with the other UK Research Councils.

Professional bodies and their umbrella organisations (e.g. Society for the Environment, Science Council, Engineering Council) offer a way to engage with environmental professionals, whose work concerns environmental challenges at a range of scales and in a variety of sectors.

4. How could NERC’s research and innovation investments best support innovation and growth at a regional/local scale?

Although high-level, conceptual thinking and research is important, it is equally vital that local context is given sufficient consideration in thinking about environmental challenges and the development of a meaningful evidence-base. This is particularly important where research informs policy. A systems approach shows us that one solution may produce different results when applied in different locations or circumstances.

Through collaboration with organisations with strong regional and local networks of environmental practitioners and professionals, such as professional bodies, NERC could maximise the impact of its investments across the UK. Developing relationships with professionals and researchers across the UK will promote better understanding of local needs and requirements. Such relationships at the local and regional scales will also ensure projects and investments are well-tailored to local context, producing evidence and innovation which can better support growth and inform policy both locally and nationally.

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² Folke et al. (2011) ‘Reconnecting to the Biosphere’ *Ambio* 40(7): 719-738.

<http://link.springer.com/article/10.1007%2Fs13280-011-0184-y>

³ Liu et al. (2007) ‘Complexity of Coupled Human and Natural Systems’. *Science*. 317(5844): 1513-1516
www.sciencemag.org/content/317/5844/1513.full