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Environmental challenges vs. scientific disciplines



The environmental research community naturally falls into a number of disciplines, for example, marine, atmospheric, earth and polar sciences; ecology and hydrology; and Earth observation. Increasingly, the environmental challenges facing the world today require multidisciplinary solutions, which is why NERC's new five-year strategy, *Next Generation Science for Planet Earth*, has seven science themes: biodiversity, the climate system, natural hazards, Earth system science, sustainable use of natural resources, environment pollution and human health, and technology. Clearly these do not immediately reflect the disciplines I've just described, so it is important that we demonstrate how NERC will support and develop these disciplines in the future. Indeed, the recent Investigating the Oceans inquiry undertaken by the House of Commons Science and Technology Select Committee questioned whether NERC allocates particular disciplines sufficient funding. So, how does NERC support the disciplines?

The answer can be found in our new funding streams: national capability, research programmes and responsive research. National capability is how we define the prerequisites to carry out environmental science: the research ships and aircraft, the computers, the datasets and the skilled people in the major environmental science disciplines. NERC's research and collaborative centres will deliver predominantly, but not exclusively, this national capability. This is a major way by which we will focus on the disciplines.

On the other hand, the research programmes funding stream will focus explicitly on the seven science themes (whilst drawing on national capability). We aim at one and the same time to nurture the disciplines and address the cross-cutting thematic science challenges. Theme leaders and NERC's Science and Innovation Strategy Board, will ensure these elements work closely together.

Let's consider how this will work for marine science, for example. Earlier this year NERC agreed funding for the Oceans 2025 consortium of marine research centres. This £120 million initiative will deliver both

national capability and some research programme elements of marine science. But NERC's commitment to marine research goes much further. In addition to Oceans 2025, NERC also supports research programme proposals and responsive mode grants in marine science. Indeed, responsive research proposals, brought to NERC by the research community, will be one way of identifying future marine challenges and so feed back into the strategy.

I should also point out that NERC's existing research programmes already support world-class marine science and technology. We have recently spent £40 million on our new Royal Research Ship *James Cook* and we are planning to spend about £60 million on a replacement for RRS *Discovery*. With state-of-the-art research vessels, autonomous underwater vehicles, long-term monitoring, satellite observations, partnership in the new National Centre for Ocean Forecasting, and excellent international collaborations, NERC can be confident it is supporting critically important marine research. One needs to look no further than the Rapid Climate Change programme and its array of instruments spread out across the Atlantic Ocean – from the coast of Africa to the United States. In August, this bold initiative reported in two back-to-back papers in the journal *Science* the first continuous measurements of the North Atlantic component of the global ocean thermohaline circulation.

Could NERC put more resources into marine science? Yes, of course, but even with NERC's £1.2 billion budget over the next three years we have to ensure the health of all the major components of environmental science. Those that argue narrowly for more resource in one area should not lose sight of the interdependence that area has with other areas of science. This is why it is essential that NERC has a balanced portfolio including a focus on the big multidisciplinary environmental challenges. On the other hand, better national coordination is certainly needed if the UK is to fully exploit NERC-funded marine knowledge. NERC is engaged in this discussion at a national level.