NATURAL ENVIRONMENT RESEARCH COUNCIL

Annual Report and Accounts 2010-11

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INVESTORS IN PEOPLE

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Contents

The Delivery Report, requested by BIS as part of its performance management system for the Research Councils, has now been combined with the Annual Report. The Delivery Report has always complemented the wider view of NERC investments and activities reported in the Annual Report. The combination of the two will bring additional focus on outputs and outcomes from the NERC Delivery Plan and Scorecard, further highlighting the impacts of our key areas of work.

Next generation science for planet Earth

NERC strategic goals

To deliver world-leading environmental research at the frontiers of knowledge:

- Enabling society to respond urgently to global climate change and the increasing pressures on natural resources.
- Contributing to UK leadership in predicting the regional and local impacts of environmental change over timescales from days to decades.
- Creating and supporting vibrant, integrated research communities.

With our researchers and stakeholders, we develop the priorities that provide a focus for the marine, polar, atmospheric, geological, terrestrial and freshwater science communities. This research is often multidisciplinary and in collaboration with national and international partners.

NERC runs a fleet of research ships and scientific aircraft. We have bases in some of the world's most hostile environments and we invest in satellite technology to monitor environmental change on a global scale.

NERC is committed to developing UK and international capability across the environmental sciences. We fund centres and universities to carry out research and to train and support a world-class community of environmental scientists.

NERC has six major environmental research centres:

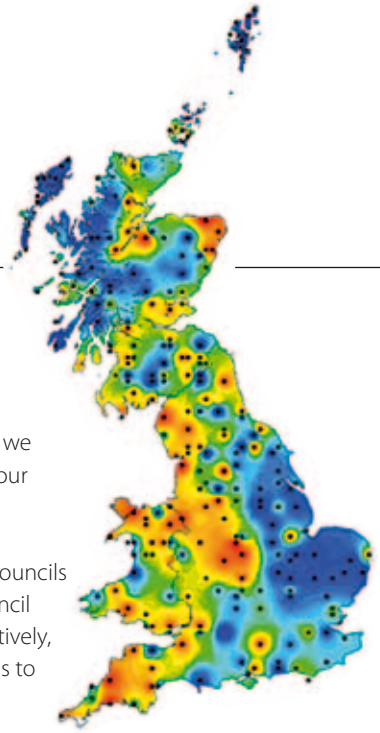
British Antarctic Survey	BAS
British Geological Survey	BGS
Centre for Ecology & Hydrology	CEH
National Oceanography Centre	NOC
National Centre for Atmospheric Science	NCAS
National Centre for Earth Observation	NCEO

Where their names appear in this report, they have been abbreviated.

The Natural Environment Research Council (NERC) is a publicly funded organisation that delivers independent, world-class environmental research. One of the seven research councils, we are the UK's main agency for funding and strategically directing research, training and knowledge exchange in the environmental sciences.

Our goal is to address the most pressing environmental issues facing society. The scientists we support work in collaboration with industry and policy-makers to ensure that our research directly benefits the people who pay for it.

The year in review



Last year's comprehensive spending review set the context for NERC to develop its plans for the next four years in the light of scientific priorities, the economic climate and the need to be an effective and efficient organisation. With our sister research councils as part of Research Councils UK, we demonstrated to government that continued investment in the UK's world-leading research is crucial to our personal, economic and social wellbeing.

The case for ongoing investment in environmental-science research is based on the benefits that derive from this research in stimulating the economy and avoiding financial and human costs from environmental change. Major environmental challenges for people include climate change, loss of natural resources and services and natural hazards. For example, the research improves our knowledge and understanding of natural hazards, and our ability to predict them; new modelling has shown that the chances of the extreme floods of 2000 were probably about doubled by human greenhouse gas emissions.

Economic opportunities arise from NERC research findings and technologies – whether these are commercial applications for scientific devices or helping the UK government understand how to manage new energy sources sustainably. You can read about many of them in this Annual Report.

The outcome of the spending review was that the science and research allocation for 2011-15 was protected from major cuts. Nevertheless, our budget presents real challenges. We will have a greatly reduced ability to make capital investments – in scientific equipment, facilities and buildings – while also needing to reduce administrative costs.

However, with help from the BIS Large Facilities Capital Fund we will complete the three major capital projects that are already under way: the Halley Antarctic base, the replacement of the research ship *Discovery* and our building project at BGS Keyworth. And despite the budget reductions, NERC will protect front-line science as much as possible by reinvesting efficiency savings into priority science areas.

To ensure that NERC continues to meet its strategic goals, our Delivery Plan 2011-2015 sets out the five actions we will deliver during the spending review period.

We will put more focus on strategic research; attract and retain top talent; focus on research impact, particularly in the business sector; transform how we deliver national capability; and make our operations more efficient.

We are also moving forward with integrating the work of the research councils more closely, both through cross-council research programmes and administratively, with the transfer of common functions to RCUK's shared services centre.

Like most challenges, these bring opportunities. The difficulties of understanding our planet and the life it supports cross the boundaries between scientific fields, and it is now widely accepted that to address them we need holistic solutions. So, while we look to increase efficiency in our science delivery and support services, the science itself is driving us to greater integration. The natural sciences themselves must work more closely together, as well as with other disciplines like social science, engineering and economics.

In response, we have set up a two-year programme to look in detail at how our centres can work more closely together, and how we can integrate administrative work around the organisation to provide the best support for our integrated science.

These approaches will ensure that research initiatives are designed both to make fundamental advances and to address practical problems. The scientific results will enable change to happen on the ground without the need for a lengthy translation of research into policy. The ground breaking Living with Environmental Change partnership is driving this approach and NERC continues to make an important contribution.

Meanwhile NERC-funded science in 2010-11 has been progressing strongly. Our scientists and technicians have helped governments deal with several national crises, both through rapid response and through the day-to-day research that helps us understand and predict these events.

NERC and Met Office aircraft reacted quickly to the UK civil emergency caused by the eruption of Eyjafjallajökull last year; our volcanologists and atmospheric scientists have continued to research the nature and effects of the eruption and now sit on international panels providing advice to policy-makers.

Our observations and modelling gave the CAA the information it needed to introduce new rules on flying through volcanic ash; rules which meant the UK avoided widespread flight cancellations and associated costs when Iceland's Grimsvotn erupted almost a year later.

In the aftermath of the devastating red-mud spill from an aluminium plant in Hungary, we helped Hungarian scientists set up preventative measures to guard against similar disasters in future. And satellite radar analysis of the

earthquakes that struck New Zealand is helping us understand their causes and determine the possible location of future events.

A number of technological developments this year promise to shed light on Earth's most remote environments. Detailed data from the ESA satellite CryoSat 2, which will transform our understanding of the complex relationship between ice and climate, are now being released to the scientific community.

Medium- and long-term climate prediction is being improved through work on solar radiation, which is indicating that the Sun could have more effect than we realised on atmospheric circulation patterns; in particular, variations in solar energy and shifts in air currents kilometres up in the atmosphere.

Back on land, NERC has been involved in one of Britain's most ambitious habitat-restoration projects, aiming to create 3700 hectares of wetland at Huntingdonshire's Great Fen. CEH scientists are using hydro-ecological models to assess the likely impact of climate change on the project. As well as great benefits for biodiversity, the wetlands will reduce flood risk, provide educational opportunities and boost the region's tourist industry.

Keeping habitats like the Fens healthy helps us protect vital ecosystem services, like food and fuel, clean water, climate regulation and disposal of waste.

Research in our Environment and Human Health programme has made exciting advances in knowledge. The new understanding of how toxins, pollutants and nanoparticles behave in the environment it has delivered could save millions of pounds in health-care costs, save many lives and significantly enhance people's wellbeing.

NERC's commitment to knowledge exchange is as strong as ever, and we continue to share our findings with industry and policy-makers and to support our researchers in engaging the public with their work wherever possible. You will find examples of effective public engagement, partnerships and skills sharing among the achievements highlighted in this report.

Steven Wilson *Interim Chief Executive*
21 November 2011

Ed Wallis *Chairman*

Guenter Guni/istockphoto

Living with Environmental Change

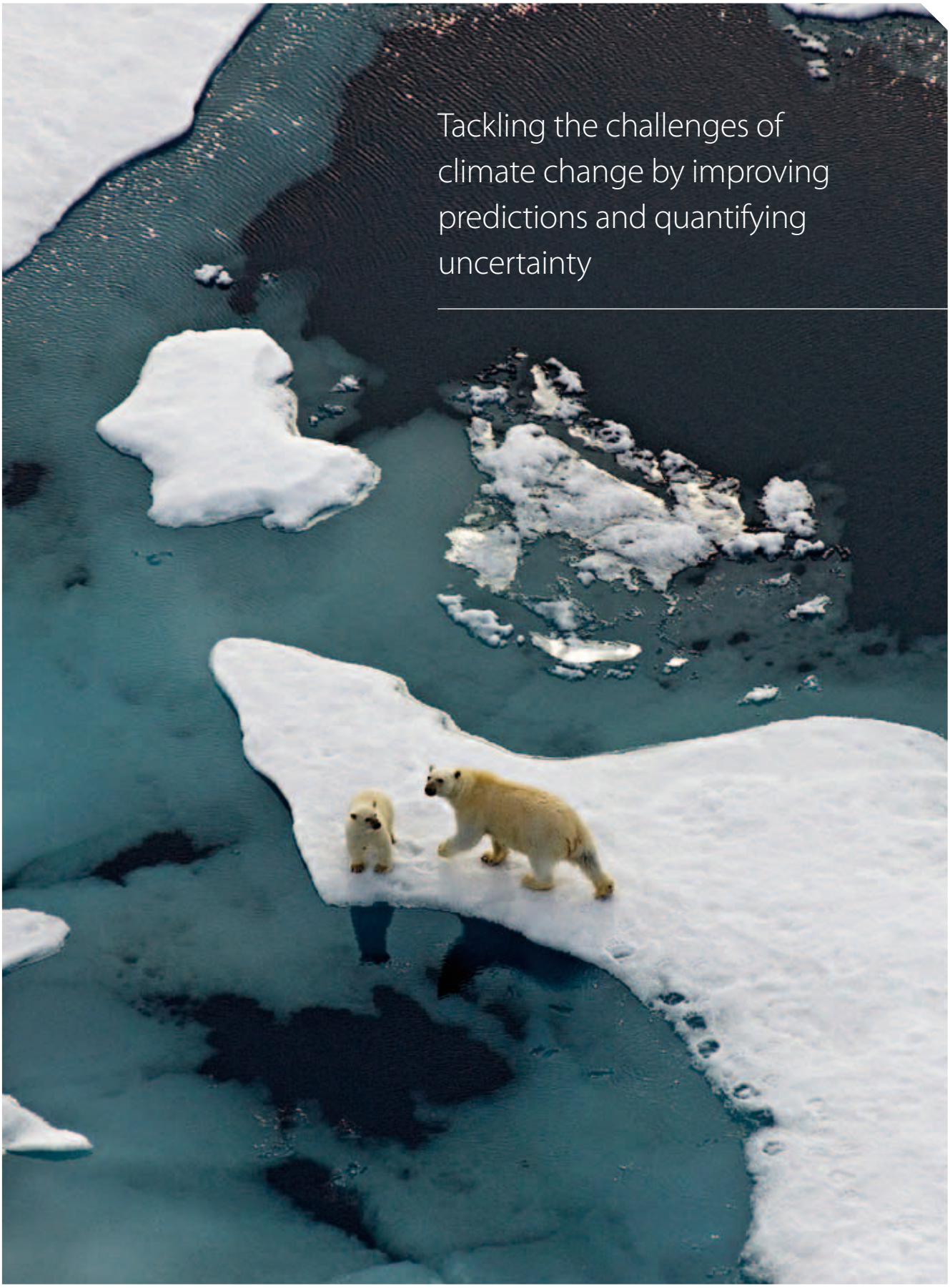
Living with Environmental Change (LWEC) is an innovative partnership of research organisations, government departments and agencies, providing decision-makers with the foresight, knowledge and tools they need to address the challenge of environmental change.

LWEC's multidisciplinary research is designed with its users in mind. The knowledge it generates gives decision-makers – be they in government, industry or local communities – the tools to mitigate, adapt to and benefit from environmental change.

NERC has played a lead role in shaping this ground-breaking partnership. It is early days for many of these, but some have already generated important results.

- The National Ecosystem Assessment highlighted the considerable economic and intangible benefits of our environment; future economic growth will be undermined unless we understand the full value of the natural world on which our health and wealth depend.
- Many low-carbon technologies rely on rare-earth metals, so the UK needs to know it has a sufficient and secure supply. The Minerals and Waste programme uses data on global metal production and trading to provide crucial information to UK and EU policy-makers and businesses.
- The Algal Bioenergy initiative is helping exploit algae's potential as a green-energy source, from the conversion of single-celled 'microalgae' into biodiesel, to the use of 'macroalgae' (seaweed) for biogas and bioethanol.
- The Joint Weather and Climate Research programme is pooling the expertise of hundreds of scientists to provide improved weather and climate forecasting at a smaller scale. Data and advice can be fed more quickly to policy-makers and will have significant local benefits for farmers, planners and tourism, as well as saving money by enabling better emergency planning.

Climate system



Tackling the challenges of climate change by improving predictions and quantifying uncertainty

Steven Kazlowski/Peter Arnold Images/Photolibrary.com

Did climate change lead to floods in 2000?

In autumn 2000, extreme flooding damaged nearly 10,000 properties in England and Wales, causing losses of £1.3 billion. Researchers from institutions including the University of Oxford and the Met Office showed that the odds of these events were probably about doubled by human greenhouse-gas emissions. Using the climateprediction.net distributed computing project, they ran climate and flooding models many times to compare the likelihood of heavy rainfall and flooding with and without 20th century greenhouse-gas emissions in the atmosphere. In nine out of ten cases, the emissions increased the risk of floods by 20 per cent or more, and two thirds of comparisons showed an increase of at least 90 per cent. The results shed new light on how greenhouse-gas emissions affect the likelihood of extreme weather.

Anthropogenic greenhouse gas contribution to flood risk in England and Wales in autumn, *Nature,* 2011.

Solving mysteries in the ice

- Polar ice caps are under threat from climate change and, if they melt, sea-level rise will endanger many coastal areas. Studies on the ice sheets' past and present will help us predict their future.
- NERC research, now supplemented by early data from ESA's ice mission, Cryosat-2, continues to advance our understanding of these complex regions. Researchers from NERC institutes and HEIs are revealing important insights into how these massive ice sheets formed, how they have responded to climate change in the past – and how they might respond in the future.
- NCEO researchers based at the University of Leeds published the first assessment of how quickly floating ice is being lost. Rapidly retreating Arctic sea ice and thinning Antarctic ice shelves are reducing floating ice by around 742km^3 per year, producing a small but measurable annual addition to sea levels of 49 micrometres.
- Researchers at Swansea University have found that the huge Larsen C ice shelf – by far the largest on the Antarctic Peninsula – is stable and isn't in danger of disintegration, despite concern following the earlier break-up of the Larsen A and B ice shelves to the north.
- In other research, the same NCEO team revealed a counterintuitive effect of climate warming on Arctic ice sheets. Although more ice melts in hot years, the greater volumes of meltwater drain more readily, shortening the period over which the ice sheet's progress is lubricated and causing it to slow down – a crucial insight for efforts to model their future behaviour.
- BAS scientists gained new insights on the structure of the East Antarctic ice sheet. Working with international colleagues, they discovered that the ice near the buried Gamburtsev Mountains could be growing from the bottom up, because it thickens when water freezes to its base, not just when snow builds up on its surface. This discovery has major implications for understanding the behaviour of ice sheets and the search for old climate records in the ice.
- BAS has also worked with SAMS, Woods Hole Oceanographic Institution and other international partners to map the underside of Antarctic sea ice with an autonomous underwater vehicle while using an aircraft-mounted laser scanner to map its upper surface – the first time underwater and aerial measurements have been so combined. The data will help improve satellite observations of ice thickness.

The science of settled weather

Recent research has radically improved our ability to predict 'atmospheric blocking'. This is a vital concept for meteorologists' understanding of why we get prolonged heatwaves and cold spells, but climate models have tended to underestimate how often it happens. Collaboration between University of Reading and Met Office researchers has pinpointed the problem, showing that certain newer models represent blocking events themselves quite well, with only a small bias remaining that affects all types of weather, not just blocking. The research is influencing the development of the next generation of climate models.

Atmospheric blocking and mean biases in climate models, *Journal of Climate*, 2011.

Solar power

University of Reading and NCAS researchers have taken advantage of current exceptionally low solar activity to improve our understanding of how solar radiation affects the climate. Their work suggests the sun could have more effect on atmospheric circulation patterns than previously thought; in particular, the results strengthen the link between variations in solar energy and shifts in the jet streams – powerful air currents kilometres up in the atmosphere. This will improve medium- and long-term climate prediction, and has prompted the Met Office to investigate the use of solar variability in its seasonal and decadal weather-forecasting systems.

Enhanced signature of solar variability in Eurasian winter climate, *Geophysical Research Letters*, 2010.

Biodiversity

Understanding how we benefit from the variety of life on Earth

Barbara Magnuson/Larry Kimball/Photolibrary.com

Did climate change make insects sociable?

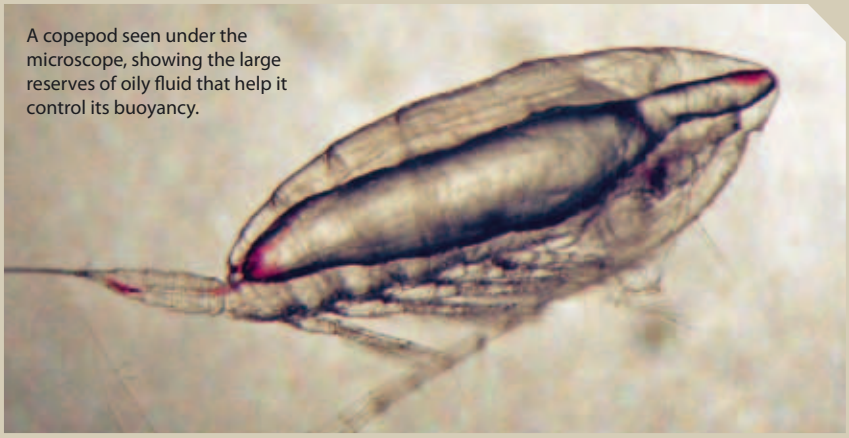
University of Sussex and Queen's University Belfast scientists have shed light on the role of environment on the evolution of cooperative animal societies by looking at sweat bees. These insects evolved social behaviour later than most relatives; some UK species are still solitary, others form colonies and some vary depending on local conditions. One such variable species can switch between social and solitary lifestyles when moved to a new environment – a solitary bee from the chilly north becomes social in sunnier climes. This suggests past climate change may have driven bee society's development. Bees' importance as pollinators means understanding their behaviour and ecology is a priority.

Cryptic plasticity underlies a major evolutionary transition, *Current Biology*, 2010.

Copepods share 'weight belt' technique with whales

BAS researchers have showed that tiny marine crustaceans known as copepods use a similar buoyancy-control method to sperm whales, among the Earth's biggest creatures. The whales can cool oily fluid within their bodies, so it becomes solid and dense and assists them in deep dives. Similarly, copepods exploit their oily body fluids' tendency to solidify and become dense under pressure. When the animals swim deeper, water pressure triggers this effect, which acts like a weight belt to let them stay there with little effort, spending winter in deep waters without wasting energy on constant swimming. Once isolated, these pressure-sensitive lipids may enable a new generation of autonomous underwater devices able to adjust their buoyancy with minimal energy expenditure.

Phase transitions of wax esters adjust buoyancy in diapausing *Calanoides acutus*, *Limnology and Oceanography*, 2011.



A copepod seen under the microscope, showing the large reserves of oily fluid that help it control its buoyancy.

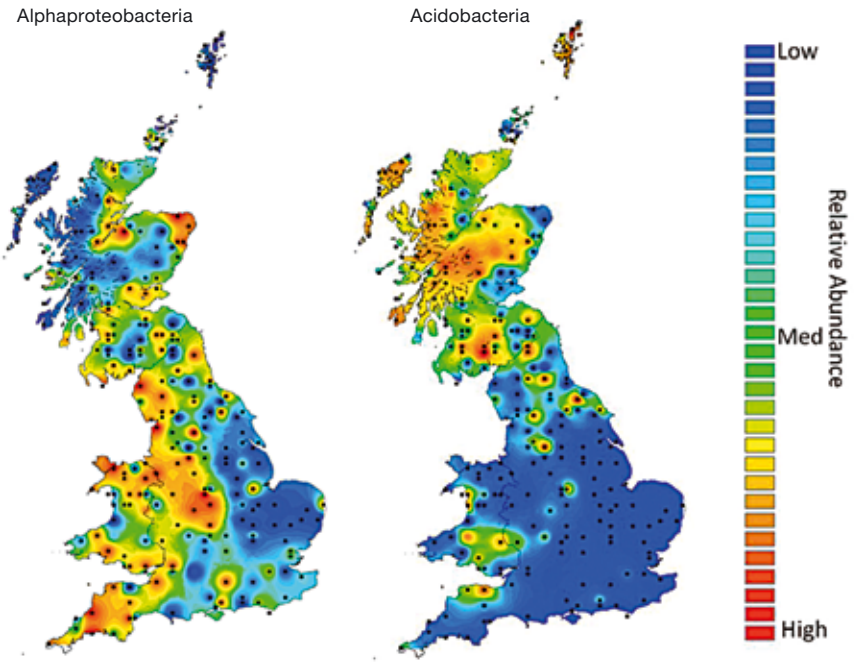
David Pond

Buried riches unearthed

Researchers from CEH and the universities of Oxford and Newcastle have produced the first comprehensive map of the bacterial biodiversity of UK soils, using molecular techniques to identify the microbes living in soils from around Britain. Meanwhile CEH and University of Warwick scientists investigated how land use and farm management affect underground biodiversity. They showed that organic farms promote a greater variety of soil-dwelling fungi, which live on plant roots and increase crop productivity. These insights will help farmers manage their land to create healthy, productive ecosystems.

The Bacterial Biogeography of British Soils, *Environmental Microbiology*, 2011.

Spatial scaling of arbuscular mycorrhizal fungal diversity is affected by farming practice, *Environmental Microbiology*, 2010.



Biodiversity

Woodwalton Fen National Nature Reserve, Cambridgeshire.

Michael David Murphy/Alamy

Renewing the Great Fen

Huntingdonshire's Great Fen is the site of one of Britain's most ambitious habitat restoration projects, aiming to create 3700 hectares of wetland. The benefits stretch far beyond biodiversity, and include reduced flood risk, better educational opportunities, improved health and wellbeing, job creation and boosting the region's tourist industry. CEH scientists have been involved throughout, providing expert guidance to, and exchanging knowledge with, project stakeholders, including the Wildlife Trust for Bedfordshire, Cambridgeshire, Northamptonshire and Peterborough, the Environment Agency, Huntingdonshire District Council, Middle Level Commissioners and Natural England. They have helped assess its feasibility using specially-developed hydro-ecological models, focusing on the possible impact of climate change and potential solutions.

Getting to the root of agricultural problems

A new technology to improve plants' root systems has been licensed exclusively by Dow AgroSciences. The method, developed by researchers at the University of Oxford and the John Innes Centre (a Biotechnology and Biological Sciences Research Council institute), could boost crop yields. The scientists cloned and analysed genes that are vital for the development of components of land plants' rooting systems and are therefore likely to be important for efficient water and nutrient uptake. They hope that as well as answering important biological questions, the research will prove invaluable in improving food security and energy production as well as promoting good health in developing nations and helping fight disease.

Hidden fungi found

Scientists have found a major new branch on the fungal tree of life. Fungi are the main degraders of biomass in land ecosystems, and this discovery means they are almost twice as diverse as previously thought, transforming our understanding of how this important group evolved. The newly discovered fungi are very unusual by earlier standards; their cells have no robust walls, relying instead on much thinner cell membranes. This suggests they have very different cell biology from the fungal model organisms which have been widely studied for more than 150 years. The discovery involved researchers from the Natural History Museum, Harvard Medical School, Barcelona's Institut de Ciències del Mar and the Universities of Exeter and Cambridge.

Discovery of novel intermediate forms redefines the fungal tree of life, *Nature,* 2011.

New directions in pest control

The fungus *Metarhizium anisopliae* has evolved to infect and kill insects; now Swansea University researchers have turned it into a powerful weapon against pests. They isolated its most suitable strain, which has now been commercially licensed and launched in the UK. It gives growers a sustainable, organic way to kill pests like thrips and vine weevils; the fungus attacks them efficiently while leaving beneficial insects, birds and other animals unscathed. This reduces the need for expensive and environmentally damaging applications of chemical pesticides, many of which are being phased out by regulators.

Sheep study helps explain immune variation

Soay sheep.

Arpat Ozgul

Animals need a strong immune system to fight off disease – but not too strong. Researchers from Edinburgh and Princeton universities used samples and information collected during a long-term study of Soay sheep on St Kilda to undertake the first ever analysis of how the strength of a wild animal's immune system affects its survival prospects. Their results, combining insights from immunologists and ecologists, confirm that strong immune systems come at a cost; sheep with strong immune responses are more likely to survive the winter, but have less success in breeding. This helps explain why natural selection causes immune systems to vary in strength rather than all being equally effective.

Fitness correlates of heritable variation in antibody responsiveness in a wild mammal, *Science*, 2010.

Tipping points found in forest biodiversity

Ecologists have long suspected that removing enough native vegetation from a landscape can cause an abrupt shift in the biodiversity it can support. But strong evidence for this has only recently been found. Researchers at the universities of São Paulo and Cambridge examined the distribution of small mammals in Brazilian Atlantic forest landscapes. They found that patches of forest in landscapes that had little remaining forest cover had far fewer species than similar-sized areas within more intact landscapes. This is a major breakthrough in understanding how habitat fragmentation affects the persistence of biodiversity. It has important implications for conservation methods in human-modified regions across the world.

Beyond the fragmentation threshold hypothesis: regime shifts in biodiversity across fragmented landscapes, *PLoS ONE,* 2010.

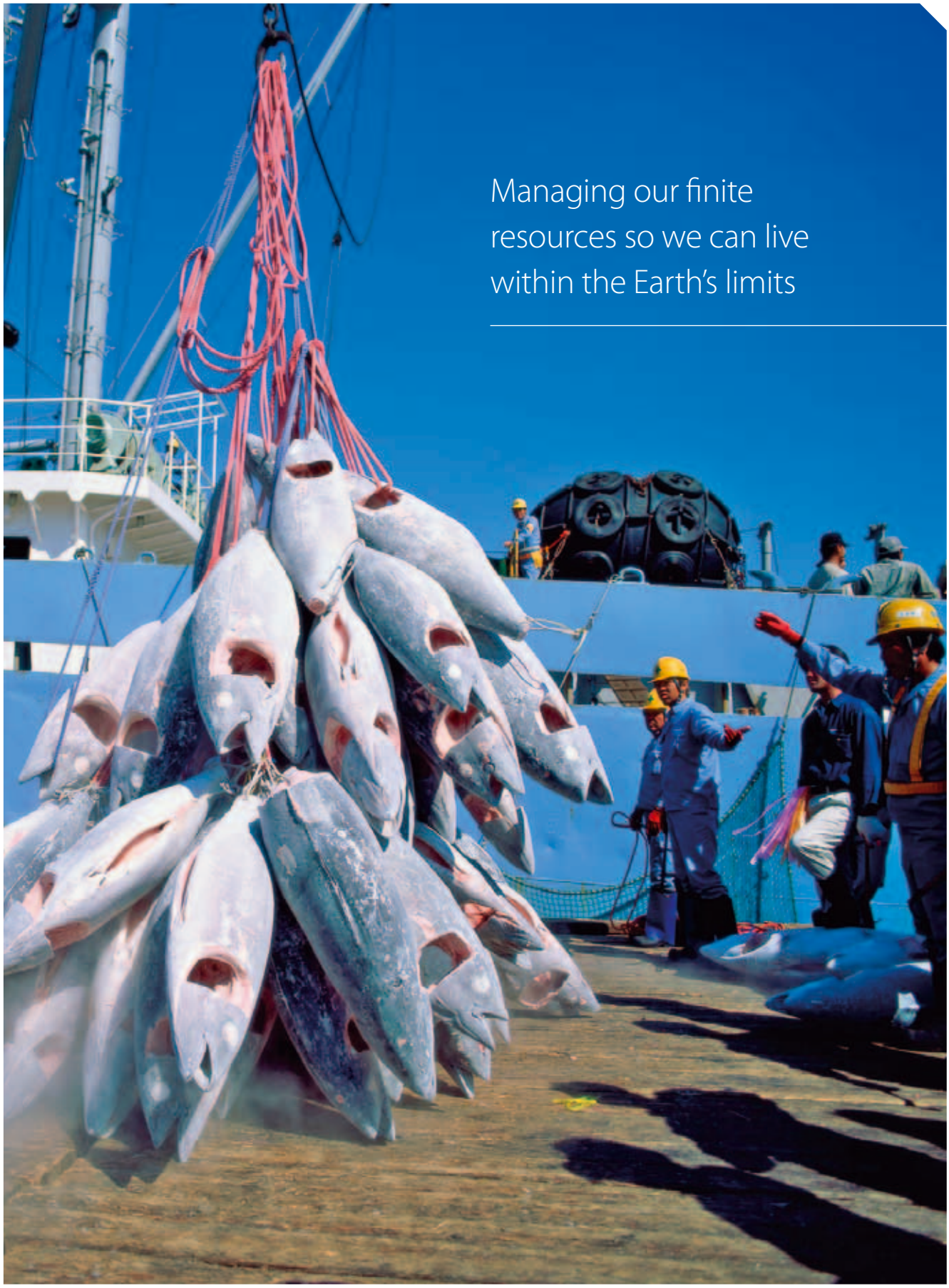
Probing the mysteries of ocean-trench life

The newly-discovered *Princaxelia jamiesoni.*

Alan Jamieson

The deep sea may be the least-understood part of the planet, and the Hadal zone, six kilometres and deeper, is most mysterious of all. A collaboration between the universities of Aberdeen and Tokyo, the HADEEP project has vastly increased our understanding of ocean-trench habitats using specially-designed landers to research their inhabitants. It also made high-profile discoveries – notably, in 2008 its lander succeeded in taking the deepest ever footage of fish. In its final year, the team made two research cruises and described a new species of amphipod, among other discoveries. HADEEP has shed new light on how deep-sea ecosystems evolved and on their diversity and importance today. Understanding the role of biodiversity in key ecosystem processes is one of NERC's strategic objectives.

Sustainable use of natural resources



Managing our finite resources so we can live within the Earth's limits

Steve Vidler/Photolibrary.com

Joined up approaches to tackling poverty

Ecosystem Services for Poverty Alleviation (ESPA) is an interdisciplinary programme funded by NERC, DFID and the Economic and Social Research Council, as part of the LWEC partnership. It brings together natural, social and political science to improve the lives of the world's poor in sub-Saharan Africa, Amazonia, South Asia and China.

Ecosystem services like climate regulation, nutrient cycling and fuel production are fundamental to all our lives, but poor people in developing countries are disproportionately affected when they fail. ESPA funds world-class research into how to manage ecosystems sustainably, to lift people out of poverty.

The last year has seen the conclusion of 28 partnership and project development grants, which helped to develop research partnerships and strategies for future ESPA research.

- A biomass energy project in India, Malawi and Kenya, led by the International Institute for Environment and Development, is proving that if planting is sensitive to food security needs, biomass can be a renewable and sustainable source of energy. The project has produced significant outputs, including a book and a number of policy briefings.

- The Swahili Seas project is building on 20 years of mangrove research by the Kenya Marine and Fisheries Research Institute. Edinburgh Napier University is leading an economic and social study of a community-based Payment for Ecosystem Services scheme, which sells carbon credits for mangrove conservation.

- Researchers from the University of Nottingham are helping communities in sub-Saharan Africa beat malnutrition by holding meetings with local farmers and villagers in their own dialect to explain how the natural environment can provide the essential minerals iodine, selenium and zinc.

- Helping Zulu communities in southern Africa gain better access to water, researchers from the University of East Anglia identified how better communication, both by policy-makers and between communities, and control of river bank erosion, could begin to resolve long-term problems.

Skills and opportunities in Nigeria

The Nigerian economy is overly dependent on oil and needs to diversify and develop other industrial sectors including the non-hydrocarbon mineral sector. In a World Bank-funded project, BGS helped train over 100 Nigerian geoscientists to carry out the geochemical mapping required for resource exploration. It is hoped that the data generated will stimulate mineral exploration throughout Nigeria, bring inward investment and deliver government policy. This work is also helping to ensure a supply of skilled people to deliver current and future science priorities.

Sustainable use of natural resources

Research underpins declaration on Europe's oceans

Borut Furlan/WaterFrame/Still Pictures

The Ostend Declaration, to address the grand challenges and opportunities facing Europe's oceans in the next decade, was formally adopted by the marine science community at the major European marine science policy conference EurOCEAN 2010. The NOC Executive Director and staff from the NOC-based National Marine Coordination Office helped steer the development of the declaration and made a significant contribution to its impact.

Continued ocean monitoring and Europe-wide coordination are essential for policy-makers to take informed decisions on concerns such as climate change, natural hazards, sustainable fishing, renewable energy and protecting the marine environment. The EU highlighted the importance of marine innovation, in particular opportunities for growth and new jobs in the marine and maritime sectors.

Better information to underpin policy

Research has identified two distinct threats to fish stocks and marine ecosystems in the deep north-east Atlantic and produced information essential for policy and management decisions:

- NOC made the first ever assessment of human activities in the region. They found that the extent of bottom trawling is an order of magnitude greater than that of all other activities combined, and highlighted problems with finding data on these activities.

- Researchers at Bristol University found that 72 per cent of the region's common fish species had been affected by warming. They emphasise that changes in species abundance in established fish communities are more important than shifts in species distributions for understanding the ecological and economic consequences of warming.

Human activities on the deep seafloor in the north-east Atlantic: an assessment of spatial extent. *PLoS ONE*, 2010

Shale gas exploration

A growing proportion of the US's natural gas is now extracted from shale. The Department of Energy and Climate Change has drawn on BGS's experience through two commissioned reports, to help them understand the opportunities for exploiting this resource safely. This information will also be used by exploration companies throughout the next round of hydrocarbon licensing. The economic benefits of shale gas could include security of supply, fewer gas-storage schemes, local supplies of gas and a reduction in carbon footprint. BGS also gave evidence to the House of Commons Climate Change Committee shale gas inquiry.

www.og.decc.gov.uk/UKpromote/onshore_paper/UK_onshore_shalegas.pdf

The first drilling rig in the UK set up to see if it's economically viable to extract natural gas from the shale deposits beneath Lancashire.

Christopher Furlong/Getty Images

Chris Radburn/PA Wire

Report reveals offshore wind costs

UKERC's report on the costs of offshore wind-power documents early expectations and policy goals, explains recent cost escalations and assesses future prospects. The UK currently imports 80 per cent of equipment and services from abroad, and currency movements, supply-chain bottlenecks and planning delays all contribute to rising costs. However the report emphasises that many developing technologies are initially costly, so there are grounds for optimism. To maximise knowledge exchange, the work was discussed with Vince Cable and presented to the Committee on Climate Change (CCC), DECC and the Carbon Trust. Its conclusions were reflected in the CCC's subsequent review of renewable energy.

Great Expectations: The cost of offshore wind in UK waters – understanding the past and projecting the future, *UKERC 2010.*

Marine monitoring for safe carbon storage

Informed environmental risk assessments and reliable and effective marine monitoring networks are crucial to the development of an offshore carbon capture and storage (CCS) industry. Most monitoring of small-scale CCS is by deep sub-surface geophysical surveys, but methods that detect physical, chemical, biological or acoustic signs of potential CO_2 leakage in the marine environment are being investigated. In a new collaboration, researchers from PML and NOC are working with Japanese scientists to understand which signs of CO_2 leakage are most sensitive and reliable to measure. New instruments and monitoring strategies will be tested at natural CO_2 seep sites, existing storage sites and controlled release experiment sites.

African groundwater improves water security

BGS scientists, working with local communities in Nigeria, Mali and Ethiopia, have shown that groundwater is much more resilient to drought and climate change than other sources of drinking water. The team also identified a link between these more secure water supplies and improved health. Maps showing the distribution of groundwater resources across Africa have been produced for DFID and the results are helping WaterAid and others to construct water supplies that will be more resilient to climate change. Used sustainably, these resources can improve the security of drinking water across Africa.

Water supply and health, *PLoS Medicine,* 2010.

Water sampliing in Nigeria.

Natural hazards

Reducing casualties and economic losses caused by natural disasters

Plume rising from volcanic eruption in Eyjafjallajökull glacier, Iceland, 17 April 2010.

Daniel Bergmann/OSF/Photolibrary.com

FREE – the science of extreme flooding

From Boscastle to Tewkesbury and Cumbria, flooding has devastated communities and taken lives across Britain many times in recent years, and the problem isn't likely to go away.

Coastal flooding alone threatens assets worth an estimated £132 billion in the UK, and the government already spends some £135 million a year maintaining sea defences. Climate change is predicted to cause rising sea levels and more extreme weather; serious floods that endanger lives, homes and vital infrastructure may grow more common.

To manage these risks, we need to understand them. The Flood Risk from Extreme Events (FREE) programme invested almost £8 million in groundbreaking research into the causes and consequences of flooding.

It brought together specialists in disciplines ranging from meteorology and hydrology to coastal oceanography. They have worked alongside local authorities, public bodies and the private sector to shed new light on how floods happen, and on how we can predict them and manage the risks.

This science complements an applied research programme called Flood Risk Management Consortium, led by Engineering and Physical Sciences Research Council with Defra, the Environment Agency, UK Water Industry Research and NERC.

Highlights of FREE scientists' work include:

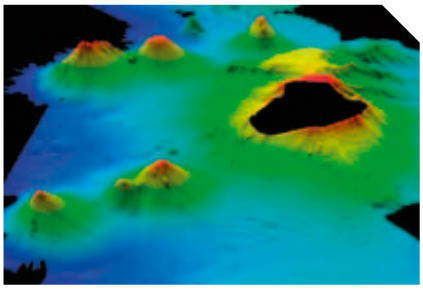
- Developing a new radar technique that lets scientists understand the behaviour of airborne moisture near the surface. This is now being applied across the UK network of weather radars, and will give real-time information on exactly where moisture is building and showers are likely to break out.
- Improving existing flood models and contributing to the development of a new Countrywide Flood Forecasting System jointly operated by the Met Office and Environment Agency, which for the first time provides a detailed nationwide picture of flood risk over the coming days and hours.
- Creating an innovative 'clouds-to-coast' prediction framework for analysing coastal flooding, which will improve flood warnings and help engineers design better sea defences. This is already attracting interest from design consultants, and from planners and policy-makers at the Environment Agency and Defra.

David Davies/PA Wire

Young volcanoes revealed in Southern Ocean

Using high-resolution sonar, BAS revealed that the South Sandwich Islands are the tips of huge volcanoes, and evidence of collapse structures such as debris avalanches indicates there is a continuing hazard of tsunamis. The islands are rich in marine life, and there are particular biological hotspots around a number of smaller seamounts scattered among the large volcanoes. This young volcanic arc is ideal for investigating tectonic and geochemical processes in subduction zones, where an oceanic plate is sliding beneath another plate. BAS collaborated with BGS and Aon Benfield Hazard Research Centre of University College London in the survey.

Growth and mass wasting of volcanic centers in the northern South Sandwich arc, revealed by new multibeam mapping, *Marine Geology,* 2010.



Stress changes could help predict eruptions

In the Afar Depression, Ethiopia, a mid-ocean ridge is forming at the Earth's surface, as the African and Arabian tectonic plates are pulled apart. Researchers from the University of Leeds monitored a series of 13 sudden events there – intrusions of magma in vertical cracks called dykes. They showed that the change in stress caused by each intrusion influences the location of subsequent events, similar to the way large earthquakes can trigger further quakes. The breakthrough could let scientists narrow down the location of volcanic eruptions, letting governments and emergency services focus their planning on the most vulnerable areas.

Stress transfer between thirteen successive dyke intrusions in Ethiopia, *Nature Geoscience,* 2010.

Natural hazards

AP Photo/Yomiuri Shimbun, Yoichi Hayashi

Worldwide response to earthquake threats

Tragically, several major earthquakes have struck this year and the threat can only increase, putting ever more lives and property at risk as the world's population and its cities grow.

As well as providing rapid-response analysis of the quakes in New Zealand and Japan, NERC has continued to fund research into geologically active areas around the world, to better understand what causes these devastating events, improve our ability to predict them, and help people prepare for and mitigate their worst effects.

- The COMET+ group in NCEO used InSAR (satellite radar) to analyse the 7.1Mw earthquake that struck west of Christchurch, New Zealand, in September 2010. It did not occur on any of the region's known major faults but instead ruptured a previously undetected shallow fault, as did the large aftershock that hit Christchurch in February 2011. The spatial gap between the surface displacements observed in the two events may indicate the existence of yet another unknown fault segment that might rupture in the future.

- COMET+ also produced the first map of surface displacements caused by the 6.9Mw earthquake in Yushu, China, in April 2010, which was used by the Chinese Earthquake Administration.

- After a major international geophysical survey, the Southampton-led UK Sumatra consortium is studying how the boundaries between fault sections limited the extent of the major Sumatran earthquakes in 2004 and 2005, and how fault movements at depth affect tsunami generation.

- The 9.0Mw earthquake that struck Japan in March was the fourth largest ever recorded. In the immediate aftermath, BGS advised government on the probability and extent of aftershocks and possible ground movements, working through the Scientific Advisory Group for Emergencies and the Cabinet Office Briefing Room. BGS also advised the nuclear industry and regulatory authorities on the probability of similar events close to the UK.

Responding to emergencies – worldwide

When Iceland's Eyjafjallajökull volcano erupted in April 2010, bringing European aviation to a standstill, NERC scientists reacted quickly. They worked alongside government and industry to monitor the eruption and the ash cloud it created, collaborating with bodies including the Civil Aviation Authority (CAA), the Government Office for Science and the Met Office.

Our Earth scientists provided advice on the evolving eruption and its implications, while our atmospheric researchers and experts in sensor technology supplied up-to-the-minute information on how the ash cloud was developing over time. This information was vital in determining when it was safe to reopen UK airspace, ending costs estimated at $400 million a day.

NERC-funded science, and the national capability and equipment its investments support, helped authorities understand and manage many different aspects of the crisis:

- Quickly deploying NERC research aircraft to gather vital information on the ash cloud's location and behaviour. Alongside ground-based instruments and atmospheric modelling work, this gave the CAA the information it needed to introduce new rules on flying through volcanic ash, allowing passenger flights to restart.
- Providing evidence to the House of Commons Select Committee, which drew on this information extensively in its subsequent report on the episode.
- Briefing the Civil Contingencies Secretariat within the Cabinet Office daily.
- Supplying expert guidance to the CAA on subjects including the eruption's probable duration and the volumes of ash being released into the atmosphere.
- Sitting on the Scientific Advisory Group for Emergencies (SAGE), establishing eruption scenarios and the National Risk Assessment for volcanoes. This led to a new Memorandum of Understanding on future monitoring of Eyjafjallajökull and its neighbour volcano Katla between BGS, NCAS and the Icelandic and UK Met Offices.
- Increasing sampling rates of air chemistry, soils, water and vegetation at 243 monitoring stations across the UK. Combined with long-term datasets, this information helped policy-makers understand secondary effects of the eruption like heavy metal pollution and freshwater acidification. Working with Defra's Volcanic Ash Network, CEH researchers provided evidence that food and fodder contamination levels were too low to be a health risk.
- Supporting the science and airworthiness activities of the International Volcanic Ash Task Force, an advisory group established by the International Civil Aviation Organisation.

After the deluge

In late 2010, using NERC's National Capability, BGS scientists travelled to Hungary to help with the clean-up operation following the devastating red-mud spill from an aluminium plant, forming part of the British assistance that was promised by the Government. Their work has helped their Hungarian colleagues set up early warning systems and preventative measures to guard against similar disasters in future. BGS and Newcastle University briefed the Prime Minister's office on what Britain could offer ahead of a meeting between the two countries' leaders. BGS has since offered to inspect other sites around Hungary to try to identify potential problems.

Bela Szandelszky/AP/Press Association Images

Environment, pollution and human health

John Birdsall/Press Association Images

AP Photo/MTI, Ferenc Fuzzesi

Environment and human health

- The three-year jointly-funded Environment and Human Health programme brought together environmental, social and biomedical scientists to better understand how we can manage the natural environment to improve people's health.
- Interdisciplinary research teams investigated how toxins, pollutants, nanoparticles and pathogens spread in the environment, how they change as they interact with different organisms, how humans are exposed to them and what impact they have on us.
- Researchers from the University of Edinburgh and the London School of Hygiene and Tropical Medicine have highlighted the different meteorological conditions and chemical processes that caused high levels of ozone pollution during the deadly 2003 heat wave. Models suggest that, on several days, ozone from continental Europe contributed substantially to levels that exceeded UK government targets.
- Researchers from the University of Sheffield showed that conventional risk-assessment tools don't account for the health benefits of growing and eating your own food, which can have a direct impact on the growing health crisis caused by poor diet and lack of exercise. They recommend a holistic approach that focuses on real health impacts rather than suspected risks.
- A University of Warwick microbial ecologist spent a year at the University of Birmingham training in medical microbiology. With colleagues, he showed that staphylococci in dairy cattle carry the resistance genes that can convert *Staphylococcus aureus* into MRSA. The researcher was subsequently appointed to the new European Centre for Environment and Human Health in Truro. Other EHH research has developed tests to detect MRSA on farms.
- One EHH project led to a patent application for a method to simulate the reaction of toxic contaminants with the chemistry and microbiology of the human gut. Scientists from Reading University have since used the method in a number of commercial contracts to assess the biological risk of pollutants on contaminated land. The team has also contributed to a Society of Brownfield Risk Assessment representation to Defra, as part of new statutory guidance on contaminated land.

Knowledge exchange leads to spin-out company

New biotechnology company IXO Therapeutics Ltd, started up by NERC in 2010, will research and develop novel medicines from natural sources for the treatment of immune-mediated and inflammatory diseases. Building on CEH and University of Oxford research, the company will develop immunotherapeutics to treat significant unmet clinical needs in areas of high commercial value, such as asthma and chronic obstructive pulmonary disease.

Improved critical limits for ozone

Excessive exposure to ozone (O_3) can damage vegetation and affect food security, carbon storage capacity and other ecosystem services; so understanding the amount of uptake of the gas beyond which damage occurs is crucial. CEH coordinates a group (ICP Vegetation) which this year revised ways of assessing critical levels for damaging effects of ozone on crops, trees and grasslands across Europe. The new critical levels can be used at local and regional scale and can be used for assessing the costs of ozone damage. They are being used in the development of UN policy on trans-boundary air pollution.

UNECE Convention on Long Range Transboundary Air Pollution, *Mapping Manual* Chapter 3: *Mapping critical levels for vegetation,* 2010.

Environment, pollution and human health

In the solardomes measuring the effects of ozone on stomatal conductance of grassland species.

Felicity Hayes

First atmospheric measurements of new greenhouse gas

The first measurements of the atmospheric growth of a 'new' greenhouse gas, known as HFC-227ea, have been made by researchers at the University of East Anglia. This gas is one of a number of man-made chemicals being used to replace ozone-damaging chlorofluorocarbons (CFCs) and 'halon' fire-extinguishing gases. Although HFC-227ea is harmless to stratospheric ozone, it could contribute to global warming due to its long atmospheric lifetime and the amount of heat it traps in the atmosphere: more than 3000 times that of an equal mass of carbon dioxide.

This knowledge will help policy-makers plan for appropriate monitoring and controls of this greenhouse gas.

Accelerating growth of HFC-227ea (1,1,1,2,3,3, 3-heptafluoropropane) in the atmosphere, *Atmospheric Chemistry and Physics*, 2010.

Dr P Marazzi/Science Photo Library

Coughs and sneezes spread diseases

The UK's plans for drug use during a severe influenza pandemic could endanger water-treatment systems, according to research by CEH. The bacteria that break down waste in sewage works could be devastated by large amounts of antibiotics and antiviral drugs. Inadequately-treated sewage released into rivers would have potentially deadly consequences for aquatic life, and drinking water sourced from these rivers would pose an immediate risk to human health. Better uptake of vaccinations against flu and secondary infections would significantly reduce these risks. The Department of Health has been advised of the findings.

Assessing the ecotoxicologic hazards of a pandemic influenza medical response, *Environmental Health Perspectives*, 2011.

Cleaning up contamination

Decades of nuclear power and industrial activities have left the UK with a legacy of waste and contaminated land. NERC's multidisciplinary research into the geological, biological and chemical processes that affect this waste will underpin solutions for treating and containing it.

Current studies on radiation exposure of wildlife will also improve our ability to conduct risk assessments for regulated releases of radioactive material.

- For the first time, BGS has shown experimentally that bacteria, surviving in deep underground conditions, can affect the movement of dissolved substances through sedimentary rock. This basic research has implications for issues including radioactive and toxic waste disposal, water quality and underground storage of carbon dioxide.
- Neptunium (Np) is highly radiotoxic, long lived and soluble, making it a particularly problematic contaminant. Researchers from the University of Manchester have shown that microbes in soils can reduce Np to a less soluble form making it easier to manage. This has important implications for radionuclide behaviour in the environment.
- BGS has carried out a desk-based geological assessment of West Cumbria to screen out areas where it would not be possible to put an underground radioactive waste facility. The report means communities and government can avoid unnecessary discussions about these areas.
- A major knowledge-exchange initiative led by CEH is training nuclear regulators, industry and NGO representatives in the effects and behaviour of radioactive contaminants, to enable them to use assessment tools to understand the risks to animal and plant life.

Decommissioning work being done at a nuclear facility.

Peter Essick/Aurora/SpecialistStock

Earth system science

Increasing knowledge of how our complex planet works

The QUEST Earth-system model.

QUEST – the next generation of Earth system science

Between 2003 and 2010, the £23 million Quantifying and Understanding the Earth System (QUEST) programme brought together the expertise of many disciplines to improve our understanding of how our planet works.

The insights it has produced help bridge the gaps between modelling and measurement, and between present and past climates, giving information about the natural constraints on climate change.

It will let scientists predict future changes in the climate far more accurately, and provides new scientific evidence for assessing how much climate change is dangerous, as well as how far we can avoid it through wise management of the biosphere – the ecosystem comprising the entire Earth and the living things that inhabit it.

- Providing a comprehensive assessment of how climate-related risks to areas including agriculture, fisheries, water resources and human health change as temperatures increase, allowing risk 'hotspots' to be identified. Government used this analysis in mapping the impacts of a 4°C rise.

- Creating the QUEST Earth System Model – a new national capability that will fully integrate with the Met Office Hadley Centre climate model, putting it at the forefront of models being used for the IPCC with new, detailed representations of ocean, atmospheric and land processes. This will give policy-makers hitherto unavailable insights into the effects of different planning decisions.

- Carrying out research on the impacts of forestry and bioenergy crops on the carbon cycle that informed negotiations for the UN Framework Convention on Climate Change.

- Engaging with UK and international policy-makers – including governments, agencies, international conventions on climate, biodiversity and pollution, and the IPCC – as well as with NGOs and companies in the water, insurance and biofuels sectors.

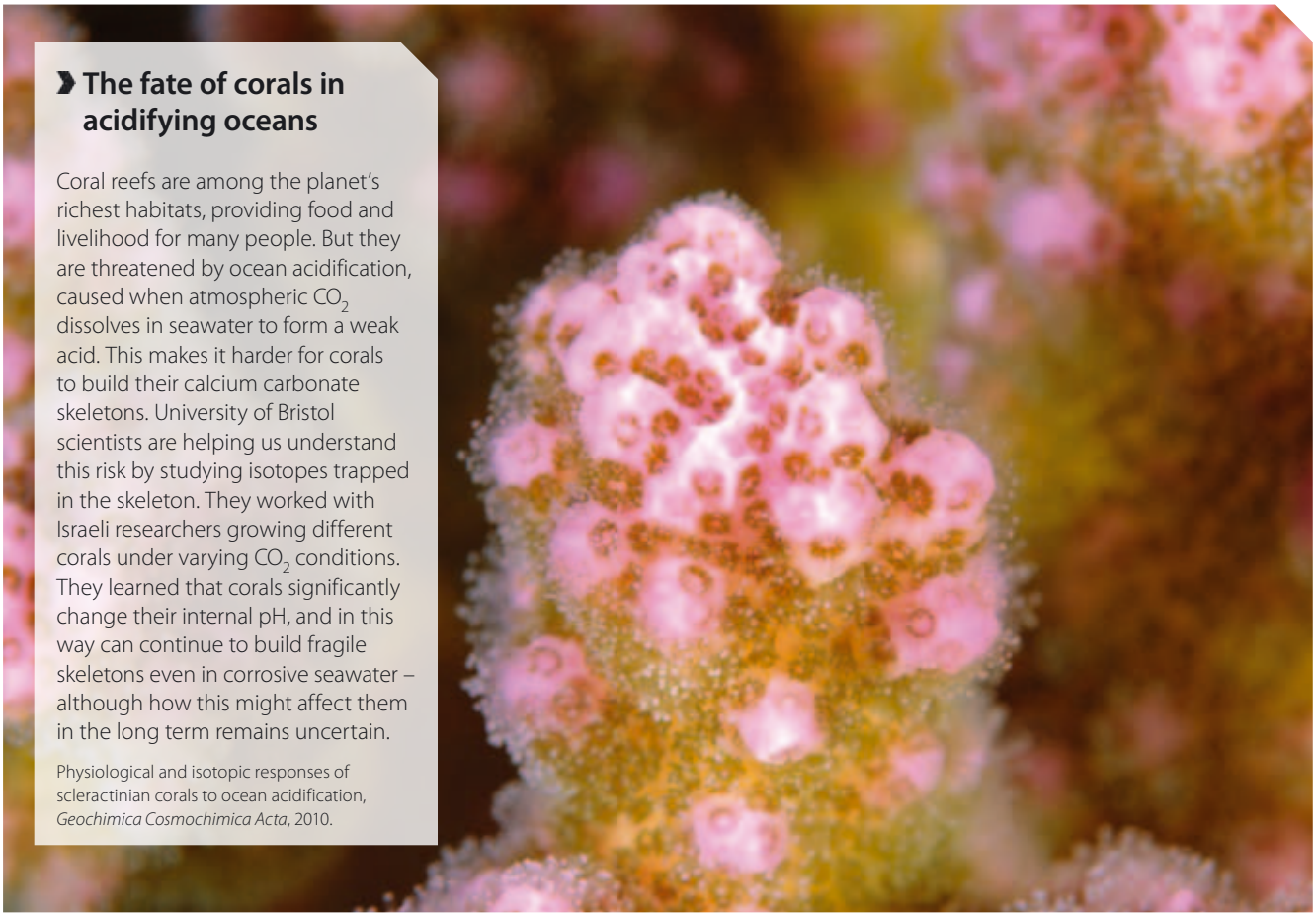
- Building an internationally-recognised science community, including more than 250 scientists from over 50 institutions. QUEST researchers published more than 300 scientific papers and policy briefings, and have worked in partnership with other research organisations including the Met Office.

Nitrogen pollution across Europe

The first ever Europe-wide assessment of the effects of nitrogen emissions, led by CEH, estimates that nitrogen causes up to £280 billion-worth of damage per year – more than double the direct economic benefits of using nitrogen-based agricultural fertilisers. The European Nitrogen Assessment recommends integrated management across the continent to achieve more efficient use of nitrogen in agriculture, transport and waste treatment. The work was funded by the European Science Foundation and the European Commission.

Juice Images/Photolibrary.com

Earth system science



Alexis Rosenfeld/Science Photo Library

The fate of corals in acidifying oceans

Coral reefs are among the planet's richest habitats, providing food and livelihood for many people. But they are threatened by ocean acidification, caused when atmospheric CO_2 dissolves in seawater to form a weak acid. This makes it harder for corals to build their calcium carbonate skeletons. University of Bristol scientists are helping us understand this risk by studying isotopes trapped in the skeleton. They worked with Israeli researchers growing different corals under varying CO_2 conditions. They learned that corals significantly change their internal pH, and in this way can continue to build fragile skeletons even in corrosive seawater – although how this might affect them in the long term remains uncertain.

Physiological and isotopic responses of scleractinian corals to ocean acidification, *Geochimica Cosmochimica Acta*, 2010.

Following carbon through the oceans

NOC research is improving our understanding of the climate system by shedding light on the biological 'carbon pump' – the sum of the living processes by which carbon is fixed and held by the oceans. Recent work shows the pump is significantly weaker than previously believed. Meanwhile, drawing on UK national capability to collect data using RRS *Discovery,* University of Warwick and NOC scientists established that single-celled 'eukaryotic' algae account for almost half the CO_2 fixed by all phytoplankton in the open oceans. Until now these microbes' role in the carbon cycle was almost completely unknown.

A reduced estimate of the strength of the ocean's biological carbon pump, *GRL,* 2011.

Significant CO_2 fixation by small prymnesiophytes in the subtropical and tropical northeast Atlantic Ocean, *ISME Journal*, 2010.

Chorus waves found to cause diffuse aurora

BAS researchers have worked with colleagues at University of California Los Angeles to prove that a special type of low-frequency radio waves is responsible for the glow of light in the upper atmosphere that's known as the 'diffuse aurora'. These 'dawn chorus' waves scatter electrons that are normally trapped much higher up above the Earth down into the atmosphere, where they strike atoms and create a visible glow. This insight is being incorporated into computer models to forecast space weather, which will help protect satellites, navigation systems, power grids and other valuable infrastructure from its damaging effects.

Scattering by chorus waves as the dominant cause of diffuse auroral precipitation, *Nature,* 2010.

Tropical mud traced to fish intestines

A significant part of the mud in tropical seabeds is produced in the guts of fish, according to scientists at Manchester Metropolitan, Exeter and Liverpool universities and the US Geological Survey. Earlier research had shown that fish produce calcium carbonate particles in their intestines, but by comparing carbonates produced by tropical fish with mud samples from different habitats around the Bahamas the team showed they can account for up to 70 per cent of mud production in some habitats. This suggests we may need to rethink how we interpret carbonates within the sedimentary record; these are major repositories of climate and environmental change data.

Fish as major carbonate mud producers and missing components of the tropical carbonate factory, *PNAS,* 2011.

Talking to the people about 'Experiment Earth?'

'Geoengineering' (see p51) covers a range of ideas aimed at slowing down or reversing climate change, either by removing CO_2 from the atmosphere or by reflecting sunlight back into space.

It's been an increasingly prominent topic in recent years, as it has become clear we need a back-up plan in case we don't manage to cut greenhouse gas emissions fast enough to avoid dangerous climate change.

The ideas involved are certainly attention-grabbing, ranging from painting roofs white or seeding clouds using fleets of specialised ships to creating orbital sun-shades, but it's never been clear what the public makes of them. Controversy over genetically modified plants has shown the vital importance of not waiting until the last minute to find out what people think of new and potentially divisive technologies.

NERC decided to investigate, working with the Sciencewise Expert Resources Centre (supported by the Department for Business, Education and Skills), the Royal Society and the multi-agency Living With Environmental Change partnership to organise a series of public dialogue events to throw light on what British people think of geoengineering. A total of 85 people took part, meeting around the country.

The results are published in a 2010 report, highlighting numerous areas of popular concern including how efforts at geoengineering could be effectively regulated, and how reversible and cost-effective they would be.

Nobody was against geoengineering in principle, but participants preferred 'natural' approaches like afforestation (planting trees and managing land use) and biochar (where plant material is heated without oxygen, locking its carbon into a fine-grained charcoal that can be added to soil), while methods like adding sulphate particles to the atmosphere to reflect more sunlight found much less favour. One recurring concern was that the possibility of geoengineering shouldn't excuse backsliding on emissions-reduction targets.

These findings illuminate the public's views on the moral, ethical and social implications of geoengineering; they will inform future NERC research into the subject.

The full report is available at www.nerc.ac.uk/about/consult/geoengineering.asp

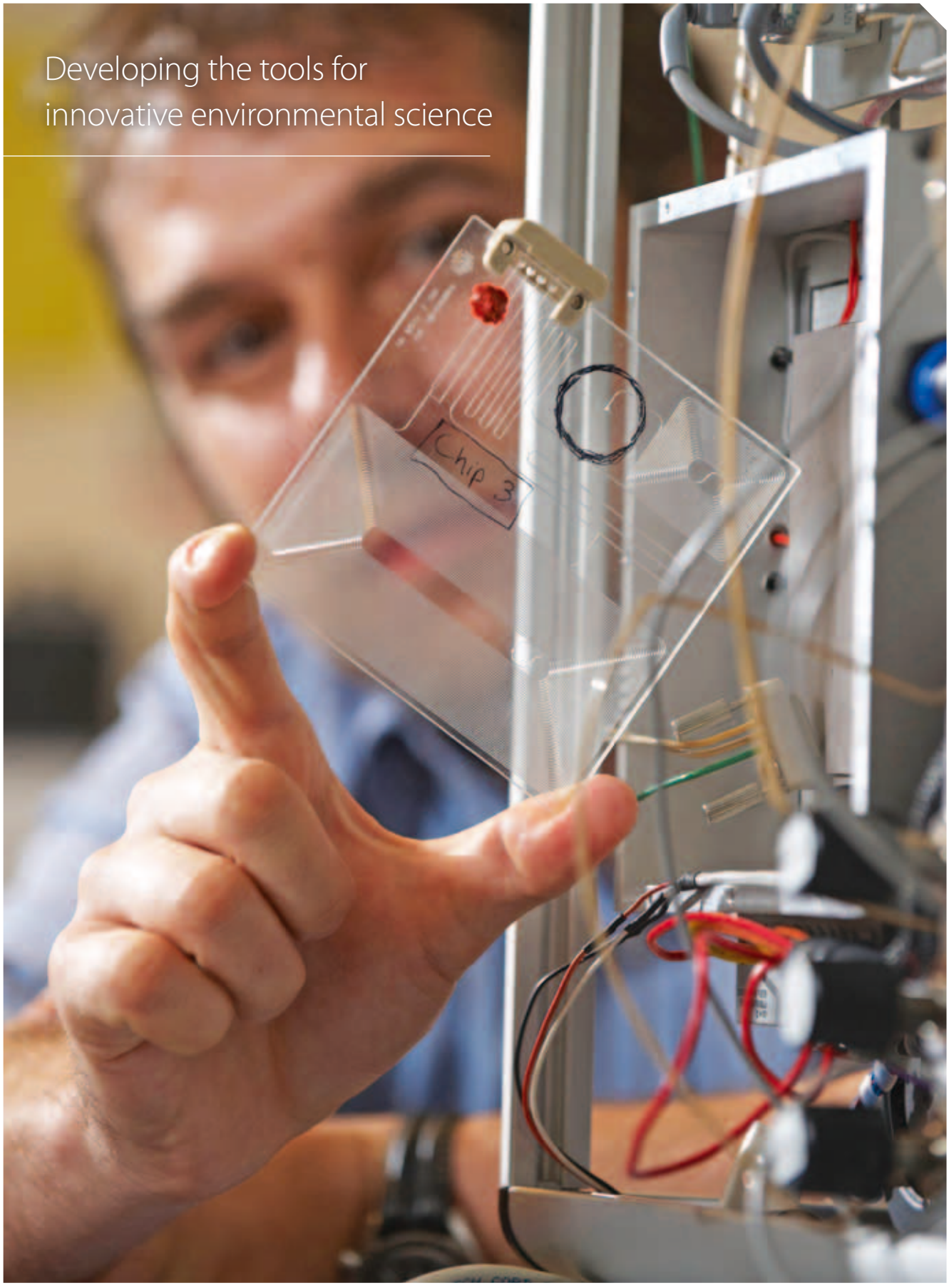
Oliver Burston/Ikon Images/Photolibrary.com

Grazing cuts grassland nitrous-oxide emissions

Long-term studies by CEH in collaboration with the Chinese Academy of Sciences and the Karlsruhe Institute of Meteorology show that having more grazing animals on continental steppe grasslands causes nitrous-oxide emissions to fall. It turns out that ungrazed grassland emits more of this powerful greenhouse gas during the spring thaw, making its annual emissions much higher. Earlier studies using shorter datasets implied the opposite was true; the findings suggest that the methodology of the IPCC should be revised. They also suggest that natural processes are more responsible for nitrous-oxide emissions from steppe grasslands than previously thought.

Grazing-induced reduction of natural nitrous oxide release from continental steppe, *Nature,* 2010.

Technologies



University of York

Gas-detection technologies exploited

When researchers at University of York and NCAS developed the technology for a low-power but highly sensitive 'lab on a chip', to detect and identify chemicals in the air, they opened the door to truly portable detection of complex mixtures of trace gases for the first time. Now the UK Ministry of Defence is using this technology to develop instruments to detect illicit drug manufacture and bomb making. The research team is also working with Defence Science and Technology Laboratory and commercial partners on its defence and security applications. The patented intellectual property associated with the project will be exploited through a joint venture with a UK SME.

The team has also developed a new way of detecting complex trace mixtures of organic nitrogen, which has been used to isolate the nitrogen components in urban air and other environmental samples. The technique is now being applied commercially, in explosive residue detection, food safety and industrial chemistry.

New sensitive and quantitative analysis method for organicnitrogen compounds in urban aerosol samples, *Environmental Science and Technology,* 2011.

Radiocarbon dates the pharaohs

The first accurate chronology of ancient Egyptian kings has been produced by a team led by the Oxford Radiocarbon Accelerator Unit. Radiocarbon has not been considered sufficiently accurate for this until now, but the researchers analysed short-lived plant remains instead of more commonly used charcoal and wood (which could come from items that were reused over a long period). The work largely confirms the historical chronology of the pharaohs but adjusted some dates by up to 100 years, filling gaps in the radiocarbon record and adding important detail to our understanding of ancient Egypt.

Radiocarbon-based chronology for dynastic Egypt, *Science*, 2010.

Undersea technology delivers more for less

Autonomous underwater vehicles (AUV) are revolutionising data gathering from the oceans, and the latest – Autosub Long Range – has been successfully tested off the Canary Islands. It can operate 6000m down with a range of 6000km; a unique combination only made possible by completely new hardware and software designed by NOC. Within two years the new AUVs could be making trips lasting several months, yielding significant efficiencies by reducing the number of missions needed to gather data.

NOC has also developed a sensitive nitrite sensor, packaged in a low-cost plastic housing, which operates at sea providing continuous data, and avoids the lengthy and costly process of retrieving samples. Two patented features of the sensor will underpin the development of further 'miniature ocean laboratories'.

Technologies

Dog-sled technology in the Arctic

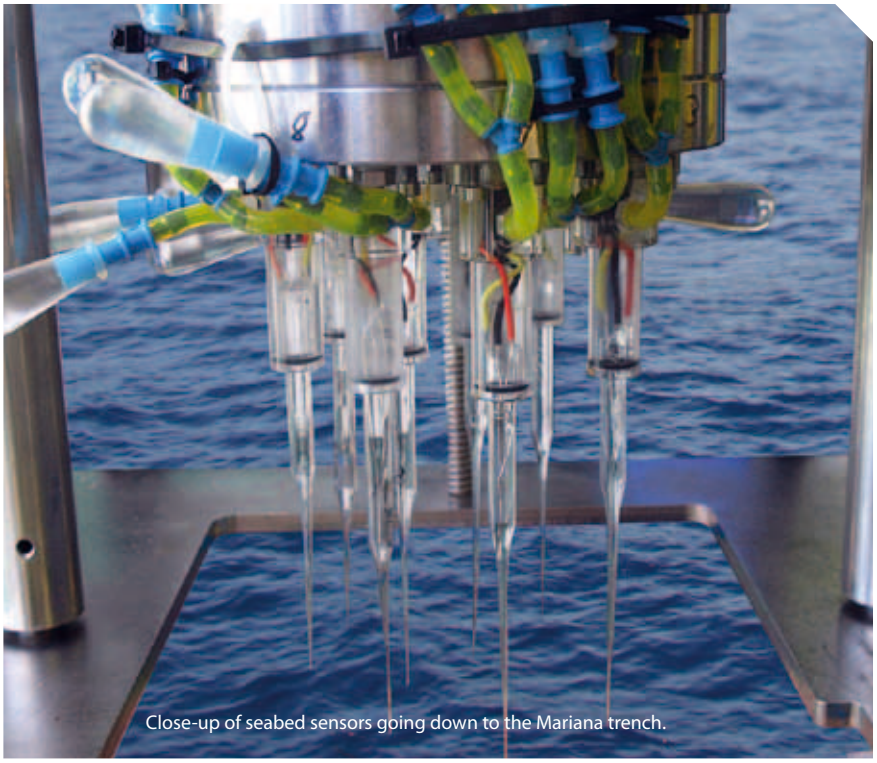
Scottish Association for Marine Science (SAMS) researchers developed a new way of measuring Arctic sea-ice thickness, adapting their scientific equipment for use by Inuit on their regular hunting journeys. The sled-mounted system transmitted scientific readings via satellite back to SAMS; a two-day trial on the sea ice around Qaanaaq (NW Greenland) yielded the equivalent of 20,000 independent ice-thickness measurements. The development means data can be collected throughout the sea-ice growth and melt seasons, rather than just the few weeks of a field campaign. Sea-ice changes are directly affecting the economy and wellbeing of many northern indigenous communities. These communities can now help to provide data that scientists and policy-makers urgently need.

Tradition and technology: sea ice science on Inuit sleds, *Eos*, 2011.

Rory MacKinnon/SAMS

Ocean trench role in carbon storage

SAMS led a team from the UK, Denmark, Germany and Japan in the first ever use of an autonomous deep-sea robot to investigate carbon cycling at the ocean's deepest point – the Challenger Deep in the Mariana Trench, 10.9km beneath the surface. Such detailed science has never been carried out at this depth before. The great pressure microbial processes have to be studied *in situ*, so the team developed instruments that could take detailed measurements at 1000 times surface pressure. Initial results indicate that organic material trapped in these trenches may play an important role in carbon storage.



Close-up of seabed sensors going down to the Mariana trench.

Professor Ronnie Glud

Logger generates data and income

A geo-locator (logger) developed by BAS over a number of years has led to new, and previously impossible, understanding of migratory birds, as well as significant income generation. The logger is fitted to a bird and then recovered when it returns to the nest, and developments in technology mean it's small and light enough to be fitted to a wide range of birds. This had led to more than 5000 loggers sold to researchers in 2010. This outstanding success and the potential for further applications have led to BAS seeking to commercialise the innovation.

Supercooled water threat to aircraft fuel systems

Basic research on cloud formation has helped engineers understand how ice forms in aircraft engines. Water can remain liquid as low as -36°C without an appropriate solid surface to trigger freezing. Researchers at the University of Leeds, together with ice crystallisation specialists Asymptote Ltd, demonstrated that this 'supercooled' water can exist in aircraft fuel systems. This knowledge will help aircraft engineers understand the build-up of ice responsible for the almost simultaneous failure of both engines on a Boeing 777 that crash-landed at Heathrow in 2008. Airbus is using the research in a European Aviation Safety Agency project.

Supercooling of water droplets in jet aviation fue, *Fuel*, 2010.

Delivering the strategy

Our strategy *Next Generation Science for Planet Earth* sets out our long-term strategic objectives and scientific priorities. The strategy can be found at www.nerc.ac.uk/publications/strategicplan/documents/strategy07.pdf. How we will deliver these, and contribute towards the goals of government and our parent body the Department for Business, Innovation and Skills (BIS), is described in our 'Delivery Plan for the Comprehensive Spending Review period 2011-2015', which can be found at www.nerc.ac.uk/about/perform/documents/deliveryplan201012.pdf.

We regularly monitor, evaluate and report on progress against delivery of our strategy, externally via our NERC/BIS Scorecard and internally via our Strategic Management Tool. This informs our decision making and allows us to demonstrate that we are effectively and efficiently investing the public funds that contribute to the UK economy, policy and society, and internationally. Our planning and performance documents can be found at: www.nerc.ac.uk/about/perform/documents.asp

Managing performance

We set a challenging programme of work in the final year of the 2008-11 Delivery Plan, with a total of 15 strategic objectives. At the end of 2010-11 financial year there had been some deviation from outcomes required for 5 of the objectives, relating to the period of stabilisation with the RCUK SSC, slower than anticipated progress of two science themes (Earth System Science and Natural Hazards) and compliance with new pay and compensation legislation. Nevertheless all off track objectives are forecast to deliver desired outcomes and 10 objectives continue to meet the required outcomes.

Research outputs

The research projects we fund report annually through our Research Outputs Database, providing research highlights for NERC publications, indicators of performance for internal and external use, and further evidence for promoting the research base. For example, in 2010 NERC-funded research produced 4,644 journal publications – an increase of 7% compared to the previous year, and more than double the volume a decade ago. International co-authorship on these publications is a good indicator of science excellence, and has consistently risen over the longer term to reach 56% in 2010. Such evidence helps manage the effectiveness of NERC funding processes and of policies towards competition and collaboration. A more detailed analysis of these performance indicators will be given in a new economic impact annual report, planned for autumn 2011.

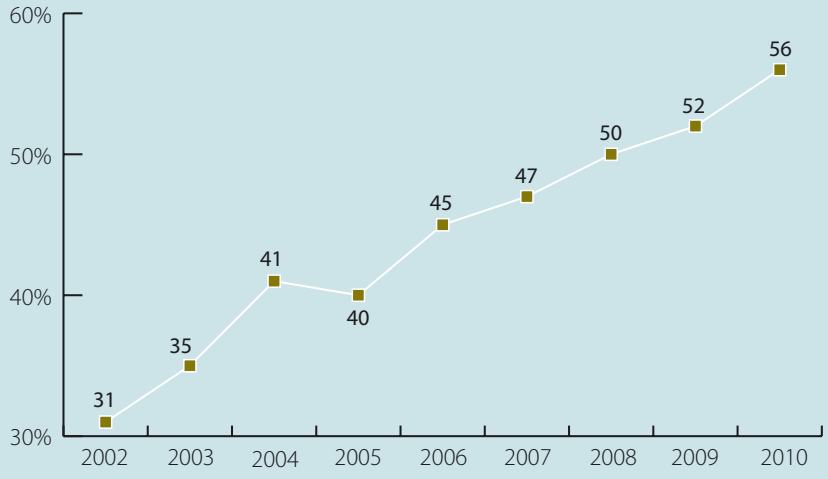
Evaluations

Our Evaluation Programme provides business performance evidence in key areas, informs strategic decisions, and helps identify evidence of achievements. In 2010-11 this included:

- Evaluations of three of our strategic science themes (Climate Systems, Biodiversity, and Sustainable use of Natural Resources) gave assurance on their positive delivery and progress to our Council and to the Science and Innovation Strategy Board. The findings informed the development of the third phase of our Theme Action Plans, enhancing our delivery of environmental research needs. The results will also inform development of our future strategy. The remaining four strategic themes (Natural Hazards, Technologies, Environment, Pollution and Human Health and Earth System Science) will be evaluated during 2011-12.

- An evaluation of the quality of our Responsive Mode funding gave assurance on the quality and outputs of our 'blue skies' research, and informed Responsive Mode policy and practice. The evaluation concluded that NERC's Responsive Mode research is on a par with, or at the forefront of, leading international research. We are now

NERC funded journal publications: International co-authorship rates



Source: Research Outputs Database

building on the results of the evaluation and undertaking a review of Responsive Mode funding to explore means by which quality can be improved further.

- An Economic Impact Valuation project delivered case studies assessing the economic impact of our research in high profile areas. The case studies (www.nerc.ac.uk/using/casestudies) formed part of the evidence used by NERC and BIS during the 2011-15 Spending Review.

External funding

Funding from outside NERC meets the costs of commissioned and co-funded research carried out by NERC's centres for government departments, other public bodies, industry, the European Commission, and international and overseas organisations. This is a significant funding stream for many of NERC's centres and it is an important means of transferring knowledge to users.

Openness and transparency

NERC is subject to the Freedom of Information Act 2000, and also the Environmental Information Regulations 2004 which provide broadly similar access rights to the Act but relate specifically to information about the environment. We work with the other Research Councils to ensure a consistent approach to open access legislation on key business activities.

During 2010 we answered 35 requests for information under the legislation, compared to 36 the previous year. The requests covered a wide range of subjects from business policy to research outputs. We answered 97 percent of our requests, some of which were complex and voluminous, within the statutory time limit.

Much of our information is readily available without a specific Freedom of Information Act request; for details see our Publication Scheme at www.foi.nerc.ac.uk.

Colin Pelton, cdp@nerc.ac.uk

Information assurance & security

The Government's Security Policy Framework and the Data Handling Review require departments to submit an annual report to Cabinet Office. NERC has put in place policies and procedures to minimise the risk of data loss and is reporting annually on information security, particularly in relation to personal information. The number of personal data loss incidents is recorded and in 2010-11 there were no such incidents.

More information: Colin Pelton, information.security@nerc.ac.uk

Grants, fellowships and studentships

We continue to monitor the success rates of grant and fellowship applications to ensure that we do not discriminate against any applicants. Trend data have shown that the proportion of women applying for research grants, and their subsequent success rate, remains relatively constant. However, the number of women in the system remains low.

Although there are yearly fluctuations, on average 50 percent of studentships are awarded to females. The current PhD stock is 50 per cent female. Females made up 45 per cent of masters students in 2009-10 and 49 per cent in 2010-11.

Requests made under the Freedom of Information Act in 2010

Business policy and operations	21
Research outputs	8
Research policy and operations	4
Funding applications	2

The 2010-11 fellowship round has resulted in a lower than average success rate for female candidates, and only 5 of the 27 candidates offered fellowships by June 2011 were female (with one more on a short reserve list). This is the reverse of the previous year, 2009-10, when female candidates were more successful than male candidates. Female candidates make up on average 35 per cent of candidates (37 per cent in 2010-11).

Responsive standard and small grant applications and success rates

	2008-09	*2009-10*	*2010-11*
Number of applications	1,147	1,211	1,259
Number of awards	253	238	221
Total £k	52,696	51,230	50,626
% success rate	22.1	19.7	17.6

Success rates for all grants by gender

	2008-09		*2009-10*		*2010-11*	
	Men	*Women*	*Men*	*Women*	*Men*	*Women*
Number of applications	1352	354	1482	345	1801	448
Number of successful applicants	305	65	390	72	401	84
% successful applicants	26	21	26	21	25	21

Success rates for fellowships by gender

	2008-09		*2009-10*		*2010-11*	
	Men	*Women*	*Men*	*Women*	*Men*	*Women*
Number of applications	122	44	128	59	114	67
Number of successful applicants	20	10	17	13	22	5
% successful applicants	16	23	13	22	19	7

Delivering the strategy

Staff

NERC embraces diversity and equality. It has introduced a wide range of measures to ensure individuals can contribute their skills, knowledge and experience to the organisation while maintaining a work/life balance.

We actively encourage parents to return to work by providing flexible working arrangements. We continue to monitor all recruitment exercises to ensure demographically fair representation, and all promotion rounds are scrutinised for fairness.

In addition we promote personal development, embracing initiatives such as sabbaticals, secondments, further education and a range of short courses. By investing in individuals, we continue to foster potential across the organisation and ensure that NERC has the necessary skills, knowledge and experience to meet future challenges.

Staff, students and fellows

	2008-09	*2009-10*	*2010-11*
Directly employed staff	2,459	2,473[1]	2,623[2]
Staff in research organisations[3]	1,423	1,726	1,864
Fellows	87	86	88
PhD[4]	988	1,017	975
Masters	362	382	378

Notes

1. *This figure excluded 27 employees transferred to the Research Councils Shared Services Centre (SSC) and seconded back to NERC, or who were due to move to SSC but have not yet done so. The figure for 2008–09 excludes 87 such employees.*
2. *The growth in staff since 2009-10 is largely due to TUPE transfers from the University of Southampton to NOC.*
3. *Headcount of all academic staff named on Research Grants which were active at the end of each financial year.*
4. *These data are based on numbers of students directly funded by NERC. They do not include studentships funded through cross-council programmes where another research council administers the award.*

Trends in publications with industry

	2010			*2011*		
Funding type	*Number of papers in ISI-listed journals*	*Number of papers with a private co-author*	*%*	*Number of papers in ISI-listed journals*	*Number of papers with a private co-author*	*%*
Responsive mode	1,670	40	2	1,750	43	2
Research programme	1,905	101	5	1,971	100	5
National capability	761	28	4	923	18	2
Total	**4,336**	**169**	**4**	**4,644**	**161**	**3**

Listing by the Institute for Scientific Information (ISI), now the Thomson Reuters Web of Science database, is used to indicate an influential, high-quality journal. Data supplied by research community via NERC Research Outputs Database with some double counting due to collaboration across funding types.

Health and safety

This report covers the period from 1 April 2010 to 31 March 2011. In this period there were 7 reportable events under the Reporting of Injuries Diseases and Dangerous Occurrences Regulations (RIDDOR). This is slightly above NERC's average annual total over the previous twelve years of 6.2. The total number of injuries and ill-health cases reported in 2010-2011 was 259, which is a marginal increase from 254 in the previous financial year; although previously the annual total has been close to 300.

An improvement notice was issued to NERC by the HSE regarding work on a Research Centre site. This notice required an assessment on the risk from hand-arm vibration be undertaken. The notice was complied with within the required 3-month period. It was demonstrated that the risk from use of vibrating hand-operated or hand-fed machines was minimal and that the relevant exposure limits for hand-arm vibration would not be exceeded

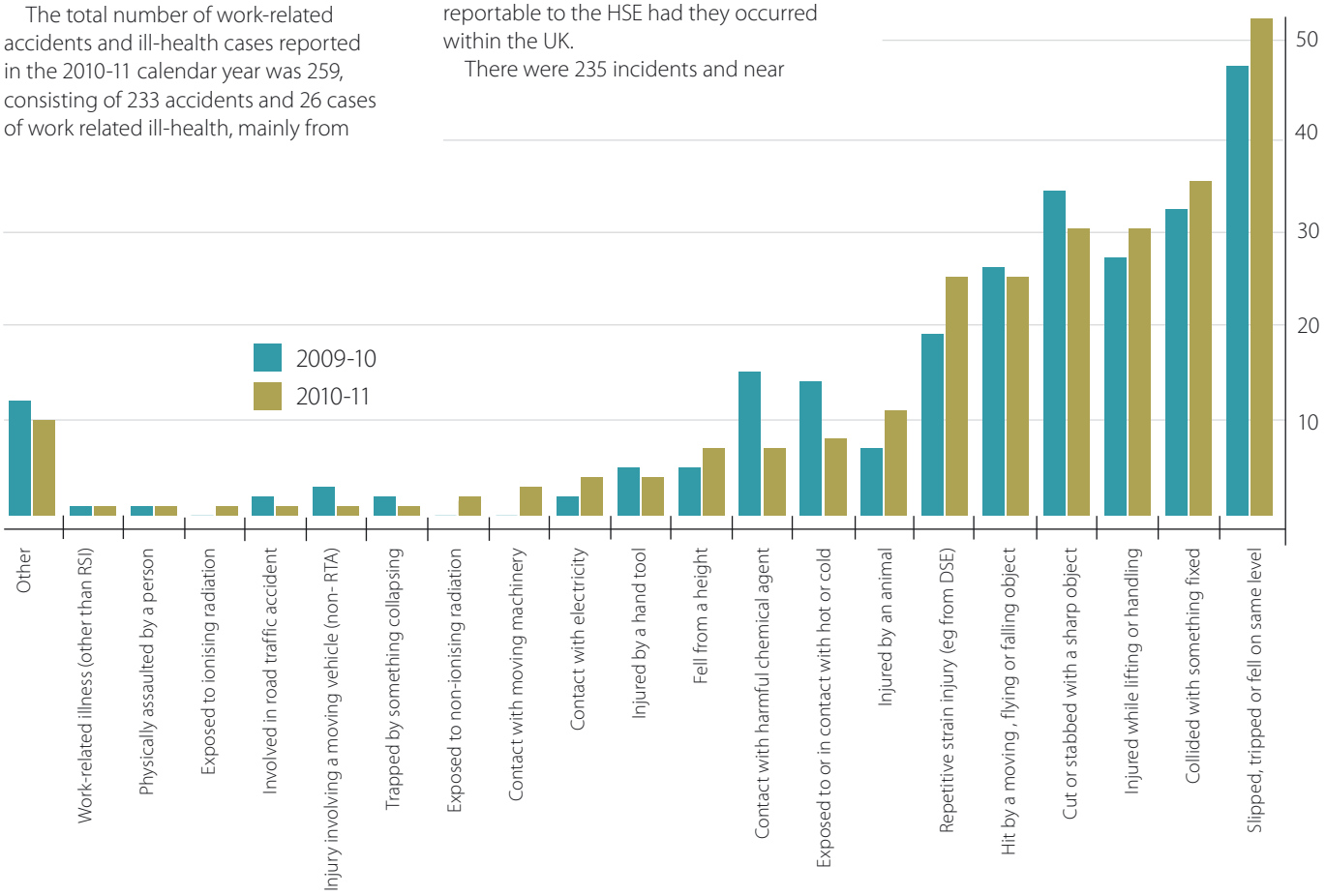
The total number of work-related accidents and ill-health cases reported in the 2010-11 calendar year was 259, consisting of 233 accidents and 26 cases of work related ill-health, mainly from DSE work. The corresponding figures for 2009-10 were 234 and 20. A breakdown of accidents and work related ill-health cases by 'type' for the financial years 2009-11 and 2010-11 is presented below.

The total number of RIDDOR events for the financial year 2010-11 was seven compared to eight for 2009-10. The green 'traffic light' target set by NERC for the number of RIDDOR occurrences in the annual reporting period of ten or less was met.

In 2010-11 the RIDDOR events consisted of four injuries leading to the loss of more than three days, two major injuries and two reportable diseases but no dangerous occurrences. There were four lost-time injuries resulting in between one and three days off work, compared to six in 2009-10. There were six occurrences on ships reportable to the Marine Accident Investigation Board (MAIB), compared to seven in 2009-10. Of these, four led to the loss of more than three days, and two were dangerous occurrences. There were two events overseas that would have been reportable to the HSE had they occurred within the UK.

There were 235 incidents and near misses reported in 2010-11 compared to 247 in 2009-10. Reporting and following up increased numbers of incidents and near misses is considered an important means of improving safety performance and preventing injuries. In this reporting period the number of reported incidents and near misses (235) compared to the number of reported accidents (233) meant our target for a ratio of at least 1:1 was met. In 2009-10 there were 247 incidents and near misses reported compared to 234 accidents, so it is reassuring that we have exceeded our target for two years running.

Stress continues to be a potential issue, especially in the current climate where NERC and the public sector are undergoing significant change. The health and safety accident and ill-health statistics do not truly reflect the amount of ill-health attributable to this cause, although we know work-related stress is one of the top three causes for staff becoming engaged with our employee welfare support system.



Delivering the strategy

Sustainability report

NERC continues to promote a sustainability agenda throughout its scientific operations, completing its fourth consecutive year of reporting energy data. In doing so, it has gained the Carbon Trust Standard, and is well-placed to comply with the requirements of the Carbon Reduction Commitment Energy Efficiency Scheme and HM Treasury's Public Sector Sustainability Reporting. NERC also considers biodiversity to be important and actively encourages its promotion throughout its estate in accordance with its own environmental policy.

NERC has undertaken a variety of sustainability projects across its estate during the reporting period. These have included the installation of voltage optimisation and light sensors, increasing the number of recycling bins, first year operation of the sea water cooling system, eco-driving training, and energy efficiency awareness campaigns. Future plans will drive further energy efficiencies through improved housekeeping and further awareness campaigns.

NERC is committed to participating in the Carbon Reduction Commitment Energy Efficiency Scheme which began in 2010. The baseline for the scheme is the data recorded during this financial year 2010-11 and will be used to set energy efficiency targets for future years.

Governance

All NERC Research Centres have obtained ISO 14001 for Environmental Management and uses this system to record all sustainability data. The Carbon Reduction Commitment Energy Scheme audits the data provided to the Environment Agency and the Carbon Trust Standard audits the data provided every two years.

Area	*Baseline Performance*	*Target Performance*
Carbon Dioxide Emissions (UK Only)	16,214 tCO2e	To re-certify for the Carbon Trust Standard
CRC Carbon Dioxide Emissions	14,933 tCO2e	CRC Baseline
CRC Related Expenditure	£179,198	CRC Baseline
Total Electricity Consumption (UK Only)	19,983,967 kWh	CRC Baseline
Total Gas Consumption (UK Only)	24,295,704 kWh	CRC Baseline
Total Energy Expenditure (UK Only)	£2,290,759	

NERC Sustainability Report for the year ended 31 March 2011

Greenhouse gas emissions Uk only (Note 3)		*2008-09*	*2009-10*	*2010-11*
Non-financial indicators (tCO2e)	Total gross emissions for scopes 1 & 2	16,083	15,201	15,551
	Total net emissions for Scopes 1 & 2 (less green tariff)	13,682	12,739	13,112
	Gross emissions scope 3	1031	771	663
Related energy consumption	Electricity: non-renewable (kWh)	20,792,033	19,796,240	19,983,967
	Electricity: renewable (2012 onwards)			
	Gas (kWh)	24,914,041	22,984,052	24,295,704
	Oil (litres)	60,957	65,916	60,933
	Aviation fuel (litres)	220,520	121,127	66,100
Financial indicators (£k)	Expenditure on energy			2,290,759.53
	CRC Expenditure (Paid from 2012 onwards)	187,613	176,796	179,198
	Expenditure on official business travel (NERC owned fleets only)			202,400.37

PERFORMANCE COMMENTARY
The baseline for the Carbon Reduction Commitment has been set for this financial year. NERC will set future targets based on this and work to reach them each financial year. NERC is also working towards re-certification for the Carbon Trust Standard in 2012.

CONTROLLABLE IMPACTS COMMENTARY
The main impacts from NERC in the UK result from the electricity, gas and other fuels that are used for the offices and official business travel. NERC is working to reduce the direct impacts it has through energy efficiency strategies.

Trends in annual capital investment (£m)

	2008-09	*2009-10*	*2010-11*
Land, buildings and Antarctic stations	12.0	24.9	14.7
Plant and equipment [1]	11.9	9.8	12.4
Transport equipment [1][2]	2.2	4.2	15.3
RCUK Shared Services Centre [3]	6.1	2.1	1.3
(Profit)/Loss on disposal of fixed assets [4]	0.1	-0.7	-1.1
Capital grants [5]	13.3	18.5	22.1
Total	**45.6**	**58.8**	**64.8**

Notes

1. *Following migration to SSC some plant and equipment assets were reclassified as transport equipment, the original investment in these assets has been left in plant and equipment.*
2. *2010-11 figures include £10m for the RRS* Discovery *replacement vessel (2009-10 £2.1m).*
3. *2010-11 figures include £11.1m for RCUK SSC Ltd shares purchased during the year (2008-09 £1.6m) less the £11.1m received from SSC for NERC's share of the SSC asset.*
4. *From 2007-08 all disposals of fixed assets classified as capital.*
5. *2010-11 figures include £2m paid to RCUK SSC Ltd on behalf of BIS.*

Patents filed

2008-09	7
2009-10	11
2010-11	7

Trends in research council income from the private sector (£m)

	2008-09	*2009-10*	*2010-11*
UK private sector	4.8	5.1	4.5
Overseas private sector	8.2	12.3	8.3
Total	**13.0**	**17.4**	**12.8**
Total at 2010-11 prices	13.7	17.8	12.8

UK figures include Integrated Ocean Drilling Programme income to BGS.

Value of earned income (contract research) by research centres (£k)

	2008-09	*2009-10*	*2010-11*
British Antarctic Survey	1,963	1,819	2,465
British Geological Survey	16,934	21,216	16,651
Centre for Ecology & Hydrology	9,993	9,325	9,882
National Oceanography Centre	5,222	6,405	6,286
Swindon Office	1,086	321	1,463
Total	**35,198**	**39,086**	**36,747**

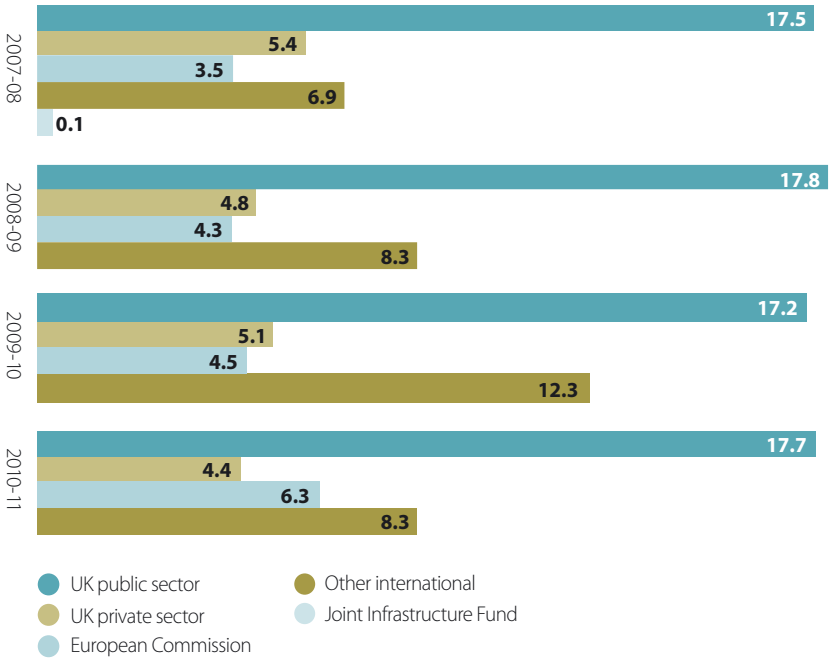
Figures do not include funding received from other bodies classified as financing (see Note 3).

Royalties and licence income by research centres (£k)

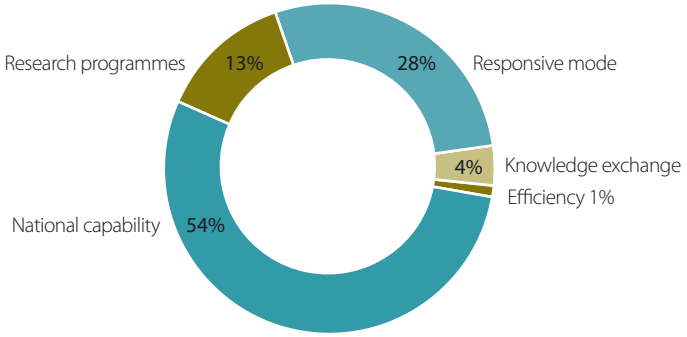
	2008-09	*2009-10*	*2010-11*
British Antarctic Survey	23	11	5
British Geological Survey	1,830	1,628	1,941
Centre for Ecology & Hydrology	253	177	502
Proudman Oceanographic Laboratory/ National Oceanography Centre	45	113	93
Swindon Office	0	4	0
Total	**2,151**	**1,933**	**2,541**

Delivering the strategy

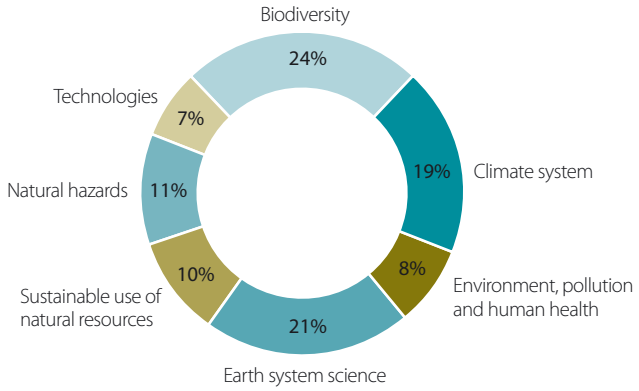
External funding for research (£m)



Allocation of science budget by funding stream



Allocation of science budget by science theme



Science budget expenditure in research organisations

Expenditure £k	RESPONSIVE AWARDS				Research programme grants	Research programme students	Research programme fellows	Research programme contracts	Total
	Grants	PhD students	Masters	Fellowships					
Aberystwyth University	560	108			33	30			731
African Collaborative Centre for Earth S					54				54
Bangor University	789	200	89	113	248	58			1,497
Bournemouth University	104	1			11				116
Brunel University	72	12							84
Bto Services Ltd (British Trust For Orni					18				18
Cardiff University	626	217			139	74			1,056
CEFAS - Centre for Environment, Fisherie					93				93
Centre for Arid Zone Studies University					16				16
Centro Internacional de la Papa					50				50
Consorcio para el Desarrollo Sostenible					28				28
Cranfield University	25	12	47		267				351
Diamond Light Source Ltd	3								3
Economic & Social Research Council								715	715
Edge Hill University College					22				22
Edinburgh Napier University	7	1			70	-5			73
Engineering & Physical Sciences Research Council								1,827	1,827
Food and Environment Research Agency					4				4
Fundacion Natura Bolivia					89				89
Glasgow Caledonian University		16			15				31
Heriot-Watt University	5		59		151				215
HR Wallingford Ltd		1			51				52
Imperial College London	1,640	572	329	491	5,173	190		174	8,569
Institute of Development Studies					58				58
Institute of Urban Environment Chinese A					25				25
International Food Policy Research Insti					95				95
International Institute For Environment					20				20
International Union for Conservation of					23				23
Isaac Newton Institute for Mathematical Sciences								90	90
Keele University	75	18							93
King's College London	35	34	115		442	11			637
Kingston University	14								14
Lancaster University	1,010	214	99	18	554	95		364	2,354
Liverpool John Moores University		29							29
London School of Economics and Political		11			176				187
London School of Hygiene & Tropical Medi		1			34				35
Loughborough University	434	8			44	14			500
Makerere University Council					31				31
Manchester Metropolitan University	84	19			227	14			344
Marine Biological Association	31	1			26			924	982
Medical Research Council								250	250
Metereological Office								1,212	1,212
National Museum of Scotland	8								8
National Oceanography Centre	409	77		91	184	5			766
Natural History Museum	680	9			26			28	743
NERC British Antartic Survey	3,393	181		47	140			451	4,212
NERC British Geological Survey	407	61		65	465			1,691	2,689
NERC National Oceanographical Centre L	162	9			10				181
NERC National Oceanographical Centre S	1,294	61		138	437			2,133	4,063
NERC Centre for Ecology & Hydrology C	392	373		31	2,025	34		580	3,435

Science budget expenditure in research organisations *continued*

Expenditure £k	RESPONSIVE AWARDS				Research programme grants	Research programme students	Research programme fellows	Research programme contracts	Total
	Grants	PhD students	Masters	Fellowships					
North Wyke Research					56				56
Open University								162	162
Oxford Brookes University		17	33						50
Plymouth Marine Laboratory clg	254	205			593			5,783	6,835
Pontificia Universidad Catolica del Peru					19				19
Queen Mary University of London	523	206	34	92	311	45			1,211
Queen's University Belfast	135	1							136
Roehampton University						10			10
Rothamsted Research		1			137				138
Royal Botanic Garden Edinburgh				26	85				111
Royal Botanic Gardens Kew	318	1							319
Royal Holloway, University of London	598	122	191	209	80	76			1,276
Royal Veterinary College	59								59
SAMS Scottish Association for Marine Sc	1,020	42			349	24		2,493	3,928
School of Oriental and African Studies					7				7
Science & Technology Facilities Council	6	2			743			3,920	4,671
Scottish Agricultural College					45				45
SEI Oxford Office Ltd					11				11
Sir Alistair Hardy Foundation for Ocean Science								437	437
St George's University of London					32				32
Suerc	38				11			1,109	1,158
SURRC	170	27			33	9		748	987
Swansea University	129	17		16	60				222
Technology Strategy Board								806	806
The Linnean Society of London								100	100
The Macaulay Land Use Research Institute					38				38
The Open University	842	107		122	189	10			1,270
UHI Millennium Institute					1				1
UK Astronomy Technology Centre					13				13
University College London	2,029	511	79	133	189	82		340	3,363
University College Swansea	412	131			169				712
University of Aberdeen	1,401	345	91	151	562	77			2,627
University of Abertay Dundee GRANT	40								40
University of Bath	177	45							222
University of Birmingham	1,034	341	186		433	98		230	2,322
University of Bradford	33	11	76		47				167
University of Brighton	71								71
University of Bristol	3,369	733		747	687	160		594	6,290
University of Cambridge	2,534	829	28	585	535	59		14	4,584
University of Cumbria						10			10
University of Dundee		2			29			429	460
University of Durham	1,304	254		22	119	70		399	2,168
University of East Anglia	2,501	717	139	175	984	118	37	471	5,142
University of Edinburgh	3,429	798	79	501	1,113	65		1,641	7,626
University of Essex	516	138		18	120	9			801
University of Exeter	2,290	263	53	461	227	117			3,411
University of Glamorgan		1							1
University of Glamorgan GRANT					1				1
University of Glasgow	735	183		206	320	38		35	1,517
University of Gloucester									0
University of Hertfordshire	34	12			214				260
University of Hull	28	59			83	14			184

Expenditure £k	RESPONSIVE AWARDS				Research programme grants	Research programme students	Research programme fellows	Research programme contracts	Total
	Grants	PhD students	Masters	Fellowships					
University of Kent		2			55	31			88
University of Leeds	4,306	884	300	343	812	155		7,987	14,787
University of Leicester	948	172	46	63	273	140		439	2,081
University of Lincoln	10	1							11
University of Liverpool	1,656	475		89	551	56		571	3,398
University of Manchester	2,435	656	31	210	886	84		18	4,320
University of Newcastle Upon Tyne	952	259	222	104	397	62			1,996
University of Northumbria at Newcastle	89			18	1				108
University of Nottingham	457	67	28		88	40		194	874
University of Oxford	4,542	823	46	589	975	10		538	7,523
University of Plymouth	701	131	30		388	28			1,278
University of Portsmouth	112	2		21	67				202
University of Reading	1,810	962	275	68	1,736	26		6,183	11,060
University of Salford	20	13			89				122
University of Sheffield	2,472	511		174	187	19		353	3,716
University of Southampton	2,363	577		343	1,340	45			4,668
University of St Andrews	1,028	267	38	201	350	14		1,058	2,956
University of Stirling	68	74	39		90	9			280
University of Strathclyde	62	41		114	147				364
University of Surrey		11			182				193
University of Sussex	332	14			111				457
University of Teesside					5				5
University of the West of Scotland		1							1
University of Ulster	192				10				202
University of Warwick	814	147		149	16	9		23	1,158
University of Westminster					24			13	37
University of York	1,494	283	118	25	439	58		442	2,859
Wildlife Conservation Society					15				15
Zoological Society of London	87	84			82				253
Grand Total	**65,238**	**14,824**	**2,900**	**6,969**	**29,535**	**2,397**	**37**	**47,969**	**169,869**

This table summarises the gross expenditure of the science budget relating to Responsive Mode and Research Programme Grants payments made directly to Research Organisations in 2010-11, including payments made to NERC Research Centres, Collaborative Centres and coordinating parties such as EPSRC and ESRC.

How we spent the science budget (£m)*

	2010-11 Outturn
Research Programmes	
Managing Research Programme Investments	0.160
Aerosol Impacts	1.002
Aerosols & Clouds	0.002
Algal Bioenergy Network	0.143
Analytical Science & Technology PhD Studentships	0.011
Arctic Programme	0.129
BioDiversa	0.883
Biodiversity & Ecosystem Service Sustainability	0.024
Carbon Capture & Storage	0.463
Changing Water Cycle	0.577
Earth System Modelling	0.997
Earthquake & Volcanic Regions	0.094
Ecology and Hydrology Funding Initiative	1.249
Ecology of Infectious Diseases	0.234
Ecosystem Sustainability & Poverty Alleviation	1.670
Environment & Human Health	0.159
Environmental Nanotechnology	0.075
E-Science	0.063
Evolution of Life & the Planet	0.055
Flood Risk in Extreme Events	1.117
Greenhouse Gas Emissions	0.002
Ice Sheet Stability	1.065
International Ocean Drilling Programme Phase I	0.558
International Ocean Drilling Programme Phase II	4.536
International Polar Year	0.277
Joint Climate & Weather Research	0.073
Land Based Renewables	0.565
Macronutrient Cycles	0.090
Networks of Sensors	0.216
Next Generation Prediction Systems	0.055
Ocean Acidification	1.324
Ocean Shelf-Edge Exchange	0.003
Ocean Surface Boundary Layer	0.001
Pollutant Exposures & Human Health 2009	0.053
Post Genomics	0.035
Quantifying the Earth System	1.081
Quantifying Uncertainty	0.497
Rapid Climate Change and the stability of the thermohaline circulation Phase I	0.013
Rapid Climate Change and the stability of the thermohaline circulation Phase II	2.916
Rural Economy & Land Use	0.439
Storm Risk Mitigation	0.558
Strategic Ocean Funding Initiative	1.152
Taxonomy & Systematics	0.128
Technology Clusters	0.087
Technology Proof of Concept	2.696
Towards a Sustainable Economy Phase	1.522
UK PopNet	0.367
UK Surface Ocean Lower Atmosphere Study	0.450
Urban Atmospheric Science	0.796
Valuation Network	0.073
Virtual Observatory	0.600
Other programmes	0.060
Other Programmes	
European Space Agency	56.471
Earth Observation Programmes	2.420
Contribution to ARGO programme	0.500
Solar Terrestrial Physics commitments	0.499
Theme Leaders	1.427
Knowledge Exchange	7.040
Collaborative Centres	
Plymouth Marine Laboratory	5.015
Scottish Association for Marine Science	2.185
Sea Mammal Research Unit	1.112
Marine Biological Association	0.859
Sir Alistair Hardy for Oceanographic Science	0.409
National Capability - Swindon Office	
International Activities	0.975
National Marine Biological Library	0.075
High Performance Computing	2.053
Marine Barter Bank	0.237
Managing National Capability Investments	1.306
Airborne Research & Survey Facility	1.308
Facility for Airborne Atmospheric Measurement	1.066
Services & Facilities	8.870
National Centre for Earth Observation	6.143
National Centre for Atmospheric Science	8.823
Responsive Mode Grants	
Antarctic Funding Initiative (AFI)	2.855
Capital Grants	1.984
Consortium Grants	11.806
New Investigator	1.291
Small Grants	2.864
Standard Grants	48.935

	2010-11 Outturn
Responsive Mode Training	
Fellowships	7.084
Studentships	25.378
British Antarctic Survey	
National Capability	33.602
Research Programmes	3.956
Antarctic & Marine	*2.341*
Halley 6	*3.522*
Core Capital	*5.574*
British Geological Survey	
National Capability	20.862
Research Programmes	3.024
Keyworth Phase II building	*6.018*
IGS (International Geoscience Services) Ltd	*0.150*
Core Capital	*2.053*
Centre for Ecology & Hydrology	
National Capability	17.982
Research Programmes	1.999
Core Capital	*4.224*
CEH Transition and Integration	1.583
CEH Transition and Integration	*1.465*
National Oceanography Centre	
National Capability	26.073
Research Programmes	1.589
Core Capital	*6.487*
RSS Discovery Replacement ship	*10.025*
Other Infrastructure	
Corporate activities (including Swindon Office)	12.932
Shared Services Centre Costs	12.730
Shared Services Centre Capital Grant	2.000
Shared Services Centre Capital Costs	*1.341*
Corporate Capital	*0.906*
Corporate Restructuring	2.230
Private Funding Initiative Scored Outside DEL	-1.293
Depreciation	23.895
Amortisation	0.548
Release of government grant reserve	-0.473
Loss in joint venture	0.786
Holiday accrual	0.337
IXO Therapeutics Ltd	*0.300*
RCUK SSC Ltd	*11.115*
Asset Disposals	*-15.194*
TOTAL NERC EXPENDITURE	**447.074**
Comprises:	
Resource **	**406.747**
Capital	**40.327**

Capital Expenditure in italics

* *This table shows how NERC has spent the BIS science allocation. All figures are net of other income received.*

** *Resource figure differs from the net expenditure for the year by £10.006m, which is broken down as follows:*

	£m
Funding received from other bodies (recorded as financing)	*12.585*
Asset Disposals (recorded under Capital)	*-1.060*
AME change in provisions	*-1.856*
AME change in holiday accrual	*0.337*
	10.006

Grants awarded in 2010-11

	RESEARCH GRANTS							
	Responsive							
	Small grants		Standard grants		Antarctic Funding Initiative		Consortium grants	
	Number	Value £k	Number	Value £k	Number	Value £k	Number	Value £k
Aberystwyth University			1	505	1	280		
Bangor University	1	53	2	627				
Bolivian Natura Foundation								
Bournemouth University			1	317				
British Trust for Ornithology								
Brunel University								
CONDESAN								
Cardiff University	2	145	5	1,117				
Catholic University of Peru								
Centre for Environment, Fisheries Aquaculture Science (CEFAS)								
City University			1	17				
Cranfield University								
Durham University	4	211	6	2,089				
Edinburgh Napier University								
Heriot-Watt University								
Imperial College London	1	59	9	1,397			2	523
Institute of Development Studies								
Institute of Urban Environment								
Int Food Policy Research Inst								
Int Union for Conservation ofNature (IUCN)								
International Institute for Env and Dev								
International Potato Center								
Keele University	1	52	1	298				
King's College London	1	57						
Kingston University			1	151				
Lancaster University	1	41	1	50	1	25		
London School of Hygiene and Tropical Medicine								
London School of Economics & Political Science								
Loughborough University			3	629			1	318
Makerere University								
Manchester Metropolitan University			1	19				
Marine Biological Association								
NERC British Antarctic Survey			7	2,093	4	1,262		
NERC British Geological Survey	1	24	2	36			1	246
NERC Centre for Ecology & Hydrology			3	399				
National Museums of Scotland	1	20						
National Oceanography Centre	5	345	3	788	1	72	1	102
Newcastle University	2	98	2	376				
Northumbria University			1	80				
Open University	2	73	2	260				
Plymouth Marine Laboratory			3	361			1	141
Queen Mary, University of London	1	47	3	1,230				
Queen's University of Belfast	1	82						
Rothamsted Research								
Royal Botanic Gardens Kew							1	1,031
Royal Holloway, Univ of London	1	63						
SEI Oxford Office Ltd								
STFC - Laboratories								
School of Oriental & African Studies								
Scottish Agricultural College								

RESEARCH GRANTS				RESEARCH FELLOWS		RESEARCH STUDENTSHIPS			
Research programmes		Knnowledge Exchange				Responsive		Research programmes	
Number	Value £k	Number	Value £k	Post-doc fellow Number	Advanced fellow Number	Doctoral training grants Number	Value £k	Doctoral training grants Number	Value £k
2	125					1	71		
1	42	1	22	1		1	142		
1	241								
1	38								
						1	78		
1	86								
4	632			1		2	213	6	429
1	19								
2	258								
3	789					1	71		
2	42			1		1	356		
1	225								
2	317								
12	3,385			2		5	625	4	325
1	45								
1	27								
1	255								
1	48								
1	46								
1	52								
		1	16						
2	1,190					1	78		
4	567					1	285	4	276
1	46								
1	221					1	78		
1	162								
1	33								
2	212								
3	1,088				1	1	213		
6	851					1	71		
12	3,763	1	13			1	428	2	140
8	1,584	1	96			1	142		
3	735	2	150	1	1	2	292		
1	28					2	213		
7	1,996					1	213		
						2	234	1	85
4	822								
						1	234	1	74
1	31								
4	398	1	429						
1	15								
2	114								

Grants awarded in 2010-11 *continued*

	RESEARCH GRANTS							
	Responsive							
	Small grants		Standard grants		Antarctic Funding Initiative		Consortium grants	
	Number	Value £k	Number	Value £k	Number	Value £k	Number	Value £k
Scottish Association For Marine Science	1	63	2	500				
Scottish Universities Env Research Cen	1	28	2	73				
St George's University of London								
Swansea University	2	88	1	125				
The Natural History Museum	4	312	1	305			1	347
University College London			8	2,549				
University of Aberdeen	3	137	5	1,052				
University of Abertay Dundee	1	49	1	15				
University of Bath			3	722				
University of Birmingham			4	1,365				
University of Bradford								
University of Brighton			1	296				
University of Bristol	4	197	9	1,824				
University of Cambridge	3	100	8	2,553			1	107
University of East Anglia	3	136	10	1,938	1	536	1	187
University of Edinburgh	1	52	10	2,253	1	662	1	228
University of Essex	1	50	1	414				
University of Exeter	3	154	13	3,815				
University of Glasgow	1	37	2	775				
University of Hertfordshire								
University of Hull	1	26			1	19		
University of Kent								
University of Leeds	3	154	9	2,284	1	35	1	112
University of Leicester	2	121	1	319	1	18		
University of Liverpool	2	131	7	2,431				
University of Maiduguri								
University of Manchester	1	80	4	1,476			2	1,844
University of Nairobi								
University of Nottingham			1	234				
University of Oxford	3	144	11	4,301			2	1,511
University of Plymouth	1	83	4	451			1	151
University of Portsmouth			1	15				
University of Reading	2	112	2	615			1	296
University of Sheffield	1	29	8	2,408			1	521
University of Southampton			7	1,610	1	132	1	370
University of St Andrews	2	91	2	603	1	65		
University of Stirling	1	58	1	35				
University of Strathclyde								
University of Surrey								
University of Sussex								
University of Ulster			1	716				
University of Warwick			5	1,021				
University of Westminster								
University of York	2	81	3	645	1	15		
Wildlife Conservation Society								
Zoological Society of London Institute of Zoology								
Grand Total	**74**	**3,883**	**206**	**52,577**	**15**	**3,121**	**20**	**8,035**

RESEARCH GRANTS				RESEARCH FELLOWS		RESEARCH STUDENTSHIPS			
Research programmes		Knnowledge Exchange				Responsive		Research programmes	
Number	Value £k	Number	Value £k	Post-doc fellow Number	Advanced fellow Number	Doctoral training grants Number	Value £k	Doctoral training grants Number	Value £k
2	542					1	71		
						1	71		
2	622								
2	400					1	142		
1	188								
11	1,524	1	101	1		4	547		
3	355					2	569	1	70
						1	71		
4	1,052					2	356	4	284
2	70								
5	1,312	1	281			4	925	5	360
7	1,075			1		1	854	1	71
13	2,308	1	25			2	939	2	143
10	1,382					3	939		
1	91	1	88	1		1	213	1	68
10	1,315					2	356	4	276
3	850					3	285		
1	84					1	71		
1	202								
1	129								
9	1,320			1		1	1,067	2	98
7	369			1		2	142	3	494
				2		3	427	1	69
1	16								
9	1,307	1	9	1		2	791		
1	222								
3	176					2	142		
6	1,314	2	609	3		5	854		
2	250	1	408			3	213	1	69
1	29								
11	2,611	3	161	2	1	3	713	1	67
2	158	1	142			4	710	2	137
17	3,482	1	8	1		1	711	1	69
2	234					3	356		
1	123					2	142		
						1	71		
1	373	1	8						
3	346	1	16	1		1	71		
1	24								
1	82			1		1	213	1	67
		1	99						
3	250	1	101	1	1	3	285	2	135
1	33								
						1	78		
264	**46,748**	**24**	**2,782**	**23**	**4**	**94**	**17,432**	**50**	**3,806**

Management commentary

Statutory basis of financial statements

NERC's statutory financial statements have been prepared using accruals accounting in accordance with the UK Government's Financial Reporting Manual (FReM) for 2010-11 and the accounts direction issued by the Secretary of State.

NERC successfully absorbed £3.1m of Emergency Budget directed Grant-in-Aid savings during Financial Year 2010-11, and NERC confidently expects to accommodate its most recent Spending Review 4-year settlement from BIS. It is, therefore, appropriate for these financial statements to be prepared on a going concern basis.

NERC maintains a risk management strategy that conforms to HM Treasury guidance. NERC's approach to risk is described comprehensively in the Accounting Officer's Statement of Internal Control within the Annual Accounts and is supported by the positive and reasonable assurance provided by the Research Councils Internal Audit Service.

Financial summary

NERC concludes the accounting period with a balanced financial position of outturn within 1% of estimate. A comparison with the previous accounting period is shown in Table 1.

Reconciliation between NERC's outturn with its annual accounts for 2010-11 is shown in Table 2.

Table 1. **NERC outturn 2010-11 and 2009-10 comparison**

	2010-11 *£000*	*2009-10 Comparison* *£000*
Science budget	443,880	449,234
Financing	12,585	10,907
Earned income	51,465	60,601
Total funding	507,930	520,742
Expenditure	511,124	510,731
Deficit/(surplus)	(3,194)	10,011
Variance %	-0.6%	1.9%

Statutory disclosures

In accordance with the Companies Act 2006, the following statutory disclosures are presented for the accounting period 2010-11:

Pensions

NERC's pension liability is discussed in greater detail at Note 5 to the Annual Accounts.

Significant interests

Potentially relevant significant interests of NERC's Council members where they are affiliated to other organisations are presented at Table 2 in the Remuneration Report to the main accounts. No issues regarding conflict with their managerial responsibilities have materialised. NERC's Council Secretariat manages a Register of Interests: www.nerc.ac.uk/about/work/boards/councils/interests.asp

Auditors

NERC's accounts are audited by the Comptroller and Auditor General who has been appointed under statute and is responsible to Parliament. The cost of the audit was £89,000. No remuneration was paid to the external auditors in respect of non-audit work in 2010-11. Internal audit was provided independently by the Research Councils' Internal Audit Service (RCIAS). RCIAS reports annually to the Audit Committee. The cost of internal audits undertaken during 2010-11 was £190,480. No remuneration was paid to the internal auditors in respect of non-audit work during 2010-11. The Accounting Officer has taken all reasonable steps to ensure that he is aware of any relevant audit information and to ensure that the Council's auditors are aware of that information. As far as the Accounting Officer is aware, there is no relevant audit information of which the Council's auditors are unaware.

Sickness absence

NERC's sickness absence rate was 2.5% (2009-10: 3.2%), equivalent to 5.6 days per full time employee (2009-10: 7 days).

Public Sector Information

NERC has complied with the cost allocation and charging requirements set out in HM Treasury and Public Sector

Table 2. **NERC outturn and annual accounts reconciliation 2010-11**

	Resource *£000*	*Capital* *£000*	*Total* *£000*
Net expenditure[1]	416,753	-	416,753
Less AME change in provisions[2]	1,856	-	1,856
Less AME change in holiday accrual	(337)	-	(337)
Funding from other bodies[3]	(12,585)	-	(12,585)
Capital grants	(22,124)	22,124	-
Capital[4]	-	55,521	55,521
Profit on disposal of fixed assets[1]	1,060	(1,060)	-
Net profit on NBV and revaluation reserve disposals[5]	-	(14,134)	(14,134)
Outturn	384,623	62,451	447,074
Science budget	385,697	58,183	443,880
Reported surplus/(deficit)[6,7]	1,074	(4,268)	(3,194)

Notes:

1. *Taken from the statement of net expenditure for the year ended 31 March 2011.*
2. *Provision utilisation, movements, unwinding of discount and change in discount factor score as AME and are outside the scope of DEL; figures taken from Note 15 Provisions.*
3. *Taken from Note 3 Financing.*
4. *Taken from Note 10(a) Property, plant and equipment, Note 10(b) Assets under the course of construction, Note 10(d) Joint venture and investments (including SSC shares acquired for the amount of £11,115,500) and Note 11 Intangible assets.*
5. *In accordance with Financial Reporting Manual and including disposal of SSC asset for the amount of £11,115,500.*
6. *Resource surplus of £1,074k comprises of £331k near-cash surplus and £743k non-cash surplus.*
7. *Capital deficit of £4,268k comprises of £1,874k capital grants deficit and £2,394k direct capital deficit.*

Information guidance, but is exempt from the requirements of The Re-use of Public Sector Regulations 2005.

Payment policy
NERC observes the Confederation of British Industry Code of Practice regarding prompt payment, and in accordance with the Government direction, is committed to paying its suppliers within 5 days of the receipt of a valid invoice or earlier if suppliers terms dictate. During 2010-11, 46% of payments were made within 5 days and 83% within 30 days. The methodology used by the RCUK Shared Services Centre for measuring payment policy performance is different from that used in previous years by NERC and therefore there are no comparatives for 2009-10 available. In accordance with the guidance of the Statutory Instrument 1197/571, creditor days for the period are 19 days (2009-10: 19 days).

Developments during the year

Arctic Research Programme
We are investing £15m in a 5-year Arctic Research programme to improve our ability to predict changes in the Arctic and the impacts that will result. The Arctic is a critical region for global environmental change and one where the UK has significant strategic interests. Understanding the drivers and feedbacks of this change, and predicting its scale and rate on timescales from months to decades, represents a major and urgent global scientific challenge of great societal importance.

The Arctic Research Programme Advisory Group, consisting of an international team of experts drawn from research and government backgrounds, published its science plan in September 2010. This informed an interactive workshop that aided the development of research proposals aiming to address the science topics posed within the programme objectives. It also considered collaborative opportunities with international partnerships, and the research infrastructure that is available for those wanting to work in this region.

Public Dialogue on geoengineering
In partnership with Sciencewise-ERC, which supports public dialogue activities in government, we carried out a public dialogue on geoengineering to assess public opinion on how future research around to thus subject should be directed, carried out and communicated.

Prior to the sessions, key findings showed a low awareness and knowledge of geoengineering. Participants' views of the seriousness of climate change affected their views on geoengineering and some technologies were considered more acceptable than others. Participants expressed the view that it would be both ethically and practically important to link any new geoengineering solutions to continued efforts at mitigating the impact of climate change, recognising that one solution might not be enough to tackle the problem.

We will use the dialogue's results to inform our future research strategy. Emerging findings will also inform other geoengineering research funded, for example, under the Living With Environmental Change (LWEC) programme.

Carbon Reduction Commitment (CRC) Energy Efficiency Scheme
As part of our environmental management, we set up a scheme to comply with the UK Carbon Reduction Commitment Energy Efficiency Scheme, which aims to improve energy efficiency and reduce carbon emissions. Through achieving a reduction in 2010/11, we have contributed to fulfilling the British government's commitment to reducing UK carbon emissions by 80 per cent by 2050, relative to 1990 levels.

Theme Action Plans
NERC has continued to develop its portfolio of strategic research programmes, delivering against the science challenges in the seven science themes of NERC's strategy. Programmes which began commissioning research activities during 2010/11 include: the Arctic Research Programme; Biodiversity and Ecosystem Service Sustainability; Ice Sheet Stability; Increasing Resilience to Natural Hazards; Macronutrient Cycles; and Next Generation Weather & Climate Prediction. NERC Council confirmed the next phase of research programme activities in May 2011.

Achievements in 2010/11 include:
- NERC-MRC health programmes ('Environmental Exposure and Human Health Initiative' and 'Environmental and Social Ecology of Infectious Diseases Programme') have grown in terms of co-funded partnerships.
- Research grants awarded for the Insect Pollinator Initiative to understand and mitigate the biological and environmental factors that adversely affect insect pollinators in the UK. Pollinators are essential for pollinating vital food crops.
- Approval of £950k to provide experimental opportunities to trial state-of-the-art autonomous underwater vehicle (AUV) and sensor technologies, and to test new operational paradigms using AUVs from shore bases for ocean research as part of the 'Next Generation Unmanned Autonomous Platforms' 2011 theme action. This enables us to understand and measure complicated processes in hostile environments - essential knowledge that is needed to allow us to model and predict environmental change.

See www.nerc.ac.uk/research/themes/ tap for more information about the Theme Action Plans.

International Strategy
Belmont Forum:

We have continued, with the US National Science Foundation, to lead the Belmont Forum, an initiative which brings together international funding agencies and science councils, aligning their resources to accelerate the production of the knowledge that society needs to manage environmental change in the 21st century.

In 2010, the Forum developed a funders' vision for the priority knowledge and capabilities derived from environmental research that society needs, and the underpinning research challenges that must be met over the next decade to deliver them. These are set out in a White Paper, and encapsulated as 'the Belmont Challenge'.

The Forum, in consultation with the International Council for Science and the International Social Science Council, is

establishing an *Alliance*, which will also include users, to mobilise transdisciplinary and cross-sectoral resources around this challenge.

The *Alliance* is due to launch its 10-year mission on Environmental Research for Global Sustainability at the Planet Under Pressure conference, to be held in London, in March 2012, and at Rio+ 20 Earth Summit, to be held in Rio de Janeiro, Brazil, June 2012.

International Opportunities Fund:

In 2010, we launched our International Opportunities Fund, which aims to facilitate international collaboration for research and research-related activities that are aligned with NERC strategic priorities, and that our usual funding schemes do not typically support.

Our allocation of £1.3m per annum to this scheme will support activities such as: international programmes and networks; collaborative secondments and exchanges; major international workshops or conferences; pump-priming to attract inward investment to UK research institutions; and international project offices. Co-funding and/or in-kind support from overseas or international partners is a funding requirement.

This scheme, which prioritised partnerships with Belmont Forum countries, is one way in which we are contributing to the Belmont Challenge. We also worked with FAPESP (the Research Council for the State of São Paulo) as co-funders through the RCUK-FAPESP Lead Agency Agreement. The first call was co-designed with FAPESP to include a focus on Earth System Science and Global Environmental Change research, particularly in the Amazon and the South Atlantic, for the jointly-funded proposals.

Halley VI

The eight modules which comprise the Halley VI research station are now externally complete, and in their final position at the new site on the Brunt Ice Shelf in the British Antarctic Territory. Internal finishing work will be done in the 2011/12 Antarctic season, and handover to NERC is expected in February 2012, allowing resumption of those scientific activities which had to be suspended during construction. Results from Halley, which began in 1957, will continue to provide a crucial global perspective on ozone, atmospheric pollution, space weather, and climate change.

RCUK Shared Services Centre

The Research Councils have created and co-own the RCUK Shared Services Centre (SSC) Ltd with an aim to reduce spending on administration by sharing transactional processes in Finance, HR and Grants, whilst making expenditure savings through centralised procurement. All Research Councils are now using all services. These services are in a period of stabilisation as the Councils adopt and adapt to the new system and their joint management of the services they receive as clients. 'Business as usual' services will be delivered once final changes to the system have been completed and operational performance satisfies service level agreements. It is hoped that SSC Ltd will also reduce its costs, beyond what is already planned for post-stabilisation, in line with the Councils' own reduction of administration budgets.

Spending Review 2011-2015

Research Council budget allocations and delivery plans were agreed with BIS and published on 20 December 2010. Given the level of cuts being applied across many Government departments, the allocation received was considered favourable. This acknowledges the importance of environmental research to the UK economy. The delivery plans show how BIS, RCUK and Research Council strategic priorities will be delivered during 2011-15, including the reduction of programme, capital and admin budgets. Our focus will now turn to implementing our transformative delivery plan and strategic actions.

Communications

This year *Planet Earth* magazine has continued to be compiled and produced but the print version has been suspended due to government austerity measures. As an interim measure we continued to produce it in e-magazine format. Planet Earth Online (PEO) continues to cover a wide range of NERC-funded science with daily news stories, blogs, features and the Planet Earth Podcast (PEP). The site

has made progress engaging as well as informing the public; news stories now routinely generate comments and debate, and numbers of Twitter and Facebook followers continue to increase steadily with fans regularly commenting on stories and issues.

Press releases and other media interactions continue to be a valuable way of promoting NERC science, and PEO complements this by providing a channel for taking a greater variety of science news direct to the public. PEO and PEP stories have been reproduced in the mainstream press, including the Daily Mail, Sunday Telegraph, Guardian and Radio 4. Since September 2010 we have been working with The Naked Scientists BBC radio programme and website www.nakedscientists.com, to broadcast PEP features. This has achieved significant extra exposure for NERC-funded science, reaching up to 200,000 people per month.

We have relaunched our science communications course, previously run by an external contractor. 'Engaging the Public with Your Research' is now run by members of NERC's Communications team with input from selected public engagement (PE) and media specialists.

The increasing amount of PE activity reported by our award holders indicates growing awareness of the importance of this aspect of their responsibilities, and growing confidence in taking part, particularly in proactive media engagement and responding to breaking news about science issues.

Forward look

NERC strategic agenda – implementing our Delivery Plan

We have identified five actions within our Delivery Plan, (published December 2010), which will be implemented to strengthen delivery of our strategy *Next Generation Science for Planet Earth*. These strategic actions will transform and sustain an efficient and effective portfolio of national capability, research, training and knowledge exchange that delivers excellence with impact for the UK during 2011-15 and beyond. For further details, see www.nerc.ac.uk/about/perform/documents/deliveryplan201012.pdf

We have established a major NERC Integration Programme to help deliver key Delivery Plan priorities through integrating NERC's national capability and shifting resources into front-line science. This will enable excellent Earth system science to generate economic impact for the UK at lower cost.

Large Capital Projects

NERC has been allocated additional funding of £20m in 2011-12, plus £18m over 2012-14 from the BIS Large Facilities Capital Fund, to support existing contractual commitments. These are to design and deliver a replacement for the RRS *Discovery* (essential for improving our understanding and prediction of the Earth's environment and continuing to underpin the UK's approach to Earth system science); to complete the upgrade of our BGS facilities at Keyworth, in order to provide modern and efficient buildings to replace outdated facilities and reduce the building's footprint; and to complete the replacement of the Halley VI science base in the Antarctic to support polar environmental research.

Dr Steven Wilson
Interim Chief Executive and Accounting Officer
21 November 2011

UK Space Agency

With the establishment of the new UK Space Agency on 1 April 2011, our responsibility for space-based infrastructure and strategic Earth Observation (EO) instrument development, including the UK ESA subscription and CEOI, has been transferred to it. Environmental research using EO data, the services and facilities that underpin this work and scientific mission support studies will remain within our remit. The UK Space Agency replaced the British National Space Centre (BNSC), which was an umbrella organisation of ten Government departments, research councils and non-departmental public bodies. Its principal driver will be economic growth through both export and innovation, and through supporting science as an enabler for growth.

NERC and UKSA will work together to ensure that the UK derives the maximum benefit from implementing space-based EO activities. A particular focus is to guarantee that NERC has access to the space-based observations it needs to deliver its environmental science objectives, and that UKSA's investments in space infrastructure are fully exploited. The two organisations are working on the development of a framework agreement document setting out respective roles.

Artist's impression of the Halley VI science base.

Accounts 2010 -11

Remuneration report

Remuneration policy

The Remuneration Committee is responsible for agreeing the pay and allowances of senior managers, i.e. directors (except for the Chief Executive, see below). The Committee members are listed below:-

Mr E Wallis, Chairman NERC
Mr P Hazell, Council Member
Professor A Halliday, Council Member
Professor A Thorpe, Chief Executive
Mrs J Timberlake, Director, People Skills and Communication who attends in an Advisory capacity only.

The Remuneration Committee works in accordance with its policy on senior staff pay, which is designed to reward senior staff on the basis of individual skills, experience and performance set against the market median for their role. A market-related pay point is determined by survey evidence obtained from relevant comparator organisations in the public, higher education and voluntary sectors and is updated annually.

In accordance with NERC's appraisal system, performance is assessed against pre-set objectives for individual roles with input in the assessment process from individual reviewees, reviewers and the Chief Executive.

From 1 April 2006 all pay movement for senior employees is performance related. Prior to that date only the non-consolidated element of senior pay was performance related.

It should be noted that no senior managers are on a service contract. No awards have been made to senior staff this year.

More information about the remuneration committee can be found at the following website www.nerc.ac.uk/about/work/boards/intro/#remuneration

Employment Contracts

NERC staff are not civil servants but the organisation makes its appointments in accordance with the broad principles set out in the Civil Service Commissioners' Recruitment Code, which requires appointments to be on merit on the basis of fair and open competition but also includes the circumstances when appointments may otherwise be made.

All senior officers covered by this report, apart from the Chief Executive, hold appointments that are open-ended. Senior staff appointed before October 2006 may work until age 65, provided their performance remains satisfactory and there is a continuing need for them; they may also request retention beyond age 65, although there is no entitlement to this. Senior staff appointed after October 2006 have a contractual retirement age of 65, although they may also seek retention beyond that age. All staff may retire after age 50 and draw their pensions on an actuarially reduced basis. Staff appointed before October 2006 may draw full pensions from age 60. Staff who leave during a formal redundancy exercise will be eligible for compulsory early retirement/severance terms, as defined under the rules of the Research Council's Superannuation Scheme. These payments are in line with those due under the Civil Service Compensation Scheme.

The notice period for all senior employees is three months.

Remuneration of the Chief Executive

Professor Thorpe started his tenure on 1 April 2005. His initial contract was for a period of four years. In April 2009 it was extended for a further four years. Both the appointment terms and remuneration package are determined by the Department for Business, Innovation & Skills (BIS).

The emoluments of the Chief Executive, including both taxable and non-taxable benefits, were £166,675 (2010: £191,627). This included:

- From 1 April 2010 a basic salary of £121,562 (2010: £121,562) and a market supplement of £20,000 (2010: £20,000)
- From 1 October 2009 a non-consolidated allowance of £20,300 p.a. pro rata for the RCUK Executive Group Chair (2010: £10,150 for six months)
- 2009-10 performance pay non-consolidated awards:
  – Annual performance bonus of £4,813 (2009: £4,791)

A charge of £36,806 (2010: £30,153) was also incurred in respect of employer's pension contributions. This was assessed as 26% of basic salary (2010: 21.3%). The Cash Equivalent Transfer Value for the Chief Executive at the 31 March 2011 was £1,481,523. The real increase in the cash equivalent transfer value for the period was £5,322. The Chief Executive is an ordinary member of the Research Councils' Pension Scheme.

Professor Thorpe stood down as Chief Executive effective 30 June 2011, the Interim Chief Executive is Dr Steven Wilson who took over effective 1 July 2011.

Audited Information

Remuneration of senior employees

Other members of the council's senior management team received emoluments during the year, including taxable benefits as below; these individuals are all ordinary members of the Research Councils' Pension Scheme.

Table 1: Remuneration of Senior Employees (2010-11)

Name	Note Ref 1	Pay 2010 - 2011 £000	Bonus 2010 - 2011	Total emoluments 2010 - 2011 £000	Pay 2009 - 2010 £000	Bonus 2009 - 2010	Total emoluments 2009-10 £000	Pension increase in real terms £000	Accrued pension at 31/03/11 £000	Lump sum at 31/03/11 £000	Cash equivalent transfer value as at 01/04/10 £000	Cash equivalent transfer value as at 31/03/11 £000	Cash equiv. transfer value increase in real terms £000
Professor A Thorpe	2	160 - 165	0 - 5	165 - 170	150 - 155	35 - 40	190 - 195	0 - 2.5	10 - 15	-	1,307	1,482	5
Professor A E Hill	3	95 - 100	5 - 10	100 - 105	95 - 100	5 - 10	105 - 110	2.5 - 5	10 - 15	112	543	673	54
Professor J Ludden		95 - 100	5 - 10	100 - 105	95 - 100	5 - 10	105 - 110	0 - 2.5	5 - 10	-	118	158	21
Professor P Nuttall		95 - 100	5 - 10	100 - 105	95 - 100	5 - 10	105 - 110	-2.5 - 0	35 - 40	145	1,017	1,112	-35
Professor N Owens		90 - 95	5 - 10	95 - 100	90 - 95	5 - 10	100 - 105	-2.5 - 0	10 - 15	122	844	913	-38
Professor A Willmott	4	-	-	-	75 - 80	5 - 10	85 - 90	-	-	-	-	-	-
Mr D Bloomer	5	45 - 50	0 - 5	50 - 55	90 - 95	5 - 10	100 - 105	-	-	-	-	-	-
Mr B Butler	6	15 - 20	-	15 - 20	-	-	-	-	-	-	-	-	-
Mr P Fox	7	35 - 40	0 - 5	40 - 45	-	-	-	0 - 2.5	0 - 5	-	-	9	7
Dr P Newton		75 - 80	0 - 5	75 - 80	75 - 80	5 - 10	80 - 85	0 - 2.5	10 - 15	-	177	207	1
Mrs J Timberlake	8	65 - 70	0 - 5	70 - 75	65 - 70	5 - 10	75 - 80	0 - 2.5	5 - 10	-	79	95	3
Dr S Wilson		80 - 85	0 - 5	85 - 90	80 - 85	5 - 10	90 - 95	0 - 2.5	10 - 15	61	206	245	3

Notes:

1 *Pay figures includes salary, overtime, allowances and awards. Bonus figures shown are estimates, 10/11 figures are based on actual bonuses paid out for 09/10, 09/10 figures are those estimated for the 09/10 accounts. Where multiple people have held the same post during the year, the estimated bonus is apportioned according to time in post.*

2 *Professor Thorpe's total emoluments includes an allowance of £20,300 for taking the role of RCUK Executive Group Chair from 1 October 2009.*

3 *Professor Hill was on secondment to the University of Southampton until 31 May 2010, he returned to NERC payroll as of 1st June 2010. His costs for April & May 2010 are therefore shown in note 8 other operating costs rather than staff costs.*

4 *Professor Willmott is no longer a member of the board following the almagamation of the Proudman Oceanographic Laboratory (POL) and the National Oceanography Centre Southampton (NOCS) into the National Oceanography Centre (NOC).*

5 *Mr Bloomer ceased being a member following his leaving his post as Director of Finance and Operations 12th September 2010 to join the SSC.*

6 *Mr Butler was interim Director of Finance and Operations from 13th September to 30th November 2010 (During November he was handing over the role to Mr Fox).*

7 *Mr Fox took up the post of Director of Finance and Operations on 1st November 2010.*

8 *Mrs Timberlake has been working as 0.8 full time equivalent from 1 April 2008.*

Total Emoluments

Total emoluments include gross salaries and performance related bonuses. From 1 April 2004 basic pay rates for senior staff incorporate all existing allowances including a supervisory and responsibility allowance and any contribution awards.

Pension benefits

All senior employees are ordinary members of the Research Councils' Pension Scheme (RCPS) which is a defined benefit scheme funded from annual grant-in-aid on a pay-as-you-go basis.

Further details about the RCPS can be found in Note 5(d) of the Annual Accounts.

The Cash Equivalent Transfer Value (CETV)

A Cash Equivalent Transfer Value (CETV) is the actuarially assessed capitalised value of the pension scheme benefits accrued by a member at a particular point in time. The benefits valued are the member's accrued benefits and any contingent spouse's pension payable from the scheme. A CETV is a payment made by a pension scheme or arrangement when the member leaves a scheme and chooses to transfer the benefits accrued in their former scheme. The pension figures shown relate to the benefits that the individual has accrued as a consequence of their total membership of the pension scheme, not just their service in a senior capacity to which disclosure applies. The CETV figures include the value of any pension benefit in another scheme or arrangement which

the individual has transferred to the Research Councils' pension arrangements and for which the Civil Service (CS) Vote has received a transfer payment commensurate with the additional pension liabilities being assumed. They also include any additional pension benefit accrued to the member as a result of their purchasing additional years of pension service in the scheme at their own cost.

The real increase in the value of the CETV

This reflects the increase in CETV effectively funded by the employer. It takes account of the increase in accrued pension due to inflation, contributions paid by the employee (including the value of any benefits transferred from another pension scheme or arrangement) and uses common market valuation factors for the start and end of the period.

Remuneration of Council Members

Members of Council receive an Honorarium of £6,850 per annum to cover all work for the Council including membership of Council's Boards. Mr Hazell receives an additional £2,260 for being Chair of NERC Council Audit Committee. The Chairman of Council, Mr Wallis, receives a salary of £16,430 per annum. These rates are effective from 1 October 2009 and are formulated by the Department for Business, Innovation and Skills.

Council members are normally employed on fixed term contracts not exceeding 4 years.

Honoraria are not payable to members who are:

- Civil Servants
- Employees of NERC
- Full time employees of organisations whose funds are derived from Votes of Parliament (eg Government Departments, UK Atomic Energy Authority, British Broadcasting Corporation and other Research Councils)

Members of Council may not receive fees in addition to honoraria. University academic staff and retired Civil Servants are eligible to receive honoraria or fees.

Table 2: Membership of the NERC Council (2010-11) [2]

Name	Affiliation	Period of Appointment	Total Emoluments £'000 2010-11	Total Emoluments £'000 2009-10	Notes
Mr E Wallis	Chairman	01 Jan 2011 - 31 Dec 2014	15 - 20	15 - 20	
Professor A Thorpe	Chief Executive and Deputy Chairman	01 Apr 2005 - 31 Mar 2013	0	0	1
Professor H Davies	Institute of Atmospheric & Climate Science, ETH Zürich	01 Aug 2005 - 31 Jul 2011	5 - 10	5 - 10	
Professor A Fitter	Department of Biology, University of York	01 Aug 2005 - 31 Jul 2011	5 - 10	5 - 10	
Professor A Glover	Chief Scientific Advisor for Scotland	01 Aug 2010 - 31 Jul 2013	0	0	1
Professor A Halliday	Department of Earth Sciences, University of Oxford	22 Nov 2004 - 31 Jul 2011	5 - 10	5 - 10	
Mr P Hazell	Chairman of the Argent Group, Non-executive Director of UK Coal Plc, BRIT Insurance Holdings Plc, and Smith & Williamson, Member of the Competition Commission and Chair of NERC Council Audit Committee	22 Nov 2004 - 31 Jul 2011	5 - 10	5 - 10	
Mr R Douglas	Managing Director, Willis analytics for Willis Re	01 Aug 2008 - 31-Jul-2012	5 - 10	5 - 10	
Professor P Curran	Vice Chancellor and Professor of Physical Geography, City University London	08 Aug 2010 - 31 Jul 2013	5 - 10	5 - 10	
Professor C Godfray	Professor of Zoology, University of Oxford	01 Aug 2008 - 31-Jul-2012	5 - 10	5 - 10	
Professor M Lockwood	Professor of Space Environment Physics, Department of Meteorology, University of Reading.	01 Mar 2010 - 31 Jul 2013	5 - 10	5 - 10	
Professor M Wilson	Professor at the Institute of Geophysics, School of Earth and Environment, Pro-Dean for Research in the Faculty of Environment, University of Leeds	01 Mar 2010 - 31 Jul 2013	5 - 10	5 - 10	
Professor T Meagher	Professor and Chair of Plant Biology at the University of St Andrews	01 Mar 2010 - 31 Jul 2013	5 - 10	5 - 10	
Professor R Watson	Chief Scientific Advisor to DEFRA	01 Dec 2007 - 30 Nov 2011	0	0	1
Professor A Watson	Professor at the School of Environmental Sciences, University of East Anglia	01 Aug 2008 - 31-Jul-2012	5 - 10	5 - 10	
Professor J Slingo OBE	Chief Scientist, Met Office	01 May 2009 - 30 April 2013	0	0	1

Dr Steven Wilson
Interim Chief Executive and Accounting Officer
21 November 2011

Notes

1 *Honoraria are not payable to members who are civil servants, employees of NERC or full time employees of organisations whose funds are derived from Votes of Parliament.*
2 *Paul Williams attends Council as a BIS observer and is not remunerated for his services.*

Statement of Account for the Financial Year 2010-11

Statement of Chief Executive's responsibilities with respect to the Financial Statements

Under Paragraph 3 of Schedule 1 to the Science and Technology Act 1965, the Secretary of State for the Department for Business, Innovation and Skills has directed the Council to prepare for each financial year a statement of accounts in the form and on the basis set out in the Accounts Direction. The accounts are prepared on an accruals basis and must give a true and fair view of the state of affairs of the Natural Environment Research Council and of its comprehensive net expenditure, recognised gains and losses and cash flows for the financial year.

In preparing the accounts the Chief Executive as the Accounting Officer is required to comply with the requirements of the Government Financial Reporting Manual and in particular to:

- observe the Accounts Direction issued by the Department for Business, Innovation and Skills, including the relevant accounting and disclosure requirements, and apply suitable accounting policies on a consistent basis;
- make judgements and estimates on a reasonable basis;
- state whether applicable accounting standards as set out in the *Government Financial Reporting Manual* (www.hm-treasury.gov.uk/frem_index.htm) have been followed, and disclose and explain any material departures in the financial statements; and
- prepare the financial statements on the going concern basis.

The Department for Business, Innovation and Skills has appointed the Chief Executive as Accounting Officer of the Natural Environment Research Council. The responsibilities of an Accounting Officer, including responsibility for the propriety and regularity of the public finances for which the Accounting Officer is answerable, for keeping of proper records and for safeguarding the Natural Environment Research Council's assets, are set out in the Non-Departmental Public Bodies' Accounting Officers' Memorandum, issued by HM Treasury and published in "Managing Public Money" (The Stationery Office).

Statement of Internal Control

1. Scope of responsibility

As Accounting Officer, I have responsibility for maintaining a sound system of internal control that supports the achievement of the Natural Environment Research Council's policies, aims and objectives, whilst safeguarding the public funds and assets for which I am personally responsible, in accordance with the responsibilities assigned to me in Managing Public Money.

The powers, roles, responsibilities and membership of Council are defined in its Royal Charter. The nature of its relationship with its sponsor department, the Department for Business Innovation and Skills (BIS), is defined in the Management Statement and Financial Memorandum agreed with DIUS (a predecessor department of BIS) in 2005. These documents are available on the NERC website.

Council has established three bodies to support it in discharging its responsibilities:

i. the Audit Committee;
ii. the Science & Innovation Strategy Board (SISB); and
iii. the NERC Investment Committee (NIC).

The responsibilities of the Chief Executive, who is also the Accounting Officer of the Council, are set out in the Management Statement and Financial Memorandum. I may delegate the administration of these responsibilities to Council's employees but may not assign any of the responsibilities absolutely to any other person. I have established the NERC Executive Board (NEB) to support me in discharging these responsibilities.

2. The purpose of the system of internal control

The system of internal control is designed to manage risk to a reasonable level rather than to eliminate all risk of failure to achieve policies, aims and objectives; it can therefore only provide reasonable and not absolute assurance of effectiveness. The system of internal control is based on an ongoing process designed to identify and prioritise the risks to the achievement of NERC policies, aims and objectives, to evaluate the likelihood of those risks being realised and the impact should they be realised, and to manage them efficiently, effectively and economically. The system of internal control has been in place in NERC for the year ended 31 March 2011 and up to the date of approval of the annual report and accounts, and accords with Treasury guidance.

3. Capacity to handle risk

Overall responsibility for risk management in NERC lies with the Chief Executive, who as the NERC Accounting Officer signs this annual Statement on Internal Control as part of the audited Annual Accounts. Currently I delegate the task of implementing and maintaining the risk management policy and strategy to the Director Finance and Operations, who fulfils the role of Director Responsible for Risk. The Director Responsible for Risk's responsibilities include overseeing the activities of the Risk Management Network (see para 5) and reporting on risk management to NEB. NERC Directors have a responsibility to ensure the effective application of NERC's risk management strategy and policy. These arrangements ensure risk management is an integral part of NERC's management style and is tied to core activities reflected in the NERC Strategic Management Tool and BIS scorecard.

NEB is the owner of the NERC Risk Management Strategy and is responsible for reporting issues relating to risks and their management to Council, and for receiving assurance from NERC staff that risks are managed appropriately and passing this assurance to Council.

In executing these responsibilities the role of NEB can be characterised as follows:

Monitor:	i	overseeing the process
	ii	noting business critical risks
	iii	noting mitigation strategies
	iv	reviewing audit output
	v	carrying out an annual review of risk and the risk management systems in place;
Decide:	i	setting and communicating the NERC level risk appetite
Direct:	i	setting delegated authority levels
	ii	solving risk management dilemmas (when asked to do so.)

NEB will review specific, high risk, matters at each meeting together with issues relating to any risks that are referred upwards by Research Centre Directors and others via the agreed escalation procedures.

NEB encourages sound properly managed risk taking and recognises that effective risk management, rather than risk avoidance, is an essential ingredient for successful business operations.

NEB Directors appoint 'owners' for all risk threats as they emerge. These risk owners are most likely to be middle / senior managers within NERC Swindon Office and the Research Centres. Risk owners have responsibility for the practical day to day management of risks and are responsible for ensuring that appropriate management plans are prepared and that risk response actions are carried out effectively. Responsibility for managing key business risks is retained at a senior level.

Statement of Internal Control
continued

Risks are managed by trained and experienced people. All staff in NERC participate in an annual appraisal, where individual training needs and personal development requirements are identified and assessed. The Risk Management Network, supported by the Risk and Assurance Manager, will be responsible for identifying specific risk management training needs and making proposals to management at appropriate levels about how such training should be provided. The Network will periodically review the delivery and take-up of such training and include a commentary in the annual report to NEB.

The NERC Risk Management Network, which meets at least annually, promotes best practice across NERC by sharing lessons learnt and monitoring compliance with the NERC Risk Management Strategy and Policy.

4. The risk and control framework

The purpose of the NERC Risk Management Strategy is to describe at a high level how NERC will implement its Risk Management Policy, setting out the necessary organisation, roles and responsibilities, along with the framework and underlying principles of the control system.

NERC Directors have a responsibility to ensure the effective application of NERC's risk management strategy and policy. Directors must satisfy themselves that the following issues have been adequately addressed within their areas of responsibility:

- the requirements of corporate governance – these include developing more focused and open ways of managing risk and ensuring that all NEB decisions on managing risk are implemented.
- the need to identify appropriate 'risk owners' at a sufficiently senior level for all identified risks.
- the adequacy of reporting arrangements that ensure the timely escalation of major risk issues internally within their area of responsibility; and, where appropriate externally to NEB. And that these arrangements are in line with delegated authority levels and the provisions of Research Centre Management Statements (where these apply).
- the need to ensure a shared understanding of risk management principles, thereby ensuring a consistent approach to the treatment of risks at all levels.
- deciding the overall risk tolerance level, or 'risk appetite' for areas that they have a responsibility for (mindful of the NERC level risk appetite determined by NEB).

NERC has a web-based database to host the NERC risk register. The system is known as STAR (System for Targets and Risks).

STAR is the cornerstone of NERC risk management and provides a single system for recording Business Risks, Business Critical Projects and activities reflected in the NERC Strategic Management Tool and BIS scorecard. In addition to attaching scores to risks and identifying mitigation tactics, STAR also records information concerning quarterly progress against plan by way of a 'traffic light system'. Reports from STAR are considered by Council (NERC Top Risks), NEB (NERC Top Risks /NERC Strategic Management Tool and BIS scorecard activities progress report) and the NERC Audit Committee (NERC Top Risks / Business Critical Projects status report). STAR also provides the quarterly report to BIS that details progress towards completing activities that feature in the BIS scorecard.

Management and control of information risks

The security of information, and especially protected personal information, is of great importance to NERC. Loss, corruption or unavailability causes harm and distress to individuals, loss in public confidence, and loss of confidence by third parties in our ability to process their information securely. A NERC 'Information Assurance Group' (IAG) has been established which is chaired by the NERC Information Security Officer (ISO). The IAG meets quarterly, or as appropriate.

IAG employs a risk-based approach to protecting NERC's information assets, by overseeing the implementation of Cabinet Office policies and guidance, through:

- BIS Information Security Group guidance on implementing the Cabinet Office Security Policy Framework
- RCUK (ICG) Information Security Policy
- NERC Information Security Policies
- Appropriate guidelines and procedures will be adopted at the Research Centre level to support the identified policies

Research Councils' UK Assurance Unit

The Research Councils' UK Assurance Unit is hosted by the Biotechnology and Biological Sciences Research Council (BBSRC) and acts on behalf of the Research Councils to review the regularity of expenditure on Research Council grants at research organisations. The unit's programme typically involves around 15-20 visits per year to the most research intensive organisations, supplemented by 15 desk based reviews for less research intensive

Statement of Internal Control
continued

bodies. Assurance activities focus on the control environment and its effectiveness in ensuring compliance with the Research Councils' terms and conditions for grant funding. For 2010/11, due to unforeseen circumstances, the planned programme of visits could not wholly be undertaken, and only 11 visits were undertaken instead of the planned 19. This was due to the diversion of staff to other RCUK priority work and the loss of staff resource without short term replacement owing to Government constraints on recruitment.

Despite the shortfall in visits, and taking into account the generally positive nature of findings from the actual visits made, the programme has nevertheless provided me with a satisfactory level of assurance. Relevant considerations include the good level of inherited assurance available from work in previous years, the fact that the 5 year rolling plan of visits is derived from a risk and assurance map and also that, the percentage coverage for 2010-11 in monetary terms, was little short of previous years. A further strand of work scrutinises the costing methodology used in Research Organisations which, for universities, is the Transparent Approach to Costing (TRAC). The programme is an important element of the assurance framework for the NERC with an annual report produced for me, as the Accounting Officer, which details activities undertaken in the year as well as proposed activities for the following year. Taking this, together with our arrangements for the scrutiny of awards before payment, I am, therefore, confident that the necessary controls are in place to ensure the safeguarding of public money.

The Research Councils Shared Services Centre Project

The RCUK Shared Services Centre (SSC) implementation was a business critical project, ending on 31 March 2011 at a cost of £135.3m, which aimed to deliver a single organisation administrative support service for all UK Research Councils. This includes main administrative activities in Human Resources, Payroll, Finance and Procurement, IT, and Grants processing. Governance and risk management of the implementation project was provided by the RCUK SSC Project Board on behalf of the Research Councils and the project. An RCUK SSC Project Audit Committee, comprising representatives from each of the Research Councils' Audit Committees, operated to provide oversight on risk management and control of the project.

The SSC project governance and leadership structures have now been dismantled and the remaining issues fall to the Research Councils and the SSC Ltd to be resolved and managed. A number of developments and enhancements are required and these have been classified as Project Phase II or Business Improvement Requests (BIRs). These need to be carefully managed throughout to ensure that the necessary Value for Money is achieved and that there is not further uncontrolled project scope and cost creep. In the meantime, and in line with government directives, there is a need to develop a wider client base for the SSC Ltd in order to enhance the benefits derived from transactional processing. The concern I have is that the priorities for the SSC Ltd introduced by new clients may divert resources away from deriving further benefits and greater quality for the Research Councils at a critical time. This is an area that my successor will be taking a particular interest in over the forthcoming year through involvement in the RCUK Executive Group, comprising all the Chief Executives of the Research Councils.

SSC Human Resources, Payroll, Finance and Procurement and IT services all went live in 2009-10. However, during 2010-11 work was ongoing in further developing the security and controls framework now operating in the relationship between the Councils and the RCUK SSC Ltd, focussed on solving issues as they arise and putting monitoring and reporting mechanisms in place. There have been regular meetings between SSC staff and heads of function within the Councils to review service delivery, to address issues and to gain a common understanding of the problems through constructive dialogue. I am concerned, however, over the apparent inability to be able to extract accurate, reliable, and timely management information (including those related to accounting for fixed assets). As I am required to provide a retrospective assessment that takes account of the situation that prevailed during the greater proportion of the 2010-11 financial year, my judgement is that this concern should be disclosed in the NERC SIC.

The Research Councils' Internal Audit Service (RCIAS) carried out a number of System Controls Audits of end-to-end financial and HR processes shared by the SSC and the Research Councils. NERC, along with the other Research Councils, was involved with seven of these audits, all of which received 'limited assurance'. This audit opinion was based on the situation at a given point in time and much work has now been completed by both the SSC Ltd and the Research Councils to improve the processes and controls since the audits were completed. Despite recent improvements, there remains one significant area of concern identified by RCIAS that continues to represent a fundamental internal control weakness and, as such, is appropriate for disclosure in this statement. The area relates to Cash Management and Banking, and in particular the bank reconciliation process which is not

Statement of Internal Control
continued

currently operating to an acceptable level of internal control. Over the coming year, my successor will be pursuing resolution of this and the other issues identified here.

A comprehensive internal audit strategy relating to the RCUK SSC project and operations for 2011-12 and beyond has been developed.

Halley VI
The British Antarctic Survey is involved in a substantial project to replace the Halley Antarctic research station. The project is intrinsically risky, all the materials for the new base have to be shipped from the UK and assembled on site during the two months of Antarctic 'summer'. The project is tightly controlled employing PRINCE2 project methodology and a project assurance process styled on the OGC Gateway approach. Preparations are well advanced for the final build season (2011-12), and the dispute with the contractor has been resolved.

RRS *Discovery* Replacement Project
The Large Facilities Capital Fund (LFCF) is providing £48m, out of a total cost of £75m to replace RRS *Discovery*. Construction commenced in 2010, with the new vessel expected to be available for science programmes in 2014. The project is tightly controlled employing PRINCE2 project methodology and the OGC Gateway project assurance process.

NERC Integration Programme
The NERC integration programme has been set up to oversee the establishment of an integrated framework for NERC's six research centres and Swindon Office to work together, using common processes and a sustainable business model, to deliver the national capability needed by the whole community. The project will be tightly controlled employing PRINCE2 project methodology and the OGC Gateway project assurance process.

5. Review of effectiveness
As Accounting Officer until 30 June 2011, Professor Alan Thorpe had responsibility for reviewing the effectiveness of the system of internal control operating within NERC during 2010-11. His review of the effectiveness of the system of internal control is informed by:

- Director's Annual Statements on Internal Control (DASIC)
- the advice of the Audit Committee
- the advice of the Risk Management Network
- the work of the internal auditors
- comments made by the external auditors in their management letter and other reports
- feedback from other consultancy and review activities

The DASIC exercise provides the main evidence informing the nature of my own assurance on internal controls as these assurances come from senior managers responsible for the development and maintenance of the NERC internal controls framework.

The Audit Committee has a duty to monitor NERC's internal control systems. The Audit Committee receives reports directly, and through internal audit, and may refer any matter within its terms of reference to NEB or Council and make recommendations concerning actions to be taken.

A network of managers responsible for the practical implementation of the NERC Risk Management Strategy in each of NERC's business units has been established and is known as 'the Risk Management Network'. The Network also includes members with special relevant expertise, for example a representative from corporate Health and Safety and the NERC Security Adviser. The Network is chaired by the NERC Health and Safety Adviser on behalf of the Director Responsible for Risk and meets at least once a year, ad hoc meetings may be convened to discuss and prepare advice on issues of urgency. Whilst the Health and Safety Adviser is acting as Chair of the Network, responsibility for representing the NERC Health and Safety community is passed to a representative from Corporate Health and Safety, thereby preserving the independence of the Chair. A member of the NERC Audit Committee attends Network meetings as an observer.

As part of its governance responsibilities, NEB undertakes a review of top risks at each meeting and receives an annual risk management report from the Risk Management Network. This report sets out for NEB details of the more significant risk management activity undertaken in the preceding year. The report also considers the issues NERC will need to address in managing risk going forward.

To help discharge this responsibility, NEB has approved a Risk Management Policy and Risk Management Strategy; agreed to the creation of a Risk Management Network; and to the appointment of a Risk and Assurance Manager. The purpose of this post is to support the Director Responsible for Risk and the Chair of the Risk Management Network in carrying out their responsibilities; and to focus management attention to risk management and provide a central reference point for risk management issues within NERC.

I was appointed as interim Accounting Officer with effect from 1 July 2011 and I have

Statement of Internal Control
continued

been advised of my new responsibilities and accountabilities. I have also been advised on the implications of my predecessor's review of the effectiveness of the system of internal control by NEB, the Audit Committee and the Director Responsible for Risk. I have satisfied myself that plans to address weaknesses identified and measures to ensure continuous improvement of the system of internal control are in place. In particular, the successful implementation of the stabilisation plans for the SSC is critical to addressing the weaknesses identified and ensure that NERC can meet the clear line of sight timetable for closure of 2011-12 annual accounts.

6. Significant internal control problems

My review has identified the following significant internal control weaknesses affecting NERC that are discussed in section 4 of this statement:

- Inadequate management information provided by SSC Ltd managed systems (including those related to accounting for fixed assets) as identified by Directors and NERC senior managers;
- Cash and banking (reflecting the concerns expressed by RCIAS resulting from their SSC Ltd internal audit programme).

Dr Steven Wilson
Interim Chief Executive and Accounting Officer
21 November 2011

The Certificate and Report of the Comptroller and Auditor General to the Houses of Parliament

I certify that I have audited the financial statements of the Natural Environment Research Council for the year ended 31 March 2011 under the Science and Technology Act 1965. These comprise the Statement of Comprehensive Net Expenditure, the Statement of Financial Position, the Statement of Cash Flows, the Statement of Changes in Taxpayers' Equity and the related notes. These financial statements have been prepared under the accounting policies set out within them. I have also audited the information in the Remuneration Report that is described in that report as having been audited.

Respective responsibilities of the Council, Accounting Officer and auditor

As explained more fully in the Statement of Council's and Chief Executives Responsibilities, the Accounting Officer is responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view. My responsibility is to audit, certify and report on the financial statements in accordance with the Science and Technology Act 1965. I conducted my audit in accordance with International Standards on Auditing (UK and Ireland). Those standards require me and my staff to comply with the Auditing Practices Board's Ethical Standards for Auditors.

Scope of the Audit of the Financial Statements

An audit involves obtaining evidence about the amounts and disclosures in the financial statements sufficient to give reasonable assurance that the financial statements are free from material misstatement, whether caused by fraud or error. This includes an assessment of: whether the accounting policies are appropriate to the Natural Environment Research Council's circumstances and have been consistently applied and adequately disclosed; the reasonableness of significant accounting estimates made by the Natural Environment Research Council and the overall presentation of the financial statements. In addition I read all the financial and non-financial information in the Annual Report to identify material inconsistencies with the audited financial statements. If I become aware of any apparent material misstatements or inconsistencies I consider the implications for my certificate.

In addition, I am required to obtain evidence sufficient to give reasonable assurance that the expenditure and income reported in the financial statements have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them.

Opinion on Regularity

In my opinion, in all material respects the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them.

Opinion on financial statements

In my opinion:

- the financial statements give a true and fair view of the state of the Natural Environment Research Council's affairs as at 31 March 2011 and of its comprehensive net expenditure for the year then ended; and
- the financial statements have been properly prepared in accordance with the Science and Technology Act 1965 and Secretary of State directions issued thereunder.

Opinion on other matters

In my opinion:

- the part of the Remuneration Report to be audited has been properly prepared in accordance with Secretary of State's directions issued under the Science and Technology Act 1965; and
- the information given in the Management Commentary part of the Annual Report for the financial year for which the financial statements are prepared is consistent with the financial statements.

Matters on which I report by exception

I have nothing to report in respect of the following matters which I report to you if, in my opinion:

- adequate accounting records have not been kept; or
- the financial statements and the part of the Remuneration Report to be audited are not in agreement with the accounting records or returns; or
- I have not received all of the information and explanations I require for my audit; or
- the Statement on Internal Control does not reflect compliance with HM Treasury's guidance.

Report

I have no observations to make on these financial statements.

Amyas C E Morse
Comptroller and Auditor General
National Audit Office
157-197 Buckingham Palace Road
Victoria, London, SW1W 9SP
29 November 2011

Statement of comprehensive net expenditure for the year ended 31 March 2011

	Notes	2011 £000	2010 £000
EXPENDITURE			
Staff costs	5(b)	**114,304**	109,311
Staff early retirements	6	**1,514**	3,915
Grants and training	7	**158,350**	154,224
Other operating costs	8	**168,762**	168,919
Depreciation	10(a),10(c)	**23,895**	22,430
Amortisation	11	**548**	605
Loss on joint venture	10(d)	**786**	383
Impairment of property, plant and equipment	10(a),10(c),12	**-**	13,485
Total expenditure		**468,159**	473,272
INCOME	4	**(51,465)**	(60,601)
NET EXPENDITURE		**416,694**	412,671
Finance lease interest		**942**	1,036
Interest receivable	9	**(1)**	(2)
Net expenditure after interest		**417,635**	413,705
CEH restructuring	15	**46**	(1,421)
Unwinding of discount	15	**269**	498
Change in discount rate	15	**(137)**	190
Profit on disposal of fixed assets		**(1,060)**	(752)
Total net expenditure for the year		**416,753**	412,220
OTHER COMPREHENSIVE EXPENDITURE			
Net (gain)/loss on revaluation of property, plant and equipment		**(1,329)**	4,960
Net gain on revaluation of intangible assets		**(17)**	(266)
Net loss on revaluation of investment property		**-**	600
Net loss on revaluation of assets held for sale	12	**1,900**	190
TOTAL COMPREHENSIVE EXPENDITURE FOR THE YEAR ENDED 31 MARCH 2011		**417,307**	417,704

All activities are continuing.

The notes on page 69 to 94 form part of these accounts.

Statement of financial position as at 31 March 2011

	Notes	31 March 2011 £000	31 March 2011 £000	31 March 2010 £000	31 March 2010 £000
Non-current assets					
Property, plant and equipment	10(a)(b)	**355,433**		346,480	
Intangible assets	11	**174**		666	
Non-current receivables	13(b)	**167**		162	
Investment property	10(c)	**-**		-	
Investment in joint venture	10(d)	**12,019**		1,239	
TOTAL NON-CURRENT ASSETS			**367,793**		348,547
Current assets					
Assets classsified as held for sale	12	**224**		3,861	
Trade and other receivables	13(a)	**42,342**		41,529	
Cash and cash equivalents	16	**16,695**		12,761	
Total current assets			**59,261**		58,151
TOTAL ASSETS			**427,054**		406,698
Current liabilities					
Trade and other payables	14(a)	**(82,303)**		(70,483)	
Provisions	15	**(2,924)**		(3,319)	
Total current liabilities			**(85,227)**		(73,802)
Non-current assets plus current assets less current liabilities			**341,827**		332,896
Non-current liabilities					
Provisions	15	**(7,490)**		(8,951)	
Trade and other payables	14(b)	**(10,299)**		(11,712)	
Total non-current liabilities			**(17,789)**		(20,663)
Assets less liabilities			**324,038**		312,233
Taxpayers' Equity					
Government grant reserve			**2,186**		2,540
Revaluation reserve			**84,502**		94,488
Income and expenditure reserve			**237,175**		215,003
Donated asset reserve			**175**		202
TOTAL GOVERNMENT FUNDS			**324,038**		312,233

The notes on page 69 to 94 form part of these accounts.

Dr Steven Wilson
Interim Chief Executive and Accounting Officer
21 November 2011

Statement of cash flows for the year ended 31 March 2011

	Notes	2011 £000	2011 £000	2010 £000	2010 £000
CASH FLOWS FROM OPERATING ACTIVITIES					
Net expenditure after interest		**(417,635)**		(413,705)	
Depreciation charge		**23,895**		22,430	
Amortisation charge		**548**		605	
Release from government grant and donated asset reserves		**(473)**		(495)	
Loss on joint venture		**786**		383	
Impairment charged to net expenditure account		**-**		13,485	
Decrease in provisions		**(2,035)**		(6,273)	
(Increase) / decrease in trade and other receivables		**(818)**		6,919	
Increase / (decrease) in trade and other payables		**11,700**		(3,690)	
Net cash outflow from operating activities			**(384,032)**		(380,341)
CASH FLOWS FROM INVESTING ACTIVITIES					
Payments to acquire property, plant and equipment		**(43,916)**		(40,695)	
Payments to acquire intangible assets		**(39)**		(201)	
Payments to acquire financial assets		**(11,566)**		-	
Receipts from disposal of property, plant and equipment, intangible assets and investments		**15,194**		1,688	
Net cash outflow from investing activities			**(40,327)**		(39,208)
CASH FLOWS FROM FINANCING ACTIVITIES					
Grant-in-aid received	3	**417,000**		408,000	
Funding received from other bodies	3	**12,585**		10,907	
Capital element of finance lease payments		**(1,292)**		(1,199)	
Net cash inflow from financing activities			**428,293**		417,708
Net increase / (decrease) in cash and cash equivalents in the period			**3,934**		(1,841)
Cash and cash equivalents at the beginning of the period			**12,761**		14,602
CASH AND CASH EQUIVALENTS AT THE END OF THE PERIOD			**16,695**		12,761

The notes on page 69 to 94 form part of these accounts.

Statement of changes in taxpayers' equity for the year ended 31 March 2011

	Notes	Government grant reserve [i] £000	Accumulated income & expenditure reserve £000	Revaluation reserve £000	Donated asset reserves [ii] £000	Total government funds £000
Balance at 31 March 2009		2,824	201,939	106,492	270	311,525
CHANGES IN TAXPAYERS' EQUITY FOR 2009-10						
Grant-in-aid received	3	-	408,000	-	-	408,000
Funding received from other bodies	3	-	10,907	-	-	10,907
Revaluation in year		-	-	(5,484)	-	(5,484)
Net expenditure for the year		-	(412,220)	-	-	(412,220)
Transfer between reserves		143	6,377	(6,520)	-	-
Release to net expenditure		(427)	-	-	(68)	(495)
Balance at 31 March 2010		**2,540**	**215,003**	**94,488**	**202**	**312,233**
CHANGES IN TAXPAYERS' EQUITY FOR 2010-11						
Grant-in-aid received	3	-	417,000	-	-	417,000
Funding received from other bodies	3	-	12,585	-	-	12,585
Revaluation in year		68	-	(628)	6	(554)
Change of reserve usage		13	(13)	(5)	5	-
Net expenditure for the year		-	(416,753)	-	-	(416,753)
Transfer between reserves		-	9,353	(9,353)	-	-
Release to net expenditure		(435)	-	-	(38)	(473)
Balance at 31 March 2011		**2,186**	**237,175**	**84,502**	**175**	**324,038**

Notes:

(i) The government grant reserve relates to assets transferred from Southampton University to NOCS. The reserve is released to the net expenditure account over the asset lives to match depreciation.

(ii) The donated asset reserve relates to assets which were donated in 2005-06 and were valued at current value on receipt and included in Note 10.

The notes on page 69 to 94 form part of these accounts.

Notes to the accounts

1. Statement of accounting policies

a. Basis of accounting

(i) The accounts have been prepared under the historical cost convention, modified to include revaluation of property, plant and equipment, intangible assets and inventories in accordance with the Financial Reporting Manual (FReM). The accounting policies contained in the FReM apply International Financial Reporting Standards (IFRS) as adapted or interpreted for the public sector context. The accounts, which give a true and fair view, have been prepared in accordance with The Science and Technology Act 1965 and with directions made by the Secretary of State.

(ii) The accounts meet the accounting and disclosure requirements of the Companies Act 1985 and accounting standards issued or adopted by the Accounting Standards Board in as far as these requirements are appropriate in accordance with the FReM.

(iii) The accounts of all NERC owned establishments have been incorporated into these accounts.

(iv) These financial statements are presented in sterling, NERC's functional currency, and all amounts have been rounded to the nearest thousand.

Adoption of standards and changes in policy

All International Reporting Standards, Interpretations and Amendments to published standards, effective at 31 March 2011, have been adopted in these financial statements, taking into account the specific interpretations and adaptations included in the FReM.

IAS7 Statement of cash flows (effective for periods beginning on or after 1 January 2010) – This requires that only expenditure which results in a recognised asset in the statement of financial position can be classified within investing activities. NERC is compliant with IAS 7 in that the only recognised investing activities are the purchase of property, plant and equipment and intangible assets within the statement of financial position.

An additional amendment to the FReM, effective from 1 April 2010, has been made in respect of IAS 36 Impairment of Assets. This requires impairments of property, plant and equipment that arise from a clear consumption of economic benefits to be taken direct to the statement of comprehensive net expenditure.

A change in accounting policy has occurred regarding the cost of capital. This is explained in note 1(q).

Effective for future financial years

The IASB and IFRIC issued certain standards and interpretations with an effective date after these financial statements. Where these changes are relevant to NERC's circumstances they are listed below and will be adopted at the effective date. They have not been adopted early and their adoption is not expected to have a material impact on NERC's reported income or net assets in the period of adoption.

IAS 24 Related Party Transactions (effective for periods beginning on or after 1 January 2011) – This amendment provides exemption for full disclosure of transactions with state-controlled entities and does not impact the current exemption allowed within the FReM. IAS 24 also clarifies the definition of a related party.

IFRS 7 Financial Instruments: Disclosures (effective for period beginning on or after 1 July 2011) – Detailed disclosures are required for financial assets transferred to another entity but not derecognised in their entirety and financial assets derecognised in their entirety but in which the reporting entity has an involvement. NERC does not expect there to be any transactions requiring disclosure but will assess further as appropriate for the 2012-13 financial statements.

IFRS 9 Financial Instruments: Classification and Measurement (effective from periods beginning on or after 1 January 2013) – IFRS 9 is a replacement for IAS 39 and introduced new requirements for the classification and measurement of financial assets, together with the elimination of two categories. Further proposals were introduced in October 2010 in respect of the derecognition of the financial assets and liabilities. IFRS 9 is due to be expanded further in June 2011 with regard to the impairment of financial assets measured at amortised costs. NERC will undertake an assessment of the impact of IFRS 9 once the full requirements are known.

b. Going Concern

These accounts have been prepared on the basis of a Going Concern. Any deficit shown on the income and expenditure reserve will be extinguished over time, having regard to the resource and capital budgets to which NERC can be expected to have access.

c. Property, plant and equipment and depreciation

Property, plant and equipment

Expenditure on property, plant and equipment includes the purchase of land and buildings, construction and services projects, and equipment valued at £5,000 or above.

Property, plant and equipment are stated at the lower of depreciated historical cost or valuation. Costs of acquisition, comprising only those costs that are directly attributable to bringing the asset into working condition for its intended use, are capitalised. Land, buildings, ice stations in Antarctica, ships and aircraft are independently and professionally revalued every five years. These assets are subject to annual indexation when a full revaluation is not completed.

All UK land and buildings were valued by Powis Hughes & Associates in 2009-10 in accordance with the Statements of Asset Valuation Practice and Guidance prepared by The Royal Institution of Chartered Surveyors. The basis of valuation was open market value for either existing or alternative use where this could be established or depreciated replacement cost in the case of specialised scientific buildings. The Antarctic Buildings that had a nil net book value were revalued by Ms Jill Thompson, member of The Royal Institution of Chartered Surveyors in 2006-07.

The four research ships, RRS *Discovery*, RRS *James Clark Ross*, RRS *Ernest Shackleton* and RRS *James Cook*, were revalued in 2008-09 by E.A. Gibson Shipbrokers Ltd. All aircraft were also revalued in 2008-09 by the International Bureau of Aviation Group Limited.

Two large value assets transferred from Southampton University in 2006-07 were valued by Hydroid Europe in 2007-08. All other plant and equipment and motor vehicles are revalued using relevant indices.

Any surplus or deficit on revaluation is taken to a revaluation reserve, except that any permanent diminution in value is charged to the statement of comprehensive net expenditure in the year in which it is recognised.

Increased depreciation charges arising from the revaluation are matched by annual transfers from the revaluation reserve to the income and expenditure reserve. On the disposal of a revalued asset, that element of the revaluation reserve which becomes realised as a result is transferred directly to the income and expenditure reserve.

Freehold land is not depreciated. All other tangible fixed assets are depreciated in order to write off the value of the asset less its estimated residual value over their estimated useful economic lives using modified reducing balance depreciation methodology. These lie within the following ranges:

Leasehold land	-	over the terms of the lease
Freehold buildings	-	up to 50 years or valuer's estimates of economic life
Long leasehold buildings	-	up to 50 years (or the length of the lease if less)
Short leasehold buildings	-	over the length of the lease
Antarctic ice stations	-	up to 35 years or valuer's estimates of remaining useful life
Plant and machinery	-	10 to 15 years
Ships and aircraft	-	minimum of 20 years for ships, 15 years for aircraft
Scientific, office and major computing equipment	-	5 to 10 years
Motor vehicles	-	3 to 7 years
Assets under construction	-	not depreciated until brought into use

Property, plant and equipment are depreciated from date when they are available for use. The residual values of assets are reviewed on an annual basis.

Notes to the accounts
continued

Component accounting
Property, plant and equipment may have parts with different useful lives. In accordance with the provisions of IAS 16 each part of an item of property, plant and equipment with a cost that is significant in relation to the total cost of the item is depreciated separately.

Donated assets
Assets which are gifted by third parties are classified as donated assets. These are shown at the lower of current value on receipt or the value of the service provided where the asset is overspecified for its intended use. Donated assets are revalued, depreciated and subject to impairment reviews in the same way as other assets. The amount capitalised is credited to the donated asset reserve. Each year, an amount equal to the depreciation charge on the asset and any impairment will be released from the donated asset reserve to the statement of comprehensive net expenditure.

Investments
NERC has acquired shareholdings in two unlisted undertakings: IXO Therapeutics Ltd, in which NERC holds a controlling interest of 67.8%, and IGS Ltd, in which NERC holds a controlling interest of 66.7%. Although controlling interests would normally require consolidation into the NERC financial statements in accordance with IAS 27, NERC has not consolidated these investments as immaterial to NERC and holds the small investments at fair value in accordance with IAS 39.

Investments in joint ventures
Investments in joint ventures are accounted for using the equity method in accordance with IAS 31 and are carried at cost less any provision for impairment. The profit or loss for the year is credited or charged to the statement of comprehensive net expenditure in the year that it arises.

NERC holds a 20.5% shareholding in the joint venture company RCUK Shared Services Centre Ltd. Under the terms of the joint venture control is shared jointly with the 6 other Research Councils.

d. Intangible assets
Intangible assets comprise purchased or developed computer software and websites and are stated at the lower of historical cost less accumulated amortisation or valuation. Intangibles are given definite useful lives and are amortised over a period not exceeding ten years on a straight line basis over the useful life of the asset from the date of use based on nil residual value.

e. Investment property
In accordance with IAS 40, any property (land or building) held by the Council mainly to earn rental income and/or for capital appreciation is recognised as an investment property in the statement of financial position. Investment properties are measured at fair values which reflect market conditions existing at the balance sheet date.

f. Impairment
The carrying amounts of the Council's property, plant and equipment, intangible assets and financial assets are reviewed at each statement of financial position date to determine whether there is any indication of impairment: property, plant and equipment, intangible assets and financial assets are considered to be impaired if objective evidence indicates that one or more events have had a negative effect on the estimated future cash flows of the assets. If any such indication exists, the assets' recoverable amounts are estimated.

An impairment loss is recognised whenever the carrying amount of an asset or its cash-generating unit exceeds its recoverable amount. To the extent the asset has not previously been revalued, impairment losses are recognised in the statement of comprehensive net expenditure.

g. Assets held for sale
Where a non-current asset, whose value will be recovered principally through sale rather than through continuing use, is available for its immediate sale in its present condition and its sale is highly probable, it is classified as 'held for sale' and presented separately on the face of the statement of financial position. A sale is highly probable where: there is evidence of management commitment; there is an active programme to locate a buyer and complete the plan; the asset is actively marketed for sale at a reasonable price; and the sale will normally be completed within 12 months from the date of classification.

Assets held for sale are stated at the lower of net book value (carrying amount) and fair value less

costs to sell. These assets are not depreciated. Depreciation ceases at the date an item of property, plant and equipment is classified as an asset held for sale.

h. Employee benefits

Under IAS 19 'Employee Benefits' an entity is required to recognised short term employee benefits when an employee has rendered service in exchange for those benefits. Included in the financial statements is an accrual for the outstanding employee holiday entitlement at 31 March 2011 on an undiscounted basis.

i. Ownership of equipment purchased with NERC research grants

Equipment purchased by an Institution with research grant funds supplied by the NERC, belong to the Institution and are not included in NERC's property, plant and equipment. Through the Conditions of Grant applied to funded Institutions, NERC reserves the right to determine the disposal of such equipment and how any disposal proceeds are to be utilised.

j. Government grants receivable and other income

Grant-in-aid for revenue and general capital purposes is credited to the income and expenditure reserve. Grant-in-aid for the purchase of specific assets is credited to the government grant reserve and released to the statement of comprehensive net expenditure over the useful life of the asset in amounts equal to the annual depreciation charge.
Other operating income is shown net of trade discounts, value added tax and other taxes. Contributions from other government bodies and contributions and grants from other bodies are treated as financing and credited to the general reserve in the same way as grant-in-aid.

k. Research and development

As an organisation wholly engaged in research, NERC does not classify research and development expenditure separately in the accounts. It is reported under operating costs in the statement of comprehensive net expenditure.

Intellectual property rights arising from the Council's research and development have not been included in these accounts as their market value cannot be readily estimated. The anticipated annual income generated from such rights is not material in value and is credited to the statement of comprehensive net expenditure on receipt.

l. Research and training grants

The majority of research grants and fellowships are paid by the Council on an instalment basis in arrears in accordance with an agreed payment profile. The majority of studentship payments are paid on a quarterly instalment basis in advance directly to the research institute.

Payments made in advance or in arrears are accounted for on an accruals basis in the financial statements. Future commitments at the balance sheet date are disclosed in Note 17 of the financial statements.

m. Insurance

In line with government policy, NERC carries its own risks in respect of employment of staff, buildings, equipment, stocks, etc, except where there exists a statutory requirement to insure or where commercial insurance represents better value for money.

n. Foreign currencies

Foreign currency balances representing cash or amounts to be received or paid in cash ('monetary items') are expressed in pound sterling at the rate(s) of exchange ruling at the statement of financial position date. Non monetary items that are measured at fair value in a foreign currency are translated using the spot exchange rate at the date the value is determined. Non monetary items that are measured at historical cost are translated using the spot exchange rate at the time of the transaction. Transactions in foreign currencies are recorded at the rate ruling at the time of the transaction. All exchange differences are taken to the statement of comprehensive net expenditure.

o. Value Added Tax

As NERC is partially exempt for VAT purposes, irrecoverable VAT is charged to the relevant expenditure category or included in the capitalised purchase cost of property, plant and equipment. Where output tax is charged or input tax is recoverable the amounts are stated net of VAT. NERC has charitable status for VAT purposes.

Notes to the accounts
continued

p. Pension and early retirement costs
Payments are made to the Research Councils' Pension Scheme in respect of superannuation benefits for Council staff. The costs of early retirements are charged to NERC's accounts in the year in which the binding decision is taken to release staff and liabilities recognised.

Payments by the Council of early retirement lump sums are recoverable from the Research Councils' Pension Scheme when recipients achieve normal retirement age. Recoverable amounts are recognised as receivables in these accounts and offset against annual staff restructuring costs.

q. Removal of notional cost of capital charge
As part of HM Treasury's Clear Line of Sight project, the cost of capital charge will no longer need to be reported in an entity's annual report and accounts. In response to this NERC will no longer be showing a notional costs note. It will also no longer be showing these costs on the face of its statement of comprehensive net expenditure. This is to make reporting simpler and easier to understand. For the financial years 2009-10 and 2010-11 this adjustment has no effect on the statement of comprehensive net expenditure as it was charged and reversed, and therefore the net expenditure for the year transferred to the general reserve is unaffected.

r. Cash and cash equivalents
Cash and cash equivalents comprise cash balances and deposits which are repayable on demand.

s. Derivatives and other financial instruments
Due to the non-trading nature of its activities and the way in which NERC is financed, NERC is not exposed to the degree of financial risk faced by non-public sector entities. Moreover, financial instruments play a much more limited role in creating or changing risk that would be typical of the listed companies to which IAS 32, 39 and IFRS7 mainly apply. NERC has very limited powers to borrow or invest surplus funds and financial assets and liabilities are generated by day to day operational activities and are not held to change the risks facing NERC in undertaking its activities.

Foreign currency risk
The Council's exposure to foreign currency risk is not currently significant. Foreign currency risk specific to the European Space Agency contract has been managed with its sponsor department, the Department for Business, Innovation and Skills, resulting in three forward purchase contracts during the year.

Trade receivables
Trade receivables are not interest bearing and are carried at original invoice amount less allowance for impairment. Provision for impairment is established when there is objective evidence that the Council will not be able to collect all amounts due according to the original terms of the receivable. The amount of provision is the difference between the carrying amount and recoverable amount and is recognised in the statement of comprehensive net expenditure.

Trade and other payables
Trade and other payables are recognised in the period in which related money, goods or services are received or when a legally enforceable claim against NERC is established or when the corresponding assets or expenses are recognised.

t. Provisions
Provisions are recognised when it is probable that NERC will be required to settle a present obligation and a reliable estimate can be made of that obligation. The obligation is normally the amount that NERC would rationally pay to settle the obligation at the statement of financial position date or to transfer it to a third party at that time.

This may require estimating the future cash flows in current-year prices (i.e. at the price level prevailing in the year covered by the accounts) and, where the time value of money is material, discounting them at the standard public sector real rate set by HM Treasury- currently 2.9% for pension provisions and 2.2% for all other provisions.

u. Decommissioning costs
Decommissioning costs are recognised as soon as the obligation exists. For Antarctic stations and other assets in the course of construction the percentage completion method will be used to determine the current obligation.

A specific provision is established to cover the current value of the expected future costs of decommissioning the asset.

v. Finance lease

NERC has the use of a ship for which substantially all risks and rewards of the asset are transferred to the Council. The asset is capitalised and is subject to the same revaluation policy as other property, plant and equipment and is depreciated over the shorter of its estimated useful economic life or the lease period, with the outstanding lease obligations (net of interest) shown in payables. Finance charges are charged to the statement of comprehensive net expenditure over the period of the agreement in accordance with the interest rate within the contract.

w. Operating leases

Operating lease rentals are charged to the statement of comprehensive net expenditure on a straight line basis over the period of the lease.

x. Key judgements and decisions

In accordance with the requirements of the Government Financial Reporting Manual the key judgements and estimates included in the accounts are on a reasonable basis. Specific policies for judgemental areas such as decommissioning costs and provisions are shown above.

2. Analysis of net expenditure by business units

NERC's primary operating segments are business units, which correspond with the way NERC is organised and managed.

NERC's assets and liabilities are shared across all business units and consequently it is not necessary to separately identify which segment they relate to to permit disclosure of this information.

	British Antarctic Survey £000	British Geological Survey £000	Centre for Ecology and Hydrology £000	National Oceanography Centre [i], [ii] £000	Science and Innovation £000	Responsive Mode £000	Other [iii] £000	Total £000
Expenditure								
Staff costs	21,539	31,884	20,945	25,735	488	92	13,621	114,304
Staff early retirements	47	-	-	53	-	-	1,414	1,514
Grants and training	183	370	667	521	67,136	89,450	23	158,350
Other operating costs	24,717	13,225	13,023	19,562	73,884	783	23,568	168,762
Depreciation	-	-	-	-	-	-	23,895	23,895
Amortisation	-	-	-	-	-	-	548	548
Loss in joint ventures	-	-	-	-	-	-	786	786
Internal transfers [iv]	(4,993)	(1,398)	(3,261)	(7,703)	10,095	13,225	(5,965)	-
Total expenditure	**41,493**	**44,081**	**31,374**	**38,168**	**151,603**	**103,550**	**57,890**	**468,159**
Income [v]	(3,935)	(20,195)	(11,393)	(10,506)	(11,415)	(1,353)	7,332	(51,465)
NET OPERATING COSTS	**37,558**	**23,886**	**19,981**	**27,662**	**140,188**	**102,197**	**65,222**	**416,694**

Notes

(i) Staff costs include charges by Capita Business Services Ltd in respect of staff transferred under TUPE Regulations from the University of Southampton to the National Oceanography Centre.

(ii) At the 1 April 2010, the National Oceanography Centre in Southampton and the Proudman Oceanographic Laboratory merged into a new Business Unit, the Nationl Oceanography Centre.

(iii) Other includes an adjustment of £12,585k (2009-10: £10,907k) for income where there was no exchange transaction, which has been treated as financing (see Note 3). In line with previous years this has been shown under Other, rather than being deducted from the individual business units the income related to.

(iv) Internal transfers result from sharing of resources, internal trading and internal awards between business units. The overall net impact on the organisation is zero

(v) Business units receive external funding for research from the UK public sector, European Commission and private sector. In addition they receive other operating income, such as software and datasales and royalties and license fees from intellectual property.

Notes to the accounts
continued

Analysis of net expenditure by business units for 2009-10

	British Antarctic Survey £000	British Geological Survey £000	Centre for Ecology and Hydrology £000	National Oceanography Centre £000	Science and Innovation £000	Responsive Mode £000	Other £000	Total £000
Expenditure								
Staff costs	22,907	32,584	20,253	21,645	1,537	318	10,067	109,311
Staff early retirements	-	3	-	9	-	-	3,903	3,915
Grants and training	196	552	868	172	68,172	84,180	84	154,224
Other operating costs	24,565	15,153	11,660	22,122	79,134	197	16,088	168,919
Depreciation	-	-	-	-	-	-	22,430	22,430
Amortisation	-	-	-	-	-	-	605	605
Loss in joint ventures	-	-	-	-	-	-	383	383
Impairment of property, plant and equipment	-	-	-	-	-	-	13,485	13,485
Internal transfers	(2,452)	(2,352)	(3,061)	(5,697)	8,846	7,682	(2,966)	-
Total expenditure	**45,216**	**45,940**	**29,720**	**38,251**	**157,689**	**92,377**	**64,079**	**473,272**
Income	(4,073)	(24,667)	(10,479)	(9,624)	(11,013)	(547)	(198)	(60,601)
NET OPERATING COSTS	**41,143**	**21,273**	**19,241**	**28,627**	**146,676**	**91,830**	**63,881**	**412,671**

3. Grant-in-aid and income from other bodies

Under the FReM, NDPBs regard grants and grant-in-aid received for revenue purposes as contributions from controlling parties giving rise to a financial interest in the body. As a result, grant-in-aid received for revenue purposes is credited to the income and expenditure reserve rather than being recognised as income in the statement of comprehensive net expenditure. Grant-in-aid for capital purposes is only credited to the government grant reserve if it is for the purchase of a specific asset with all other capital grant-in-aid credited to the income and expenditure reserve. Where other income is received and there is no exchange transaction, this is also treated as financing and credited to the income and expenditure reserve.

The table below shows a summary of the grant-in-aid and income from other bodies that are treated as financing inflow and have been transferred to the income and expenditure reserve during 2010-11:

		2011		2010
	£000	£000	£000	£000
Grant-in-aid received		**417,000**		408,000
Funding received from other bodies				
Government Departments	4,803		5,256	
Other Research Councils	5,854		4,623	
Other Public Sector	1,928		1,028	
		12,585		10,907
		429,585		418,907

4. Income

	2011 £000	2010 £000
a. Income from government departments		
Department for Environment Food and Rural Affairs	4,741	5,300
Department for Business, Innovation and Skills	638	597
Ministry of Defence	313	190
Department for International Development	352	18
Environment Agency	1,133	1,056
Department of Enterprise, Trade and Investment Northern Ireland	1,499	2,847
Foreign and Commonwealth Office	587	948
Department for Communities and Local Government	258	269
Total income from government departments	9,521	11,225
b. Income from other bodies		
European Community [(i)]	6,321	4,481
Other Research Councils	2,173	567
Other Public Sector	5,978	5,364
Private Sector	12,753	17,449
Total income from other bodies	27,225	27,861
c. Other operating income [(ii)]		
Software and data sales	290	166
Scientific publications	316	388
Property and equipment rentals	1,205	1,885
Lecture fees, seminars and training courses	46	85
Royalties and licence fees from intellectual property	2,541	1,933
Other income [(iii)]	9,848	16,563
Total other operating income	14,246	21,020
d. Release of government grant reserve	**473**	495
TOTAL INCOME	**51,465**	60,601

Notes:
(i) Income from the European Community consists of cash receipts of £4,350,116 and accruals of £1,971,180.
(ii) The 2009-10 comparators for this category have been restated due to the changes in NERC's chart of accounts following migration to SSC.
(iii) This includes £1,159,844 of non-grant related income from Research Council and Collaborative bodies (2009-10 £2,475,048) and £1,942,132 (2009/10: £1,986,583) of monies from the University of Southampton paid to the National Oceanography concerning their joint occupation of the Waterfront Campus.

Notes to the accounts
continued

5. Salaries and wages

a. Staff numbers

The average number FTE's (Full Time Equivalent) staff employed during the year was:

	2011 No.	2010 No.
Permanent staff	2,441	2,375
Temporary and contract staff	65	65
Staff on inward secondment/loan	3	2
Agency staff	12	12
	2,521	**2,454**

The total number of staff reported in the Annual Report is based on head count as at the 31 March 2011, whereas the above figures are average FTEs for the year.

Staff numbers above include 168 staff (2009-10: 26) transferred under TUPE Regulations from the University of Southampton to the National Oceanography Centre for which the payroll is administered by Capita Business Services Ltd.

b. Staff costs

	2011 £000	2010 £000
Salaries and wages	**86,754**	83,663
Social Security costs	**6,884**	6,585
Other pension costs (note 5d)	**20,666**	19,063
	114,304	109,311

Salary paid by Capita Business Services Ltd in respect of staff transferred under TUPE Regulations from the University of Southampton to the National Oceanography Centre of £6,591,137 (2009-10: £963,470), have been included in the figures above.

Temporary staff costs total £550,549 (2009-10: £1,618,420) and are also included in the figures above.

Agency costs of £512,080 (2009-10: £1,739,346) and charges by SSC Ltd in respect of staff transferred under TUPE Regulations and seconded back to NERC of £388,521 (2009-10: £1,408,325) have been included in operating costs.

The total amount capitalised for staff costs in 2010-11 is £620,745 (2009-10: £258,374). This relates to an estimated 16.4 full time equivalents for those staff employed by NERC that are adding value to assets such as those engaged in project managing or building of assets.

c. Remuneration to Council and Committee members/Peer Review College

The following are included in staff costs, Note 5(b); other operating costs, Note 8 and staff costs, Note 5(d) pensions.

	2011 £000	2010 £000
Council Members' fees	102	96
Committee Members/Peer Review	348	346
Other emoluments	80	116
	530	**558**

Committee members may receive £170 per day (2009-10: £170).

Committee Chairs may receive £230 per day (2009-10: £230).

British Geological Survey Programme Board members receive £3,430 per annum (2009-10: £3,430).

British Geological Survey Programme Board Chair receives £4,575 per annum (2009-10: £4,575).

Chairs of Boards of Council receive £9,110 per annum (2009-10: £9,110).

The Chair of the Living with Environmental Change Programme Board receives £5,130 per annum (2009-10: £5,130).

All emoluments are non-pensionable.

Council Members are normally employed on fixed term contracts not exceeding 4 years.

Peer Review College members receive honoraria of £1,000 per annum (2009-10: £1,000). The Peer Review College Associate members receive honoraria of £500 per annum (2009-10: £500).

Peer Review College Members and Associate Members are initially employed for 1 year commencing 1 June.

Number of Council, Committee and Board Members as at 31 March

	2011 No.	2010 No.
Council Members*	**16**	16
Committee/Peer Review College and Board Members	**445**	441
	461	457

* includes Chief Executive and Chairman

Council* / Committee and Peer Review College Members' emoluments fell into the following bands:

	2011 No.	2010 No.
to £5,000	**443**	442
£5,001 to £10,000	**13**	12
£10,001 to £15,000	**-**	1
£15,001 to £20,000	**1**	1
	457	456

** Neither the Chief Executive nor the members of Council who are also Civil Servants receive any remuneration for their work on NERC Council and are therefore excluded from this table. The Chief Executive's emoluments are disclosed separately in the remuneration report.*

d. Superannuation
Pension scheme payments

	2011 £000	2010 £000
Payments in respect of the Research Councils' Pension Scheme (RCPS)	**20,462**	15,881
Payments to pension schemes other than the RCPS:		
Merchant Navy Officers' Pension Fund	**40**	2,859
Merchant Navy Officers' Pension Plan	**-**	2
Merchant Navy Ratings' Pension Fund	**14**	198
Merchant Navy Ratings' Pension Plan	**3**	5
Partnership Pensions	**147**	118
	20,666	19,063

Notes to the accounts
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Most employees of NERC are members of the Research Councils' Pension Scheme (RCPS) which is a defined benefit scheme but is accounted for as a defined contribution scheme funded from annual grant-in-aid on a pay-as-you-go basis as the Council is unable to identify its share of the underlying assets and liabilities. The pension scheme is analogous to the Principal Civil Service Pension Scheme, except that while the scheme provides retirement and related benefits based on final emoluments, redundancy and injury benefits are funded by the Council. The pension scheme is administered by the Research Councils' Joint Superannuation Services, and the finances administered by the Biotechnology and Biological Sciences Research Council (BBSRC). The scheme is a multi-employer scheme, for which a separate Research Councils' Pension Scheme Account is published.

From 1 April 1994 the Council has paid employer's contributions to the Research Councils' Pension Scheme, at a percentage of scheme members' pensionable pay as assessed by the Government Actuary's Department on a periodical basis. The actuarial valuation was carried out as at 31 March 2010 by a qualified independent actuary but the final results of this are currently unknown. The draft report is available and the employer's contribution rate has increased from 21.3% to 25.6%, effective from 1 April 2010. The employers' contribution rate of 25.6% therefore applies to these accounts. Details are available in the accounts of the RCPS, which can be found at www.bbsrc.ac.uk. NERC paid costs in the year of £20,462,217 (2009-10: £15,881,440).

With effect from 30 July 2007, in line with arrangements throughout the civil service, a new career average RCPS pension arrangement called NUVOS was introduced with a 2.3% accrual rate. All new employees with effect from this date were given the option of joining the NUVOS scheme or alternatively a Partnership Pension Account. This is a stakeholder-type defined contributions scheme where the employer pays a basic contribution of between 3% and 12.5% (depending on the age of the member) into a stakeholder pension product. The employee does not have to contribute but where they do make contributions, these will be matched by the employer up to a limit of 3% (in addition to the employer's basic contribution). NERC also contributes a further 0.8% of pensionable salary to cover the cost of risk benefit cover (death in service and ill health retirement).

The Council also paid contributions during the year to a number of other multi-employer pension schemes for specific groups of employees, details of these schemes are shown below:-

Scheme	Rate of contribution	Year of last valuation
Merchant Navy Officers' Pension Fund^	11.9%	2009
Merchant Navy Officers' Pension Plan	5.1%	n/a
Merchant Navy Ratings' Pension Fund*	2.0%	2008
Merchant Navy Ratings' Pension Plan	5.1%	n/a

^ The Merchant Navy Officers' Pension Fund (New Section) was subject to an actuarial valuation as at 31 March 2009 and showed a deficit overall. In 2009-10 NERC made a one off payment of £2,817,513 in full settlement of our share of the deficit. The NERC element of the scheme is now fully funded and no liability in respect of the 31 March 2009 valuation is outstanding at 31 March 2011.

* The Merchant Navy Ratings' Pension Fund closed on 31 May 2001. A new actuarial valuation was undertaken at 31 March 2008.

NERC held a provision for our share of the deficit amounting to £2,449,582 in 2008-09 and made a one off payment in 2009-10 in full settlement of £2,724,138. The NERC element of the scheme is now fully funded and no current liabilities exist at 31 March 2011.

On closure of the fund members transferred to the RCPS or the new Merchant Navy Ratings' Pension plan which is a money purchase scheme.

6. Staff restructuring / early retirements [(i)]

Resource costs packages agreed	2011 £000	2010 £000
Annual compensation payments	**141**	88
Redundancy compensation payments	**626**	1,420
Early retirement lump sums	**497**	1,135
Compensation in lieu of notice	**-**	130
Resource costs packages agreed [(ii)]	**1,264**	2,773
Increase early retirement liability	**250**	1,142
TOTAL COSTS	**1,514**	**3,915**

Exit package cost band	Band	Number of compulsary redundancies	Number of other departures	Total number of exit packages by cost band
<£10k	1	25	4	29
£10k-£25k	2	2	3	5
£25k-50k	3	7	4	11
£50k-£100k	4	12	2	14
£100k-£150k	5	3	-	3
£150k-£200k	6	2	-	2
>£200k	7	1	-	1
Total packages agreed		**52**	**13**	**65**
		£000	**£000**	**£000**
Total resource costs packages agreed [(iii)]		**2,062**	**467**	**2,529**

(i) All payments were within contracted entitlement.
(ii) Resource costs packages agreed net of release of provisions as per Note 15.
(iii) Full costs of all exit packages agreed during the year, including those costs that are covered by the release of provisions as per Note 15. These costs will therefore differ from the totals shown in note ii.

7. Grants and training

		2011 £000		2010 £000
Research grants		**90,315**		72,507
Research contracts		**33,955**		48,025
Post Graduate training awards				
Research students	**24,349**		23,332	
Research masters	**2,907**		3,600	
Research fellows	**6,824**		6,760	
		34,080		33,692
TOTAL GRANTS AND TRAINING AWARDS		**158,350**		154,224

Notes.
Payments were made to various bodies within the public sector, public corporations,higher education institutions and other government agencies. A full list of all awards made during the year is available in the Annual Report section on pages 46-49.

Notes to the accounts
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8. Other operating costs

	2011 £000	2010 [v] £000
Rent and rates	**1,318**	1,144
Maintenance, cleaning, heating and lighting	**10,050**	5,692
Office supplies, printing and stationery	**3,011**	3,321
Laboratory supplies, computing and field equipment	**18,400**	14,743
Postage, telephone and other telecommunications	**1,537**	1,659
Hospitality [i]	**549**	635
Audit fees [ii]	**99**	69
Travel and subsistence	**8,511**	8,462
Ships and aircraft operations	**16,923**	14,923
External training	**1,567**	1,475
SSC operating costs [iii]	**7,793**	2,626
Professional and research services by outside bodies [iv]	**99,247**	113,858
Operating leases	**18**	7
(Decrease)/increase in allowance for trade receivables	**(261)**	305
	168,762	168,919

Notes:
(i) Hospitality costs include room hire, accommodation and catering costs for meetings, workshops and conferences.
(ii) The costs for audit fees include external statutory audit fee of £89k (2009-10: £66k).
(iii) SSC operating costs include the costs for services such as procurement, information technology, finance, payroll, grants and recruitment.
(iv) The cost for professional and research services by outside bodies includes international subscriptions of £60.7m (2009-10: £67.6m), bought in services of £30.9m (2009-10: £38.8m) (including SSC Ltd set up costs of £4.3m (2009-10: £6.8m) and SSC capital grant of £2m) and other services, including consultancy, advertising, waste disposal and medical/legal costs.
(v) The 2009-10 comparators for this category have been restated due to the changes in NERC's chart of accounts following migration to SSC.

9. Interest receivable

	2011 £000	2010 £000
Interest on bank balances	**1**	2

10(a). Property, plant and equipment [i]

Cost or valuation	Land, buildings and Antarctic stations (ii), (iii), (iv) & (vii)	Plant and equipment (vi)	Transport (iv), (v), (vii) & (x)	Total
	£000	£000	£000	£000
At 1 April 2010	274,168	100,359	192,708	567,235
Additions	11,868	8,425	4,723	25,016
Revaluation	(1,164)	2,420	3,268	4,524
Revaluation Adjustment (vii)	(29,811)	(25,003)	37,412	(17,402)
Reclassification (viii)	-	(271)	271	-
Disposals	-	(842)	(1,892)	(2,734)
At 31 March 2011	255,061	85,088	236,490	576,639
Depreciation				
At 1 April 2010	115,738	65,677	99,093	280,508
Charge for the year	6,160	10,341	7,394	23,895
Revaluation	(411)	1,288	1,863	2,740
Revaluation Adjustment (vii)	(29,811)	(25,003)	37,412	(17,402)
Reclassification (viii)	-	(159)	159	-
Disposals	-	(675)	(322)	(997)
At 31 March 2011	91,676	51,469	145,599	288,744
NET BOOK VALUE AT 31 MARCH 2011	**163,385**	**33,619**	**90,891**	**287,895**
At 1 April 2010	158,430	34,682	93,615	286,727

Notes

(i) Opening balances in 2009-10 comparators have been restated from 2009-10 accounts to split out Assets under the course of construction as shown in Note 10(b).

(ii) Cost / valuation includes £18,842,130 in respect of Freehold Land which is not depreciated (31 March 2010: £19,781,225).

(iii) The additions figure for land, buildings & Antarctic stations includes £8,954,916 of capitalised construction costs for the new building at CEH Wallingford (2009-10 £7,896,692) transferred from AUCC in note 10(b).

(iv) Including specialised Antarctic vehicles.

(v) The NBV of the leased ship is £19,001,147 (2009-10: £21,648,623). The annual depreciation charge on this asset held under the finance lease was £2,671,648 for the year (2009-10: £2,034,409).

(vi) Includes donated assets with a value of £174,739 and is offset by a donated asset reserve. There is no restriction on the use of these assets.

(vii) There has been no effect on the depreciation charge as a result of the application of component depreciation (IAS 16). Assets have historically been split between land and buildings and sites; ships have also been accounted for based on the component accounting rules. It has been decided not to apply component depreciation for the aircraft based on the advice given by our professional valuers, IBA Group. Furthermore, Polaris House is solely occupied as a standard office building with no requirement for any part or element to be replaced at any set intervals or for any major regular inspections. There are therefore no component parts in Polaris House based on the principles of IAS 16. Day to day servicing is deemed repair and maintenance.

(viii) The migration of NERC's Fixed Asset Register to the new Oracle system required some adjustments to the revalued elements of asset cost and accumulated depreciation in order to ensure that depreciation was correctly recorded in the new system. There is no net effect on the NBV or depreciation of these assets due to these changes.

(ix) Previously small boat assets were classified as plant & equipment, these are now classified as transport.

(x) Opening balances and 2009-10 comparators have combined the previous categories of ships & aircraft and motor vehicles into a single category of transport.

Notes to the accounts
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Cost or valuation	Land, buildings and Antarctic stations £000	Plant and equipment £000	Transport £000	Total £000
At 1 April 2009	278,562	100,575	190,597	569,734
Additions	15,681	9,713	2,857	28,251
Revaluation	(5,107)	843	1,228	(3,036)
Disposals	(634)	(10,772)	(985)	(12,391)
Impairment	(6,826)	-	(8)	(6,834)
Transfer to assets held for sale	(7,508)	-	(981)	(8,489)
At 31 March 2010	274,168	100,359	192,708	567,235
Depreciation				
At 1 April 2009	113,129	66,331	94,232	273,692
Charge for the year	5,949	9,819	6,654	22,422
Revaluation	404	-	-	404
Disposals	(501)	(10,473)	(948)	(11,922)
Transfer to Held for Sale	(3,243)	-	(845)	(4,088)
At 31 March 2010	115,738	65,677	99,093	280,508
NET BOOK VALUE AT 31 MARCH 2010	**158,430**	**34,682**	**93,615**	**286,727**
At 1 April 2009	165,433	34,244	96,365	296,042

10(b). Assets under the course of construction [(i)]

Cost or valuation	Land, buildings and Antarctic stations (ii) & (iii) £000	Plant and equipment (iv) & (v) £000	Transport (v) & (vi) £000	Total £000
At 1 April 2010	44,365	13,503	1,885	59,753
Additions & Capitalisation	3,058	5,229	10,613	18,900
Reclassification [(iv)]	-	(461)	461	-
Disposals	-	(11,115)	-	(11,115)
NET BOOK VALUE AT 31 MARCH 2011	**47,423**	**7,156**	**12,959**	**67,538**
At 1 April 2010	44,365	13,503	1,885	59,753

Notes

(i) Opening balances in 2009-10 comparators have been restated from 2009-10 accounts to split out Assets under the course of construction from property, plant & equipment as shown in Note 10(a).

(ii) Includes £35,836,601 for the Halley VI Antarctic Base (2009-10 £32,888,117).

(iii) The additions & capitalisation figure for land, buildings & Antarctic stations includes a reduction of £8,954,916 for capitalised construction costs for the new building at CEH Wallingford (2009-10: £7,896,692) transferred to Note 10(a).

(iv) The disposal of plant & equipment represents the Council's individual share of £11,115,500 (2009-10: £9,774,165) of the SSC asset, which has been sold to the RCUK Shared Services Centre in March 2011, after which NERC acquired an additional 11,115,500 'B' shares for the amount of £11,115,500 (see Note 10(d)).

(v) Previously small boat assets were classified as plant & equipment. These are now classified as transport.

(vi) Opening balances and 2009-10 comparators have combined the previous categories of ships & aircraft and motor vehicles into a single category of transport.

Cost or valuation	Land, buildings and Antarctic stations (i) & (ii)	Plant and equipment (III)	Transport	Total
	£000	£000	£000	£000
At 1 April 2009	41,493	11,550	635	53,678
Additions & Capitalisation	9,241	1,492	1,711	12,444
Impairment	(6,369)	-	-	(6,369)
NET BOOK VALUE AT 31 MARCH 2010	**44,365**	**13,042**	**2,346**	**59,753**
At 1 April 2009	41,493	11,550	635	53,678

10(c). Investment property

Cost or valuation	£000
At 1 April 2009	1,729
Revaluation	(600)
Impairment	(69)
Transfer to assets held for sale	(1,060)
At 31 March 2010 and 31 March 2011	**-**
Depreciation	
At 1 April 2009	52
Charge for the year	8
Transfer to assets held for sale	(60)
At 31 March 2010 and 31 March 2011	-
NET BOOK VALUE AT 31 MARCH 2010 AND 2011	**-**
Net Book Value at 1 April 2009	1,677

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10(d). Joint venture and investments

Cost or valuation	'A' share RCUK Shared Services Centre £	'B' shares RCUK Shared Services Centre £	IXO Therapeutics Ltd Shares £	IGS Ltd Shares £	Total £
At 1 April 2009	1	1,622,660	-	-	1,622,661
SSC losses	-	(383,397)	-	-	(383,397)
At 31 March 2010	**1**	**1,239,263**			**1,239,264**
SSC shares acquired	-	11,115,500	300,000	150,000	11,565,500
SSC losses	-	(786,000)	-	-	(786,000)
At 31 March 2011	**1**	**11,568,763**	**300,000**	**150,000**	**12,018,764**

The Council owns one 'A' ordinary share of £1 in the RCUK Shared Services Centre Ltd (SSC Ltd). Each of the seven Research Councils owns one share and they are all joint investors in the project. A' shares have voting rights.

During the 2010-11 financial year the Council acquired a further 11,115,500 'B' shares of £1 in the SSC Ltd. This increases the total of NERC shares to 12,738,160. These shares represent 20.54% of total shares issued of 62,016,358 and have no voting rights. The 'B' shares convey ownership rights to the holder, including any distributions or proceeds from the sale of the SSC. The investment has been classified as a 'joint venture' between the Research Councils with NERC's individual share being 20.54% and the other six Research Councils owning the remaining 79.46% or 49,278,198 shares.

In accordance with IAS31, the equity method of accounting has been adopted and so the value of the shares has been adjusted by the RCUK Shared Services Centre Ltd losses of £786k for the 2010-11 financial year, which have been charged directly to the statement of comprehensive expenditure. The losses include the depreciation costs incurred by SSC Ltd but not recharged to its customers, who are the seven Research Councils.

SSC Ltd was incorporated on 1 August 2007 to set up the Shared Services Centre (registration number 6330639). Its principle place of business is at North Star House, North Star Avenue, Swindon, Wiltshire. The services provided include procurement, information technology, human resources, finance and payroll.

For the period ended 31 March 2011 the financial statements of RCUK Shared Services Centre Limited shows revenue of £61.5m (2009-10: £64.8m) and total costs of £66.0m (2009-10: £65.1m) resulting in a loss for the year of £4.5m (2009-10: £0.3m). The balance sheet totals are £7 'A' shares and £62,016,358 'B' shares issued to the Research Councils and £3.9m cash (2009-10: £5.2m).

The Research Councils entered into a supplementary shareholders' agreement with the Secretary of State for Business, Innovation and Skills on 4 October 2011 to allot the Secretary of State for Business, Innovation and Skills one 'A' ordinary share in the capital of RCUK SSC Ltd. This supplementary agreement confirmed the covenants of the original shareholders' agreement, signed 8 August 2007, remain extant. On that basis, the Council retains the same level of investment in RCUK SSC Ltd at 20.54% of the Company's 'B' shares.

During the year NERC invested £300k into IXO Therapeutics Ltd (formerly Pharmatic Limited), registration number 06106043 and registered office c/o NERC Innovation Team, Polaris House, North Star Avenue, Swindon, Wiltshire. The company specialises in research and development of novel immunotherapeutics. The NERC holding now totals 150,000 preference shares and 779,470 ordinary shares, giving NERC a controlling interest of 67.8% of the ordinary shares issued. Although a controlling interest would normally require consolidation into the NERC financial statements in accordance with IAS 27, NERC has not consolidated this small investment as immaterial to NERC and holds the investment at fair value, currently estimated at intial cost, in accordance with IAS 39.

NERC invested £150k in IGS (International Geoscience Services) Limited, a research company incorporated on 12 December 2010, registration number 7475665 and registered office c/o NERC Innovation Team, Polaris House, North Star Avenue, Swindon, Wiltshire. NERC holds 3,001 shares, giving NERC a controlling interest of 66.7% of the shares issued. Although a controlling interest would normally require consolidation into the NERC financial statements in accordance with IAS 27, NERC has not consolidated this small investment as immaterial to NERC and holds the investment at fair value, currently estimated at initial costs in accordance with IAS 39.

11. Intangible assets

	Software licenses £000	Website costs £000	Total £000
Cost or valuation			
At 1 April 2010	8,003	211	8,214
Additions	39	-	39
Revaluation	233	-	233
Revaluation Adjustment (i)	(690)	-	(690)
Disposals	(14)	-	(14)
Impairment	-	-	-
At 31 March 2011	7,571	211	7,782
Amortisation			
At 1 April 2010	7,337	211	7,548
Charge for the year	548	-	548
Revaluation	216	-	216
Revaluation Adjustment (i)	(690)	-	(690)
Disposals	(14)	-	(14)
At 31 March 2011	7,397	211	7,608
NET BOOK VALUE AT 31 MARCH 2011	**174**	**-**	**174**
Net Book Value at 31 March 2010	666	-	666

Notes
Intangible assets comprise of separately acquired computer software licences and internally developed website costs. They are stated at the lower of historical costs less accumulated amortisation or valuation.

The intangible assets were revalued on a annual basis using the HM Treasury GDP deflator figures.

If the intangible assets were recognised using the cost model, the NBV would have been £165k at 31 March 2011 (£654k at 31 March 2010). The revaluation surplus amounted to £9k at 31 March 2011 (£12k at 31 Mar 2010).

(i) The migration of NERC's Fixed Asset Register to the new Oracle system required some adjustments to the revalued elements of asset cost and accumulated depreciation in order to ensure that depreciation was correctly recorded in the new system. There is no net effect on the NBV or depreciation of these assets due to these changes.

	Software licenses £000	Website costs £000	Total £000
Cost or valuation			
At 1 April 2009	8,163	211	8,374
Additions	201	-	201
Revaluation	266	-	266
Disposals	(627)	-	(627)
At 31 March 2010	8,003	211	8,214
Amortisation			
At 1 April 2009	7,192	156	7,348
Revaluation	550	55	605
Disposals	(405)	-	(405)
At 31 March 2010	7,337	211	7,548
NET BOOK VALUE AT 31 MARCH 2010	**666**	**-**	**666**
Net Book Value at 31 March 2009	971	55	1,026

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12. Assets held for sale

	£000
Net cost or valuation	
At 1 April 2010	3,861
Disposals	(3,637)
NET BOOK VALUE AT 31 MARCH 2011	**224**
Net cost or valuation	
At 1 April 2009	628
Transfers	5401
Revaluation	(190)
Disposals	(1,765)
Impairment	(213)
NET BOOK VALUE AT 31 MARCH 2010	**3,861**
Net Book Value at 1 April 2009	628

Notes
The assets held for sale comprise buildings and land owned at the Bidston site. These assets were re-classified from the property, plant and equipment category to held for sale at 31 March 2008. Management is committed to sale and a buyer has been located. The sale is expected to complete within the next 12 months. The Bidston property has been impaired down to its agreed sale price.

During the year the following held for sale assets were disposed of:

- Piper Navajo Aircraft.
This asset was deemed surplus to requirements as at 31 March 2010. Management decided to dispose of this asset and the sale was completed in April 2010.

- Buildings and land owned at Penrhos Road, Bangor.
These assets were re-classified from the investment property category to held for sale at 31 March 2010. The sale was completed by 30 June 2010.

- Buildings and land leased at the Oxford Site.
These assets were re-classified from the property, plant and equipment category to held for sale as at 31 March 2010. This lease was surrendered by 30 September 2010.

13. Receivables

	£000	2011 £000	£000	2010 £000
(a) Current assets: trade and other receivables				
Trade receivables		**11,057**		4,223
Intra Government				
Central Government bodies	**3,145**		2,093	
Local Authorities	**25**		3	
		3,170		2,096
Other receivables		**1,687**		5,644
Prepayments [(i)]		**20,188**		26,170
Accrued income		**6,724**		4,149
Provision for trade receivables		**(484)**		(753)
		42,342		41,529
(b) Non-current receivables: trade and other receivables				
Other receivables		**167**		162
TOTAL RECEIVABLES		**42,509**		41,691

Notes
(i) Prepayments include RRS Discovery *replacement ship of £9,300,000, European Space Agency £2,772,172, Halley VI of £2,415,854, IODP of £1,788,452 and studentships of £572,904.*

14. Payables

	£000	2011 £000	£000	2010 £000
(a) Current liabilities: trade and other payables				
Trade payables [(i)]		**12,640**		-
Intra Government				
Central Government bodies	**2,589**		-	
Local Authorities	**24**		-	
		2,613		-
Taxation & Social Security		**2,287**		161
Other payables		**2,463**		21,648
Accruals & deferred income [(i)]		**56,554**		41,763
Obligation under finance leases		**1,412**		1,292
Monies held on behalf of EU Programme Collaborators		**4,334**		4,961
Monies held on behalf of the Integrated Ocean Drilling Programme Collaborators		**-**		658
		82,303		70,483
(b) Non-current liabilities: trade and other payables				
Obligation under finance leases		**10,299**		11,712
TOTAL PAYABLES		**92,602**		82,195

Notes
(i) Any trade payables not paid prior to migration to the Shared Services Centre at 1 April 2010 had been accrued for and were included in the Accruals & deferred income category for the 2009-10 financial year.

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15. Provisions for liabilities and charges [i]

	Antarctic Treaty costs [ii] £000	Shared Services Centre [iv] £000	Early Retirements £000	Other liabilities [iii] £000	CEH restructuring [v] £000	Total £000
At 1 April 2009	5,591	813	3,141	3,622	6,110	19,277
Change in discount rate	-	-	182	-	8	190
Write back of provisions no longer required	(65)	(119)	-	(85)	(1,465)	(1,734)
Amounts provided in year	-	205	1,142	(97)	44	1,294
Unwinding of discount	123	-	140	104	131	498
Provision utilised in year	(424)	(315)	(2,559)	(3,042)	(915)	(7,255)
Provision at 31 March 2010	**5,225**	**584**	**2,046**	**502**	**3,913**	**12,270**
Changes in provisions for 2010-11:						
Change in discount rate	-	-	(51)	-	(86)	(137)
Write back of provisions not required	-	(118)	-	-	(213)	(331)
Amounts provided in year	173	115	250	644	259	1,441
Unwinding of discount	115	-	37	11	106	269
Provision utilised in year	-	(581)	(1,105)	(244)	(1,168)	(3,098)
Provision at 31 March 2011	**5,513**	**-**	**1,177**	**913**	**2,811**	**10,414**

Notes

(i) The discount rate used is 2.9% for pension provisions and 2.2% for all other provisions (2009-10: 1.8% for pension provisions and 2.2% for all other provisions).

(ii) Antarctic Treaty costs represents the Council's liability to remove any items from the Antarctic no longer used.

(iii) Other liabilities include claims made against NERC and commitments to onerous operating lease payments. These have been estimated on the likelihood of the leases being assigned during the remainder of their term.

(iv) The Research Councils and RCUK Shared Services Ltd have developed a Shared Services Centre to carry out the central functions of human resources, finance, procurement and information technology across the Councils. As a result some Research Councils have incurred redundancy costs, particularly where existing staff live a distance away from Swindon where the centre is situated, and termination costs for their existing systems. The Research Councils have collectively agreed that they will be jointly liable for all necessary redundancies and termination costs following an agreed funding allocation model, where the provision for all seven Councils is shared. The provision was fully utilised in the year.

(v) CEH restructuring costs include NERC's liability for CEH staff restructuring, staff removal, decommisioning and removal costs.

Analysis of expected timing of discounted cashflows

	Antarctic Treaty costs £000	Shared Services Centre £000	Early Retirements £000	Other liabilities £000	CEH restructuring £000	Total £000
Provision due within one year	1,096	-	503	710	615	2,924
Between one and five years	1,454	-	488	203	1,858	4,003
Between five and ten years	417	-	186	-	313	916
Thereafter	2,546	-	-	-	25	2,571
Provision at 31 March 2011	**5,513**	**-**	**1,177**	**913**	**2,811**	**10,414**
Provision due within one year	49	584	991	378	1,317	3,319
Between one and five years	2,765	-	805	124	1,939	5,633
Between five and ten years	489	-	250	-	664	1,403
Thereafter	1,922	-	-	-	(7)	1,915
Provision at 31 March 2010	5,225	584	2,046	502	3,913	12,270

16. Cash and cash equivalents

	£000	2011 £000	£000	2010 £000
The following balances were held at 31 March:				
Government Banking Service				
HM Paymaster General	**-**		3,250	
Citibank	**104**			
		104		3,250
Commercial bank accounts				
Lloyds TSB	**15,877**		8,238	
National Bank of Abu Dhabi	**598**		653	
Other local commercial accounts	**116**		620	
		16,591		9,511
Balance at 31 March		**16,695**		12,761

17. Forward commitments on approved research grants, research contracts and studentships

	Research Grants £000	Postgraduate Training £000	Fellowships £000	Contracts £000	Total 2011 £000
2011-2012	107,388	20,989	7,872	33,931	170,180
2012-2013	66,769	12,177	5,657	10,672	95,275
2013-2014	34,294	6,201	3,267	8,955	52,717
2014-2015	6,310	20	919	3,378	10,627
2015-2016	703	-	314	2,312	3,329
2016-2017	159	-	-	1,924	2,083
	215,623	**39,387**	**18,029**	**61,172**	**334,211**

18. Finance lease obligations

NERC has the use of a research ship, the RRS *Ernest Shackleton*, under a lease contract. The amounts payable under the finance lease obligations are as follows:

As at 31 March 2011	Payments £000	Interest £000	Net payments £000
Within one year	2,334	922	1,412
Between one and five years	8,106	2,439	5,667
Thereafter	5,320	688	4,632
	15,760	**4,049**	**11,711**

As at 31 March 2010	Payments £000	Interest £000	Net payments £000
Within one year	2,234	942	1,292
Between one and five years	8,511	2,678	5,833
Thereafter	6,916	1,037	5,879
	17,661	**4,657**	**13,004**

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19. Related party transactions

The Natural Environment Research Council (NERC) is a Non-Departmental Public Body (NDPB) sponsored by the Department for Business, Innovation and Skills (BIS).

BIS is regarded as a related party. During the year, NERC has had various material transactions with BIS and with other entities for which BIS is regarded as the parent Department, viz: Engineering and Physical Sciences Research Council, Biotechnology and Biological Sciences Research Council, Science and Technology Facilities Council, Medical Research Council, Economic and Social Research Council, the Arts and Humanities Research Council and the Technology Strategy Board.

NERC has had various material transactions with other Government departments and other central Government bodies. NERC has also entered into various material transactions with the RCUK Shared Services Centre Ltd.

During the year, NERC entered into the following material transactions with Council members in respect of payments under awards or contracts funded by NERC.

Council Member	Number of Awards or Contracts	£
Professor C Godfray	2	252,444
Professor A Halliday	2	251,364
Professor J Slingo OBE	5	260,143
Professor A Watson	11	622,869

None of the above mentioned related parties were involved in the approval of awards to the Institution where he/she is a senior member of the staff.

In addition, NERC made the following aggregated payments in respect of NERC funded awards or contracts to Institutions where Council members are also senior members of staff.

Related party	Institution	Amount £000
Professor A Glover	University of Aberdeen	2,627
Professor M Wilson	University of Leeds	14,856
Professor A Halliday Professor C Godfray	University of Oxford	7,622
Professor A Thorpe Professor J Slingo OBE Professor M Lockwood	University of Reading	11,149
Professor M Lockwood	Science and Technology Facilities Council	3,960
Professor M Lockwood	Meteorological Office	1,212
Professor T Meagher	University of St Andrews	3,058
Professor A Watson Professor R Watson	University of East Anglia	5,287
Professor A Fitter	University of York	3,042

20. Losses and special payments

During the year there were 33 losses totalling £86,671 as follows:

Type	Number	Amount £
Stores losses[1]	19	78,998
Constructive losses[2]	1	8,797
Claims abandoned[3]	13	(1,124)
	33	**86,671**

Notes
1. *Stores losses include damage to the remotely operated vehicle ISIS of £51,335 and theft of acoustic equipment of £27,654.*
2. *Constructive loss consists of payment to Freedom Communications UK following a High Court Writ.*
3. *Claims abandoned include write back of historic balance sheet postings.*

During the 2009-10 financial year 68 losses totalled £590,738 as follows:

Type	Number	Amount £
Cash losses	12	2,047
Stores losses	13	7,652
Constructive losses	1	176,000
Claims abandoned	42	405,039
	68	**590,738**

21. Shareholdings

Other than shareholdings shown in note 10(d), the Council holds:

- 249 shares in Wallingford Hydrosolutions Ltd, a specialist technology transfer company. Wallingford Hydrosolutions Ltd provide high quality consultancy services and environmental software systems to the water and environmental sectors. The shares are not publicly traded and currently have no open market value. At 31 March 2011 NERC's shareholding represented 24.9% of the issued share capital of Wallingford Hydrosolutions Ltd. Although NERC's shareholding implies a significant influence and therefore would normally require recognition on an equity basis within NERC's financial statements in accordance with IAS 28. NERC has not recognised this small investment due to its being immaterial to NERC;

- 1,000 shares in Gordons 1 Ltd (formerly Cybersense Biosystems Ltd), a holding company and supplier of field analytical tools and services to the environmental sector. The shares are not publicly traded and currently have no open market value. At 31 March 2011 NERC's shareholding represented 0.05% of the issued share capital of Gordons 1 Ltd;

- 54,000 shares in Microbial Solutions Ltd, a company set up to commercialise innovative wastewater treatment technology, which uses a collection of non-pathogenic bacteria to cleanse toxic metal working fluids from the engineering industry. The shares are not publicly traded and currently have no open market value. At 31 March 2011 NERC's shareholding represented 23.49% of the issued share capital of Microbial Solutions Ltd. Although NERC's shareholding implies a significant influence and therefore would normally require recognition on an equity basis within NERC's financial statements in accordance with IAS 28. NERC has not recognised this small investment due to its being immaterial to NERC;

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- 21,900 shares in Oxford Expression Technologies Ltd, which provides products, services and consultancy to the global pharmaceutical and biotechnology industries. The shares are not publicly traded and currently have no open market value. At 31 March 2011 NERC's shareholding represented 13.5% of the issued share capital of Oxford Expression Technologies Ltd; and

- 18,750 shares of 0.1p each in Spectrum (General Partner) Ltd (Spectrum), which acts as the Advisory Board for the Rainbow Seed Fund (RSF). The Rainbow Seed Fund comprises of a partnership of publicly funded research laboratories with funding of £10m from BIS and is being managed by Midven Ltd. Spectrum's main role is to ensure that the RSF operates within the guidelines set out by BIS. The RSF is set up to provide investment to support the early stages of commercialisation of technology and services from its partners which includes NERC, Science and Technology Facilities Council, Biotechnology and Biological Sciences Research Council and Defence Science and Technology Laboratory. At 31 March 2011 NERC's shareholding represented 18.75% of the issued share capital of Spectrum Limited. Neither the value of the investment nor trading position of Spectrum is included in the statement of financial position as it is not material to the accounts.

22. Capital and lease commitments

Capital commitments
As at the date of these accounts, NERC is committed to a sum of £55.7m in respect of capital contracts. This includes the building of the RSS Discovery replacement ship of £45.7m to be completed in 2013-14, the Antarctic base Halley VI for £1.7m due to be completed in 2012-13 and the BGS Keyworth Phase 2 Development for £7.1m due to be completed in 2013-14.

Lease commitments
The amounts payable under non-cancellable operating leases are as follows:

	2011 £000	2010 £000
Within one year	**23**	7
Between one and five years	**17**	30
	40	37

Bonds and guarantees
The Council has a number of bonds and guarantees that are lodged with Lloyds Bank and relate to overseas contracts, amounting to £1,092,609 at 31 March 2011 (2009-10: £1,321,323).

23. Contingent liabilities

The value of contingent liabilities at 31 March 2011 of legal claims made against NERC where based on legal advice sought it is not deemed probable that these will lead to future outflows of resources, is estimated at £47k.

24. Events after the reporting period

At 1 April 2011, the UK Space Agency, a newly-formed executive agency of the Department for Business, Innovation and Skills, has taken over the European Space Agency contract and the foreign currency risk specific to this contract, which was being managed with its sponsor department, the Department for Business, Innovation and Skills, will no longer apply to NERC.

There are no other post balance sheet events between the balance sheet date and 29 November 2011, the date when the Accounting Officer approved the accounts. The financial statements do not reflect events after this date.

25. Derivatives and other financial instruments

IFRS 7 Financial Instruments – Disclosures, IFRS 32 Financial Instruments - Presentation and IFRS 39 Financial Instruments – Recognition and Measurement require disclosure of the role which financial instruments have had during the period in creating or changing the risks an entity faces in undertaking its activities. Due to the largely non-trading nature of its activities and the way it is financed, the Council is not exposed to the degree of financial risk faced by non public sector entities. Moreover, financial instruments play a much more limited role in creating or changing risk than would be typical of the listed companies to which IFRS 7, 32 and 39 mainly apply. The Council has limited powers to borrow or invest funds and except for the finance lease contract (details of which are given in notes 1(l), 10(a) and 18) and forward purchases of foreign currency, financial assets and liabilities are generated by day-to-day operational activities and are not held to change the risks facing the Council in undertaking its activities.

Liquidity risk
The Council's net revenue resource requirements are financed by grant-in-aid from its sponsor department, the Department for Business, Innovation and Skills. The capital expenditure, with the exception of the ship financed under the finance lease referred to above, is also financed through grant-in-aid. The Council is therefore not exposed to significant liquidity risks.

Interest rate risk
The Council is not exposed to significant interest rate risk.

Foreign currency risk
The Council's exposure to foreign currency risk is not currently significant. Foreign currency risk specific to the European Space Agency contract was being managed with its sponsor department, the Department for Business, Innovation and Skills, resulting in three forward purchase contracts during the year. From 1 April 2011, the UK Space Agency, a newly-formed executive agency of the Department for Business, Innovation and Skills, will take over the European space Agency contract and this specific risk will no longer apply to NERC.

Some research reported here may not yet have been peer-reviewed or published. For a list of NERC Council members see page 57. For members of our other committees see our website www.nerc.ac.uk.

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