



**DELIVERY  
REPORT**



**Report for 2009/10**  
June 2010

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## 1. Executive Summary

The Delivery Report is requested by the Department for Business, Innovation and Skills (BIS) as part of its performance management system for the Research Councils. The report focuses primarily on the outputs and outcomes from the Natural Environment Research Council (NERC) Delivery Plan and Scorecard for 2009/10, and complements the wider view of NERC investments and activities reported in the Annual Report, Economic Impact Baseline (EIB) and Economic Impact Reporting Framework (EIRF). The Delivery Report also includes important achievements reported in 2009/10, not captured at the Scorecard level (i.e. those achievements occurring this year from previous investments).

### Recent Successes (Section 2)

NERC continues to make significant progress in delivering its strategy Next Generation Science for Planet Earth and has continued to demonstrate its contribution to academic advances, from excellent research, across and within disciplines, including significant advances in understanding, methods, theory and application. This year, NERC's scientific community and NERC-funded researchers have:

- Contributed evidence that informed discussions at Copenhagen
- Initiated several programmes to address ecosystem services nationally and internationally
- Provided the scientific foundations for major marine legislation
- Improved the UK's capacity to forecast economically devastating floods
- Used NERC's research aircraft to give crucial scientific support in civil emergencies i.e. the ash cloud
- Responded rapidly to devastating natural disasters overseas
- Invested in a new research ship to ensure NERC's future in delivering world-class science
- Shown that human activities have caused more than half the increase in sea levels since 1850
- Collaborated with industry and government to investigate cost-effective and sustainable methods of carbon capture and storage (CCS)
- Shown that ticks' saliva could form the basis for life-saving new anti-clotting drugs
- Launched the MONSooN supercomputer, with the Met Office; to share data and run models, for forecasting climate and its impacts
- Began the second phase of the NERC/ERFF (Environment Research Funders Forum) Skills Needs Review to identify postgraduate skills needs

### Public Engagement with Research (Section 3)

In addition to supporting delivery of Research Councils UK (RCUK) Public Engagement with Research (PER) activities, in 2009/10:

- NERC worked in partnership with Sciencewise-ERC to run a public dialogue on geoengineering that will inform NERC's future policy and funding decisions in this area
- Volunteer members of the public helped researchers monitor the movement and spread of a range of creatures, including the invasive harlequin ladybird
- NERC researchers achieved prime-time TV slots and high-profile media coverage, ensuring the effective communication of environmental science.

### Progress in Management (Section 4)

NERC has continued to develop and improve management structures and management processes. In 2009/10, NERC:

- Created a new National Oceanography Centre (NOC) to better deliver integrated marine science and international marine policy
- Began a £17m project to restructure existing facilities at NERC's British Geological Survey (BGS) site in Keyworth, Nottingham
- Completed the first annual cycle of its strategy review process to ensure a dynamic strategy

- Approved the second phase of NERC's Theme Action Plans (TAPs), an investment of £96m

NERC research has contributed to society and the economy by improving policy and public services, improving the performance of existing businesses, delivering highly skilled people to the labour market, attracting R&D investment from global business, and creating new business. In 2009/10, NERC:

- Continued to strengthen its engagement with key business sectors by developing an Impact Action Plan
- With the Technology Strategy Board (TSB), developed working relationships on low impact buildings with the construction industry, and mapped the water sector needs with Living With Environmental Change (LWEC)
- Along with its sister Research Councils, implemented the 'Pathways to Impact' requirement for all grant applications

### **Progress to Date Against Targets and Milestones (Section 5)**

NERC set a challenging programme of work in 2009/10, with a total of 61 activities on the Scorecard, set out under NERC's 18 strategic objectives. At the end of quarter 4, 20 activities were on track and 34 completed. Progress towards 6 activities was delayed due to a number of issues affecting delivery. Implementation of the Shared Services Centre (SSC) was critically off track due to delays in a number of 'go live' dates.

### **Future Targets/Milestones (Section 6)**

NERC updated its Delivery Plan and Scorecard to reflect the key activities that will deliver the NERC strategy. The activities relate to NERC's strategic objectives, and new and updated activities are headed under 'Strategic Partnerships', 'Knowledge Exchange', 'Strategic Science Themes', 'People' and 'Organisation'.

### **Update of Economic Impact Baseline (Section 7)**

NERC's EIB report is published alongside the Delivery Report. The report demonstrates the value of and impact of NERC science, the role NERC plays in developing the UK skills base, and the breadth of NERC science, including NERC's role in supporting climate science.

### **The Efficiency Programme (Section 8)**

By participating fully in the cross-Council SSC, NERC continued to improve efficiency and save money that can then be diverted into science.

NERC achieved operational efficiency savings of £3.78m against a target of £1.867m; under the category 'Reducing the proportion of Research Centre expenditure attributable to administration costs'. NERC exceeded its targets for all four cash-releasing savings categories.

## **2. Recent successes**

NERC's strategy [Next Generation Science for Planet Earth 2007-2012](#) recognises a responsibility not only to fund excellent research that addresses the critical environmental issues of the 21st century, but also to ensure that NERC makes a real contribution to building a sustainable economy and improving quality of life through increasing the economic impact of NERC's investment in research and training. For example, researchers supported by NERC influence national and international policy-makers, and NERC's research contributes to increased prosperity through the development of new products and services, and improvements to existing technologies that ensure environmental sustainability.

NERC-funded research is a foundation for what is becoming known as the Green Economy; that is an economy that makes optimal use of environmental resources, understands environmental constraints and environmental change processes.

## 2.1 Economic Impact Reporting Framework

Highlights from the 2009/10 EIRF include:

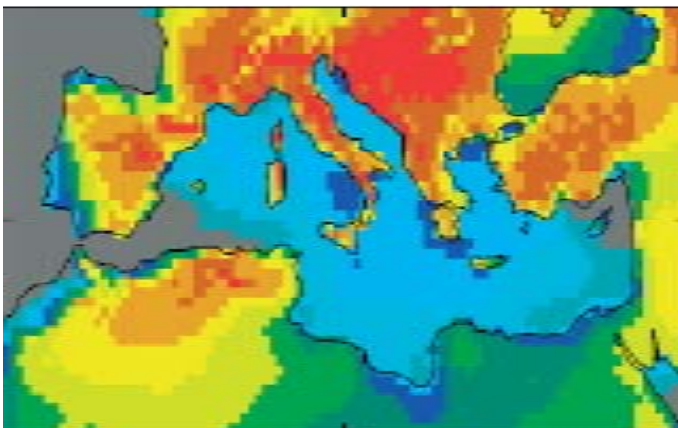
- The number of ISI journals from NERC funding rose to 4,336, an increase of 6%. International co-authorship is now being sustained above 50%, demonstrating sustained science quality.
- The UK environmental sciences achieved a citation impact score of 1.43 times world average for 2008, the highest amongst the G8 nations.
- A growing number of projects relevant to policy provided advice to government; 34% of projects gave advice in 2009/10, a rise of 8% over 5 years. There were 882 instances where advice was provided. NERC also provided advice for 22 consultations and 7 inquiries, helping inform policy on topics including regulation on geo-engineering and securing food supplies.
- Over the past 5 years, NERC funded around 3,500 highly skilled post-graduates to industry and the public sector (675 during 2009/10). NERC is committed to the long term health of the research base, providing trained people to meet the needs of stakeholders.
- 2.3% of NERC-funded peer-review journal articles achieve outstanding citations impact, where only 1% of papers match this worldwide.\*]

\* Counting articles published between 2003 and 2007 with a citation impact more than 8 times the world average (using citations counted to the end of 2008)

## 2.2 NERC's Research Highlights

Included in this section are examples of where NERC-funded researchers have made substantial achievements in the past twelve months, and demonstrate the contribution the environmental sciences make to the health and wealth of the UK and internationally. The headings below relate to the science themes that are set out in NERC's strategy 'Next Generation Science for Planet Earth'.

### Climate Systems



NERC plays a leading role in the development of risk-based predictions of the future state of the climate. These predictions will help develop future mitigation and adaptation strategies to cope with the effects of climate change. To achieve this, in 2009/10:

- Through its Research Centres, NERC contributed to a keynote document for marine decision makers and stakeholders (including industry) outlining the vulnerability of UK, and adjacent seas, to the impacts of ongoing climate change. This, along with evidence from NERC's NOC, contributed to the 'UK Climate Projections' (UKCP09) regarding sea temperature, salinity, stratification, circulation and waves. UKCP09 is funded by the Department for Environment, Food and Rural Affairs (Defra) and is used to support decision making by a wide range of people who want to access potential impacts of the projected future climate and explore adaptation options to address these impacts.
- NERC-funded National Centre for Earth Observation (NCEO) demonstrated that even a single air flight can have a measurable impact. Aircraft condensation trails can develop into cirrus clouds that last for days so it is important to understand how they form and what effect

they have on the climate. Using a combination of global and regional models, conventional observations and satellite datasets, the contrail induced cirrus was found to produce a detectable heating effect at night due to an enhanced greenhouse effect but a cooling by day due to increased reflection of sunlight back to space.

- Changes in the hydrological cycle are expected to play a central role in governing a vast range of environmental impacts. At the same time, predictions of water-related variables show very high uncertainty; for example, as shown in the recent 'Intergovernmental Panel on Climate Change Fourth Assessment Report' (IPCC AR4). As part of the Living With Environmental Change partnership, NERC has created a major interdisciplinary 'Changing Water Cycle' programme, which will develop science-based strategies to help respond globally to, and minimise, the risks to human and natural systems caused by changes to the water cycle, and their impacts on water and food security and ecosystem health. This programme will also support NERC's 'Natural Hazards' and 'Sustainable Use of Natural Resources' science themes.

### **The Copenhagen United Nations Climate Change Conference 2009**

A number of NERC-funded researchers contributed to the Copenhagen United Nations Climate Change Conference 2009. Researchers included representatives from the universities of Edinburgh and Leeds and NERC's Centre for Ecology and Hydrology (CEH), working with Met Office and Department of Energy and Climate Change (DECC) colleagues.

Researchers advised DECC ahead of the conference, through presentation of results (including evidence on greenhouse gas emissions and a carbon map of Africa) and behind-the-scenes analysis. Researchers also influenced policy-makers during the conference through a series of seminars.



Two of the key outcomes of the talks were commitments 'to reduce global emissions so as to hold the increase in global temperature below 2°C' and to achieve 'the peaking of global and national emissions as soon as possible'.

Image: Stage-managed communication between researchers and the Danish Prime Minister (far right) at the Copenhagen Climate Congress.

### **Biodiversity**



Biodiversity plays an important role in providing ecosystem services such as purifying water, regulating climate, and maintaining the environment in which we live. In 2009/10:

- NERC began co-funding the LWEC Insect Pollinator Initiative (with the Biotechnology & Biological Sciences Research Council (BBSRC), Defra,

Scottish Government and the Wellcome Trust) to promote innovative research aimed at understanding and mitigating the biological and environmental factors that adversely affect insect pollinators. The initiative will investigate the factors that lie behind the declines in pollinators, such as honeybees and bumblebees, seeking to identify solutions to reverse those declines. Possible causes of this decline include disease, chemicals such as pesticides, habitat change and a range of management practices. An evidence base is needed to inform the conservation of wild insect pollinators and to improve the husbandry of managed species, to avoid the potentially catastrophic loss of the ecosystem services they

provide. Low cost seed mixes to boost bumblebee pollinators could be worth up to £440m pa, equivalent to 13% of farming income.

- NERC's CEH researchers produced one of a set of eighteen indicators that are helping policy-makers and conservationists to measure biodiversity. Its indicator tracks the presence of invasive species in Britain between 1960 and 2007, and will be used to measure the UK's progress towards its international biodiversity treaty obligations.



- NERC-funded University of Aberdeen researchers have shown that alien invaders such as predatory American mink can be beaten with the right approach. The mink have been devastating fragile ecosystems ever since they were introduced to the UK during the 20th century. Once established, eradicating them is difficult. Working with local governments, conservationists, industry and local communities, the mink have been forced

to retreat from land across the Cairngorms – one of the biggest successes ever seen in eradicating an invasive species.

- NERC undertook a study to inform a new large scale integrated research programme 'Biodiversity and Ecosystem Service Sustainability' (BESS). Through directed, five-year projects, research will be developed around a series of integrated landscape studies in the UK. These are designed to provide the basic science that will ultimately underpin policy-led initiatives on the management and benefits associated with UK ecosystems. Landscapes in the UK are being increasingly viewed as multi-functional and are required to deliver a wide range of services to people, including food, clean air, water, health and recreation.

### **Improving ecosystems management policies to help alleviate poverty in the developing world**

The Millennium Ecosystem Assessment showed that the loss of services from ecosystems (for example deforestation, soil degradation, water purification) is a significant barrier to reducing poverty, hunger and disease. Tackling this set of problems requires a combination of environmental science, ecological economics and political economy.



In December 2009, NERC, the Department for International Development (DFID) and the Economic & Social Research Council (ESRC) announced funding of £40.5m to deliver high quality and cutting-edge research that will improve understanding of ecosystems, in terms of the services they provide for poverty reduction and inclusive growth processes. The 'Ecosystem Services for Poverty Alleviation' (ESPA) programme aims to deliver high quality and cutting-edge research that will improve our understanding of ecosystems in terms of the services they provide for poverty reduction and inclusive growth processes. It will provide the evidence and tools to enable decision makers and end users to manage ecosystems sustainably and in a way that contributes to poverty reduction.

## Sustainable Use of Natural Resources



NERC-funded research continues to explore how renewable and non-renewable resources can be used to develop a sustainable economy, particularly as demand for the world's resources continues to grow. In 2009/10:

- NERC's BGS researchers used borehole and seismic data to create 3D models to characterise the subsurface geology in different areas. Their research supports the views that man-made salt caverns and depleted oil and gas fields generally have the best potential for gas storage. As the UK only stores between 11 and 14 days' supply of gas, developing more storage facilities is a national priority and BGS is at the forefront of research into underground gas storage. BGS has worked with local authorities for a number of years, providing advice on gas storage technologies, where and how gas storage might be undertaken in various counties and the geological characterisation of some proposed sites both for local Councils and developers.
- Researchers from NERC's CEH, in collaboration with Reading University's Walker Institute for Climate System Research and Jeremy Ben and Associates (JBA), have developed the first 'drought catalogue', characterising 20th century droughts in 24 European regions. By examining patterns of rainfall and river flow across the continent, they were able to develop a novel method of forecasting droughts in the UK, based on drought conditions elsewhere in Europe. The work was funded by the Environment Agency (EA) and co-funded by Defra, which are using this work to improve drought monitoring and forecasting in England and Wales. The catalogue and other outputs are also being used in EU strategy documents on future drought research initiatives.
- A team at NERC's NOC discovered for the first time why fish are so abundant along continental shelves. They found a strong 'internal tide' in the Celtic Sea that moves between warm surface waters and cold deep ones, creating turbulence as it breaks and stirring up nutrients from deeper water. These nutrients feed the plankton at base of the marine food chain, providing the perfect environment for young fish like mackerel. Similar processes go on along continental shelves all over the world, and understanding them will be vital to conserving fisheries.
- The UK Energy Research Centre (UKERC) report into 'Global oil depletion: an assessment of the evidence for a near-term peak in global oil production, UKERC, 2009'<sup>1</sup> tackled the controversial question of whether global oil production will peak and then decline before 2030. Despite major limitations in the available data, the report concluded that sufficient information was available to assess this risk and that knowledge was improving in key areas. Commonly used methods, underestimate the size of remaining resources and provide overly pessimistic forecasts of future supply. Nevertheless, a peak in conventional oil production before 2030 appears likely and there is significant risk of a peak before 2020. UKERC is co-funded by NERC, the Engineering & Physical Sciences Research Council (EPSRC) and ESRC, and is part of the £28m cross-Council programme 'Towards a Sustainable Energy Economy' (TSEC).



<sup>1</sup> Link to report: <http://www.ukerc.ac.uk/support/Global%20Oil%20Depletion>

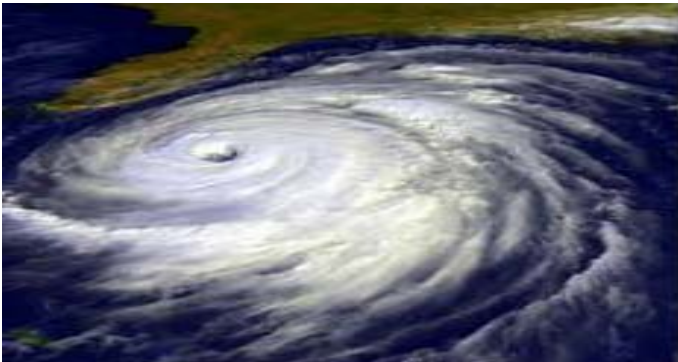
### **'Water meter in every home', says new report**

NERC's CEH and spin-out company Wallingford HydroSolutions, produced river flow predictions for an EA report 'Water for People and the Environment: Water Resources Strategy for England and Wales'. The report predicts that the effects of climate change will reduce the amount of water in rivers in England and Wales by 10-15%. This will rise to at least 50% during summer.



The reduced river flows, combined with an expected population increase of 20 million people, will place enormous strain on the UK's already-overstretched water resources. The average Briton currently uses 148 litres, or 260 pints, every day and this demand puts existing water resources under pressure in many parts of the country. According to the EA, 25 million people live in areas of the UK where there is less available water per person than in Spain or Morocco. To cope, the agency recommends 'near universal' water metering, a review of the water industry's structure, and actions to reduce water consumption.

### **Natural Hazards**



NERC plays an important role in the science of forecasting and mitigating natural hazards in the geophysical environment. In 2009/10:

- Work at NERC's NOC provided new insight into the joint occurrence of storm surges and high tides. Researchers used high-resolution numerical models to apply these insights around the entire UK coastline. The results are directly applicable to flood and coastal defence policy and will be presented in a user-friendly interface. Coastal flooding costs the UK approximately £1 billion each year and any increase in flood frequency or severity would have serious economic and social consequences. Statistical information on extreme sea levels must be up to date and easily accessible to decision-makers in order to inform coastal defence policy.
- In 2009/10, NERC established a £4.9m 'Storm Risk Mitigation Through Improved Prediction and Impact Modelling' research programme, to address the need to increase the capability to forecast the impacts of hazardous weather, heavy rain, and high winds on catchments and coasts; which is likely to increase due to climate change.
- NERC's CEH continued to develop improved methods for river flow frequency estimation and forecasting for UK flood risk estimation. The up-grade to rainfall-runoff methodology in the FEH (Flood Estimation Handbook), to deal with very large events, greater than several hundred years return period, was completed. CEH negotiated data access through the ATLANTIS consortium to enable development of the HI-RES FEH pilot study to assess the usefulness of high-resolution spatial data to improve flood frequency estimation.

### NERC-funded researchers in Haiti response

Vital data provided by NERC's BGS helped the response to the Haiti earthquake in January 2010. BGS researchers detected the 7.0 magnitude earthquake as it happened. Within minutes, they alerted agencies and rescue missions. Within 24 hours, the World Bank was using NERC seismic data and high-resolution satellite images to assess the damage around Port-au-Prince.

Working with non government organisations (NGOs), the Red Cross and Unicef, researchers assessed the status of Haiti's infrastructure, and identified areas safe from aftershocks, land slips and flooding. UK researchers played a critical role in providing a rapid assessment. The data was used to help guide relief activities, develop reconstruction plans, and assess future post-disaster needs.



Image: Affects of the Haiti Earthquake

### Environment, Pollution and Human Health



NERC science provides new approaches to predicting the future behaviour of pathogens and pollutants as the climate changes, and provides solutions to issues, such as disease spread, drinking water contamination, and air pollution. In 2009/10:

- NERC provided vital evidence for the 'Environmental Audit Committee inquiry on air quality'. According to evidence presented to the inquiry, air pollution could still be contributing to as many as 50,000 deaths per year as it makes asthma worse and exacerbates heart disease and respiratory illness. To further understanding of air pollution and its impacts, Defra commissioned NERC's CEH to produce a 'Review of Transboundary Air Pollution' (RoTAP), as well as completing the assessment of long term trends in eutrophication, acidification, and photochemical oxidants in the UK.
- NERC established the 'Urban Atmospheric Science' programme to generate new knowledge and predictive capacity of key environmental processes governing the distribution, transport, and transformation of atmospheric pollutants in urban areas. The research will have strong links to health research and the infrastructure investments required to understand and reduce the health impacts of air pollution on people in urban areas. It will also help provide solutions to issues such as disease spread, drinking water contamination and air pollution; reduce the burden of human disease linked with environmental causes; and anticipate new threats to public health before they become serious.

### A new technique may help remove nanoparticles from sewage

Through the joint funded 'Environmental Nanoscience Initiative' (ENI), researchers from NERC's CEH, ISIS Neutron Source, King's College London and Oxford University found that coating silica nanoparticles in surfactant before introducing them into sewage meant that they interacted with components of the sewage to form a solid sludge. The sludge could then be separated from the wastewater and disposed of. Manufacturers worldwide use millions of tonnes of nanoparticles in products every year, much of which end up in sewers. The effect of nanoparticles on the environment is not well understood and more research is needed on whether similar techniques could be used to remove other kinds of nanoparticles.

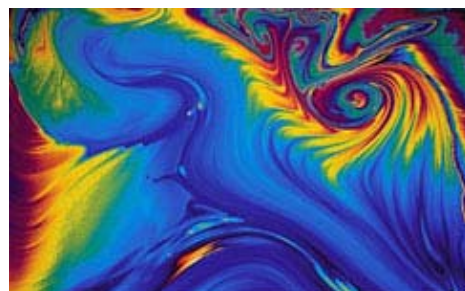
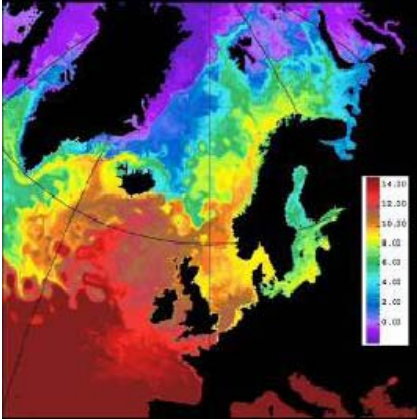


Image: Interference colours on illuminated soap film.

## Earth System Science



To understand the complex, interconnected system that is our planet, NERC supports research which looks at how the Earth works today, how components of the system have changed, and predicting what will happen in the future. In 2009/10:

- The state-of-the-art 'UK Surface-Ocean / Lower Atmosphere Study' (UK SOLAS) Cape Verde Atmospheric Observatory was recognised by the World Meteorological Organisation as one of 15 Global Atmospheric Watch stations. The Observatory can sample reactive trace gases, like organic sea-spray particles, which researchers from the NERC-funded UK SOLAS programme have discovered play an important role in cloud formation over the sea and

hence the global climate. The research will improve ability to predict climate change, giving insights into the natural marine production and fate of important trace gases. Climate modellers and policy makers need such information as it will show whether these processes are sensitive to other environmental factors.

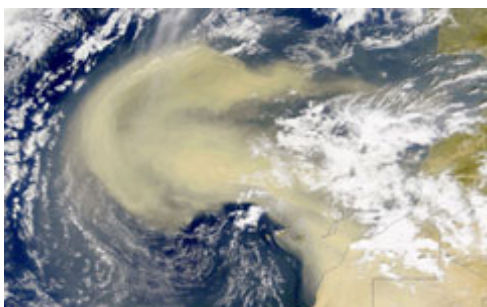
- NERC's British Antarctic Survey (BAS) researchers led a study that obtained the most comprehensive picture yet of the rapidly thinning glaciers along the coastline of both the Antarctic and Greenland ice sheets. The research indicates that the most significant and rapid ice loss results from glaciers speeding up where they flow into the sea. This 'dynamic thinning' of glaciers reached the far north of Greenland, intensified in Antarctica and spread and penetrated far into the interior of both ice sheets as the glaciers accelerated. The findings are an important step forward in making more accurate predictions of how much sea levels will rise in the future.



Image: BAS Field Camp on Pine Island

- Researchers from NERC's NOC discovered that human activity is to blame for more than half the changes in sea level since 1850. During the twentieth century, only four centimetres of the observed 18 centimetre sea-level rise can be attributed to natural variation; the remaining 14 centimetres are a direct result of human activities. It was discovered that, before 1800, any change in sea level can be explained by natural variation, caused by phenomena such as changes in the amount of heat reaching the Earth from the Sun, or the cooling effects of volcanic eruptions. Researchers reported that a large part of sea-level rise after 1800 is a result of an increase in atmospheric carbon dioxide (CO<sub>2</sub>) from deforestation, and burning of fossil fuels from the start of the Industrial Revolution.

### Iron dust helps oceans to fix nitrogen



New research by an international team including researchers from NERC's NOC and the University of Essex showed that dust storms are a major source of iron to the ocean and control the cycle of nitrogen, an important nutrient for marine creatures. This could be an important conclusion for understanding past and future climate changes, as the cycle of oceanic nitrogen is crucial for marine life and ultimately for the storage of carbon in the oceans.

The data provided some of the first conclusive evidence that iron availability is playing a significant role in controlling the input of fixed nitrogen, at least to the Atlantic Ocean. Researchers tested the idea during a scientific cruise on board the Royal Research Ship (RRS) 'Discovery' in 2005.

Image: Dust storm over the Sahara

## Technologies



Technologies are used in NERC's research for many purposes: to observe and monitor the environment, provide sophisticated models of environmental processes to predict the future state of the environment; and develop mitigation solutions. Technology will play an essential role in enabling solutions to this century's most pressing environmental challenges. In 2009/10:

- NERC continued working towards improved ocean prediction systems through its 'Oceans 2025' research programme. Covering over three-quarters of the Earth's surface, oceans play a crucial role in regulating the global climate and are an important source of food, energy and other raw materials. Through this programme, NERC aims, in collaboration with Imperial College, to set up and demonstrate the viability of an unstructured ocean model (Imperial College Ocean Model - ICOM) in a realistic large-scale ocean setting. Work in this area is being undertaken through the 'Strategic Ocean Funding Initiative' (SOFI) of 'Oceans 2025'. Model testing has been developed and is now running. In collaboration with NOC, the Imperial College team are now setting up a model with NEMO (Nucleus for European Modelling of the Ocean).
- The Chief Scientist from NERC's Centre for Polar Observation and Modelling (CPOM) based at University College London, has been the Lead Investigator for the European Space Agency's CryoSat-2 Earth Explorer satellite mission. The satellite will use an altimeter to measure both the shape and thickness of Arctic and Antarctic ice with unprecedented accuracy. Researchers can use the information to understand how melting polar ice affects ocean circulation patterns, sea level and global climate. Diminishing ice cover at the poles provides an early indication of global warming rates and because ice plays an important role in regulating climate and sea level, the consequences of change are far reaching. CPOM is part of NERC-funded NCEO.



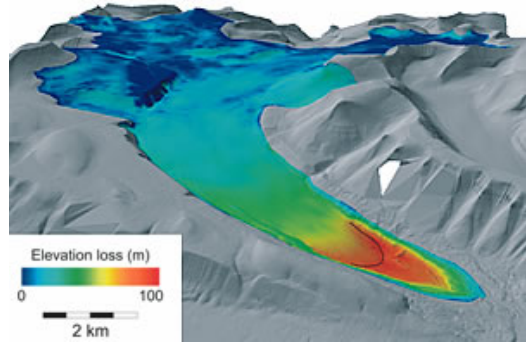
Image: ESA's CryoSat-2 Earth Explorer satellite

- NERC-funded researchers from the Universities of Liverpool and Cranfield mapped the magnetic properties of Britain's soil for the first time. The soil's magnetic field varies from place to place and, until recently, researchers have not known why. The team changed this by sampling soil all over Britain, measuring and analysing local variables to understand what causes soil magnetism. Using basic data on geology and weather, the likely soil magnetism of an area can be modelled without the need for samples. The research has helped improve British Army mine detectors, which have often been less effective in very magnetic soils. The 'Soil Map' enabled the team to advise defence authorities on where to find samples of highly magnetic earth with which to test potentially better mine detector designs.

### Innovating with laser technology

NERC researchers are innovating new ways to make use of lasers (known as Light Detection And Ranging - LiDAR) to picture objects from a distance.

NERC's CEH and Bournemouth University have discovered a way to map the undergrowth in remote forests, normally hidden beneath the canopy, using airborne LiDAR. Swansea University is collaborating with Forest Research to show that LiDAR on the NASA ICESat satellite can provide similar information. Such observations contribute to an understanding of how forests capture carbon and their vulnerability to climate change.



LiDAR allowed geoscientists at Durham University and its partners to monitor ground movements at the surface rupture created by the L'Aquila earthquake in central Italy in April 2009. They found that nearby faults had been made more dangerous and could lead to further earthquakes. The work will help the Italian authorities to improve their emergency planning procedures. Similar prediction and mitigation advice has also been given to Iran and Indonesia and will help save lives.

UK local authorities can use the data LiDAR provides to monitor changes in the environment, such as the effects of declining hedgerows, or any unplanned urban or industrial development.

Image: The Slakbreen glacier, Svalbard

### National Capability



The environmental sciences rely on facilities, infrastructure and datasets to enable researchers to deliver NERC's strategic objectives, including national needs. In 2009/10:

- NERC's CEH led a large team of academics, EA colleagues and other water abstractors, to review the best science to define the maximum amount of water that can be taken from different rivers, while still meeting ecological goals. This was used by UK authorities to determine practical regulatory standards, and meet legislative requirements such as the European Water Framework and Habitats Directives. The EA has revised its procedures to include these standards, which have major implications for farmers, and water and power generation companies. This builds on the river flow predictions developed for the EA report 'Water for People and the Environment: Water Resources Strategy for England and Wales' by CEH and spin-out company 'Wallingford HydroSolutions'
- NERC commissioned the building of a replacement ship for the ageing RRS 'Discovery'. The new research ship will provide a state-of-the-art platform for researchers to address some of the world's most pressing environmental issues, and enable them to make measurements of the oceans. This will lead to vital evidence regarding climate change, marine ecosystems and underwater earthquakes and landslides, which will, in turn, deliver significant economic and societal benefits. The contract was awarded to Spanish shipyard, C.N.P. Freire, S.A. The ship should be ready to begin scientific work by 2013/14.

- Researchers at the NERC-funded Oxford Radiocarbon Accelerator Unit were among an international group who managed to sequence, for the first time, most of an ancient human's genome. Using a 4000 year-old lock of hair, found in a museum basement, researchers recovered nearly 80 per cent of the genetic material of a palaeo-Eskimo man from the Saqqaq culture – the earliest known settlers in Greenland. The breakthrough provides evidence for an early human migration from Siberia into the Americas some 5,500 years ago, independent of the move that gave rise to modern Native Americans and Inuit.



Image: Saqqaq reconstruction

### NERC research aircraft aids volcanic ash research

In March 2010, NERC deployed its specialist research aircraft to the edge of the massive plume of ash erupting from the Eyjafjallajökull volcano; using on-board instruments to 'see' the volcanic plume. NERC used two of its research aircraft, a BAe-146-301 from the Facility for Airborne Atmospheric Measurements (FAAM) and a Dornier 228, from the Airborne Research and Survey Facility (ARSF), to fly small teams of researchers to gather vital data from the Icelandic volcano, which grounded flights across Britain and Northern Europe during April 2010. Their findings fed into Met Office forecast models and advice to airports to allow commercial planes back into the air.



Image: Eyjafjallajökull volcano

### Responsive Funding



Responsive Mode funding plays an essential role in sustaining the research base; providing opportunities for curiosity-driven research, training of the next generation of researchers and helping NERC identify emerging issues and priorities for future NERC strategies. Responsive Mode also plays an incidental role in delivering NERC's strategic science themes. In 2009/10:

- With partners, NERC's CEH developed a new drug that can control blood flow and prevent clotting, potentially preventing a stroke or heart attack. The UK and Slovakian research team discovered and isolated an anticoagulant or anti-clotting agent, which they named Variegin, from the salivary glands of ticks. Tests to establish whether Variegin could prevent venous thrombosis, were a huge success and suggest Variegin could have applications for coronary diseases, deep-vein thrombosis and be applied during major surgery to control bleeding. NERC's CEH is also establishing PHARMATIC, a new company that focuses on the development of biotherapeutics derived from parasites.
- NERC began a two-pronged evaluation of its Responsive Mode, convening independent panels of academics and users to assess the research achievements and outputs of sample grants in the areas of biodiversity and global change; whilst simultaneously collecting evidence of Responsive Mode funded research having influenced NERC's strategy. The panels will meet early in 2010/11 and an evaluation report comprising their conclusions and a summary of strategic impacts is expected to be presented to NERC's Science and Innovation Strategy Board (SISB) and Council later in the year.

- Findings from an analysis carried out June 2008 - March 2009 on the effect of volcanic ash on health was published. NERC-funded researchers from Durham University have shown that ash from Chaitén volcano, Chile has potentially serious health implications for local people in Chile and Argentina. Regular exposure to the volcanic ash over a period of months or years could potentially lead to respiratory illnesses. The research highlighted the need for Chilean and Argentinean authorities to set up long-term air quality monitoring networks. The researchers' results were disseminated to local geological surveys and health authorities, and the local branch of the World Health Organisation. Nine percent of the world's population live within 100km of a historically active volcano, so understanding the potential health risks posed by volcanic ash could benefit hundreds of millions of people worldwide.

### Diapycnal and Isopycnal Mixing Experiment in the Southern Ocean (DIMES)

NERC worked with US partners to deliver the major observational 'DIMES' Responsive Mode consortium programme in the Southern Ocean to increase knowledge of the physical, chemical and biological feedback processes, and improve understanding and modelling of key processes determining the sensitivity of the climate system. This major observational programme to quantify mixing processes is critical to climate modelling.

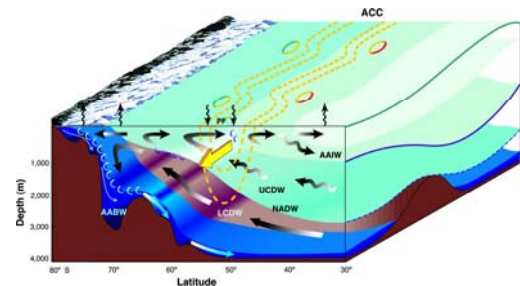


Image: Schematic representation of Southern Ocean meridional overturning circulation

## Partnerships



UK and international partnerships are particularly important for the environmental science community. The scale of the research NERC supports, and the cross-border nature of the environmental challenges facing humanity, mean that much of its research is delivered in partnership with others. In 2009/10:

- NERC continued to manage Phase II of the UK support programme for the 'Integrated Ocean Drilling Programme' (IODP), through a £7m investment (2008 – 2013). This will enable the UK to maintain its influence within the IODP, by undertaking preparatory science for international collaborations. IODP research focuses on a wide range of fundamental and applied issues, such as global climate change, biodiversity, natural hazards involving earthquakes and volcanic processes, sustainable mineral and energy resources, as well as the internal structure and dynamics of Earth. Three international platforms are now in operation and the UKIODP management is being reviewed and restructured to ensure most efficient operation and programme delivery. The final strategic call for research programme grants was opened in January 2010 and up to £2.1m will be awarded via Small and Standard grants.
- NERC continued its negotiations around the Memorandum of Understanding signed by the UK and Canadian governments to enter into a bilateral agreement on access to polar infrastructure and logistics. In May 2009, the establishment of an Arctic Office was announced and a meeting was held to consider the potential for a coordinated Arctic research programme to meet NERC's strategic objectives and discuss a major action on the Arctic as part of the 2009 TAPs.
- With the Met Office, NERC procured and launched the MONSooN supercomputer, as part of the Joint Climate Research Programme. This will enable NERC and Met Office researchers to share data and run models on the same platform, for forecasting climate and its impacts. As well as a common computing platform, the service will deliver a number of other features that will improve researchers' ability to collaborate and share data and ideas. The programme's overarching aim is ensuring that the UK maintains and strengthens its leading

international position in climate science, and hence in climate forecasting and provision of advice for climate policy; enabling policy makers to make more informed and timely decisions on issues like adaptation to future climate change.

### **Living With Environmental Change (LWEC)**

LWEC is a large scale programme, run through a partnership of the UK's major funders of environmental research and lead by NERC.

LWEC aims to provide the knowledge and tools that individuals, government and business need to make informed choices about the future. This research will help to make better predictions and analysis of environmental change to adapt and become more resilient, and help people to mitigate or avoid the worst impacts, as the environment changes.

Within the Spending Review period, so far LWEC programmes have:

- Provided important policy evidence for the Copenhagen climate change negotiations, through DECC and Met Office AVOID programme, which informed Lord Stern's economic analysis of the Copenhagen emissions scenarios.
- Begun the first analysis of the UK's natural environment, in terms of the benefits it provides to society and continuing economic prosperity, through its UK National Ecosystem Assessment (co-funded by NERC, Defra, ESRC, Scottish Government and the Welsh Assembly Government (WAG). Its findings will be reported in 2011.

By 1 April 2010, 40 programmes had been launched under LWEC; NERC is currently involved in 19 of these.



## **2.3 Training and Skills Highlights**

NERC is committed to enhancing the quality and output of the UK research base by training the next generation of environmental researchers, helping provide the UK economy with highly-skilled people. UK environmental science depends on a healthy and diverse research base. To deliver research that meets national and international priorities, NERC needs to ensure that there is a thriving environmental science community with the skills to address both the scientific and organisational challenges identified in its strategy. NERC places particular importance on creating an adaptable and integrated community, in which individuals work together across disciplinary boundaries and undertake non-research roles to tackle the most crucial issues facing Earth. In 2009/10:

### **Training**



- NERC held three studentship competitions, resulting in 31 new PhD studentships. The 'Analytical Chemistry and Technology' competition (in collaboration with Trustees of Royal Society for Chemistry's Analytical Chemistry Trust Fund) called for proposals for projects related to the development of new

analytical techniques suitable for use in environmental science. The 'Ocean Acidification' competition, called for proposals to broaden community engagement, strengthen capacity development activities, and address the deliverables of the £12m, collaborative 'UK Ocean Acidification' programme - a LWEC accredited programme, co-funded by NERC. The joint ESRC/NERC 'Interdisciplinary Studentships' competition, called for proposals to be genuinely interdisciplinary in approach and to address the interests of both ESRC and NERC, ensuring they engaged with ESRC's research challenges, NERC's strategic priorities, and LWEC objectives.

## Skills

- The second phase of the ERFF/NERC Postgraduate Skills Needs Review to identify postgraduate skills needs, which are training priorities for challenges facing the environmental sciences sector, was started. A major consultation took place in January 2010, and the responses have informed the development of a Postgraduate Skills Needs Framework, which will be communicated this summer. The Review will also provide a reference point for postgraduate level training activities within the environmental sciences sector, including continuing professional development and short courses. This will help to ensure that there are people with the right mix of skills and knowledge available to employers in the future.

## People



NERC made good progress on delivery of the People component of its strategy. Rollout and implementation of the 'Personal Deal' continued during the year within NERC Centres. This should ensure NERC staff and the wider environmental sciences community have a personal deal with the organisation and that this evolves and changes as organisational needs and individual aspirations change.

- NERC began development of a strategy, and targeted actions, to ensure that young people are attracted to careers in the environmental sciences. A major internal workshop was held in September 2009, which identified current activities, and considered how to increase coordination and add value. NERC's BAS were recently awarded for their inspirational curriculum-linked website for young people.
- A number of NERC colleagues were recognised in the Queen's New Year Honours for their outstanding achievements. Professor Alastair Fitter, FRS Pro Vice-Chancellor for Research, University of York and a member of NERC Council, was awarded a CBE and Professor Ed Hill, Director of NOC, an OBE; both for services to environmental science. Dr Peter Clarkson, Emeritus Associate, Scott Polar Research Institute, was awarded the MBE for services to Antarctic science. Professor John Huthnance, NOC, was awarded the MBE for services to marine science. Dr David Kerridge, Head of Science, Earth Hazards and Earth Systems Science at BGS, was awarded the MBE for services to geophysics.

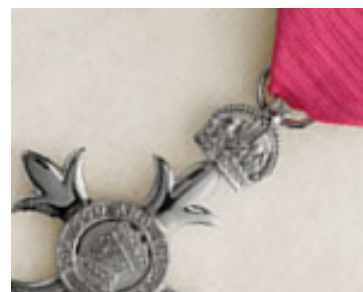


Image: Queen's New Year Honours Medal.

Image source: [http://www.direct.gov.uk/en/NI1/Newsroom/DG\\_183673](http://www.direct.gov.uk/en/NI1/Newsroom/DG_183673)

## 3. Public Engagement with Research

NERC continued to participate in RCUK public engagement activities and actively supported and influenced the development and delivery of the RCUK PER Strategy. RCUK enables society to value and have confidence in research processes and outputs; carries out public engagement to inspire young people to pursue research careers; and increases the societal impact of research by creating a culture where the research sector and researchers themselves value public engagement as an important activity, and where an awareness of social and ethical issues informs research decisions.

NERC has continued to actively support the influence and development of the RCUK strategy, for example supporting 'Beacons for Public Engagement', which recognises, rewards, and builds capacity for public engagement, and supporting the RCUK 'Researchers in Residence'

programme, to bring researchers, young people and teachers together via exciting and innovative placements in secondary schools across the UK.

In addition to supporting delivery of RCUK PER activities, in 2009/10:

- NERC worked in partnership with Sciencewise-ERC (Expert Resource Centre), which supports public dialogue activities in government, to run a public dialogue on geoengineering to inform NERC's future policy and funding decisions in this area. Workshops were held in Birmingham, Cardiff and Cornwall and members of the public attending had the chance to discuss the ethical, social and legal implications of potential geoengineering technologies. So far, early findings from the dialogue have informed the outputs of an EPSRC/NERC collaboration of key stakeholders to initiate a research proposal on geoengineering, and have influenced the House of Commons Science and Technology Select Committee Report on the regulation of geoengineering. A final report from the dialogue will be published later in 2010.



- Volunteer members of the public proved invaluable in helping researchers monitor the movement and spread of a range of creatures. Over 1500 volunteers helped track the migration of the black-tailed godwit from Iceland to Portugal. Data then collected helped reveal that the earlier the birds migrate, the better their long-term breeding success. More than 20,000 members of the public helped monitor the invasive harlequin ladybird's spread across the country, helped by a mobile phone reporting portal aimed at young people. Since its arrival in 2004, the ladybird has spread by an astonishing 100 kilometres a year.

- NERC researchers achieved prime-time TV slots and high-profile media coverage that reached the public and policy-makers alike. For example NERC-funded researchers advised the BBC during six months of filming the documentary series 'Banded Brothers: the mongoose mob', ensuring the effective communication of the science behind these animals. NERC also arranged the Iceland volcanic ash feature at Cranfield air field for the 'Big Bang Theory' TV programme. In addition to this, NERC gained UK and overseas media coverage, with news of new work on pollutants that have potentially far-reaching implications for animal and human health; and achieved global media coverage of work on the influence of the Amazon rainforest on climate change.



## 4. Progress in management

In 2009/10, NERC has continued to develop management structures and processes to ensure that delivery against the strategic challenges in the strategy is effective and efficient. This includes changes to physical infrastructure to improve efficiency, as well as the introduction of new processes to deliver the strategy. NERC has also taken a number of steps to increase the economic impact of the research supported by the Council.

### 4.1 Management structures

- To build better working systems across the NERC family, the NERC Proudman Oceanographic Laboratory (POL) and the NERC-funded component of the National Oceanography Centre, Southampton (NOCS) were merged into a single institution. The newly formed National Oceanography Centre (NOC) will have a key role in providing national capability to meet the needs of the whole UK marine research community, aligning the role and funding of Marine Centres to ensure sustainability.

- NERC's BGS began a £17m project to restructure existing facilities at its Keyworth site in Nottingham. The project aims to provide modern and efficient buildings to replace outdated facilities and reduce the building's environmental footprint. Work will include construction of a core store, computer room, new offices, and the refurbishment of existing buildings.



- NERC made good progress in the restructuring of CEH. The 2006 – 2010 'Transition and Integration' programme will enable CEH to sustain and improve on its position as the UK's Centre of excellence for integrated research in land and freshwater environmental sciences. During 2009/10, the 'GroDome' plant growth facility at the CEH Wallingford site has been completed, and is now operational. The Oxford site is due to close in June 2010.

Image: GroDome interior – plant growth facility at CEH Wallingford

## 4.2 Management processes

- NERC Council completed its first annual cycle of the strategy review process. The purpose of these reviews is to establish progress in delivery of the strategy: which elements of the strategy have been delivered over the financial period (April-March) and whether this meets expectations. The results will help show whether priorities need to be amended to reflect the evolution of drivers and to respond to emerging issues. The review also helped identify key achievements, outcomes and impacts that will inform NERC's evidence base for the next spending review and BIS performance management requirements.
- NERC began implementation of its Environmental Management Plan, which sets out its strategy for the effective environmental management for all NERC majority owned Research Centres, aircraft, ships and field stations, both in the UK and abroad. NERC is committed to carrying out world-class Earth system science while being a responsible and environmentally conscientious organisation, by applying environmental best practice and reducing the running costs of its activities.



Image: Solar PV panels at Rothera, Antarctica

- NERC has continued to work towards meeting its commitment to the UK Carbon Reduction Commitment (CRC) Energy Efficiency Scheme. This is central to the UK's strategy for improving energy efficiency and reducing CO<sub>2</sub> emissions, as set out in the 'Climate Change Act 2008'. The CRC has been designed to raise awareness in large organisations, especially at senior level, and encourage changes in behaviour and infrastructure. Through this scheme, NERC will contribute to fulfilling the British government's commitment to reducing UK carbon emissions by 60% by 2050, relative to 1990 levels.
- NERC Council approved the second phase of NERC's TAPs, an investment of £96m. TAPs set out activities to address the strategic challenges in NERC's seven science themes, and thus determine NERC's future research programme investments over the next five years. New programmes identified included:



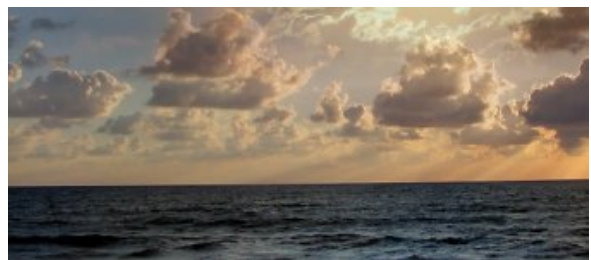
- Arctic Research (NERC budget: £15m)
- Macronutrient Cycles (NERC budget: £9.5m)
- Biodiversity and Ecosystem Service Sustainability (NERC budget: £13m) and;

- Environmental and Social Ecology of Human Infectious Diseases (NERC budget: £4m).

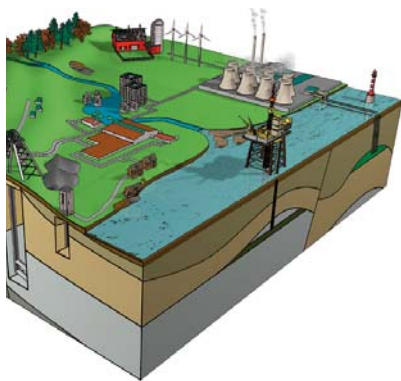
### 4.3 Economic Impact

NERC's science themes address issues of major economic, environmental and societal relevance. The aim is to integrate knowledge exchange and economic impact with all NERC's activities. In 2009/10:

- NERC continued to strengthen its engagement with key business sectors by developing an 'Impact Action Plan', which incorporates NERC's 'Green Economy' strategy. Market analysis was used to explore what key business sectors need from environmental science and consultation with stakeholders helped assess where the maximum impact from existing research investments is likely to be achieved. NERC research will help these sectors adapt to environmental change and respond to a low carbon economy. A planned programme of interviews, workshops and other activities will bring together NERC staff and researchers with the business community. The 'Impact Action Plan' is currently being reviewed prior to Council approval.
- NERC worked closely with the TSB to increase business interaction with the environmental science community, and take-up of commercialisation. NERC and the TSB developed their working relationships on low impact buildings with the construction industry, and mapped the water sector needs with LWEC. NERC also developed a BAB with the TSB to ensure links with industry are developed as fully as possible. With ESRC, NERC and TSB also established a flagship Knowledge Transfer Partnership (KTP) programme for the insurance industry.
- Research Councils implemented the 'Pathways to Impact' requirement for all grant applications. These were developed from knowledge exchange plans originally introduced by NERC for Responsive Mode grant applications. Pathways to Impact encourage applicants to explore, from the outset, who could potentially benefit from their work in the longer term, and consider what could be done to increase the chances of their research reaching those beneficiaries.
- NERC maximised impact through commercialisation schemes such as the Environment Young Entrepreneurs Scheme (YES). The Environment YES helps train future entrepreneurs within the environmental sciences and provides them with an insight into commercialisation. For example, a team of graduate students from the University of Oxford was rewarded for their exceptional entrepreneurial skills by scooping first prize of £1000 in the Environment YES competition.
- NERC continued to lead rigorous, high-quality climate science that is informing policy-makers and industry. Through the National Marine Coordination Office NERC played a key role in developing the first UK Marine Science Strategy, a 15-year strategic framework to support the development, co-ordination and focus of marine science in the UK, across government, industry, NGOs and other sectors. This strategy will ensure researchers and policy-makers work together to tackle long-term challenges. The Marine Science Co-ordination Committee will be responsible for the delivery of the Strategy. The Committee is comprised of the Government Departments, Devolved Administrations and main delivery bodies involved in UK marine science.



## Carbon Capture and Storage



The UK Carbon Capture and Storage Consortium (UKCCSC) is proposing a safe and economical method for capturing and storing man-made CO<sub>2</sub>, by injecting it deep into the ground where it dissolves in groundwater. CO<sub>2</sub> in natural gas fields has been studied to assess the potential effects of this storage over thousands of years, so that the long-term state of disposal sites can be predicted and safe solutions found.

In May 2009 a research study into opportunities for CO<sub>2</sub> storage around Scotland was launched. It is led and managed by NERC's BGS on behalf of the Scottish Centre for Carbon Storage and funded by a consortium of industry stakeholders and the Scottish Government; and will significantly raise the

profile of BGS in Scotland and northern England.

NERC is providing essential research and advice to government on the regulatory framework for CO<sub>2</sub> storage, site characterisation, storage capacity, and site monitoring – North Sea CCS business could be worth £2-4 billion p.a. to the UK by 2030, sustaining between 30,000 and 60,000 jobs, with a cumulative value of £25-45 billion between 2010 and 2030.

Image: carbon capture and storage diagram

## 5. Progress to date against targets and milestones

NERC set a challenging programme of work in 2009/10, with a total of 61 activities on the Scorecard, set out under NERC's 18 strategic objectives. NERC reported progress on these activities quarterly to BIS. At the end of quarter 4, 20 activities were on track and 34 had been completed. Progress towards 6 activities had been delayed due to a number of issues affecting delivery, and implementation of the SSC was critically off track due to delays in a number of 'go live' dates. A summary of progress is included in Annex A<sup>2</sup>, and highlights have been provided throughout this report.

## 6. Future targets/milestones

At the end of 2009/10, NERC updated its Delivery Plan and Scorecard to reflect the key activities that would deliver the NERC strategy. The activities map to NERC's strategic objectives, and examples of new and updated activities include:

### Strategic partnerships

- Leading a partnership with the US National Science Foundation, NERC launched an initiative to improve coordination of international research funding and capability towards tackling the most urgent global environmental change challenges.

### Knowledge Exchange

- Developing and implementing LWEC's 'Knowledge Exchange' and 'Evaluation' strategies; to provide evidence to support direction and decision-making, ensure accountability and demonstrate achievements. Enhance NERC's engagement and impact, working with the TSB and LWEC Business Advisory Board (BAB), to help business sectors respond to a low carbon economy.

### Strategic Science Themes

- Climate Systems - determining the role of groundwater in alluvial flooding through 3D special modelling, through the BGS 'Groundwater Extreme Events' (Oxford flooding) programme.

<sup>2</sup> Annex A is not published, this is for internal management use.

- Biodiversity - implementing the BESS programme (£13m): to understand the functional role and critical levels of biodiversity in UK ecosystems; to deliver ecosystem services and develop impact plan assessment tools.
- Sustainable use of natural resources - quantifying the scales of N and P fluxes and nature of transformations through the catchment under a changing climate and perturbed C cycle, through the 'Macronutrient Cycles' programme (£9.5m). Investing £250k in a capacity building phase.
- Earth system science - with UK and International partners, supporting research to improve capability to predict changes in the Arctic, through the 'Arctic Research' programme (£15m).
- Natural hazards theme – through the 'Volcanoes and Earthquake Risk' programme (NERC £4.6m), with partners, maximizing the impact of NERC science on earthquakes volcanic events and related hazards. Initiating a programme to increase resilience through improved forecasting and take-up of scientific advice in earthquake-prone and volcanic regions.
- Environment, pollution & human health – through the 'Environmental Exposure and Human Health Initiative' (NERC £4m), with the Medical research Council (MRC) and others (NERC £4m), establishing interconnections and pathways between environmental pollutants and interacting stressors, and exposure routes and health effects in humans. Awarding up to 6 Research Consortia grants.
- Technologies – through the 'Network of Sensors' programme (NERC £5m), support development of up to five environmental sensor network demonstration projects; to demonstrate the scientific and technological opportunity and impact of the approach.
- Implementing Peer Review reforms.

### People

- Developing and implementing a revised NERC Training Strategy, focussed on the identified priorities within NERC's community. This will help provide the trained people needed to sustain environmental research and to meet the needs of stakeholders in the UK.

### Organisation

- Increasing our awareness of the skills available within our community and the development of 'skills networks' that cross organisational and disciplinary boundaries and that are used to increase collaboration within our areas of interest.
- Reporting, via RCUK, on savings made in response to HM Treasury's 'Operational Efficiency Programme (OEP)' savings plan which draws on private-sector expertise to identify public sector efficiency savings from back office operations, procurement, asset management, property, and local incentives and empowerment. NERC's share of RCUK savings targets for 2010/11 is £43.2m.

## 7. Update of Economic Impact Baseline

NERC's EIB report is published alongside this Delivery Report at:

<http://www.nerc.ac.uk/about/perform/documents.asp>. The report demonstrates the value and impact of NERC science; the role NERC plays in developing the UK skills base; and the breadth of NERC science including, but not limited to, NERC's role in supporting climate science.

## 8. The Efficiency Programme



- By participating fully in the cross-Council SSC, NERC is working towards improving efficiency and saving money that can then be diverted into research. The SSC is already providing IT and telecommunications services to NERC, and it is planned that services in all its other business areas will be delivered to NERC during 2010. During 2009/10 NERC has been assessing its current processes against the new processes to analyse the impacts. The NERC migration of HR,

Payroll, Finance, and Procurement functions to the SSC is planned to take place during the 2010/11 financial year.

Image: SSC Ltd, Swindon

- During 2009/10, NERC disposed of the Monks Wood site for the sum of £1.6m, and a number of small assets totalling £88k.

**Value for Money**

In 2009/10 NERC reported the following operational efficiency savings (formerly Value for Money savings):

- NERC achieved savings of £3.783m against a target of £1.867m; under the category 'Reducing the proportion of RC expenditure attributable to administration costs'.
- NERC exceeded its target of £22.651m for all four cash-releasing savings categories, achieving savings of £38.494m.

## 9. Summary financial table

### 9.1 NERC Financial Outturn

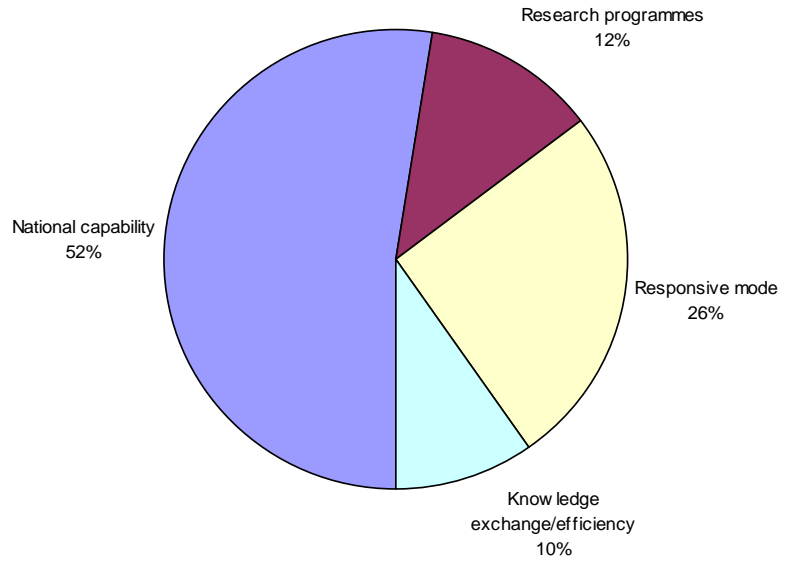
	Outturn (£k)	Science Budget (£k)	Variance (£k)
Near Cash	353,403	352,988	-415
Non Cash	27,708	28,049	341
Capital	67,087	68,197	1,110
<b>Total DEL</b>	<b>448,198</b>	<b>449,234</b>	<b>1,036</b>

### 9.2 Expenditure by Mechanism

Provisional Outturn	2009-10 (£k)
Institutes costs	182,480
International subscriptions	57,091
Grants	120,532
Postgraduate training	26,932
Fellowships	6,760
Centrally managed administration, restructuring and efficiency	31,003
Resource Income	-71,395
<b>Sub-total Near cash</b>	<b>353,403</b>
Non cash	27,708
Capital	68,775
Capital Income	-1,688
<b>Total</b>	<b>448,198</b>
BIS Allocation	449,234
<b>Surplus</b>	<b>1,036</b>

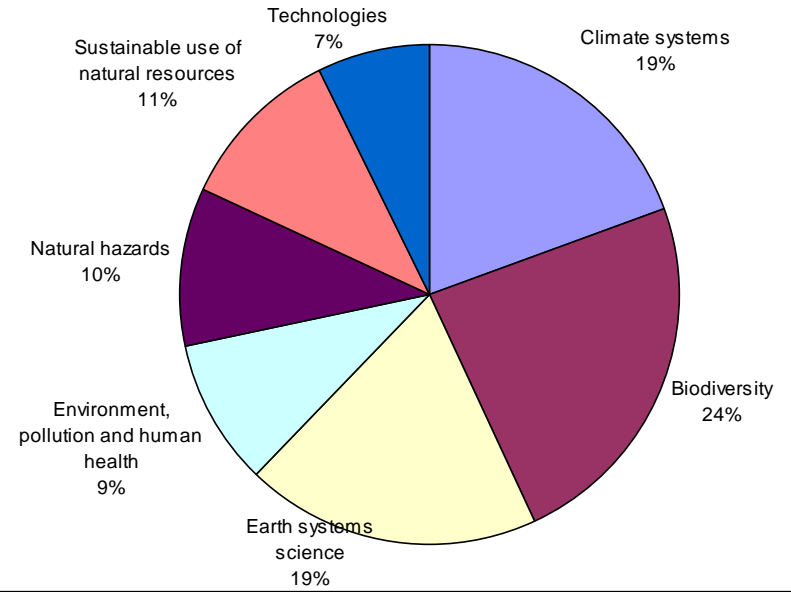
### 9.3 Allocation of Science Budget by Funding Stream

Science budget expenditure by funding stream



### 9.4 Allocation of Science Budget by Science Theme

Science budget expenditure by science theme



Please note the figures have not yet been audited and are therefore subject to alteration later if necessary.