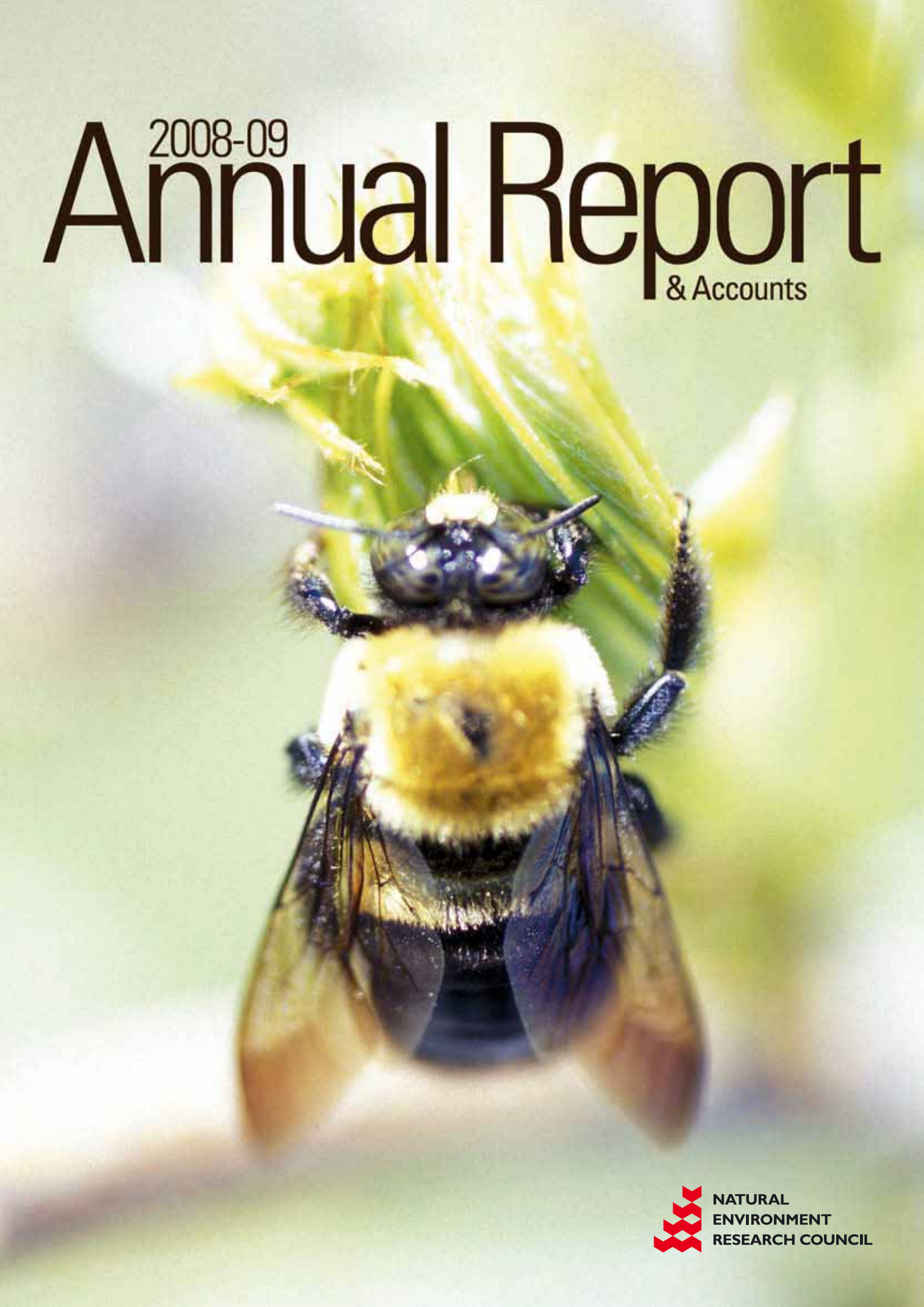
2008-09 Annual Report & Accounts



NATURAL ENVIRONMENT RESEARCH COUNCIL

The Natural Environment Research Council Annual Report and Accounts 2008-09

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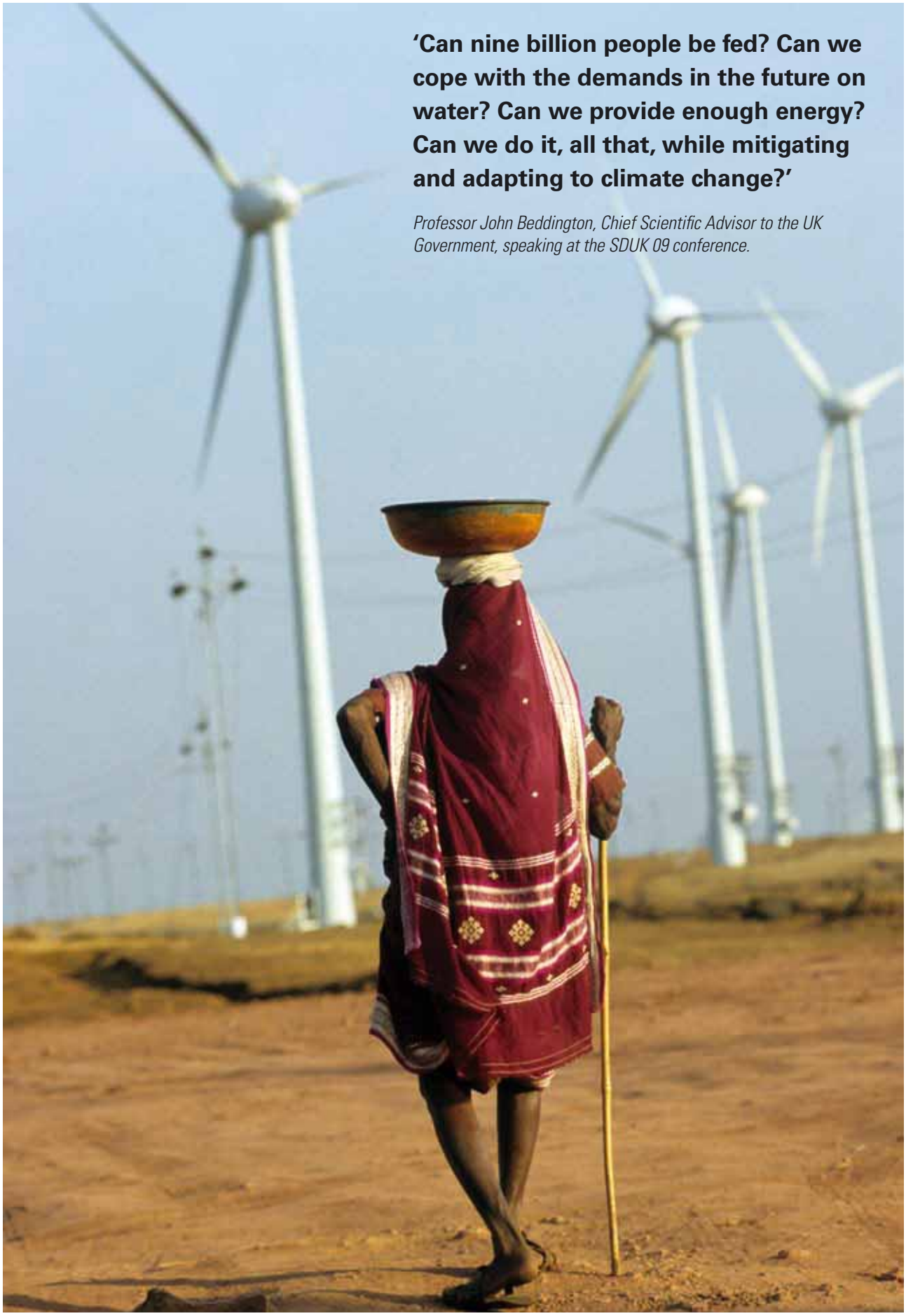


'Can nine billion people be fed? Can we cope with the demands in the future on water? Can we provide enough energy? Can we do it, all that, while mitigating and adapting to climate change?'

Professor John Beddington, Chief Scientific Advisor to the UK Government, speaking at the SDUK 09 conference.

Joerg Boethling /Still Pictures

Next generation science for planet Earth

The Natural Environment Research Council (NERC) is a publicly funded organisation delivering world-leading environmental research and training the next generation of researchers. It is the UK's main agency for funding and strategically directing research, training and knowledge exchange in the environmental sciences.

NERC's strategic goal

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; and
- creating and supporting vibrant, integrated research communities.

The priorities we develop with our researchers and stakeholders provide a focus for the marine, polar, atmospheric, earth, terrestrial and freshwater science communities.

The research is often multidisciplinary and in collaboration with other 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 invest in satellite technology to observe environmental change on a global scale.

This Annual Report to Parliament describes selected achievements from 1 April 2008 to 31 March 2009. It highlights NERC's progress in delivering its five-year strategy Next Generation Science for Planet Earth. For each of the three years following the Spending Review of 2007 we will also be presenting a Delivery Report to the Department for Business, Innovation and Skills (BIS), formerly the Department for Innovation, Universities and Skills (DIUS), reporting progress on achievements and activities contained in our Delivery Plan and Scorecard.

These and other NERC publications are available at www.nerc.ac.uk/publications, or call 01793 411750.

The UK is second only to the US in terms of total citations for published environmental research. The environmental research community supported by the Natural Environment Research Council can rightly be described as world class.


JAMES CLARK ROSS

The year in review

NERC-funded scientists deliver world-leading environmental research, helping us predict changes to our environment, use natural resources sustainably, improve people's quality of life and find solutions to some of the world's biggest challenges.

NERC has made significant progress in delivering its strategy, *Next Generation Science for Planet Earth*, now in its second year of the five-year plan. The appointment of theme leaders responsible for each of the seven scientific themes has been well received by the community and is proving very successful in highlighting funding priorities to support our strategy.

It has also been an excellent year in terms of scientific achievements. For example, evidence was presented that severe drought in the Amazon in 2005 turned the region from a carbon dioxide sink to a source – a swing equivalent to Europe and Japan's combined annual CO_2 emissions.

This sensitivity is a major concern, not least because some climate models predict that parts of the Amazon will dry out this century. Another example is Arctic sea-ice extent, which reached a record low in autumn 2007. Research using satellite data has led scientists to estimate that sea-ice thickness in the following winter was nearly 19 per cent thinner in some areas compared with the previous five winters. Many more highlights of our research are presented in the report.

The quality of our research is fundamentally important. In 2008-09, we commissioned independent experts to look at how NERC-funded research papers rank internationally in terms of citations. Their analysis shows that across all our funding mechanisms – be it blue skies research, strategic research or research by fellows – NERC-funded research is extremely highly cited.

The report also shows why NERC is such an attractive partner for national and international collaboration. This year, we have launched the Joint Climate Research Programme with the Met Office, including a shared investment in super computing; signed, at ministerial level, a polar research agreement to develop closer ties between the UK and Canada; and developed an international environmental research funders' workshop with the National Science Foundation, our US counterpart.

NERC's international collaboration, and indeed all UK research, is made possible by the essential national capabilities that our investment provides: our facilities, data and expertise. These are largely managed by NERC-supported centres.

The Government has called for a debate in the research community about focusing research on areas where the UK has competitive advantage. In partnership, the Research Councils have developed six focused research programmes, in areas that are hugely important to our society – Energy, Living with Environmental Change (LWEC), Ageing, Digital Economy, Security and Nanoscience. NERC leads for the Research Councils on the LWEC programme, but we also contribute to most of the other programmes.

LWEC is a partnership of 20 organisations spanning research councils, government and delivery agencies. In June 2009, LWEC announced 18 new research programmes representing a total investment of more than £100 million, of which NERC plans to contribute £30 million. This initiative, and others detailed in this report, show the environmental research community can respond rapidly to changing priorities and help boost the UK economy.

The green economy is high on the public agenda, and NERC is working with partners to develop a major role for the UK. By providing the environmental research and expertise that will underpin new sectors, like renewable energy and carbon capture and storage, we will help UK businesses seize the opportunities in new green markets.

NERC invests in training to support the next generation of environmental scientists, helping sustain the research base and meet the changing needs of employers. This year we have started a skills review alongside the Environment Research Funders' Forum to look at the research skills needed to address the challenges facing the UK economy. This review will highlight new areas which NERC will support through masters and PhD studentships.

Investment in the way NERC is organised has continued to make our research facilities better and more efficient. We made excellent progress with the re-structuring of the Centre for Ecology & Hydrology (CEH). New laboratories and office space are either completed or being built at CEH Edinburgh and Wallingford, and we are close to opening a new building – the William Smith Building – at the British Geological Survey in Keyworth.

These combined achievements show NERC's success this year, and the vital contribution our environmental research can make to people's lives and to the global economy at a time of major environmental, economic and social challenge.

Alan Thorpe, *Chief Executive*
Ed Wallis, *Chairman*
24 June 2009

Climate system

Major changes in the Arctic and the Amazon came to the fore in 2008-09. UK researchers showed Arctic sea ice is thinning as well as shrinking in area during summer months. And UK scientists announced that the unusual Amazon drought in 2005 led to the rainforest emitting more carbon than it absorbed.

A boat attempts to navigate a dried up section of the Amazon River near Uricurituba, in northern Brazil.

Euzivaldo Queiroz/AP/PA Photos

Role of forests in storing carbon becomes clearer

Trees in African rainforests are getting bigger and are trapping an extra 0.6 tonnes of carbon per hectare every year compared to the 1960s.

Scientists led by Dr Simon Lewis of the University of Leeds measured the girth of 70,000 trees in 79 areas of intact forest across Africa, using records spanning 40 years. The research suggests tropical forests absorb the equivalent of a fifth of annual fossil-fuel carbon emissions.

Another study – led by Professor Oliver Phillips, also from Leeds – showed that severe drought in the Amazon in 2005 turned the region from a carbon dioxide sink to a source – a swing the size of Europe and Japan's combined annual CO_2 emissions. This sensitivity is a major concern because some climate models predict that parts of the Amazon will dry out this century.

Further research reveals that ancient forests in temperate regions accumulate carbon for centuries, contrary to the long-standing view that they stop after reaching maturity. The research – co-authored by Professor John Grace from the University of Edinburgh – suggests these forests are an important global carbon sink.

Increasing carbon storage in intact African tropical forests. Nature, *2009.*

Old-growth forests as global carbon sinks. Nature, *2008.*

Drought sensitivity of the Amazon Rainforest. Science, *2009.*

Oceans give clues to future rainfall

Human activities are changing the Atlantic's saltiness, according to a study by researchers at the University of Reading and the Met Office Hadley Centre.

The study compared observed changes in salinity over the last 40 years with changes simulated in the Met Office's climate model. Increases in salinity observed in the subtropical North Atlantic were only reproduced in the model when past increases in greenhouse gases caused by human emissions were included.

These increases in greenhouse gases cause increases in evaporation and decreases in rainfall in this region; both lead to increased salinity.

'Our paper provides constraints that will help us reduce the uncertainty in predictions of future rainfall,' said joint author Professor Rowan Sutton of the University of Reading. 'This is vitally important to our understanding of how the climate will change,' he added. *Detection and attribution of Atlantic salinity changes.* Geophysical Research Letters, *2008.*


Measuring the thickness of the Arctic sea ice.

Arctic sea ice is receding and thinning

In autumn 2007, Arctic sea-ice extent reached a record low since records began and sea-ice thickness the following winter was nearly 19% (49 cm) thinner in some areas compared with the previous five winters.

Researchers led by Dr Katharine Giles from the National Centre for Earth Observation (NCEO) used satellite data to measure sea-ice thickness from 2002 to 2008.

Giles said, 'Changes in sea-ice extent are due to both the ice melting or moving around and also piling up. So it's important to know how thickness and extent are changing.'

Another team at the Scottish Association for Marine Science – led by Dr Seymour Laxon, also from NCEO – has developed a device to measure temperature profiles to understand how temperature relates to changes in ice thickness.

Circumpolar thinning of Arctic sea ice following the 2007 record ice extent minimum. Geophysical Research Letters, *2008.*

Effectiveness of iron fertilisation in doubt

A naturally iron-rich region of the Southern Ocean locks away nearly three times more carbon at the bottom of the ocean than a similar area without iron. But the amount of carbon locked away per unit of iron falls far short of some geoengineers' estimates.

An international team of researchers from the National Oceanography Centre, Southampton analysed the nutrient mix around the Crozet Islands.

'The numbers we calculated for the carbon-to-iron ratio – a measure of how much carbon is locked away for a given iron input – fall 15 to 50 times short of some geoengineering estimates,' said Dr Richard Sanders, a member of the research team.

Southern Ocean deep-water carbon export enhanced by natural iron fertilization. Nature, *2009.*

Cosmic rays could help forecast major weather events

Cosmic rays detected deep underground can reveal major changes in the weather 20 kilometres above ground. This could enable more accurate and reliable weather forecasting.

An international team led by Dr Scott Osprey of the National Centre for Atmospheric Science analysed cosmic ray data captured by a detector used in a particle physics experiment in a disused iron mine in Minnesota, USA.

The team found that abrupt changes in cosmic rays during winter coincided with sudden rises in stratospheric temperatures. These events can affect the severity of winters as well as the amount of ozone over the poles.

Dr Osprey said, 'Until now we've relied on weather balloons and satellites to tell us about major weather events, but now we can use cosmic ray data.'

Sudden atmospheric warmings seen in MINOS deep underground muon data. Geophysical Research Letters, *2009.*


Two scientists work on the neutrino detector of the MINOS experiment.

Peter Ginter

Biodiversity

The UK is developing global standards for describing genomes. This work makes research more efficient, allowing rapid scientific advances. It is particularly important at a time when vast amounts of genetic data threaten to overwhelm researchers.

Christian Musat/Fotolia.com

Bumblebees benefit from varied landscapes

Bumblebees' services as pollinators are vital to British plants and agriculture, but their numbers have dropped sharply in recent years. Our understanding of their ecology and behaviour remains limited.

The Living with Environmental Change (LWEC) partnership launched a £10 million programme in 2009 to identify the main threats to bees and other pollinators.

In 2008, scientists at the Centre for Ecology & Hydrology (CEH) used bumblebee colonies to investigate the effects of parasitism from the closely-related cuckoo bumblebee, which can reduce or eliminate production of new bumblebee queens.

Contrary to expectations, the benefits to a colony of being founded earlier in the year with plentiful food nearby are offset by greater risk of parasitism.

The researchers concluded that the colonies likeliest to thrive are those with varied food supplies scattered nearby – this supports conservation efforts aimed at creating more biodiverse landscapes.

'We should look to create more heterogeneous landscapes, which provide more refuges for bumblebees as well as more ecological niches in general,' said project leader Dr Matt Heard at CEH.

Effects of resource availability and social parasite invasion on field colonies of Bombus terrestris. Ecological Entomology*, 2008.*

Algae adopt Cheshire Cat defence

One of the ocean's most common microbes has been found to use a unique defence mechanism – completely changing its appearance by switching to another phase in its lifecycle.

The alga *Emiliana huxleyi* is normally covered in chalky armour plates, but when faced with viral attack it sheds them and adopts what researchers have dubbed the 'Cheshire Cat' strategy after Lewis Carroll's famous disappearing feline.

'It looks completely different,' said co-author Dr Willie Wilson at Plymouth Marine Laboratory. 'It is a fantastic strategy because it can sit in this stage until conditions improve.'

This is the first time scientists have shown a dramatic difference in vulnerability to viruses between life-cycle stages in a marine microbe.

The 'Cheshire Cat' escape strategy of the coccolithophore Emiliania huxleyi in response to viral infection. Proceedings of the National Academy of Sciences*, 2008.*

DNA study illuminates ageing in swifts

Life expectancy in Alpine swifts can be predicted from the length of particular DNA sequences, and how quickly they get shorter, scientists have found. Called telomeres, these sequences are found at the ends of chromosomes and help preserve genetic information and chromosome integrity during cell division.

Telomeres get shorter with each round of division, and this eventually curtails cell division. Until now, how this relates to ageing has been unclear. Studying wild swifts showed that birds with short and fast-eroding telomeres have lower life expectancies.

'It's very striking that telomere length and rate of shortening are a better predictor of lifespan than the birds' actual ages,' said Professor Pat Monaghan, group leader at the University of Glasgow. The research could ultimately shed light on ageing in humans.

Telomere dynamics rather than age predict life expectancy in the wild. Proceedings of the Royal Society B, *2009*.

Solving the riddle of the smell of the sea

Dimethyl sulfide (DMS) is a gas with a crucial role in many ocean ecosystems. Its functions range from triggering cloud formation to helping crustaceans and seals find food – it even gives the sea its tangy smell.

Marine microbes produce DMS from another compound called DMSP, which is made by plants and phytoplankton. But until recently how the microbes do this has been a mystery.

Ground-breaking research by UK scientists, building on work first published in *Science*, has changed that; for the first time they have identified three distinct sequences of genes which create three entirely different enzymes to do the job. The researchers used metagenomic techniques to test how common these genes were. Surprisingly, the genes weren't found only in bacteria; they have also made their way into fundamentally different organisms, such as fungi that infect plants.

'Given the importance of DMS production, it is surprising that the subject was only addressed using genetics a few years ago,' said lead researcher Professor Andy Johnston at the University of East Anglia. He added that the next step is to understand how the enzymes work and the relative importance of the three processes in the oceans before ultimately looking at how DMSP is made, as well as how it is broken down.

Structural and Regulatory Genes Required to Make the Gas Dimethyl Sulfide in Bacteria. Science, *2007.*

Threats to sea birds

Parasites reduce North Sea seabird populations' breeding success by affecting the ability of mothers to rear their sons.

Researchers from the Centre for Ecology & Hydrology (CEH) and the University of Edinburgh studied European shags breeding on the Isle of May off the east coast of Scotland.

They found that when parasite infection impairs the foraging ability of mothers, male birds suffer more than their sisters. It seems this is because they need more food to grow than females.

Another study by CEH and University of Leeds researchers found that guillemots are increasingly attacking and killing unattended chicks from neighbouring nests because of food shortages.

'Fish shortages mean both parents have to forage to find enough food to feed their chicks. This leaves chicks vulnerable to attack,' said Professor Sarah Wanless of CEH, who co-led the research.

Parasite treatment affects maternal investment in sons. Science, *2008.*

Hitting the buffers: conspecific aggression undermines benefits of colonial breeding under adverse conditions. Biology Letters, *2008.*

How do predators know where to look for food?

Many marine predators use similar underlying strategies to search the ocean for prey, scientists have shown.

They collected data from depth-recording tags on 31 sea animals from seven species, including sharks, turtles and penguins. Analysing their movements showed their paths were similar to 'Levy walks'. These are mathematical patterns in which clusters of short moves are interspersed with longer jumps to new areas.

Computer simulations show that Levy walks are a better way to forage than random movement, if prey is also sparsely distributed in a 'Levy-like' way. This suggests that such search strategies could confer an evolutionary advantage.

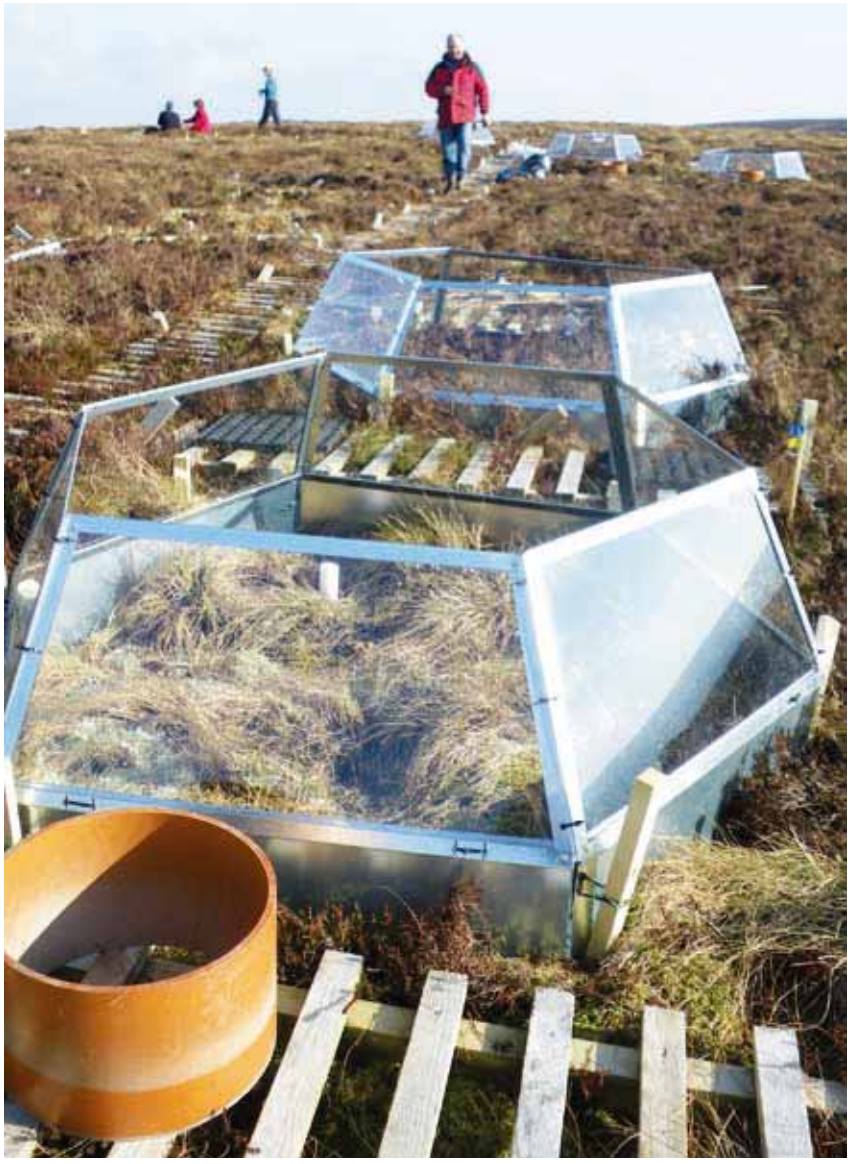
'This is a new approach to testing optimal foraging theory in free-ranging animals,' said lead author Professor David Sims at the Marine Biological Association. 'What Levy walk modelling shows is that this pattern may be a universal solution animals have evolved to tackle changing environmental conditions.'

The research may eventually have applications in areas involving searching for something with limited time and resources – for example, autonomous robots sampling inhospitable environments or in search-and-rescue missions.

Scaling laws of marine predator search behaviour. Nature, *Feb 2008*.

Sustainable use of natural resources

The world may come to rely on carbon capture and storage to stop emissions entering the atmosphere. But questions remain about the stability of carbon dioxide stored deep underground. NERC researchers have shown the gas has been dissolved in water and stored naturally for at least 20 million years in an underground reservoir.



Keeping moorland carbon underground

When carbon sinks are mentioned, people often think of tropical rainforests. But scientists at the Centre for Ecology & Hydrology (CEH) and Lancaster University are investigating a major sink closer to home – Britain's peat reserves.

Long-term monitoring in the Pennines has illuminated how changes in biodiversity caused by shifts in moorland management affect the soil's capacity to store carbon.

'Historically the bleak, wet and windy British moorlands have been doing a great job sucking up carbon dioxide from the air and laying down vast boggy peat deposits,' said CEH ecologist Dr Nick Ostle. 'There is no reason why this shouldn't continue with carbon-conscious conservation even in the face of climate change. This work has allowed us to understand how plant traits help keep carbon in the soil where we want it to stay,' he added.

Ongoing research could offer ways of managing moorlands to minimise greenhouse gas emissions.

Plant functional group identity influences short-term peatland ecosystem carbon flux. Functional Ecology, *2009.*

Geologists probe threat to UK groundwater

In some parts of England, groundwater provides 80% of the public water supply. Cities and suburbs are expanding, and large areas of countryside could be built over. This may endanger aquifers' ability to recharge themselves.

British Geological Survey scientists analysed how this could affect cities' water supplies, using computer models to estimate the area of UK aquifers covered by built-up areas and likely to be at risk.

The research will help policy-makers and the water industry make plans to manage groundwater resources and deal with related issues like the water quality of urban run-off and its effect on groundwater.

Suburbanisation of important aquifers in England and Wales: estimating its current extent. Water and Environment Journal, *2007.*

Feeding China in a changing climate

China's population continues to grow while its area of cropland is shrinking due to forces like urbanisation and desertification. Climate change could seriously threaten its food security.

Researchers at the Tyndall Centre for Climate Change Research

collaborated with Chinese colleagues to investigate how a changing environment will affect Chinese agriculture, and how farmers and policy-makers could adapt.

They conclude that there is limited risk in the short term; yields of some staples, like maize, will probably fall but others like wheat and rice will rise to compensate as they are fertilised by more atmospheric carbon dioxide.

But by around 2050 agriculture will come under pressure as higher temperatures worsen desertification, threaten water supplies and reduce yields. 'When we look past the mid century, that's when we start to see the major headline-grabbing problems,' said lead author Dr Declan Conway of the University of East Anglia.

The Department of Energy and Climate Change and the Department for International Development provided funding for the research in partnership with China's Ministry of Science and Technology.

Future cereal production in China: The interaction of climate change, water availability and socio-economic scenarios. Global Environmental Change*, 2009.*

Researching a sustainable path to bioenergy

Using fast-growing bioenergy crops to generate energy is a leading candidate to help wean the UK off fossil fuels. But there are still many gaps in our knowledge. TSEC-Biosys, part of the Towards a Sustainable Energy Economy (TSEC) initiative, aims to fill those gaps.

Scientists from the programme have investigated, for example, how much biomass could be grown in the UK; how 15 different species of miscanthus grass performed over more than a decade; and the environmental effects of large-scale planting of bioenergy crops.

They found that, if planted and managed well, crops like coppiced poplar and willow could help improve biodiversity and soil structure compared to traditional arable crops, as well as reducing greenhouse gas emissions.

The interdisciplinary programme looks at bioenergy as a 'whole system', examining aspects of the subject ranging from the complexities of biofuel supply chains to the economic and social concerns of farmers and members of the public.

'A whole-systems approach that embraces resource, technical, economic, environmental and social issues is crucial to understanding the role of bioenergy in our future energy system. This project has brought together UK bioenergy researchers to address these issues,' said Dr Ausilio Bauen of Imperial College London.

Identifying potential environmental impacts of large-scale deployment of dedicated bioenergy crops in the UK, Renewable and Sustainable Energy Reviews*, 2008.*

Harnessing the power of the tides

Proposed tidal barrages in estuaries on Britain's west coast could provide 10% of the nation's electricity.

But they could also disrupt shipping and industry and seriously affect wildlife-rich intertidal habitats. Computer models developed at Proudman Oceanographic Laboratory (POL) with the University of Liverpool will help minimise such problems by predicting the effects that barrages in different places would have on tides.

'Virtually every estuary in Britain has some nature conservation status,' said Dr Judith Wolf of POL. 'But our simulations can tell us the best way to retain tidal ranges, and where tidal ranges would be unaffected.'

Carbon capture and storage in China

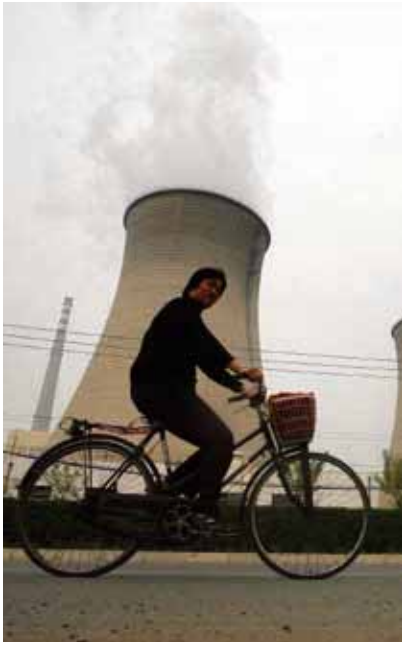
Coal-fired power plants, a leading source of carbon dioxide, continue to be built to meet China's growing energy needs.

British Geological Survey (BGS) researchers have worked with Chinese scientists and officials to develop ways to reduce these new power stations' climate impact by capturing carbon dioxide and storing it underground.

A 2009 seminar, hosted by BGS, brought together UK, European and Chinese geoscientists to discuss the potential for geological carbon capture and storage (CCS) in China.

'As China builds more coal-fired power stations it is locking in carbon dioxide emissions for 30, 40, 50 years to come,' said Jonathan Pearce of BGS. 'It's very important we try to help China decide whether CCS is a possible route for them to deal with these emissions.'

Further information: www.nzec.info



Reuters/David Gray

Natural hazards

From developing a countrywide system to predict floods several days ahead to volcano monitoring, in 2008-09 NERC-funded early-warning systems have helped vulnerable people and reduced economic losses.

Reuters/Stringer

Probing the causes of the Sichuan quake

When a devastating earthquake struck Sichuan in China in 2008, Dr Alexander Densmore of Durham University was the first UK scientist and one of the first from any Western nation to visit the area.

Looking for clues to the earthquake's causes, his team successfully mapped the faults and measured the amount of movement it caused. This information adds enormously to our understanding of the risk of future earthquakes in the region.

'The earthquake occurred along faults we knew were active, so in that sense it was foreseeable, but not predictable,' said Densmore. He warned that Chinese authorities could be well-advised to prevent new construction in potentially risky areas. 'If they consider imposing buffer zones around faults, they could save a lot of lives in the future,' he added.

Flood risk to increase under global warming

Evidence of a link between extreme rainfall and warm weather suggests rainstorms may become more severe under global warming than previously predicted.

Climate scientists led by Dr Richard Allan of the National Centre for Earth Observation analysed satellite data from 1987 to 2004 to look at natural changes in tropical ocean temperature and rainfall intensity caused by El Niño.

'There is a major concern that heavy rainstorms will become more common and more intense in a warmer climate,' said Allan.

The risk of flooding could in turn intensify. A separate study – led by Dr Hayley Fowler of the University of Newcastle and published in the *International Journal of Climatology* – shows extreme rainfall and flooding becoming more severe across Britain

by the end of the century.

Atmospheric Warming and the Amplification of Precipitation Extremes. Science, *2008.*

Multi-model ensemble estimates of climate change impacts on UK seasonal precipitation extremes. International Journal of Climatology, *2009.*

Understanding volcano risk

A renewed crisis developed at the Soufriere Hills volcano on Montserrat following a large explosion at the end of July 2008. Persistent cloud cover meant that the explosion's effect on the volcano's lava dome was not known and people living nearby were evacuated as a precaution.

Scientists from the National Centre for Earth Observation (at the University of Reading), the Montserrat Volcano Observatory and the British Geological Survey invoked an international charter to immediately image the volcano through the cloud using very high-resolution radar.

They saw that the explosion had not increased the future risk and briefed the authorities, who revoked the evacuation – all without any sight of the lava dome.

Forecasting floods across the nation

Scientists at the Centre for Ecology & Hydrology (CEH) are working with colleagues at the Met Office and Environment Agency on a new nationwide flood early-warning system following the Pitt Review of the flooding of 2007.

The system, which will be used by the new Flood Forecasting Centre, divides England and Wales into one-kilometre squares and provides advance warning of flooding in each of them. It will work alongside existing regional flood-warning systems, which focus on particular river catchments and monitoring stations.

'This will complement existing systems by giving us a coherent national picture of flood risk and by forecasting further ahead in time,' said Bob Moore, head of the Hydrological Modelling and Forecasting Group at CEH.

The system is planned to be in operation by autumn 2009 and supporting nationwide flood alerts by 2010.

Monitoring the Soufriere Hills volcano, Montserrat.

PA/PA Archive/Press Association Images

Environment, pollution and human health

High cholesterol levels mean a bigger risk of heart disease. Armed with this type of information, doctors can assess the health of a person before he or she gets ill. What if you could do the same for the environment?

In the last decade, a whole new area of research has sprung up to investigate the links between metabolic changes, genetics and lifestyle. But it goes much further than human health.

Wojtek Buss/Photolibrary.com

Does ozone kill more people on hot days?

Ozone and heat are independently associated with increased death rates, but in some UK cities, including London, ozone effects are worse on hot days, according to researchers. Scientists from Edinburgh University and the London School of Hygiene and Tropical Medicine analysed 11 years of summertime data across 15 cities.

Lead researcher Dr Sam Pattenden said, 'Several studies have examined summer mortality resulting from heat or exposure to high ozone concentrations. Information on links between heat and ozone health effects is sparser.'

The findings are particularly important because several climate modelling studies suggest temperatures during the 2003 heatwave may become the summer norm in the late 21st century.

Ozone and mortality in 15 British conurbations: is the effect worse on hot days? Impacts of future environmental change on climate and air pollution-mediated human health. Environmental Health*, in preparation 2009.*

Metabolomics and bioinformatics facilities

A budding new area of science means we can now get a snapshot of the health of an animal or plant long before it shows signs of serious problems. Known as metabolomics, it lets researchers investigate the links between metabolic changes and an individual's genetics and lifestyle.

To help develop this new field NERC funded an expansion of its former Molecular Genetics Facility to include a metabolomics centre at the University of Birmingham and a bioinformatics centre at the Centre for Ecology & Hydrology (CEH).

The new facility at Birmingham will give environmental scientists access to world-class facilities for metabolomics research.

The bioinformatics centre provides data generation, bioinformatics, the new Bio-Linux computing platform and the National Grid Service and GeneSpring software licences.

Assessing pollution risks using 'omic' technologies

The Environment Agency and other regulators have a new way of assessing pollution and environmental change.

Toxicologist Professor Kevin Chipman and colleagues from the Universities of Birmingham, Exeter, Stirling and Glasgow Caledonian, as well as other agencies, used 'omics'

techniques (toxicogenomics and metabolomics) to investigate how fish respond to environmental pollution.

The researchers – part of the Post-Genomics and Proteomics programme – wanted to understand the molecular mechanisms fish use to respond to pollution. This response may affect the genetic diversity of flounder and stickleback fish.

Chipman said, 'We successfully characterised fishes' responses to pollution at a molecular level and identified adaptive responses, some of which offer potential biomarkers for environmental monitoring.'

Hepatic transcriptomic profiles of European flounder (Platichthys flesus) from field sites and computational approaches to predict site from stress gene responses following exposure to model toxicants. Aquatic Toxicology, *2008.*

Developing more nutritious food

Fruit and vegetables grown in polytunnels could be made more nutritious by growing them under special plastic films that let the sun's ultraviolet rays through.

Plants produce chemicals called flavonoids to protect their cells from harmful UV rays. Flavonoids make food tastier, have antioxidant properties, reduce the risk of some cancers and help protect against heart disease.

Traditional polytunnels exclude UV rays. But scientists from the Rural Economy and Land Use (RELU) programme based at the University of Reading discovered that a red variety of lettuce grown under commercial conditions responded dramatically to the UV-transparent film. Higher UV levels caused the leaves to redden and increased concentrations of the main flavonoids.

Christa Kniffi/Alamy

UK's first environmental nanoscience facility

In 2009, NERC launched the Facility for Environmental Nanoparticle Analysis and Characterisation (FENAC), based at the University of Birmingham.

The facility builds on the success of the Environmental Nanoscience Initiative and will provide analytical support over the whole range of environmental nanosciences.

'The environmental and human health impacts of manufactured nanoparticles are currently unknown but potentially serious,' said facility director Professor Jamie Lead.

'To gain full benefits from nanotechnology, these potential risks must be identified and minimised.'

FENAC collaborates with the nanotoxicology community, who are investigating the biological uptake and effects of these manufactured nanoparticles.

More information: www.gees.bham.ac.uk

UK rivers still too acidic for sensitive species

Mayflies, freshwater snails and other invertebrates in Welsh rivers are recovering more slowly than expected, even though the cause of their decline – acid rain – is no longer the problem it was.

These are the results of a 25-year study of 14 Carmarthenshire rivers,

Bartomeu Borrell/Photolibrary.com

which found just four new species of insect had recolonised the waterways.

Recent wet winters, which increased acidity in moorlands and forest streams, are to blame. The research confirms that while conditions in upland British streams are improving, ecological recovery is marginal.

Lead author Professor Steve Ormerod from Cardiff University said, 'Streams have been acidified enough to cancel out up to 40% of the last 25 years' improvements.'

The findings, funded by Defra, NERC and others also showed that adding lime to soils to reduce acidity had few long-term benefits.

Restoration and recovery from acidification in upland Welsh streams over 25 years. Journal of Applied Ecology, *2009.*

Kite mark for manure pollution risk

A new system lets farmers recycle manure without risking pollution to nearby streams and rivers.

The tool, developed by researchers working on the Rural Economy and Land Use (RELU) programme, helps farmers visualise and understand contamination risks.

'The kite risk-assessment tool illustrates whether the farm is high risk, and how the farmer can apply his efforts most effectively and at least cost,' said project leader Dr Dave Chadwick from North Wyke Research.

'We have also developed a cost-assessment tool that offers farmers a list of the methods they could use to reduce the risk of microbial pollution, together with what each method would cost,' he added.

Earth system science

The idea that Earth's climate will change smoothly as greenhouse gases rise is being challenged, as some scientists contend this picture may not reflect reality. Thresholds, or tipping points, may be reached that lead to rapid changes. UK scientists have now assessed the likelihood of crossing nine of the known policy-relevant tipping points this century.

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Identifying looming tipping points

Key components of the Earth's climate system could pass a tipping point within the next century, according to research led by Professor Tim Lenton of the University of East Anglia and the Tyndall Centre for Climate Change Research.

The study found that Arctic sea ice and the Greenland ice sheet could be closest to their tipping points. Seven other systems, including the Indian summer monsoon and Amazon rainforest, could be threatened by climate change this century.

A tipping point is a critical threshold at which even a small change caused by human activity could have large, long-term consequences for the Earth's climate system.

'A variety of tipping elements could reach their critical point within this century under human-induced climate change,' said Lenton.

Tipping elements in the Earth's climate system. Proceedings of the National Academy of Sciences*, 2008.*

Tiny shifts in ocean temperature trigger ecological sea change

Scientists have identified critical 'tipping points' in the ocean's temperature. They trigger abrupt shifts across whole ecosystems, affecting biodiversity and potentially reducing numbers of species like Atlantic cod, which are already suffering from over-exploitation.

'The North Sea can no longer support as many cod as it had in the past, now that it has crossed the threshold to become a warm temperate system,' said Dr Martin Edwards of the Sir Alister Hardy Foundation for Ocean Science.

Such 'regime shifts' have been reported before, following small temperature changes, but this is the first time they have been understood as a global phenomenon.

The research lets scientists predict major ecosystem shifts and will help policy-makers in areas like fisheries policy plan to adapt to climate change. *Causes and prediction of abrupt climate-driven ecosystem shifts in the North Atlantic.* Ecology Letters*, 2008.*

Quantifying effects of man-made atmospheric nitrogen on the ocean

Up to a third of the atmospheric nitrogen that ends up in the oceans is man-made, a landmark study published in *Science* reveals.

Nitrogen encourages phytoplankton growth, which ultimately means the oceans absorb more atmospheric carbon dioxide, but the researchers found that two-thirds of this benefit may be offset by an increase in harmful nitrous oxide emissions.

An international team, including Professor Tim Jickells of the University of East Anglia, estimated the amount of man-made nitrogen entering the ocean in 1860, 2000 and 2030.

'Nitrogen gets into the atmosphere from car exhausts and power stations as well as from nitrogen fertilisers, so we need to understand the impact of all of them,' said Jickells.

Impacts of atmospheric anthropogenic nitrogen on the open ocean. Science*, 2008.*

Eddies behind recent warming of the Southern Ocean

Swirling eddies in the world's largest ocean current could explain the recent warming seen in the Southern Ocean, according to research published in the *Journal of Climate*.

An international team of researchers – led by Dr Andrew Hogg of Australian National University and including NERC-funded scientists – developed a high-resolution climate model specifically to look at Southern Ocean eddies.

Their findings contradict the predictions of some climate models, which show that the stronger winds of recent years push cold water across the Antarctic Circumpolar Current leading to cooling rather than warming.

'If the resolution of standard climate models were altered to include ocean eddies, large experiments would be too expensive to run using existing supercomputing resources,' said Dr Mike Meredith of the British Antarctic Survey, who co-authored the work.

Eddy heat flux in the Southern Ocean: response to variable wind forcing. Journal of Climate*, 2008.*

Greenhouse gases shrouded Snowball Earth

Vast ice sheets covering the Earth 630 million years ago co-existed with high levels of atmospheric CO_2 normally associated with a warm climate, according to research published in *Science*.

Rocks showing signs of past glaciation crop up in nearly every continent, indicating that ice sheets must have covered the entire planet at some point in its history – the Snowball Earth theory. According to the theory, CO_2 emitted by volcanoes would build up in the atmosphere until it reached a level high enough to trigger a melt.

Until now the controversial theory lacked evidence. But researchers, including Professor Ian Fairchild of the University of Birmingham, found evidence for it after analysing ancient Arctic rocks.

'We confirmed this idea using exciting new methods on samples that had been archived for 25 years,' said Fairchild.

Stretching the envelope of past surface environments: neoproterozoic glacial lakes from Svalbard. Science*, 2009.*

Taiwanese typhoons bury carbon at sea

The effect of typhoons on tropical rivers could prove important in removing carbon from the atmosphere, according to new research.

Researchers analysed carbon in the LiWu river, Taiwan, during typhoons.

Using radiocarbon techniques to distinguish between carbon from rocks and modern carbon from plants and soil, they found the river carried more modern carbon at the peak of storms during torrential rain. At this time rivers carry huge amounts of sand and mud to the ocean, resulting in the burial of the carbon at great depths.

'Climate is an important driver

Reuters/Nicky Loh

controlling the erosion of soil and vegetative organic carbon,' said Dr Robert Hilton, formerly of the University of Cambridge, who took part in the research.

As extreme weather is expected to get more frequent, tropical rivers' ability to bury organic carbon may increase. *Tropical-cyclone-driven erosion of the terrestrial biosphere from mountains.* Nature Geoscience*, 2008.*

Technologies

Environmental scientists often need to get to remote inhospitable places. New advances in unmanned autonomous vehicles are giving researchers access to places once thought unreachable.

In 2008-09, an autonomous submarine ventured farther under an ice shelf than ever before; unmanned aircraft completed missions above Antarctica; and ocean gliders provided a cost-effective way of monitoring the oceans.

The underwater glider ready for launch at the National Oceanography Centre, Southampton.

Unmanned vehicles aid remote research

Unmanned submarines, aircraft and ocean gliders are helping researchers reach formerly inaccessible places.

Autosub, designed by engineers at the National Oceanography Centre, Southampton (NOCS), successfully returned from six perilous missions under the Antarctic ice shelf. The expedition was necessary to find out why the ice of the Pine Island glacier has been thinning and moving more quickly in recent decades.

Researchers from the British Antarctic Survey and the Technical University of Braunschweig sent robot aircraft over the Weddell Sea to measure convection above sea ice. This is the first time fully automated aircraft have flown in Antarctica, proving that miniaturised sensors on small robots can now do science in areas too risky for people.

And researchers from NOCS, the Scottish Association for Marine Science and other marine institutes have been launching underwater gliders into the Atlantic Ocean to measure ocean properties cost-effectively.

'Gliders are changing the way we observe the ocean,' said David Smeed from NOCS.

World's biggest digital geological mapping initiative

The OneGeology initiative has created digital maps of the Earth's rocky structure; it is doing for the world below our feet what Google Earth has done for the surface of the planet.

The project – the world's biggest digital geological mapping initiative – allows people to share geological information. Better access to geological map data will help improve prediction of natural disasters, find valuable resources and discover places in which to store CO_2 underground.

'Knowledge of the rocks we all live on has become increasingly important.

Sharing that knowledge at a time of global environmental change is crucial,' said Ian Jackson, project coordinator from the British Geological Survey (BGS).

The project, a collaboration between geologists and computer scientists in 102 nations, was the key feature at the opening ceremony of the 2008 International Geological Congress in Oslo. It has attracted huge interest from the international media.

BGS has also embarked on two other landmark projects – 3D mapping of the geology beneath London and the Clyde Estuary.

More information: www.onegeology.org

Sat nav signals measure ocean wind and waves

It is rarely a problem to tell how rough the sea is when you are afloat on it. But gauging conditions from a distance and across a wider area has always proved harder.

Now scientists have pioneered a way to use signals from satellites in navigation systems like the Global Positioning System (GPS) to measure the intensity and direction of ocean wind and waves from space. The new technique, developed by the National Oceanography Centre, Southampton (NOCS), with Surrey Satellite Technology Ltd and the University of Sannio in Italy, could help improve advance warning of storms and weather forecasts.

'In the future we would like to put this kind of inexpensive Earth observation payload on more satellites,' said Dr Christine Gommenginger, a specialist in exploiting satellite data for oceanography.

Songbird migration tracked

For the first time scientists have tracked songbirds like wood thrushes and purple martins during their epic migrations from North to South America and back again.

One purple martin took 43 days to reach Brazil during autumn migration, but in spring returned to its breeding colony in just 13 days.

A team from York University in Toronto mounted geolocators, miniaturised by scientists at the British Antarctic Survey, on 14 wood thrushes and 20 purple martins in 2007.

The locators measure light level. This lets researchers infer the time of sunrise and sunset, which indicates location.

Electronic engineer James Fox from the British Antarctic Survey said, 'We are producing the smallest geolocators in the world.'

Better flash flood prediction

For the first time, scientists have devised a way of mapping air humidity close to the ground. The technique uses radar data previously rejected as interference by the Met Office's operational network of rain radars. Visualising changes to surface humidity helps predict areas of developing convection and associated flash flooding.

Professor Anthony Illingworth from the University of Reading said,

'Our system is now operating 24 hours a day, seven days a week on the Cobbacombe network radar in Devon.'

The Met Office is rolling out the system on all UK radars.

Diamond light source

A rare kind of rust could be used to stop pollution leaking from contaminated sites, according to new research using powerful X-ray beams generated by specialist equipment called synchrotrons.

Scientists led by Dr Andy Shaw from the University of Leeds used the Diamond Light Source synchrotron to find ways to keep green rust in its reactive state for longer.

Green rust in its reactive state makes pollutants such as chromium, uranium, selenium and technetium insoluble, so it may help stop pollution spreading.

'Green rust is so unstable that it's extremely difficult to study,' said Shaw. 'Using the synchrotron lets us analyse it in conditions very close to those in contaminated soil.'

Defying gravity

A new satellite launched in March 2009 will help oceanographers map the world's currents by focusing on Earth's gravity field.

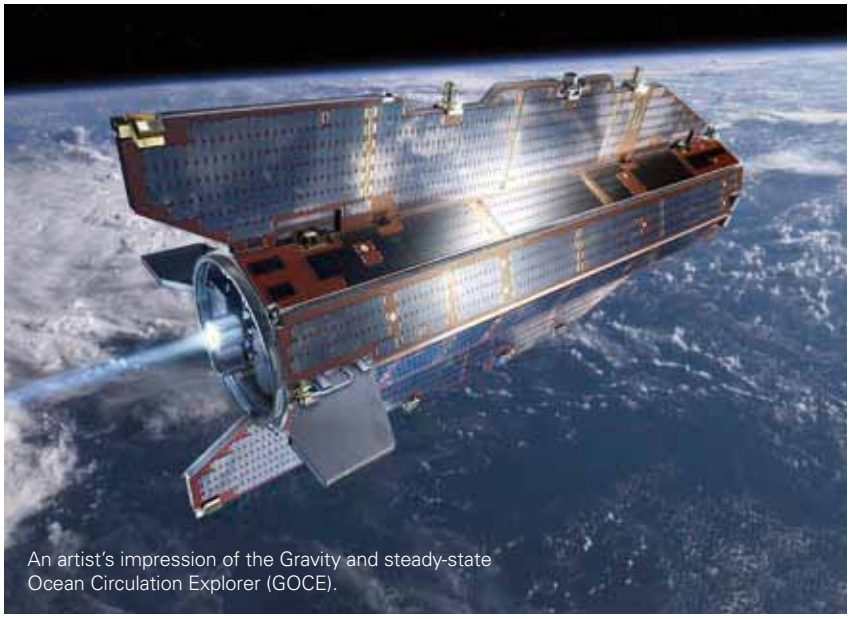
Understanding variations in the gravity field will also provide new information on the Earth's interior, including the movement of magma beneath volcanoes.

The European Space Agency satellite, called Gravity and steady-state Ocean Circulation Explorer (GOCE), was launched from the Plesetsk cosmodrome in Russia.

GOCE's sleek aerodynamic shape lets it cruise just 160 miles above Earth's surface at the edge of the atmosphere.

Many UK scientists are eagerly awaiting its first results. Professor Chris Hughes, an expert in ocean circulation at the Proudman Oceanographic Laboratory (POL) said, 'We're delighted the satellite has successfully made it into orbit; now the really exciting challenges begin.'

NERC invests over £40 million a year in the European Space Agency and GOCE's ion thrusters were built in the UK.



An artist's impression of the Gravity and steady-state Ocean Circulation Explorer (GOCE).

ESA-AOES Medialab

Knowledge exchange

In 2008, the UK's Committee on Climate Change, which includes NERC-funded researchers, recommended the UK reduce greenhouse gas emissions by 80% by 2050. This will be one of the biggest challenges the UK economy has ever faced.

Underlying this major policy decision is the massive global effort by environmental researchers in the past two decades to forewarn of major changes in the Earth's climate system. The UK is considered a world leader in climate research and NERC is the country's largest funder in this area of science.

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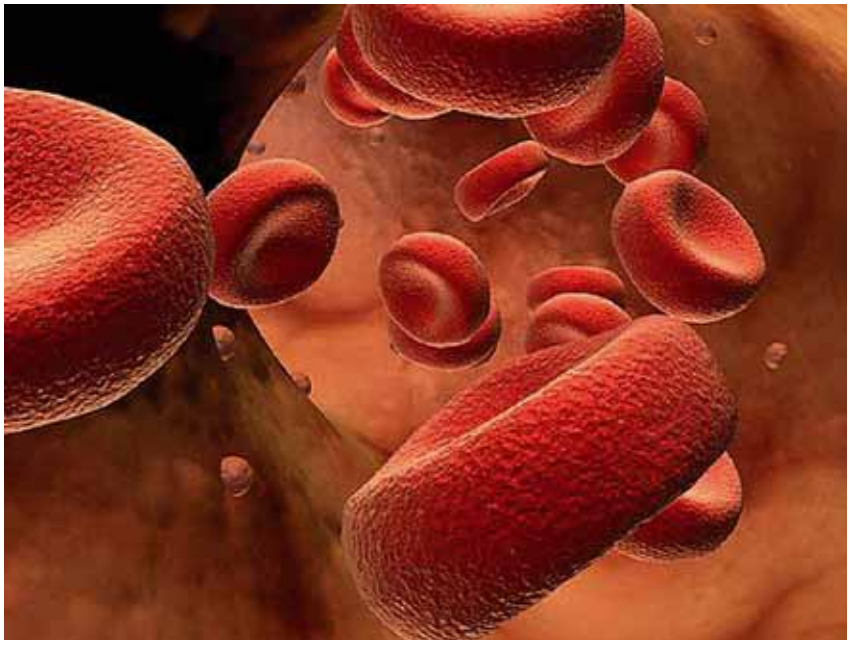
UKERC influences 80% emissions-cut targets

The UK government recently committed to a new target of cutting greenhouse gas emissions by 80% by 2050. In April 2009, the Chancellor included carbon budgets in the budget statement for the first time. Both decisions were based on advice from the newly formed Committee on Climate Change.

One of the committee's members is Professor Jim Skea, head of research at the UK Energy Research Centre (UKERC) and vice-chair of Working Group III of the United Nations Intergovernmental Panel on Climate Change.

UKERC, funded by NERC and other research councils, provides authoritative, impartial advice on energy to the British government. Its work is strongly influencing policy, and has been cited in the 2007 Energy White Paper and the White Paper on nuclear power. UKERC is mentioned several times in the House of Lords European Union Committee report on the EU's renewable energy target in reference to issues like the proposed Severn tidal barrage.

UKERC expertise also contributed to the recent government announcement that new coal-fired power stations can be built if they feature carbon capture and storage technology.



Medical RF.Com/Science Photo Library

From molten metal to blood clots

Scientists have adapted mathematics designed to model how planets form to predict where blood clots could form in diseased hearts.

Professor Nick Petford at Bournemouth University developed equations to simulate how a planet's molten core forms when liquid metal makes its way through tiny fissures in the solid rock. He then realised they could apply to other liquids.

'We solved the fluid flow equations around the meteorite straight from the image,' Petford explained. 'But the trick is, it could be any image.'

Working with heart specialists, he found that importing images from MRI scans of patients' hearts into his software let him predict the flow of blood – and where it might stagnate and form deadly clots. When surgeons investigated, they found the predictions were right. 'What we can start to think about now are bespoke blood-flow models,' Petford added.

Tougher ozone controls needed

Existing controls on emissions that cause ozone production are not enough to cut pollution to acceptable levels, according to a Royal Society report that is influencing policy worldwide.

An international working group on the sources and effects of ozone at ground level concluded that since pollutants do not respect national boundaries and the emissions controlling ozone over Europe come from all countries in the northern hemisphere, the current patchwork of regulations needs to be replaced by a comprehensive international framework.

'Ozone is a global traveller and one of the most pervasive air pollutants,' said Professor David Fowler at the Centre for Ecology & Hydrology, who chaired the study. 'Weather systems transport ozone, and the pollutants that lead to its formation, often far from their point of origin.'

Ozone is a greenhouse gas as well as harming plants and animals; it is estimated to cause more than 21,000 premature deaths in Europe each year, and did €6.7 billion of damage to crops in 2000.

Ground-level ozone in the 21st century: future trends, impacts and policy implications. Royal Society, *2008*.

Protecting endangered shorebirds

The Dutch population of black-tailed godwits has been dropping rapidly, and in 2007 Dr Jenny Gill of the University of East Anglia organised a workshop bringing together international researchers to find out why.

They concluded that problems in the Netherlands and in Africa, where the birds spend winter, are responsible. In the Netherlands, dropping water levels are destroying wetland habitat.

In Africa and en route there, wetlands have almost disappeared. The godwits must now feed in rice fields, and many of these are threatened.

The workshop included NGOs and consultants reporting to the EU Ornis committee and the secretariat of the African-Eurasian Waterbird Agreement.

The black-tailed godwit.

Danny Ellinger/FN/Minden/FLPA

Patents filed

2006-07	6
2007-08	10
2008-09	7

They have fed the workshop's recommendations, which include better protection for rice fields and efforts to raise Dutch water levels, into their reports. Policy-makers are now considering how to implement them.

Communicating ocean acidification

Climate change grabs the headlines, but other consequences of carbon dioxide emissions like ocean acidification could be as big a threat.

Dissolved carbon dioxide means that by the end of the century the oceans are predicted to become more acidic than they have been for 20 million years.

This could badly affect calcifying marine organisms, dissolving their chalky shells. Creatures from plankton at the base of the food chain to sea urchins, crustaceans and the coral reefs which millions of people depend on for food are all at risk.

Plymouth Marine Laboratory is recognised as a leading centre for research into the issue. Senior scientist Dr Carol Turley was among the authors of the 2005 Royal Society report which helped bring it to the attention of policymakers and the public, and has since become an IPCC lead author and spoken at international events including the 2009 United Nations Climate Change Congress in Copenhagen.

The world avoided by the Montreal Protocol

Climate change would be an even bigger problem if governments had failed to tackle the ozone hole.

The landmark 1987 Montreal Protocol curbed CFC emissions; without it these emissions could have triggered as much warming as carbon dioxide emissions by the end of the century.

'It's a very good thing that we didn't keep emitting CFCs at early 1980s levels – doing so would have had a substantial climate impact,' said co-author Professor John Pyle, from the University of Cambridge and co-director of the National Centre for Atmospheric Science (NCAS).

'The Montreal Protocol has already had a huge impact on climate change, over and above the benefits that have come out of Kyoto,' he added.

The World Avoided by the Montreal Protocol. Geophysical Research Letters, *2008*.

An example of coral bleaching.

Tom Stack/WaterFrame/Photolibrary.com

Protecting plants without pesticides

Lancaster University scientists have discovered a potentially revolutionary way of harnessing plants' natural defences to deter insect pests.

Jasmonic acid (JA) is a natural defence against pests. When a plant is attacked, it produces JA as an internal signal to make its own chemicals that protect against the insect damage.

The researchers found that soaking tomato seeds in JA caused the resulting plants to suffer significantly less insect damage for at least eight weeks after germinating. The effect also

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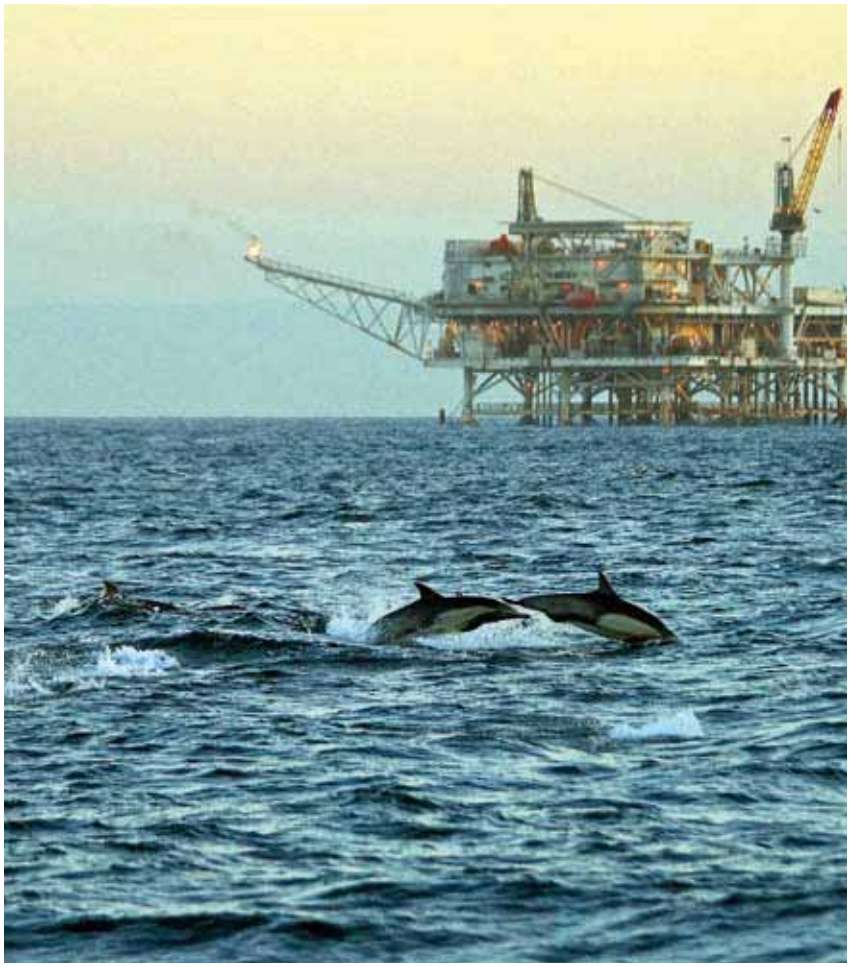
Royalties and licence income by research centres (£k)

Centre	2006-07	2007-08	2008-09
British Antarctic Survey	13	31	23
British Geological Survey	1,692	2,279	1,830
Centre for Ecology & Hydrology	197	405	253
Proudman Oceanographic Laboratory	75	48	45
Swindon Office	10	5	0
Total	**1,987**	**2,768**	**2,151**

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

	2005-06	2006-07	2007-08	2008-09
UK private sector	13.3	9.3	5.4	4.8
Total at 2008-09 prices	14.3	9.8	5.5	4.8

Figures include Integrated Ocean Drilling Program income to BGS.



Peter Bennett/Ambient Images/Photolibrary.com

seems to work on other species like peppers and wheat.

The technology could help prevent costly crop damage without pesticides.

Through the services of PBL (Plant Bioscience Limited), and following tests in North America last year, the technology has now been commercially licensed worldwide; treated seeds should be on the market in 2010.

SMRU Ltd – commercialising sea mammal science

The Sea Mammal Research Unit (SMRU) has successfully launched a commercial arm as a limited company to profit from its expertise.

SMRU Ltd advises clients including the British and US navies, offshore construction firms and the oil and gas industries about environmental monitoring and mitigation, helping them comply with environmental regulations.

'There are a huge number of positives and very few negatives to this,' said Professor Ian Boyd at SMRU. 'It gives us massive leverage over our intellectual property and expertise.'

Because marine mammals are so sensitive to problems like water contamination or noise pollution from seismic surveys or sonar, regulators see them as an indicator for the health of whole ecosystems.

In three years the company's turnover has grown to £1.5m with profits of £400,000. It hopes to multiply that turnover by ten times over the next half-decade; it recently opened an office on the US west coast and plans others elsewhere in the world.

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

Centre	2007-08	2008-09
BAS	1,464	1,963
BGS	16,127	16,934
CEH	10,237	9,993
NOCS	2,062	1,786
POL	1,604	3,436
Swindon Office	1,941	1,086
Total	**33,435**	**35,198**

Figures do not include funding received from other bodies classified as financing of £6.546m (2007-08: £8.177m).

Trends in publications with industry

	2007			2008		
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	1,574	44	3	1,538	59	4
Research programme	1,715	87	5	1,921	63	3
National capability	604	15	2	631	33	5
Total	**3,893**	**146**	**4**	**4,090**	**155**	**4**

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. 2007 figures are revised.

People

The UK has a world-class record in environmental science. This reputation helps attract and retain the best scientists and support staff.

NERC's postgraduate training programmes are producing the scientists of tomorrow. Around half our PhD students go on to work in industry and roles shaping policy.

Secretary of State for Energy and Climate Change Ed Miliband, and Dr Eric Wolfe, during a fact-finding mission to the British Antarctic Survey's ice-core facility.

Climate briefings

Prince Charles, the Secretary of State for Energy and Climate Change, Ed Miliband, and the Secretary of State for Environment, Food and Rural Affairs Hilary Benn all visited the British Antarctic Survey to be briefed on climate change

Benn commented on his Defra blog, 'I was tremendously impressed by what I saw, and in particular their work on measuring temperature and carbon dioxide from ice cores which are hundreds of thousands of years old.'

BAS in partnership with the University of Cambridge has also developed a series of seminars for over 750 senior business leaders to help them understand the science of climate change and address its challenges and opportunities for their businesses and their customers.

***Planet Earth* short-listed for national awards**

In October 2008, NERC launched PlanetEarth*online*, a news site that is updated daily, to complement its award-winning magazine *Planet Earth*. The site rapidly became an invaluable resource, regularly used by the media to source stories.

Google has accepted the site as an independent news source. Its weekly podcasts are available on iTunes. Blogs from researchers as far apart as the Afar Depression in Ethiopia and the Japan Trench in the Pacific Ocean have led to worldwide headlines. Footage from the HADEEP expedition to look for life in the depths of ocean trenches, which first appeared on the PlanetEarth *online* blog, was viewed by more than 1.5 million people around the globe.

The website and the magazine, which has a circulation of 20,000, have been shortlisted for two Chartered Institute of Public Relations awards: magazine of the year and website of the year.

Avoiding the credit freeze – in Antarctica

The British Antarctic Survey's (BAS) website buckled under the weight of interest in its recruitment campaign for chefs, electricians and plumbers on the planet's coldest continent – Antarctica.

Amid the gloom of financial crises and redundancies, the news attracted much media interest.

Over 45,000 people visited the vacancies pages on the BAS website.

'We received over 1100 applications for the Antarctic trades posts', said head of communications Linda Capper.

Sailing over changing seas

The Tall Ships event in Liverpool in 2008 attracted more than a million visitors. One of the most successful attractions at the event was the Oceans 2025 'Sailing Over Changing Seas' exhibition, organised by enthusiastic teams from six marine laboratories, the British Geological Survey (BGS) and NERC.

The exhibition featured research themes along the route of the race and included the Atlantic heat conveyor, oceans for energy, sea mammal research, alien species, climate change in the abyss and NERC's fleet of research ships.

Elements of the exhibition have already been reused at BGS open days and at the final departure of QEII.

Royal Society Summer Exhibition

The oceans and climate linked three exhibits featuring NERC-supported research at the Royal Society's Summer Science Exhibition.

Visitors to the 'breathing ocean' display saw data from research ships monitoring carbon dioxide and other gases around the world.

The exhibit from the GLIMPSE project (Greenland Ice Margin Prediction, Stability and Evolution) showed how aerial photographs, satellites, lasers and other high-tech gadgets help scientists better understand climate change and measure the changing Greenland Ice Sheet. The research, funded by the Leverhulme Trust, worked with NERC's Airborne Research & Survey Facility (ARSF).

And teenagers studying science in Liverpool teamed up with scientists from the Proudman Oceanographic Laboratory (POL) to discover whether the river Mersey is over-fertilising the Irish Sea.

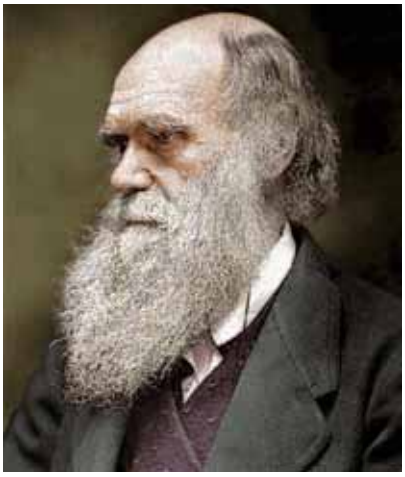
Darwin 200

A touring exhibition and a special issue of NERC's award-winning magazine Planet Earth contributed to celebrations marking Charles Darwin's 200th anniversary.

All events and public-engagement activities throughout the year were coordinated under the banner 'Darwin 200', a consortium of organisations led by the Natural History Museum and including NERC and other research councils.

NERC-funded scientists have been involved in many activities, including advising and appearing in numerous TV programmes.

Professor George Turner from the University of Bangor, for example, advised producers of the BBC/Discovery Channel co-production What Darwin Didn't Know. 'I accompanied the film crew and presenter, briefing them on our research on cichlid fish speciation,' said Turner.



NHM/London

The great land use debate

The Great Land Use Debate – an online discussion – attracted the attention of the *Guardian*, BBC Radio 4's *Farming Today* and the National Farmers' Union.

The debate, kicked off by Secretary of State Hilary Benn, was devised by the Rural Economy and Land Use (RELU) programme as part of National Science and Engineering Week. It asked questions like: What is our long-term vision for land use in the UK? Should farmers diversify into energy crops? Is it reasonable to expect farmers to be guardians of wildlife and landscapes?

Hilary Benn said: 'We...need a properly informed debate about how to get the best from our land, based on the most up-to-date evidence. I believe that RELU has a key role to play in this.'

Staff, students and fellows

	2005-06	2006-07	2007-08	2008-09
Directly employed staff	2,736	2,659	2,573	2,459[1]
Staff in HEIs[2]	1,216	1,227	1,300	1,240
Fellows	98	97	100	86
PhD	1,032	996	969	988
Masters[3]	335	383	371	362

Notes:
1 *This figure excludes 87 employees transferred to the new Research Councils Shared Service Centre and seconded back to NERC.*
2 *Staff in higher education institutions employed on research grants.*
3 *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.*

National capability

NERC's national capability, which includes its expertise, data, facilities and equipment, is an invaluable asset to the UK economy. Sea-level information accurately predicts storm surges. Other ocean data have helped Google launch its latest service – Google Ocean. And NERC's climate expertise influenced the European Space Agency's decision to build its first UK facility.

Taking readings during the Countryside Survey.

Countryside Survey

Environment Secretary Hilary Benn welcomed the results of the biggest and most comprehensive survey of the UK's countryside and its natural resources – the £10 million Countryside Survey.

Benn said, 'The countryside lies at the heart of our prosperity, health and well-being.

'We must ensure the landscapes, wildlife and ecosystems that provide us with the essentials of life are not only looked after but are improved for future generations.'

The survey, the fifth since 1978, shows how fields, woods, ponds, hedges, streams, heaths and moorlands have changed.

A team of 80 Centre for Ecology & Hydrology (CEH) scientists surveyed 591 randomly selected sites in England, Scotland and Wales.

The project, commissioned by NERC, Defra and other government departments and agencies, was managed by CEH. The results of the 2007 field survey were published in November 2008.

More information: www.countrysidesurvey.org.uk

UK marine researchers help develop Google Ocean

Scientists from the National Oceanography Centre (NOCS), Plymouth Marine Laboratory (PML) and other marine research institutes worked with Google to help populate the 'Oceans' layer of Google Earth, which contains ocean-floor, water-column and surface data from marine experts around the world.

Virtual travellers can swim around underwater volcanoes, watch videos about exotic marine life, read about nearby shipwrecks, contribute photos and videos of favourite surf and dive spots and keep up to date with current research cruises through near real-time blogs.

Google Chief Executive Officer Eric Schmidt said, 'In discussions about climate change, the world's oceans are often overlooked despite being an integral part of the issue.'

Professor Stephen de Mora, PML's Chief Executive, said, 'The oceans layer is a wonderful tool and will help convey what life is like for marine scientists aboard a research cruise.'

UK sea-level rise

Sea-level rise predictions included in the 2002 UK Climate Impacts Programme remain valid, according to researchers from Proudman Oceanographic Laboratory (POL).

'We estimated long-term sea-level trends around the UK based on records from the UK National Tide Gauge Network,' said Dr Phil Woodworth from POL.

The researchers say a sea-level rise of 1.4 mm per year around the UK coast during the 20th century can be attributed to climate change.

'Predictions of future UK sea-level changes will be included in the upcoming 2009 UK Climate Impacts Programme report. However, our study suggests that there are unlikely to be major modifications to the existing projections for the 2080s as included in the 2002 UKCIP studies,' added Woodworth.

Better storm surge prediction

An improved system for predicting storm surges in the UK has been adopted by government agencies and forecasters for coastal flood forecasting.

Proudman Oceanographic Laboratory (POL) collaborated with the Met Office to demonstrate the benefits of a new type of coastal flood forecasting – probabilistic forecasting. The new approach produces not one but several forecasts. Each forecast uses slightly different initial conditions and other parameters allowing forecasters to improve how they quantify uncertainty.

Dr Kevin Horsburgh, Head of the National Tide and Sea Level Facility at POL said, 'Our work proves that the storm surge ensemble gives better, more quantitative management of flood risk. It is highly valued by the Environment Agency.'

Reducing flood risk, protecting wildlife

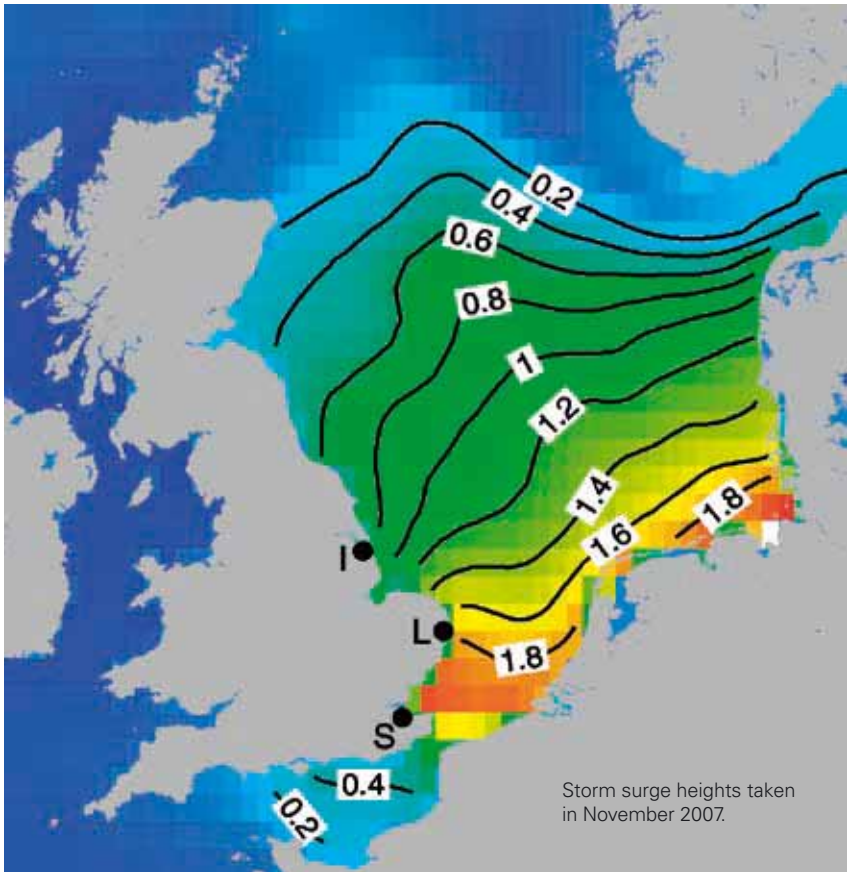
Following major UK floods in 2007, Professor David Gowing from the Open University received a NERC urgency grant to investigate the threat to biodiversity.

'We mobilised within ten days to collect samples around the country, assisted by NERC's quick response to our funding request,' said Gowing.

They found over 500kg of phosphorus per hectare had been deposited in places. Such high nutrient levels risk damaging plant communities.

'The Environment Agency has already used our results to assess nutrient supply as part of their flood-risk management scenarios,' added Gowing.

The information has helped the agency develop ideas for alleviating flood risk to Oxford while protecting the unique Thames meadows.



Storm surge heights taken in November 2007.

Barry Batchelor Wire/PA Archive/Press Association Images

Partnerships

NERC's international team has a close relationship with Research Council UK's new offices in China, India and the United States.

The NERC Dornier 228.

UK scientists probe links between clouds and climate

A 20-strong team of British scientists, including researchers from the National Centre for Atmospheric Science (NCAS), recently returned from South America after taking part in a collaborative project to understand how clouds affect the climate. The project involved around 150 international scientists from 40 institutions in eight countries.

The project aims to grasp how some of the planet's biggest cloud systems, which form off the coast of Chile and Peru, shape the climate. The UK team worked closely with US and South American teams to prepare aircraft and equipment for use during autumn 2008.

The British team used two specially adapted NERC research aircraft – the Facility for Airborne Atmospheric Measurements (FAAM) atmospheric research BAe-146 aircraft sampled aerosol particles and clouds, while the Airborne Research and Survey Facility (ARSF) Dornier 228 used its remote sensing instruments to probe the clouds from far above.

Hermes scores top marks

A multidisciplinary programme to investigate deep-water ecosystems has been selected to appear in the top 40 projects out of 10,000 funded under the European Commission's huge Framework Six programme.

'It is important that we create a new role for science in international policy-making and diplomacy.'

Prime Minister Gordon Brown, 2009.

The successful four-year Hermes project – Hotspot Ecosystem Research on the Margins of European Seas – led to a wealth of scientific results and to research and training opportunities for 100 PhD students and 40 postdoctoral researchers.

Project co-ordinator, Professor Philip Weaver of the National Oceanography Centre, Southampton said, 'We have broken new ground by bringing together scientists, policy-makers, NGOs and industry to tackle major issues in the deep ocean.'

Some of the scientific highlights include the unexpected discovery that cold winters are behind the boom-and-bust cycle of the valuable Mediterranean deep-sea shrimp fishery and that commercial fishing in the north-east Atlantic could be harming fish populations a kilometre below the deepest reach of fishing trawlers.

RCUK international offices

Research Councils UK (RCUK) opened an office in India in October 2008, following an announcement earlier in the year by Prime Minister Gordon Brown. The announcement recognises India's rapidly growing economy and burgeoning higher education and research sectors. The New Delhi office joins RCUK offices in Brussels, China and the United States.

The office strengthens NERC's existing partnerships with the Indian

research community, most notably in climate research, food security and improving prediction of the Asian monsoon.

The UK collaborates with China on research more than any other European country and is third internationally behind the US and Japan.

Research links with the US are well-established: the UK remains the most important collaborator for US researchers, and analyses of published papers show both partners benefit from the relationship. The RCUK offices in Beijing and Washington are already adding value to NERC's international collaborations.

International research

The UK continues to play a leadership role in major international research programmes like the World Climate Research Programme (WCRP) and the International Geosphere Biosphere Programme (IGBP).

NERC manages several international project offices, hosted in NERC centres or universities on behalf of these global programmes.

These programmes have been cited by the Intergovernmental Panel on Climate Change (IPCC) as the best way to plan and carry out international research.

IPCC co-chair Dr Susan Solomon and Professor Martin Manning, former head of the IPCC Working Group I Technical Support Unit, wrote in *Science* in 2008, 'The planning and coordination of international research are best carried out by organisations such as WCRP, IGBP, and the International Human Dimensions Programme.'

First large-scale barter exchange cruise programme

A team of UK scientists surveyed the ocean floor in the region of the deadly 2004 Sumatran tsunami as part of a unique large-scale barter exchange cruise programme.

Researchers are keen to find out how the structure of major faults affects the size of earthquakes.

The barter exchange cruise programme is the first time two countries have negotiated use of each other's marine research equipment on such a scale and has allowed UK and German scientists to use expensive facilities cost-effectively.

UK scientists have spent 140 days on the German research ship, RV Sonne, and had the additional support of a transnational team of marine technicians on every expedition.

In exchange, NERC has hosted several cruises for German researchers and made specialist equipment available.

The British Atmospheric Data Centre to work with leading climate model data centres for next IPCC report.

The British Atmospheric Data Centre will work with the Programme for Climate Model Diagnosis and Intercomparison in the USA and the World Data Center for Climate in Germany to support the distribution and archiving of data for the next IPCC assessment report.

Climate researchers use specific but different climate models to answer their own research questions, so the World Climate Research Programme's Working Group on Coupled Modelling is running a project comparing climate models which will provide key inputs for the next IPCC report.

While the Programme for Climate Model Diagnosis and Intercomparison will lead support for the comparison project, the management and delivery of the data require a global partnership involving the British Atmospheric Data Centre and the World Data Center for Climate.

Mountain range the size of the European Alps surveyed beneath the Antarctic ice sheet

Submerged beneath thick ice, Earth's last unexplored mountain range, the Gamburtsev Mountains, has been surveyed in detail for the first time.

A seven-nation team – including an airborne geophysics team from the British Antarctic Survey (BAS) – pooled resources in one of the most ambitious and challenging Antarctic projects yet. Researchers want to know why there are mountains in the middle of the continent.

The mountain range, flanked by subglacial lakes, is thought to be the birthplace of the vast ice sheet and may contain the oldest ice on the planet – an important target for extending the climate record using ice cores.

Working in temperatures below -30°C, the survey team collected radar, magnetic and gravity data while covering 120,000 kilometres – equivalent to three flights around the globe.

UK agrees deal with Canada to share polar facilities

A new agreement between the UK and Canadian governments to share ships, aircraft and research stations in the Arctic and Antarctic to increase science cooperation paves the way for a greater understanding of the rapidly changing polar regions.

Results from International Polar Year highlight the need for more research on the regional and global consequences of disappearing ice and melting permafrost and illustrate how international cooperation is necessary to address these major challenges.

Canada and the UK are well-matched as the UK has the resources of the British Antarctic Survey and an Arctic research base. Canada has extensive Arctic infrastructure and is a signatory to the Antarctic Treaty but has no research facility on that continent.

Recent meetings have led NERC to establish a UK Arctic Office to facilitate this agreement and logistical support for UK research throughout the Arctic.

The seven-nation Gamburtsev team.

Delivering the strategy

This is an overview of NERC's expenditure, funding, environmental impacts, grant application success rates, health and safety and freedom of information requests. These are followed by a management commentary, a financial summary and an outline of organisational changes.

A British mechanical services engineer inspects solar panels on a roof at the British Antarctic Survey's Rothera base.

Reuters/Alister Doyle

The Natural Environment Research Council (NERC) was established by Royal Charter on 1 June 1965 under the Science and Technology Act 1965. NERC's mission is to gather and apply knowledge, create understanding and predict the behaviour of the natural environment and its resources, and communicate all aspects of its work.

In 2007, NERC launched its strategy *Next Generation Science for Planet Earth, 2007-12*. To order a copy of the strategy see: www.nerc.ac.uk/publications/.

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.

Trends in annual capital investment (£m)

	2005-06	2006-07	2007-08	2008-09
Land, buildings and Antarctic stations	5.5	12.0	19.0	12.0
Plant and equipment	11.4	8.5	11.2	11.9
Ships and aircraft	14.9	14.5	2.9	1.8
Motor vehicles	0.3	1.8	0.7	0.5
RCUK Shared Service Centre [i]	-	-	3.2	6.1
(Profit)/Loss on disposal of fixed assets [ii]	-0.2	-0.3	-1.9	0.1
Capital grants [iii]	-	13.2	11.6	13.3
Total	31.9	49.7	46.7	45.7

Notes:
(i) 2008-09 figures include £1.6m for RCUK SSC Ltd shares purchased during the year.
(ii) From 2007-08 all disposals of fixed assets classified as capital.
(iii) In 2005-06 Capital Grants were not classified as capital.

Requests made under the Freedom of Information Act

	2008
Business policy and operations	13
Research policy and operations	7
Research outputs	4
Funding applications	1
Personal information	1
Contracts	1
Total	27

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 such as peer review.

During 2008 we answered 27 requests for information under the legislation, on subjects ranging from business policy to research outputs. We answered 96% of our requests, some of which were complex, 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.

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

Energy saving

Solar panels, wind turbines and virtual computer systems have been installed at NERC centres and on bases as far apart as Antarctica and Cape Verde during 2008-09.

All central computer services in NERC's Antarctic bases and at the British Antarctic Survey's (BAS) head office in Cambridge are now virtual. The new approach means 25 servers have now been removed, saving over 30 kW of electrical power a year. At Bird Island, a small station in Antarctica, the electricity bill has fallen 50%. The buildings are quieter and do not need air conditioning to control internal temperatures.

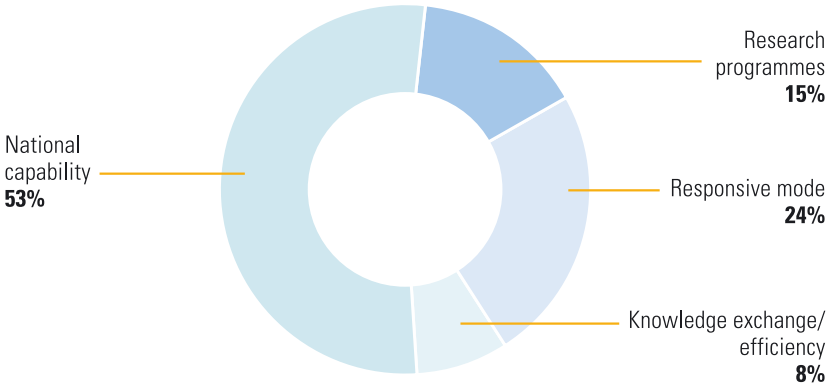
Solar collectors now help power the Antarctic bases of Rothera, Signy and Bird Island and new energy-efficient buildings reduce running costs.

On the island of Cape Verde in the Atlantic Ocean scientists from the National Centre for Atmospheric Science (NCAS) helped hand-winch a three-tonne wind turbine from the ground over fresh volcanic rock to help power the state-of-the-art Cape Verde Atmospheric Observatory. NCAS hopes the turbine will halve power costs at the station.

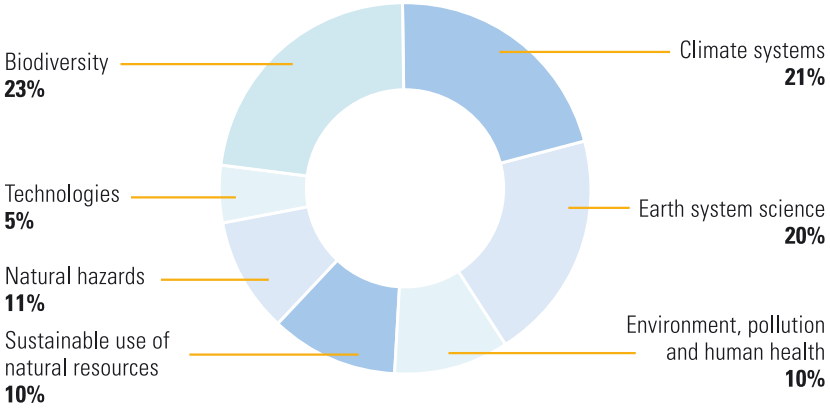
On yer bike

In 2008-09 NERC launched a scheme for employees to get a bike tax free by paying for it in monthly instalments,

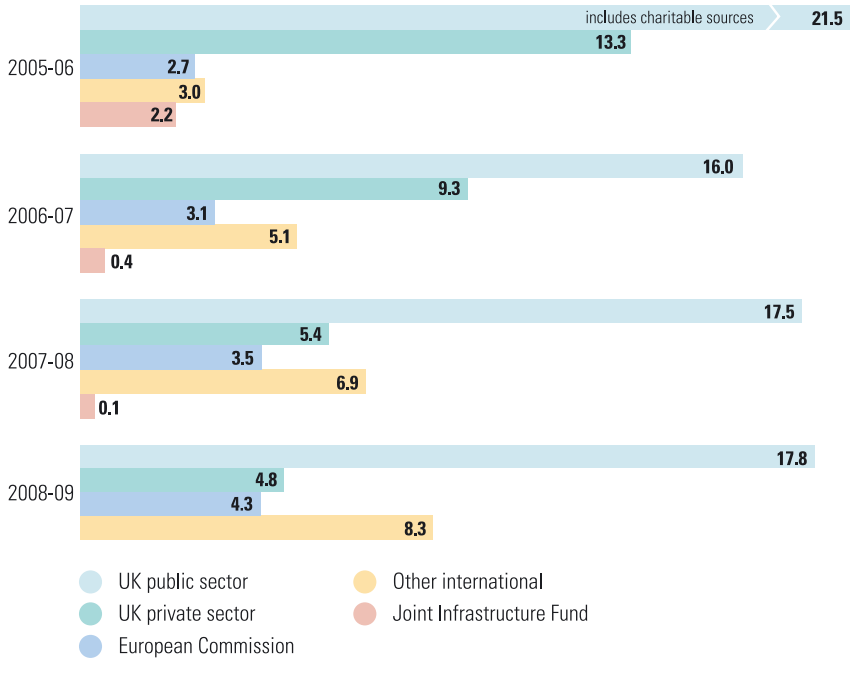
Allocation of science budget by funding stream



Allocation of science budget by science theme



External funding for research (£m)



From 2006-07 onwards figures no longer include funding received from other other bodies categorised as financing.

taken from their salary. All NERC employees are eligible for the scheme, which aims to increase the number of people cycling to work.

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.

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.

After a disappointing success rate for female applicants in 2007-08, of the 30 fellowships offered in 2008-09, 10 (33%) were to female candidates, resulting in 23% of the female applicants being successful compared to 16% of male applicants. The percentage of fellowships being offered to female candidates in previous years was; 20% (5 of 25) in 2007; 33% (10 of 30) in 2006; 43% (13 of 30) in 2005 and 25% (8 of 32) in 2004.

For PhD and masters courses, studentships are awarded to universities and NERC research centres. Institutions select students within set eligibility criteria.

Of the 362 NERC-funded masters students in 2008, 54% are female; which is a small increase from 2007 (185 of 371). Of the 329 NERC-funded PhD students starting in 2008, 54% were female, 46% were male. In 2007 there was an even split of male and female, while in 2006 55% were female and 45% were male. So the 2008 data shows that there has been a small increase in female students compared to the previous year.

Responsive standard and small grant applications and success rates

	2006-07	2007-08	2008-09
Number of applications	825	848	923
Number of awards	190	184	210
Total £k	39,699	41,837	47,651
% success rate	23	22	23

NB: Statistics show joint applications from two or more research organisations as one application.

Success rates for grants by gender

	2006-07		2007-08		2008-09	
	Men	Women	Men	Women	Men	Women
Number of applications	827	207	884	196	970	221
Number of successful applicants	207	39	243	36	248	45
% successful applicants	25	19	27	18	26	20

Success rates for fellowships by gender

	2006-07		2007-08		2008-09	
	Men	Women	Men	Women	Men	Women
Number of applicants	102	51	92	52	122	44
Number of successful applicants	20	10	20	5	20	10
% success rate by gender	20	20	22	10	16	23

Environmental accounts and greening of NERC

This is the sixth year that NERC has produced a set of accounts that evaluate the environmental impact of our operations. NERC provides world-class science while ensuring that damage to the environment is limited.

The accounts cover areas over which NERC has direct operational and financial control, including our bases in the UK and abroad and our research vessels and aircraft. These are not precise audited financial accounts, but an indicative management tool that encourages thought and action to measure NERC's environmental impacts, and take cost-effective steps to minimise them. This tool has been developed over the years and is now part of our capital purchasing procedures.

Overall, environmental restoration and avoidance costs have increased this year. This increase is caused by the first full-year operation of the RRS *James Cook*, an ocean-going multi-purpose scientific research vessel.

Several management actions have partly offset the increase:

- A new energy-management system has been implemented across NERC. Primary meters have been installed at most NERC sites measuring water, electricity, gas, oil and heating with a centralised online recording system. To extend this system of smart meters, secondary metering will soon be installed on the larger sites. This will help us better understand the link between demand and usage.
- Increased recycling, including 100 per cent recycling at some locations, has resulted in lower waste costs.
- We have adopted ISO14001 standard environmental management accreditation across NERC, and have opened a new building with an 'excellent' BREEAM rating.
- NERC is continuing to provide resources for a 'Greening Fund' for local initiatives in order to reduce its environmental footprint and to mitigate some of its restoration costs. Initiatives in 2008-09 include a sustainable energy system developed for Antarctic field camps, a green-roof trial, cycle sheds, a plant-growth facility and field-sample stores.

Restoration/avoidance costs (Unaudited)

	2007-08[1] £	2008-09 £
Impacts to air		
Arising from :		
Energy		
Electricity consumption	172,500	169,100
Gas consumption	44,100	42,100
Oil consumption	2,600	2,400
Diesel consumption	11,700	12,300
Total energy	**230,900**	**255,900**
Transport		
Business mileage	114,300	112,000
Commuting	30,500	32,300
NERC ships	488,100	563,800
NERC planes	43,600	46,100
Total transport	**676,500**	**754,200**
Total impacts to air	**907,400**	**980,100**
Impacts to land		
Waste disposed to landfill	5,400	5,000
Total impacts to land	**5,400**	**5,000**
Impacts to water		
Water use and sewage	not quantified	not quantified
Total environmental costs	**912,800**	**985,100**
Staff costs	108,153,000	105,457,000
Other operating costs	94,127,000	110,561,000
Total operating costs	**202,280,000**	**216,018,000**
Total revised operating costs	**203,192,800**	**217,003,100**

The following table shows the total emissions to air from the impacts included in the accounts above, by category of emission (in tonnes).

	2007-08[1]	2008-09
Carbon dioxide	38,500	38,100
Sulphur dioxide	100	100
Nitrous oxide, particulate matter, carbon monoxide, hydrocarbons	300	300
Methane	2	2

Note:
1. 2007-08 figures restated because of improved data quality.

Health and safety

NERC's heath and safety performance remains good, but the potentially dangerous environments in which many of our staff work, such as Antarctic bases and on board our research ships and aircraft, means there is no room for complacency.

Thankfully, 2008 was an uneventful year for accidents, with the number of incidents reportable under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) falling to five, compared to nine in 2007.

None of these five events was classed as a 'dangerous occurrence.' The difference compared to the previous year is largely due to the absence of Lyme Disease, which appeared three times in 2007.

The top three major causes of accidents were 'cuts', 'slips, trips and falls', and 'injuries while lifting and handling', which caused over 60% of the classifiable injuries. 300 injuries to staff were reported, exactly the same as in 2007. A higher-than-usual number of injuries in 2008 were classified as 'others'.

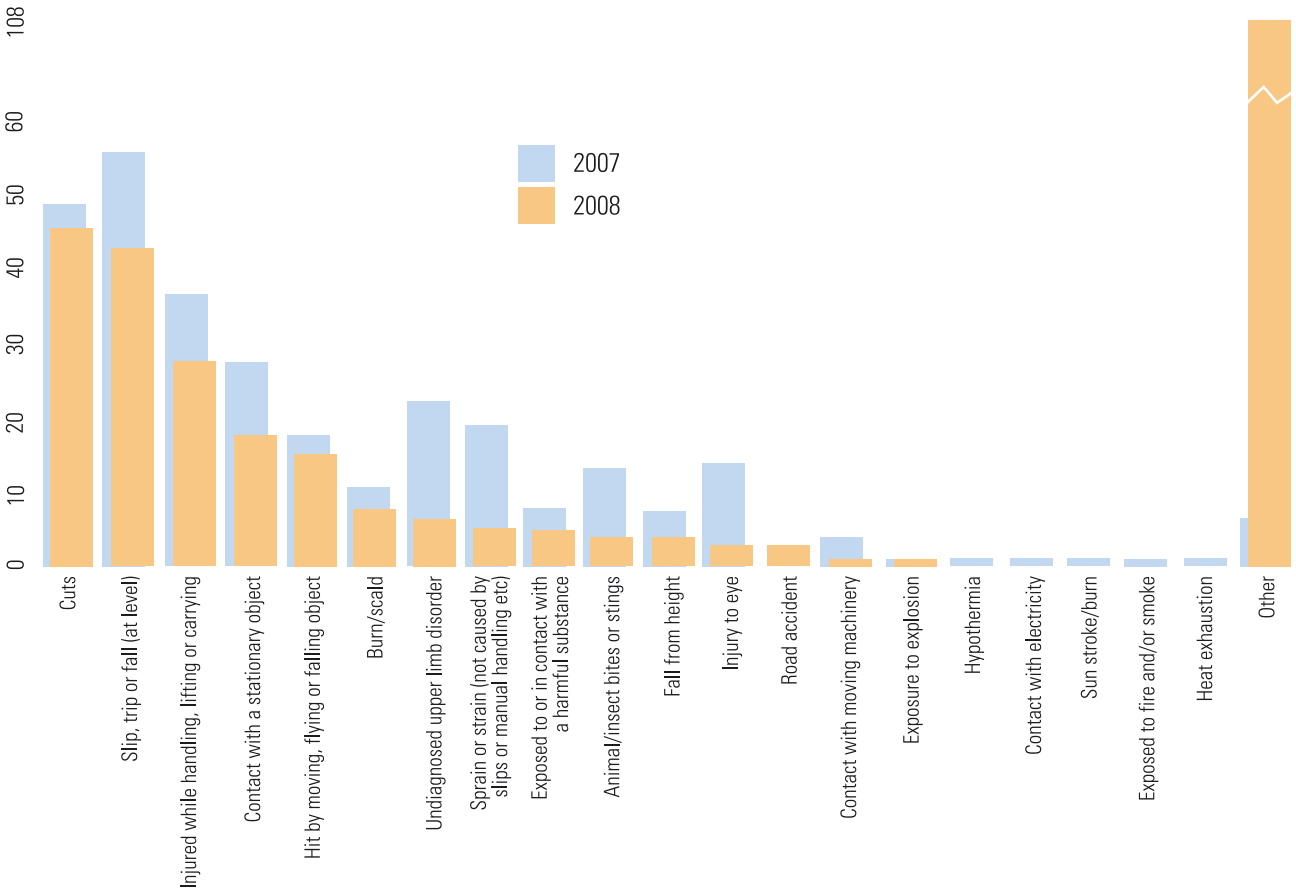
There were no fatalities throughout the year, though there were serious incidents, for example on an expedition to Madagascar when a NERC staff member was taken seriously ill. Lessons have been learned from these episodes.

Initiatives over 2008 include the approval of a new Ionising Radiation Policy and Procedure. NERC has also continued its corporate audit programme, completing audits of display screen equipment (DSE) and manual handling at the Scottish Association for Marine Science (SAMS) and of management systems at the National Oceanography Centre, Southampton (NOCS), as well as an external audit of the NERC Health and Safety Management System.

Stress continues to be a risk for staff, particularly in areas undergoing major changes such as the Shared Services Centre. NERC health and safety advisors have worked closely with NERC Welfare to co-ordinate the way we deal with stress, and to launch joint initiatives where appropriate.

NERC managers and staff receive regular training on health and safety issues. Corporate training in health and safety for all managers continued, with three courses in 2008. We also ran eight training courses on safety responsibilities and risk management for all staff.

ACCIDENTS



HOW WE SPENT THE SCIENCE BUDGET (£m)

	Allocation	Outturn	Variance
Research Programmes			
Aerosol impacts	1.863	1.949	0.086
Autosub under ice	0.122	0.010	-0.112
Carbon capture and storage	0.050	0.002	-0.048
Changing water cycle	0.035	0.020	-0.015
Depleted uranium	0.511	0.247	-0.264
Ecology and hydrology funding initiative	1.338	1.289	-0.049
Ecosystem sustainability	0.300	0.009	-0.291
Ecosystem sustainability and poverty alleviation	0.000	0.200	0.200
Environment and human health	1.075	0.911	-0.164
Environmental factors in the chronology of human evolution and dispersal	0.061	0.018	-0.043
Environmental nanotechnology	0.241	0.272	0.031
E-science	1.019	0.918	-0.101
Flood risk in extreme events	2.728	2.218	-0.510
Flood risk management consortium	0.000	0.049	0.049
Hazard uncertainty probability risk	0.020	0.000	-0.020
Ice sheets	0.040	0.047	0.007
Integrated ocean drilling programme	4.396	4.129	-0.267
International polar year	2.258	1.703	-0.555
Joint climate research programme	0.007	0.000	-0.007
Joint NERC/EPSRC environmental maths & statistics programme	-0.033	-0.167	-0.134
Link Bioremediation	0.100	0.112	0.012
Low carbon innovation	0.129	0.194	0.065
Lowland catchment research	0.381	0.128	-0.253
Marine Bioenergy	0.050	0.020	-0.030
Ocean margins LINK programme	0.073	-0.032	-0.105
Polluted troposphere	0.064	-0.039	-0.103
Genomics	2.184	2.300	0.116
Quantifying the earth system	6.725	6.454	-0.271
Rapid climate change and the stability of the thermohaline circulation	1.070	1.190	0.120
Rapid climate change and the stability of the thermohaline circulation (Phase II)	2.301	1.738	-0.563
Rural economy & land use	2.014	2.020	0.006
Strategic oceans funding initiative	0.987	0.940	-0.047
Surface ocean lower atmosphere interactions	2.504	2.039	-0.465
Sustainable energy	1.241	1.361	0.120
Sustainable marine bioresources	0.183	0.300	0.117
Technology clusters	0.100	0.000	-0.100
Valuation	0.200	0.084	-0.116
Rapid climate change and the stability of the thermohaline circulation		*0.632*	*0.632*
Other Programmes			
Theme Leaders	1.888	1.423	-0.465
Living With Environmental Change	0.015	0.182	0.167
Resource brought forward balance	1.190	0.000	-1.190
EO Administration	0.374	0.320	-0.054
EO centres of excellence	1.130	1.487	0.357
EO Other programmes	0.723	1.041	0.318
Centre for Earth Observation Instrumentation	0.628	0.861	0.233
European Space Agency	47.063	47.126	0.063
International subscriptions	2.030	1.899	-0.131
Knowledge exchange	4.619	4.047	-0.572
Commercialisation	0.800	0.715	-0.085
Data Centre Support	0.731	0.789	0.058
Marine barter bank	-0.004	-0.268	-0.264
Other programme activities	0.816	0.252	-0.564

HOW WE SPENT THE SCIENCE BUDGET (£m) *cont.*

	Allocation	Outturn	Variance
Collaborative Centres			
Tyndall Centre for Climate Change	0.790	0.790	0.000
Centre for Population Biology	1.217	1.874	0.657
UKPopNet	0.793	0.933	0.140
MBA Library	0.367	0.310	-0.057
National Centre for Earth Observation	5.555	6.142	0.587
National Centre for Atmospheric Science	4.992	5.010	0.018
Marine Biological Association	0.983	1.026	0.043
Sir Alistair Hardy Foundation for Ocean Science	0.397	0.397	0.000
Plymouth Marine Laboratory	4.578	4.359	-0.219
Scottish Association for Marine Science	2.812	2.833	0.021
Scottish Marine Research Unit	1.134	1.140	0.006
Other OCEANS 2025	0.259	0.316	0.057
Scientific Facilities & Technology			
High Performance Computing	2.068	1.684	-0.384
Services & Facilities	7.845	8.024	0.179
Large Facilities Diamond/ISIS	0.081	0.081	0.000
Facility for Airborne Atmospheric Measurement	2.126	2.079	-0.047
Airborne Remote Sensing Facility	0.740	0.830	0.090
Airborne Remote Sensing Facility - LIDAR	0.000	0.318	0.318
Diamond Phase II	0.500	0.500	0.000
Services & Facilities Capital	*0.995*	*0.165*	*-0.830*
FAAM maintenance and renewal	*0.300*	*0.218*	*-0.082*
Airborne Remote Sensing Facility - LIDAR	*0.389*		*-0.389*
Other capital	*1.332*	*0.152*	*-1.180*
Responsive Mode Grants			
Standard Grants	39.439	36.713	-2.726
Small Grants	2.821	2.324	-0.497
New Investigator	0.577	1.211	0.634
Antarctic Funding Initiative (AFI)	1.301	2.376	1.075
Consortium Grants	7.778	10.504	2.726
Capital Grants	1.279	2.513	1.234
Responsive Mode Training			
Studentships	23.009	24.407	1.398
Fellowships	6.751	6.350	-0.401
British Antarctic Survey			
National Capability	34.209	33.850	-0.359
Research Programmes	4.613	4.613	0.000
Antarctic bases environmental clean up	0.215	0.215	0.000
Halley 6	*4.000*	*3.269*	*-0.731*
Antarctic & Marine	*2.032*	*1.272*	*-0.760*
Core Capital	*1.982*	*1.405*	*-0.577*
British Geological Survey			
National Capability	22.599	23.137	0.538
Research Programmes	3.609	3.766	0.157
William Smith building	*6.686*	*5.635*	*-1.051*
Core Capital	*3.497*	*2.038*	*-1.459*

	Allocation	Outturn	Variance
Centre for Ecology & Hydrology			
National Capability	19.476	18.582	-0.894
Research Programmes	2.351	2.282	-0.069
Core Capital	*2.033*	*2.059*	*0.026*
CEH Transition and Integration	10.793	4.869	-5.924
CEH Transition and Integration	*4.940*	*5.081*	*0.141*
National Oceanography Centre Southampton			
National Capability	17.501	20.592	3.091
Research Programmes	2.318	2.318	0.000
Core Capital	*3.905*	*3.468*	*-0.437*
Proudman Oceanographic Laboratory			
National Capability	4.057	3.555	-0.502
Research Programmes	1.051	1.382	0.331
Core Capital	*1.216*	*0.447*	*-0.769*
Other Infrastructure			
Swindon Office	11.472	11.070	-0.402
Shared Services Centre Costs	9.958	7.941	-2.017
Shared Services Centre Capital Costs	*5.800*	*4.497*	*-1.303*
Corporate Capital	*2.278*	*1.899*	*-0.379*
Restructuring	1.425	1.323	-0.102
Public Funding Initiative Scored Outside DEL	-1.101	-1.106	-0.005
Provisions	-6.088	-4.470	1.618
Cost of Capital	9.840	10.156	0.316
Depreciation	23.989	23.220	-0.769
Asset Disposals	*-0.400*	*0.149*	*0.549*
Overcommitment against Science Budget	-7.414		7.414
Overcommitment against Science Budget	*-8.344*		*8.344*
TOTAL NERC EXPENDITURE	**416.046**	**417.232**	**1.186**
Comprises:			
Resource*	**383.405**	**384.846**	**1.441**
Capital	***32.641***	***32.386***	***-0.255***

Capital Expenditure in italics

** Resource figure differs from the Statement of Net Expenditure by £7.454m, which is broken down as follows:*

	£m
Funding received from other bodies (recorded as financing)	*6.546*
AME impairments	*0.815*
Asset Disposals (recorded under Capital)	*0.149*
Change in discount factor	*-0.056*
	7.454

SCIENCE BUDGET EXPENDITURE IN RESEARCH ORGANISATIONS

Expenditure £k	RESPONSIVE AWARDS								
	Grants	PhD students	Masters	Fellowships	Research programme grants	Research programme students	Research programme fellows	Research contracts	Total
Aberystwyth University	197	233	117	120		13			680
Bangor University	1,103	292			284	17			1,696
Birkbeck College	34								34
Bournemouth University	18				96				114
Brunel University	43	21		33					97
Cardiff University	614	407	62		317	27			1,427
Central Science Laboratory					30				30
Centre for Environment, Fisheries Aquaculture Science (CEFAS)					46				46
Cranfield University	51			78	52	37		29	247
Diamond Light Source	6								6
Durham University	1,144	391			178	46	3	250	2,012
Edge Hill University					29	268			297
Edinburgh Napier University					51	13			64
EPSRC								58	58
ESRC								2,059	2,059
Glasgow Caledonian University		13	106		65				184
Global Canopy Foundation					37				37
H R Wallingford Ltd					47				47
Heriot-Watt University	3	17	523	280					823
Imperial College London	1,604	788			593	24		2,409	5,418
John Innes Centre	18				31				49
Keele University	54	31	153						238
King's College London	117	93	128	80	458				876
Kingston University								41	41
Lancaster University	1,166	331			534	53		103	2,187
Liverpool John Moores University	17	21							38
London School of Economics and Political Science					19				19
London School of Hygiene and Tropical Medicine					80				80
Loughborough University	100	18							118
Macaulay Land Use Research Institute					37				37
Manchester Metropolitan University	40	13	292	136					481
Marine Biological Association	169			24				1,134	1,327
National Oceanography Centre	518	66			529	32			1,145
Natural History Museum	328	17		86	103				534
NERC British Antarctic Survey	1,045	173		69	246				1,533
NERC British Geological Survey	258	46		106	101				511
NERC Centre for Ecology & Hydrology	602	589			1,366	13			2,570
Newcastle University	1,098	429			336	90			1,953
Northumbria University	53			173	4				230
Open University	429	148	37		193			145	952
Oxford Brookes University		30	45	13					88
Plymouth Marine Laboratory	239	236			840			1,947	3,262
Policy Studies Institute					2,210				2,210
Proudman Oceanographic Laboratory	259	68			361	11			699
Queen Mary, University of London	533	300			23	14			870
Queen's University of Belfast	134								134
Roehampton University	2	22	240	127					391
Rothamsted Research				19	35				54
Royal Botanic Gardens Kew	112				41				153
Royal Holloway, University of London	697	266		103	58	67			1,191
Scottish Agricultural College					7	15			22
Scottish Association For Marine Science	483	64			265			3,135	3,947
Scottish Crop Research Institute					1				1

Expenditure £k	RESPONSIVE AWARDS								
	Grants	PhD students	Masters	Fellowships	Research programme grants	Research programme students	Research programme fellows	Research contracts	Total
Scottish Universities Environmental Research and Reactor Centre	147	52			14			1,512	1,725
Sir Alister Hardy Foundation for Ocean Science								397	397
STFC - Laboratories	71				215			3,266	3,552
Swansea University	360	190			92			490	1,132
The Institute for European Environment Policy					46				46
UHI Millennium Institute			162	203	9				374
University College London	987	681	120	218	529	69		421	3,025
University of Aberdeen	1,632	396		21	565	95			2,709
University of Bath	263	13	232	16					524
University of Birmingham	1,085	506	91		431	28		101	2,242
University of Bradford		47							47
University of Brighton	76			440					516
University of Bristol	2,928	1,067	43	468	1,622	54		1,568	7,750
University of Cambridge	2,104	1,242			356	110		189	4,001
University of Cumbria						21			21
University of Dundee	17	13	183	132	69			433	847
University of East Anglia	2,188	934	153	768	1,453	93	12	2,997	8,598
University of Edinburgh	3,991	1,149			555	106		1,355	7,156
University of Essex	439	174	70	182	163				1,028
University of Exeter	1,357	453			213	70	2		2,095
University of Glamorgan				416	2				418
University of Glasgow	554	230			100	12			896
University of Hertfordshire	61	35		62	119	16			293
University of Hull		132							132
University of Kent		22	395	262		26			705
University of Leeds	4,280	1,028	49	16	858	143		5,563	11,937
University of Leicester	852	289			134	55		289	1,619
University of Lincoln	31			24					55
University of Liverpool	1,370	516	41	220	390	42		620	3,199
University of Manchester	2,728	809	37	14	709	82		246	4,625
University of Nottingham	298	113	61	405	55	47		90	1,069
University of Oxford	3,024	1,244	39		955	65		571	5,898
University of Plymouth	622	147			312	27			1,108
University of Portsmouth			369	267	83				719
University of Reading	2,540	1,001			1,474	49		6,740	11,804
University of Salford	82	26		312				81	501
University of Sheffield	1,985	674		172	362	75		512	3,780
University of Southampton	1,546	674	50		753	213		48	3,284
University of St Andrews	1,608	366	52		157	20		1,140	3,343
University of Stirling	134	190		111	166				601
University of Strathclyde	89	57			52				198
University of Surrey		28			117				145
University of Sussex	456	62							518
University of the West of England					66				66
University of the West of Scotland					54				54
University of Ulster	270			95					365
University of Warwick	535	173			149				857
University of Westminster								14	14
University of Worcester			156		4				160
University of York	1,447	373		74	345	101		995	3,335
Zoological Society of London	195	194							389
TOTAL	**55,640**	**20,423**	**4,006**	**6,345**	**23,451**	**2,359**	**17**	**40,948**	**153,189**

GRANTS AWARDED IN 2008-09

	RESEARCH GRANTS					
	RESPONSIVE					
	Small grants		Standard grants		Antarctic Funding Initiative	
	Number	Value £k	Number	Value £k	Number	Value £k
Aberystwyth University	3	126	3	635	1	287
Bangor University	1	64	3	625		
Cardiff University			6	642		
Durham University	7	246	4	1,307	2	219
Edinburgh Napier University	1	41				
Glasgow Caledonian University						
Global Canopy Foundation						
Imperial College London	4	222	5	989		
Institute of Development Studies						
Keele University			1	272		
King's College London						
Lancaster University	5	197	6	1,497		
Loughborough University			1	254		
Macaulay Land Use Research Institute						
Manchester Metropolitan University	1	72	1	85		
National Oceanography Centre			6	1,191		
Natural History Museum	1	59	4	776		
NERC British Antarctic Survey			3	764	6	1,076
NERC British Geological Survey			6	1,080		
NERC Centre for Ecology and Hydrology			1	54		
Newcastle University	4	246			1	460
Open University	2	202	4	1,222		
Oxford Brookes University						
Plymouth Marine Laboratory	1	25				
Proudman Oceanographic Laboratory			1	147		
Queen Mary, University of London			2	283		
Royal Holloway, University of London	1	42	2	575		
Royal Veterinary College			1	217		
Scottish Association For Marine Science	2	163	2	623		
Scottish Universities Environmental Research Centre			1	306	1	58
Swansea University	4	176	2	350		
University College London	1	43	7	2,127		
University of Aberdeen	2	62	4	929		
University of Bath					1	359
University of Birmingham	3	119	4	1,580		
University of Bradford			2	169		
University of Bristol	3	112	13	3,640		
University of Cambridge	3	111	8	1,724		
University of Dundee						
University of East Anglia			8	2,229		
University of Edinburgh	3	177	11	4,513	2	283
University of Essex	1	68	1	396		
University of Exeter	3	124	5	1,341		
University of Glasgow	2	119	1	329		
University of Hertfordshire			2	153		
University of Hull			1	40		
University of Kent						
University of Leeds	2	94	13	4,526	1	35
University of Leicester	1	61	4	1,025		
University of Liverpool	1	29	6	1,465		
University of Manchester	2	150	4	653		
University of Nottingham			2	687		
University of Oxford	3	97	11	2,960		
University of Plymouth	1	38	3	972		
University of Portsmouth			1	338		
University of Reading	2	86	4	691		
University of Sheffield			9	2,316		
University of Southampton	4	206	9	1,830	1	135
University of St Andrews			3	302		
University of Stirling	1	64				
University of Strathclyde			1	28		
University of Ulster	2	61	1	400		
University of Warwick			2	666		
University of York			7	1,850		
Zoological Society of London	1	105				
TOTAL	**78**	**3,807**	**212**	**53,773**	**16**	**2,912**

			RESEARCH PROGRAMMES		KNOWLEDGE EXCHANGE		RESEARCH FELLOWS		RESEARCH STUDENTSHIPS		
	Consortium grants		Research programmes				Post-doc fellow	Advanced fellow	Doctoral training grants		
	Number	Value £k	Number	Value £k	Number	Value £k	Number	Number	Number	Value £k	
									3	276	
			1	436				1	4	479	
			2	76					3	338	
	1	53	2	182					2	342	
			1	86							
									1	69	
			1	153							
			2	652	2	647			7	840	
			1	139							
			1	335							
			1	126	2	591			3	348	
			1	153							
			1	462					1	69	
	1	1,418	5	509			1				
							1				
	1	4,331							1	277	
							1		1	69	
			5	741					2	533	
			1	281	1	103			4	401	
			1	124			1		1	69	
									1	76	
			1	197	1	81			1	343	
									1	69	
									3	381	
			1	300				1	4	410	
			4	418							
									1	69	
					1	241			2	206	
									8	529	
	1	45	4	1,010					3	409	
									1	69	
			1	320					2	469	
									1	69	
	1	53	1	56			1	2	8	1132	
			3	242			1		2	1274	
			1	174					1	69	
			3	716			1	1	5	1113	
	1	345	3	221			1		3	1018	
			1	307					1	206	
			1	50			2		3	422	
					2	431			4	272	
									1	69	
									2	141	
	1	489	3	111	2	201			8	1140	
					1	92			3	205	
			4	1,448				1	4	559	
	1	1,100	1	50			1		6	1169	
			2	178					3	209	
			4	456	3	306	2	1	8	1255	
			2	182					1	196	
	1	317	2	1,024					4	1255	
			1	61					4	684	
			1	36					4	979	
			1	68	1	503			3	342	
					1	211			1	69	
									1	69	
									1	137	
			1	100	2	174			4	460	
			1	248					1	141	
	9	**8,151**	**73**	**12,428**	**19**	**3,581**	**13**	**7**	**147**	**21,794**	

MANAGEMENT COMMENTARY

Statutory basis

These financial statements have been prepared in accordance with the 2008-09 Government Financial Reporting Manual (FReM) and the Accounts Direction issued by the Department for Innovation, Universities & Skills (DIUS), which now forms part of the new Department for Business, Innovation and Skills (BIS). This manual is available at www.financial-reporting.gov.uk/

The 2008-09 accounts have been prepared on an accruals basis whereby income and expenditure are credited or charged to the Statement of Net Expenditure when the goods or services have been provided. The balance sheet shows the assets and liabilities at the year-end.

Financial summary

In accordance with the resource accounting and budgeting rules used by the Department for Innovation, Universities and Skills to monitor performance, NERC has a balanced financial position for 2008-09. Performance is within 1% of budget.

DIUS outturn

	2008-09 £000	2007-08 £000
Science Budget	416,046	389,137
Earned Income	52,683	48,337
Total Funding	468,729	437,474
Expenditure	469,915	437,195
(Deficit) / Surplus	(1,186)	279
Percentage variance	(0.3)%	0.1%

Following the necessary accounting policies, the accounts show net expenditure for the year of £392m. Whilst accurate, this figure is calculated on a different basis from the figures used by DIUS and a full reconciliation can be found in Table 1.

Table 1

Reconciliation between annual accounts 2008-09 and DIUS reported outturn

	Resource £000	Capital £000	Total £000
Net expenditure for the year [(i)]	392,300		392,300
Less: AME impairments [(ii)]	(815)		(815)
Funding from other bodies	(6,546)		(6,546)
Treatment of capital grants	(13,315)	13,315	-
Capital [(iii)]		30,614	30,614
Capital investment [(iv)]		1,623	1,623
Loss on the disposal of fixed assets [(i)]	(149)	149	-
Change in discount factor	56		56
DIUS outturn (resource and capital)	**371,531**	**45,701**	**417,232**
DIUS science budget	369,351	46,695	416,046
(Deficit)/Surplus reported to DIUS [(v/vi)]	**(2,180)**	**994**	**(1,186)**

Notes:
(i) Taken from the Statement of Net Expenditure for the year ended 31 March 2009.
(ii) Taken from Note 9(a) Fixed Assets — note (iv) re Dornier Aircraft impairment.
(iii) Taken from Note 9(a) Fixed Assets – Additions.
(iv) Taken from Note 9(d) Other Investments – 'B' shares in RCUK Shared Services Centre Ltd.
(v) Resource deficit comprises of £283k near cash deficit and £1,897k non cash deficit.
(vi) Capital surplus comprises of £739k capital grants surplus and £255 capital surplus.

Shared Services Centre

The seven research councils have established a Shared Services Centre (SSC), to provide finance, grants, human resources, information systems, procurement and payroll operational services to each of the councils and their institutes. The councils have created the SSC with the aim of reducing spending on administration through sharing and standardising processes. The councils have agreed to share all the set-up costs and NERC's agreed share is 20.54%. The 2008-09 costs have been accounted for in NERC's books as £7,941k as expensed and £4,497k as Assets in the course of construction. The transition to shared services centre is regarded as a business-critical project and is referred to in our Statement of Internal Control. During the year NERC purchased 1,622,660 'B' shares in RCUK Shared Services Centre Limited (SSC Ltd) at £1 per share. NERC has nominated David Bloomer, the Director of Finance and Operations, to serve as a Non Executive Director of SSC Ltd. He receives no remuneration for this role.

Council members

Council is NERC's top-level decision-making body. Council decides on all issues of major importance, including corporate strategy, key strategic objectives and targets and major resource decisions. It is accountable for its stewardship of NERC's budget and how far NERC meets its key performance objectives and targets. A list of NERC Council members in 2008-09 is given in the Remuneration report. The council consists of the Chairman, the Chief Executive (and Deputy Chairman) and 18 other members. Council members are appointed by the Secretary of State for Innovation, Universities and Skills and are drawn from academic and industrial communities. Two of the members are also appointed from government departments. In addition to the listed members, a representative of the Secretary of State for Innovation, Universities and Skills, Paul Williams, attends Council meetings.

The Council Secretariat holds a Register of Interests; see: www.nerc.ac.uk/about/work/boards/council/interests.asp.

Payment policy

NERC observes the Confederation of British Industry Code of Practice regarding prompt payment, making

payments when due in accordance with the contract or within 30 days of receipt of goods or services or the presentation of a valid demand for payment. In line with Treasury guidance NERC is working towards making payments within 10 days. During 2008-09, 84% of payments were made within 30 days of the invoice date (2007-08: 82%). In accordance with the guidance given in Statutory Instrument 1997/571 the figure for creditor days is 22 days (2007-08: 23 days).

Risk
NERC has adopted a risk management strategy that conforms to the principles of the HM Treasury guidance. A description of NERC's capacity to handle risk and its control framework is in the Statement of Internal Control (SIC).

Attendance data
Sickness absence was 3.0% in 2008-09 (3.2% in 2007-08).

Public Sector information
NERC have complied with the cost allocation and charging requirements set out in HM Treasury and Office of Public Sector guidance, where they are appropriate. However, the information they hold is exempt from the requirements of 'The Re-use of Public Sector Regulations 2005' as specified in para 5(3) of the regulations.

Foreign exchange risk
NERC is a contributor to the European Space Agency. Our agreed forward commitment is €143m over the remaining Comprehensive Spending Review period (2009-10 to 2010-11). Funding is provided in sterling.

Going concern
The Accumulated Income and Expenditure Reserve carried forward at the 31 March 2009 shows a surplus of £205m. Grant-in-Aid for 2009-10, taking into account the amounts required to meet NERC's liabilities falling due in that year, has already been included in the department's estimates for that year, which has been approved by Parliament. There is no reason to believe that the department's future sponsorship and future parliamentary approval will not be forthcoming. It has accordingly been considered appropriate to adopt a going concern basis for the preparation of these financial statements.

Internal audit and Audit Committee
The Research Councils' Internal Audit Service undertakes an agreed programme of internal audits for NERC. Council's Audit Committee has two Council members and two independent members, and is attended by the Chief Executive. The committee meets four times a year to review internal and external audit and control matters, and the Council's accounts. The membership of the committee can be found on the NERC website: www.nerc.ac.uk/about/work/boards/audit/members.asp.

Auditors
NERC's accounts are audited by the Comptroller and Auditor General in accordance with paragraph 3(3) of Schedule 1 to the Science and Technology Act 1965. The charge for the year comprises £52k for statutory audit and £7.8k for IFRS trigger points 1 & 2. All these costs related to audit services. There was no auditor remuneration for non-audit work. So far as the Accounting Officer is aware, our auditors are aware of all relevant audit information. The Accounting Officer has done all he should to make himself aware of any relevant audit information and to establish that NERC's auditors are aware of that information.

Developments during the year

International plan
NERC's international plan was agreed in November 2008. It describes how international collaboration is integral to our work and outlines our approach to choosing international partners.

The plan commits NERC to supporting UK leadership and participation in international partnerships and programmes and to promoting international collaboration across the breadth of our investments. We will encourage UK scientists to work with the best in the world and to establish international networks, especially at early stages in their careers. Furthermore, the strategy describes how we will fund world-class scientists to work in the UK, and strategically target partners and research topics to provide a foundation for UK collaboration and leadership.

Research centre strategies
Two of our research centres launched new science strategies in 2008-09.

CEH launched its Science Strategy for 2008-2013, *Integrated Science for Our Changing World*, in April 2008 at an event at the Royal Society in London.

The BGS Strategy, launched in March 2009 at the Royal Society, demonstrates how BGS will focus its applied geoscience research on the 'zone of human interaction with Planet Earth'.

Both strategies describe six challenges, which will contribute to delivery of the seven science themes defined in NERC's Science Strategy 2007-2012, *Next Generation Science for Planet Earth*, launched in 2007.

National Centre for Earth Observation
The National Centre for Earth Observation (NCEO) was launched at a reception at the Royal Institution on 5 March 2009. NCEO will support science that enables solutions to some of the world's biggest environmental challenges. The centre has a leading scientific role in the development of two of the three missions in the final selection stage for the European Space Agency's next Earth Explorer missions. It is also undertaking projects to deal with issues such as climate and sea-level change, flooding, deforestation and the carbon cycle, earthquakes and volcanic activity.

Living with Environmental Change
The programme Living with Environmental Change (LWEC) has had a successful year. The LWEC partnership now includes 20 organisations, and in October 2008 Professor Andrew Watkinson became LWEC Director.

Six strategic objectives were agreed by the LWEC Partners Board, and at their meeting in December 2008 the Partners Board agreed proposals for research programmes, research centres and other activities associated with LWEC. In total, they identified around £100m of public investment in research (£30m from NERC) aimed at successfully adapting to and mitigating environmental change.

So far, several new research programmes have been launched, including a programme to investigate how to avoid dangerous climate change (AVOID), led by the Department of Energy and Climate Change, and the Changing Water Cycle, led by NERC. Funding has been awarded under

the EPSRC/ESRC-led programme on Adaptation and Resilience to a Changing Climate and under the DfID/ NERC/ESRC programme on Ecosystem Services for Poverty Alleviation.

Communications
This year has seen a major development in the way NERC communicates its research to the public and its stakeholders, with the launch of an online version of our highly successful *Planet Earth* magazine. The new website, which is updated several times a week, enables us to communicate a much wider range of NERC science to a much larger audience.

Content is written in a style that is accessible to young people and non-scientists as well as being of general interest to business, policy-makers and the science community. Readers can comment on stories and use social networking websites to tell others about them.

In this same spirit of openness, we have continued to engage our researchers and stakeholders in dialogue through our open Council meeting, this year held in Exeter, and through community events in London and Manchester. These events provide an opportunity for an open debate on our future strategic science priorities.

Many of our public engagement activities have also been delivered in partnership. As part of a consortium of NERC centres we helped to create an exhibit for display to the million or so visitors to Liverpool's waterfront during the Tall Ships race in July 2008. We also continue to work closely with RCUK.

This year Council has reviewed the full range of NERC's science in society activities. The outcome of this review will help us refresh our science in society (public engagement) strategy.

Knowledge exchange activities
NERC successfully launched the Policy Placements scheme in May 2008. The scheme aims to help translate environmental science into public policy by placing researchers in government organisations for three to 12 months. Alternatively, researchers can identify their own placement opportunities through one month 'workshadowing'.

In 2008, we launched the Science Impacts Database, containing over 150 case studies demonstrating the impact of NERC research. The database was well received when it was presented to several government departments, including the Department for Innovation, Universities and Skills (DIUS).

National Capability Advisory Group
NERC has established the National Capability Advisory Group (NCAG) to maintain an overview of our National Capability (NC) portfolio funding and to predict future NC needs and opportunities. The group first met in June 2008 and, since then, has conducted analyses of its portfolio, including marine, Earth observation, atmosphere, earth, terrestrial and freshwater, and polar science.

Ship management review
In February 2009, NERC's Council agreed the recommendations from the Ship Operations Review conducted in 2008-09. The key recommendation from the review was that we should not outsource our ship operations at the present time. The review found that we match industry standards in the efficiency and effectiveness with which we currently manage our ship operations.

The review, available on our website, examined vessel supply and demand; vessel scheduling across the entire NERC fleet; managing the period until our research ship *Discovery* is replaced; and options for managing long-term ship operations.

Forward look

Environmental Nanoscience Initiative
NERC will invest £2 million in a new environmental nanoscience research programme in partnership with EPSRC, ESRC, MRC, the Environment Agency, Defra, and the US Environmental Protection Agency.

The programme will address the need for research to develop and test predictive tools and similar conceptual models that predict exposure, bioavailability and effects of manufactured nanomaterials in the environment. A joint Announcement of Opportunity will be issued in 2009.

RAPID-WATCH
RAPID-WATCH, the successor to the successful Rapid Climate Change programme, was launched in 2008.

Over the next five years – and working with partners including Met Office Hadley Centre; the US National Science Foundation and National Oceanic and Atmospheric Administration; and Canada's Bedford Institute of Oceanography – we will


Halley VI.

exploit data from the Atlantic Meridional Overturning Circulation (MOC) observing system. This will allow us to identify and interpret recent changes in the MOC, assess the risk of rapid climate change and investigate the potential for predictions of the MOC and its impact on climate.

Changing Water Cycle
The Changing Water Cycle is a major interdisciplinary programme being developed as part of the Living with Environmental Change (LWEC) partnership. It aims to develop science-based strategies to respond to, and minimise, the risks to human and natural systems caused by changes to the water cycle and their impacts on water and food security and ecosystem health.

Following the launch of the programme in February 2009, design of the programme's science challenges will be completed in the first half of 2009-10.

Technology Strategy Board
NERC will continue to work with the Technology Strategy Board (TSB) to increase business interaction with the environmental science community. NERC will commit £5.5m during the spending review period in collaboration with the TSB. Over the coming year, key activities include:

- alignment of NERC and TSB strategies;
- working with TSB's low-impact buildings Innovation Platforms;
- establishing and co-funding (through a new special-interest group in environmental risk management) the financial services Knowledge Transfer Network (KTN);
- developing a new Knowledge Transfer Partnership (KTP) programme with ESRC and TSB for the insurance sector.

Review of NERC strategy
The first annual review of NERC strategy is currently being planned and is due to report to NERC Council in July 2009. The purpose of the review is to assess progress in delivery of the strategy (ie what elements of the strategy have been delivered to date and if this meets expectations) to help us plan ahead and, if necessary, update priorities. It will also identify key achievements that can be used to inform Spending Review evidence and meet Government performance management requirements.

Value for Money
NERC will define and enact the Comprehensive Spending Review Value for Money (CSR VFM) savings plan. VFM is the successor to the Gershon efficiency savings plan, which the research councils successfully completed at the end of 2007-08.

Halley VI
Construction of the Halley VI science base in the Antarctic and hand-over of the finished station to NERC are scheduled for 2012.

Data security
The Government's Security Policy Framework and the Data Handling Review require departments to submit an annual report to Cabinet Office. NERC is putting 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; in 2008-09 there were no such incidents.

Professor Alan J Thorpe
Chief Executive and Accounting Officer
24 June 2009

Remuneration Report

Remuneration policy

The Remuneration Committee is responsible for agreeing the pay and allowances of senior managers, ie directors. 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 up rated 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 the non-consolidated element of senior pay was performance related.

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, which 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 the 1st April 2005. His initial contract was for a period of four years. In April 2009 it was extended for a further four years.

The emoluments of the Chief Executive, including taxable benefits, were £126,838 (2007-08: £114,365). This included basic salary of £119,765 (2007-08: £110,864) and performance related bonus of £7,073 (2007-08: £4,095). A charge of £25,510 (2007-08: £23,487) was also incurred in respect of employer's pension contributions. This was assessed as 21.3% of basic salary (2007-08: 21.3%). The Cash Equivalent Transfer Value for the Chief Executive at the 31 March 2009 was £1,121,745. The real increase in the cash equivalent transfer value for the period was £65,859. The Chief Executive is an ordinary member of the Research Councils' Pension Scheme.

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 (2008-09)

Name	Note Ref	Total [5] emoluments 2008-09 £000	Total emoluments 2007-08 £000	Pension increase in real terms £000	Accrued pension at 31/03/09 £000	Lump [6] sum at 31/03/09 £000	Cash [7] equivalent transfer value as at 1/04/08 £000	Cash [8] equivalent transfer value as at 31/03/09 £000	Cash equiv. transfer value increase in real terms £000
Professor A Thorpe		125 - 130	110 - 115	2.5 - 5	5 - 10	-	967	1,122	66
Professor P Nuttall		105 - 110	100 - 105	0 - 2.5	30 - 35	125	785	886	22
Professor A Willmott		80 - 85	75 - 80	0 - 2.5	0 - 5	-	488	563	29
Mr J Hansford	1	5 - 10	85 - 90	-	-	-	-	-	-
Professor A E Hill	2	95 - 100	95 -100	0 - 2.5	10 - 15	95	469	549	32
Mr D Bloomer		95 - 100	85 - 90	0 - 2.5	5 - 10	-	111	143	19
Mrs J Timberlake	3	75 - 80	85 - 90	0 - 2.5	0 - 5	-	66	85	11
Dr S Wilson		85 - 90	85 - 90	0 - 2.5	10 - 15	46	166	193	7
Professor J Ludden		100 - 105	95 - 100	0 - 2.5	0 - 5	-	47	80	25
Professor N Owens		90 - 95	45 - 50	0 - 2.5	5 - 10	104	655	724	15
Dr P Newton	4	75 - 80	-	0 - 2.5	5 - 10	-	130	158	15

Notes:

1 *Mr Hansford retired from full-time employment with NERC from 1 May 2008. He was subsequently re-employed on a fixed term contract on a part-time basis in a role outside the senior management team.*
2 *Professor Hill is on unpaid leave from NERC on secondment to the University of Southampton who determine his salary.*
3 *Mrs Timberlake changed from full time to 0.8 full-time equivalent from 1 April 2008.*
4 *Dr Newton was acting Director of Science Delivery from 1 April 2008 and became substantive director on 1 August 2008.*
5 *The average annual earnings increase for senior employees (excluding Chief Executive) was 4.1%.*
6 *Lump sums available for members of the RCPS Classic Scheme only.*
7 *Cash Equivalent Transfer as at 01/04/08 or date of starting if later. These figures are different from closing figures published last year. This is due to the CETV factors being updated to comply with the Occupational Pension Schemes (Transfer Values) (Amendments) Regulations 2008.*
8 *Cash Equivalent Transfer as at 31/03/09 or date of leaving if earlier.*

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 4(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 a transfer payment commensurate with the additional pension liabilities being assumed has been received. 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. CETVs are calculated in accordance with The Occupational Pension Schemes (Transfer Values) (Amendment) Regulations 2008.

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 £6,740 per annum to cover all work for the Council including membership of Council's Boards. The Chairman of Council, Mr Wallis, receives a salary of £16,180 per annum. These rates are effective from 1 October 2008 and are formulated by the Department of Universities, Skills and Innovation.

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 (2008-09)

Name	Affiliation	Period of Appointment	Total Emoluments £'000 2008-09	2007-08	Note Ref
Mr E Wallis	Chairman	01 Jan 2007 - 31 Dec 2010	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 T Davies	School of Environmental Sciences, University of East Anglia	01 Nov 2001 - 31 Jul 2008	0 - 5	5 - 10	2
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 2007 - 31 Jul 2010	0	5 - 10	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	10 - 15	
Mr E Jenner	Technology and business consultant, formerly of AstraZeneca Plc	01 Apr 2002 - 31 Jul 2008	0 - 5	5 - 10	2
Mrs K Morgan	Vice Chairman of the Royal Agricultural College, Pro Chancellor of the University of West of England, Deputy Chairman of WaterAid	01 Aug 2002 - 31 Jul 2008	0 - 5	5 - 10	2
Mrs S Parkin	Programme Director at Forum for the Future	01 Aug 2006 - 31 Jul 2009	5 - 10	5 - 10	
Professor P Curran	Vice Chancellor and Professor of Physical Geography, Bournemouth University	08 Aug 2006 - 31 Jul 2010	5 - 10	5 - 10	
Professor J Mitchell	Chief Scientist, Met Office	10 Oct 2006 - 30 April 2009	0	0	1
Professor M Lockwood	Professor of Space Plasma Physics, and Energy and the Environment, University of Southampton, Chief Scientist at the Rutherford Appleton Laboratory's Space Science Department	01 Mar 2007 - 31 Jul 2010	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 2007 - 31 Jul 2010	5 - 10	5 - 10	
Professor T Meagher	Professor and Chair of Plant Biology at the University of St Andrews	01 Aug 2007 - 31 Jul 2010	5 - 10	0 - 5	
Professor R Watson	Chief Scientific Advisor to DEFRA	01 Dec 2007 - 30 Nov 2011	0	0	1
Mr R Douglas	Managing Director, Willis analytics for Willis Re	01 Aug 2008 - 31-Jul-2012	0 - 5	0	
Professor C Godfray	Professor of Zoology, University of Oxford	01 Aug 2008 - 31-Jul-2012	0 - 5	0	
Professor A Watson	Professor at the School of Environmental Sciences, University of East Anglia	01 Aug 2008 - 31-Jul-2012	0 - 5	0	

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 Professor Davies, Mr Jenner and Mrs Morgan left on 31 July 2008.

Professor Alan J Thorpe

Chief Executive & Accounting Officer

Date: 24 June 2009

Annual accounts 2008-09

Statement of Council's and 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 Innovation, Universities 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 of its income and expenditure, recognised gains and losses and cash flows for the financial year.

In preparing the accounts 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 Innovation, Universities 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* 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 Innovation, Universities 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 departmental 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 Innovation, Universities and Skills, is defined in the DIUS/NERC Management Statement and Financial Memorandum (2005), 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 DIUS/NERC 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 departmental 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 2009 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 DIUS 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 on a monthly basis 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.

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 Management Co-ordinator, 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 currently meets twice each year, helps promote best practice in risk management across NERC by sharing lessons learnt and monitoring compliance with (and continued relevance of) the NERC Risk Management Strategy and Policy (which are available to all staff via the NERC extranet).

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 DIUS 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 DIUS scorecard activities progress report) and the NERC Audit Committee (NERC Top Risks / Business Critical Projects status report). STAR also provides the quarterly report to DIUS that details progress towards completing activities that feature in the DIUS scorecard.

The seven Research Councils have agreed to establish a Shared Services Centre (SSC), to be based in Swindon. The SSC will provide finance, grants, human resources, procurement and some aspects of information systems services to each of the Councils and their Institutes. The Councils are setting up the SSC with the aim of reducing spending on administration through sharing and standardising processes. The SSC was incorporated last year as RCUK Shared Services Centre Ltd and is in the process of establishing itself to be ready for the transfer of services. There is a phased implementation plan for transferring the Councils' services that commenced during 2008-09 with the transfer of some procurement and information services functions and will continue during 2009-10 with the transfer of finance and human resources functions.

The British Antarctic Survey are involved in a substantial project to replace the Halley Antarctic research station. The project is intrinsically risky, all materials for the new base have to be shipped from the UK or South Africa and assembled on site during the three months of Antarctic 'summer'. The project is tightly controlled employing PRINCE2 project methodology and a project assurance process styled on the OGC Gateway approach. However, despite these controls, the project has encountered substantial contractual issues that are currently being worked through with the contractor. The project delivery remains on target and it is expected that the costs can be controlled within the range approved by Council.

As a stakeholder in the project NERC has established a team to manage its participation in the project and the associated risks. The NERC SSC project's overall risk status is reported to every meeting of the NERC Executive Board and the NERC Audit Committee.

5. Review of effectiveness

As Accounting Officer, I have responsibility for reviewing the effectiveness of the system of internal control operating within NERC. My 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 twice 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 monthly review of top risks 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 Management Co-ordinator. 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 have been advised on the implications of the result of my review of the effectiveness of the system of internal control by NEB, the Audit Committee and the Director Responsible for Risk. Plans to address weaknesses identified and measures to ensure continuous improvement of the system of internal control are in place.

6. Significant internal control problems

My review did not identify any significant internal control weaknesses.

Professor Alan J Thorpe
Chief Executive & Accounting Officer
Date: 24 June 2009

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 2009 under the Science and Technology Act 1965. These comprise the Statement of Net Expenditure, the Balance Sheet, the Cash flow Statement, Statement of Recognised Gains and Losses, 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 being audited.

Respective responsibilities of the Council, Chief Executive and Auditor

The Council, and Chief Executive as Accounting Officer, are responsible for preparing the Annual Report, which includes the Remuneration Report and the Financial Statements, in accordance with the Science and Technology Act 1965 and Secretary of State for Innovation, Universities and Skills directions made thereunder and for ensuring the regularity of financial transactions. These responsibilities are set out in the Statement of Council and Chief Executive's Responsibilities.

My responsibility is to audit the financial statements and the part of the Remuneration Report to be audited in accordance with relevant legal and regulatory requirements, and with International Standards on Auditing (UK and Ireland).

I report to you my opinion as to whether the financial statements give a true and fair view and whether the financial statements and the part of the Remuneration Report to be audited have been properly prepared in accordance with the Science and Technology Act 1965 and Secretary of State for the Department of Innovation, Universities and Skills directions made thereunder. I report to you whether, in my opinion, the information, which comprises the Delivering the strategy section, included within the Annual Report, is consistent with the financial statements. I also report whether 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.

In addition, I report to you if the Natural Environment Research Council has not kept proper accounting records, if I have not received all the information and explanations I require for my audit, or if information specified by HM Treasury regarding remuneration and other transactions is not disclosed.

I review whether the Statement on Internal Control reflects the Natural Environment Research Council's compliance with HM Treasury's guidance, and I report if it does not. I am not required to consider whether this statement covers all risks and controls, or form an opinion on the effectiveness of the Natural Environment Research Council's corporate governance procedures or its risk and control procedures.

I read the other information contained in the Annual Report and consider whether it is consistent with the audited financial statements. This other information comprises the Next generation science for planet Earth, The year in review, Climate system, Biodiversity, Sustainable use of natural resources, Natural hazards, Environment, Pollution and human health, Earth system science, Technologies, Knowledge exchange, People, National capability, Partnerships and the unaudited part of the Remuneration Report, the Chief Executive's Introduction and the Chairman's Foreword. I consider the implications for my report if I become aware of any apparent misstatements or material inconsistencies with the financial statements. My responsibilities do not extend to any other information.

Basis of audit opinion

I conducted my audit in accordance with International Standards on Auditing (UK and Ireland) issued by the Auditing Practices Board. My audit includes examination, on a test basis, of evidence relevant to the amounts, disclosures and regularity of financial transactions included in the financial statements and the part of the Remuneration Report to be audited. It also includes an assessment of the significant estimates and judgments made by the Council and Accounting Officer in the preparation of the financial statements, and of whether the accounting policies are most appropriate to the Natural Environment Research Council's circumstances, consistently applied and adequately disclosed.

I planned and performed my audit so as to obtain all the information and explanations which I considered necessary in order to provide me with sufficient evidence to give reasonable assurance that the financial statements and the part of the Remuneration Report to be audited are free from material misstatement, whether caused by fraud or error and that 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. In forming my opinion I also evaluated the overall adequacy of the presentation of information in the financial statements and the part of the Remuneration Report to be audited.

Opinions
In my opinion:

- the financial statements give a true and fair view, in accordance with the Science and Technology Act 1965 and directions made thereunder by the Secretary of State for the Department for Innovation, Universities and Skills, of the state of the Natural Environment Research Council's affairs as at 31 March 2009 and of its net expenditure, recognised gains and losses and cash flows for the year then ended;

- the financial statements and the part of the Remuneration Report to be audited have been properly prepared in accordance with the Science and Technology Act 1965 and directions made thereunder by the Secretary of State for the Department for Innovation, Universities and Skills; and

- information, which comprises of the Delivering the Strategy section included within the Annual Report, is consistent with the financial statements.

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.

Report
I have no observations to make on these financial statements.

Amyas C E Morse
Comptroller and Auditor General
National Audit Office, 151 Buckingham Palace Road, Victoria, London, SWIW 9SP
Date: 6 July 2009

Statement of net expenditure for the year ended 31 March 2009

	Notes	2009 £000	2008 £000
Expenditure			
Staff costs	4(b)	**105,457**	108,153
Staff early retirements	5	**1,762**	2,422
Grants and training	6	**143,923**	128,409
Other operating costs	7	**157,687**	139,382
Depreciation	9(a)	**23,746**	23,510
Impairment of fixed assets	9(a)	**1,082**	5,359
Total expenditure		**433,657**	407,235
Income	3	**(52,683)**	(48,337)
Net operating costs		**380,974**	358,898
Notional cost of capital	13	**10,156**	8,933
CEH restructuring	12	**(642)**	(2,269)
Finance lease interest		**1,170**	1,320
Interest receivable	8	**(12)**	(56)
Unwinding of discount	12	**505**	650
Loss/(Profit) on disposal of fixed assets		**149**	(1,928)
Net expenditure for the year	14	**392,300**	365,548

Accumulated Income and Expenditure reserves are shown at note 14.

All activities are continuing.

The notes on page 60 to76 form part of these accounts.

Balance sheet as at 31 March 2009

	Notes	£000	**31 March 2009 £000**	£000	31 March 2008 £000
Fixed assets					
Tangible assets	9	**353,000**		333,444	
Investments	9 (c)/(d)	**1,623**		47	
			354,623		333,491
Current assets					
Debtors	10	**53,070**		40,643	
Cash at bank and in hand		**14,602**		8,872	
		67,672		49,515	
Current liabilities					
Creditors falling due within one year	11 (a)	**(73,000)**		(60,707)	
Net current liabilities			**(5,328)**		(11,192)
Total assets less current liabilities			**349,295**		322,299
Creditors falling due after more than one year	11 (b)		**(15,618)**		(16,767)
Provisions for liabilities and charges	12		**(19,277)**		(24,731)
Net Assets			**314,400**		280,801
Capital and Reserves					
Government Grant Reserve	14		**2,824**		3,313
Revaluation Reserve	14		**106,492**		97,200
Accumulated Income and Expenditure Account	14		**204,814**		179,980
Donated Asset Reserve	14		**270**		308
Total Government Funds	14		**314,400**		280,801

The notes on page 60 to 76 form part of these accounts.

Professor Alan J Thorpe
Chief Executive & Accounting Officer
Date: 24 June 2009

Cash flow statement for the year ended 31 March 2009

	Notes	£000	2009 £000	£000	2008 £000
Net cash outflow from operating activities	15		**(362,167)**		(332,844)
Returns on investments and servicing of finance					
Interest received	8	**12**		56	
Interest element of finance lease payments		**(1,170)**		(1,320)	
			(1,158)		(1,264)
Capital expenditure					
Payments to acquire tangible fixed assets		**(30,614)**		(36,950)	
Payments to acquire investments		**(1,623)**		-	
Receipts from disposal of tangible fixed assets and investments		**92**		2,998	
			(32,145)		(33,952)
Net cash outflow before financing			**(395,470)**		(368,060)
Financing					
Grant-In-Aid received	2	**395,760**		353,555	
Funding received from other bodies	2	**6,546**		8,177	
Capital element of finance lease payments		**(1,106)**		(1,014)	
			401,200		360,718
Increase/(decrease) in cash	16		**5,730**		(7,342)

The notes on page 60 to 76 form part of these accounts.

Statement of recognised gains and losses for the year ended 31 March 2009

	2009 £000	2008 £000
Impairment of assets recorded through Revaluation Reserve	**-**	(4,530)
Gain on revaluation of fixed assets	**13,964**	32,882
Recognised gains and losses	**13,964**	28,352

The notes on page 60 to76 form part of these accounts.

Notes to the Accounts

1. Accounting policies

a. Basis of accounting

(i) The accounts have been prepared under the historical cost convention, modified to include revaluation of fixed assets in accordance with the Financial Reporting Manual (FReM). 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 HM Treasury or the Department for Innovation, Universities and Skills.

(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. The Council is exempted from producing a note of historical cost profits and losses normally required by Financial Reporting Standard Number 3.

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

b. Fixed assets and depreciation

Tangible fixed assets

Expenditure on fixed assets includes the purchase of land and buildings, construction and services projects, and equipment valued at £5,000 or more.

Tangible fixed assets 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 land and buildings were valued by Powis Hughes & Associates in 2007-08 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 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 Accumulated 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 equipment	-	5 to 10 years
Office and major computing equipment	-	5 to 10 years
Motor vehicles	-	3 to 7 years
Assets under construction	-	not depreciated until brought into use

Fixed assets are not depreciated in the month of acquisition and are depreciated by a full month in the month of disposal.

In accordance with the provisions of FRS 15 paragraph 83, the components of assets with substantially different economic lives are accounted for separately for depreciation purposes and depreciated over their individual useful economic lives.

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 Net Expenditure. No cost of capital charge is imposed.

Investments
Investments are shown at market value. Any surplus or temporary deficit on revaluation is taken to the revaluation reserve. Any permanent impairment in value is charged to the Statement of Net Expenditure in the year that it arises.

c. Ownership of equipment purchased with NERC Research Grants
Equipment purchased by an Institution with research grant funds supplied by the NERC belongs to the Institution and is not included in NERC's tangible fixed assets. 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.

d. 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 Net Expenditure over the useful life of the asset in amounts equal to the annual depreciation charge (see note 14).

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.

e. 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 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 Net Expenditure on receipt.

f. 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.

g. Foreign currencies
Assets and liabilities denominated in foreign currencies are expressed in pounds sterling at the rate(s) of exchange ruling at the balance sheet date. 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 Net Expenditure.

h. 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 fixed assets. Where output tax is charged or input tax is recoverable the amounts are stated net of VAT. NERC has charitable status for VAT purposes.

i. Pension and early retirement costs

Payments are made to the Research Councils' Pension Scheme in respect of superannuation benefits for Council staff. The cost of early retirements are charged to NERC's accounts in the year in which the decision is taken to release staff and a provision for early retirement cost created. This provision is released to fund early retirement costs when they are paid.

The provision for these costs is discounted at the HM Treasury rate of 3.2% (2007-08: 2.5%). The unwinding of the discount is charged to the Statement of Net Expenditure.

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 debtors in these accounts and offset against annual staff restructuring costs.

j. Notional costs

In line with HM Treasury requirements, a notional interest charge is included in the accounts to reflect a charge for the use of capital in the business in the year, as the Council has no specific interest bearing debt. In accordance with Treasury guidance, the calculation is based on a 3.5% rate of return on average net assets employed (2007-08: 3.5%) less amounts held with Paymaster General and donated asset reserve.

k. 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 balance sheet 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 3.2% for pension provisions and 2.2% for all other provisions.

l. 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 tangible fixed assets 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 creditors. Finance charges are charged to the Statement of Net Expenditure over the period of the agreement in accordance with the interest rate within the contract.

m. Operating leases

Operating lease rentals are charged to the Statement of Net Expenditure on a straight line basis over the period of the lease.

n. Investments

Investments are stated at cost less any provision for impairment.

2. Grant-in-Aid and income from other bodies

Under the Financial Reporting Manual, 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 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 income and income from other bodies that are treated as financing inflow and have been transferred to the Income and Expenditure reserve during 2008-09 (see note 14):

	2009	2008
	£000	£000
Grant-in-Aid received	**395,760**	353,555
Funding received from other bodies	**6,546**	8,177
Total	**402,306**	361,732

3. Income

		2009	2008
		£000	£000
a.	**Income from Government departments**		
	Department for Environment Food and Rural Affairs	4,738	4,995
	Department of Business Enterprise & Regulatory Reform	920	858
	Ministry of Defence	292	269
	Department for International Development	152	885
	Environment Agency	1,860	1,004
	Department of Enterprise, Trade and Investment Northern Ireland	1,472	1,190
	Foreign and Commonwealth Office	1,122	988
	Department for Communities and Local Government	263	402
	Other departments (i)	2,199	2,651
	Total income from Government departments	**13,018**	13,242
b.	**Income from other bodies**		
	European Community	4,326	3,490
	Other Research Councils	956	1,308
	Other Public Sector	3,857	3,088
	Private Sector	13,041	12,307
	Total income from other bodies	**22,180**	20,193
c.	**Other operating income**		
	Software and data sales	2,176	2,041
	Scientific publications	426	472
	Library and administrative services	960	1,189
	Property and equipment rentals	1,410	1,675
	Sales of products	69	76
	Lecture fees, seminars and training courses	249	144
	Promotional items	195	306
	Royalties and licence fees from intellectual property	2,151	2,768
	Reimbursement of expenditure	7,371	3,406
	Other income	1,951	2,307
	Total other operating income	**16,958**	14,384
d.	**Release of Government Grant Reserve**	527	518
	Total income	**52,683**	48,337

(i) Other Government Departments includes £1m Meteorological Office (2007-08: £1.6m).

4. Salaries and wages

a. Staff numbers

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

	2009	2008
	No.	No.
Administrative	531	604
Scientific	1,210	1,260
Professional and technical	363	376
Marine and Antarctic contract	257	266
Staff on inward secondment/loan	3	3
Agency/temporary and contract staff	84	126
	2,448	2,635

Note: The total number of staff reported in the Annual Report are calculated based on head count as at the 31 March 2009, whereas the above figures are average FTE's for the year.

Not included in the figures above are staff transferred under the Transfer of Undertakings (Protection of Employment) Regulations 2006 (TUPE Regulations) to RCUK Shared Services Centre Limited (SSC Ltd). On 1 April 2008 95.0 FTEs were transferred under the TUPE Regulations to SSC Ltd and immediately seconded back to NERC. During the year the average number FTEs transferred under TUPE Regulations to SSC Ltd and seconded back to NERC was 72.5 FTEs. All those staff were previously included under the Administrative category.

b. Staff costs

	2009	2008
	£000	£000
Salaries and wages	82,756	84,965
Social Security costs	6,602	6,690
Other pension costs (note 4d)	16,099	16,498
	105,457	108,153

In 2008/09 temporary and contract staff costs total £4,813,688 (2007-08: £5,316,079) and are included in the figures above.

Agency costs of £2,206,214 (2007-08: £1,527,622) and charges by SSC Ltd in respect of staff transferred under TUPE Regulations and seconded back to NERC of £2,308,113 (2007-08: nil) have been included in operating costs.

The total amount capitalised for staff costs in 2008/09 is £453,718 (2007-08 £626,322). This relates to an estimated 9.5 full-time equivalents for those staff employed by NERC that are adding value to assets such as NERC Estates and 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 4(b), other operating costs, note 7 and staff costs, note 4(d) pensions.

	2009	2008
	£000	£000
Council members' fees	111	113
Committee members'/Peer Review	331	300
Other emoluments	112	108
	554	521

Committee members may receive £166 (2007-08: £160) per day.

Committee Chairman may receive £223 (2007-08: £215) per day.

British Geological Survey Programme Board members receive £3,000 per annum (2007-08: £3,000).

British Geological Survey Programme Board Chairman receives £4,000 per annum (2007-08: £4,000).

British Antarctic Survey Independent Board members receive £5,118 per annum (2007-08: £5,000).

Chairmen of Boards of Council receive £8,970 per annum with effect from 1/10/2008 (2007-08: £8,750).

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. The Peer Review College associate members receive honoraria of £500 per annum.

Peer Review College members and associate members are initially employed for 1 year commencing 1 June.

Average number of Council, Committee and Board members

	2009	2008
	No.	No.
Council members*	17	15
Committee/Peer Review		
College and Board members	395	366
	412	381

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

	2009	2008
	No.	No.
£0 to £5,000	399	368
£5,001 to £10,000	11	11
£10,001 to £15,000	1	1
£15,001 to £20,000	1	1
	412	381

** includes Chief Executive and Chairman*

d. Superannuation

Pension scheme payments

	2009	2008
	£000	£000
Payments in respect of the Research Councils' Pension Scheme (RCPS)	15,868	15,947
Payments to pension schemes other than the RCPS:-		
Merchant Navy Officers' Pension Fund	45	409
Merchant Navy Officers' Pension Plan	3	5
Merchant Navy Ratings' Pension Plan	5	5
Partnership Pensions	178	132
	16,099	16,498

Most employees of NERC are 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. 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. The Council is unable to identify its share of the underlying assets and liabilities.

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 for the scheme was carried out as at 31 March 2006 by a qualified independent actuary. The draft report is available and discussions have commenced about a possible increase in the employers contribution rate from 21.3% to 26%, effective from 1 April 2010. The employers' contribution rate of 21.3% therefore applies to these accounts. NERC paid costs in the year of £15,867,782.

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%	2004
Merchant Navy Officers' Pension Plan	5.1%	2000
Merchant Navy Ratings' Pension Fund*	2.0%	2008
Merchant Navy Ratings' Pension Plan	5.1%	2000

^ No current liability outstanding.

** The Merchant Navy Ratings' Pension Fund closed on 31st May 2001. A new actuarial valuation was undertaken in March 2008. Although the preliminary results of the valuation were published in December 2008, the trustees have not yet decided upon their preferred funding option and the discussions with the members, led by Stena, continue.*

The Fund has a deficit, the liability for which is shared between members' employing organisations. We currently hold a provision for our share amounting to £2,449,582. This relates to an increased deficit for the Fund based on more prudent actuarial assumptions than the previous valuation (such as increased life expectancy and greater uncertainty in the market). The funding schedule is anticipated to be 15 years. The provision also relates to the additional liability arising from the withdrawal of two of the voluntary contributors.

On closure of the fund members transferred to the RCPS or the new Merchant Navy Ratings' Pension plan which is a money purchase scheme. For members who opted for section 148 revaluation of accrued pension, 2% of the residual employer's contributions are still paid to the closed scheme.

5. Staff restructuring/early retirements

	2009 £000	2008 £000
Annual compensation payments	228	9
Redundancy compensation payments	346	484
Early retirement lump sums	271	735
Provision for early retirement liability (Note 12)	1,349	1,999
Recoverable early retirement lump sums	(432)	(805)
	1,762	2,422

6. Grants and Training

	2009 £000	2008 (i) £000
a. *Research Grants – analysis by theme*		
Climate systems	14,235	12,331
Biodiversity	17,549	15,202
Sustainable use of natural resources	8,008	6,937
Earth system science	16,639	14,414
Natural hazards	6,756	5,852
Environment, pollution and human health	5,418	4,693
Technology	2,266	1,963
	70,871	61,392
b. *Research Contracts – analysis by theme*		
Climate systems	9,012	7,441
Biodiversity	6,616	5,463
Sustainable use of natural resources	4,317	3,565
Earth system science	7,439	6,143
Natural hazards	3,934	3,248
Environment, pollution and human health	3,816	3,151
Technology	4,658	3,846
	39,792	32,857

	2009 £000	2008 (i) £000
c. Post Graduate training awards		
Research students	22,965	23,041
Research masters	4,006	4,003
Research fellows	6,289	7,116
	33,260	34,160
Total grants and training awards	**143,923**	128,409

Note (i) The 2007-08 figures have been restated in line with NERC's strategic and scientific priorities as set out in 'Next Generation Science for Planet Earth'.

7. Other operating costs

	Note	2009 £000	2008 £000
Rent and rates		2,474	2,884
Maintenance, cleaning, heating and lighting		3,810	5,595
Office supplies, printing and stationery		4,532	4,276
Laboratory supplies, computing and field equipment		14,812	15,019
Postage, telephone and other telecommunications		1,693	1,489
Hospitality		698	657
Audit fee	(i)	61	54
Travel and subsistence		9,687	9,053
Ships and aircraft operations	(ii)	15,120	10,525
External training		1,087	1,206
SSC operating costs	(iii)	1,281	-
Professional and research services by outside bodies	(iv)	102,118	88,629
Operating leases		5	4
Increase/(decrease) in provision for bad debt		309	(9)
		157,687	139,382

Notes:
(i) The costs for Audit Fee include external audit fees for IFRS costs for trigger points 1 & 2 of £7.8k and statutory audit fee of £52k. There are no non-audit fees.
(ii) The cost for Ships and Aircraft Operations include £1.7m for the refit of the RRS Discovery *and a £2.5m increase in bulk fuel costs due to a large increase in the costs of marine gas and aviation fuels during the year and the weakening of Sterling against the Dollar.*
(iii) SSC Operating Costs include the costs for services which were transferred to SSC Ltd during the year, such as procurement, information technology and recruitment.
(iv) The cost for Professional and Research Services by Outside Bodies includes international subscriptions of £50.4m, bought in services of £33.2m (including SSC Ltd set up costs of £6.7m) and other services including consultancy, advertising, waste disposal and medical/legal costs.

8. Interest receivable

	2009 £000	2008 £000
Interest on bank balances	**12**	56

9. a. Tangible fixed assets

Cost or valuation	Land, buildings and Antarctic stations (i) & (iv) £000	Plant and equipment (v) and (vi) £000	Ships and aircraft (iii) & (iv) £000	Motor vehicles (ii) £000	Total £000
At 1 April 2008	312,917	108,431	169,377	7,786	598,511
Additions	12,002	16,396	1,732	484	30,614
Revaluation	(1,188)	(352)	13,161	(211)	11,410
Disposals	(115)	(3,916)	-	(342)	(4,373)
Impairment	(267)	-	(815)	-	(1,082)
At 31 March 2009	323,349	120,559	183,455	7,717	635,080
Depreciation					
At 1 April 2008	108,453	68,147	82,816	5,651	265,067
Charge for the year	5,831	11,349	5,677	889	23,746
Revaluation	-	(2,306)	-	(467)	(2,773)
Disposals	(115)	(3,511)	-	(334)	(3,960)
At 31 March 2009	114,169	73,679	88,493	5,739	282,080
Net Book Value At 31 March 2009	**209,180**	**46,880**	**94,962**	**1,978**	**353,000**
At 1 April 2008	204,464	40,284	86,561	2,135	333,444

Notes:

(i) Cost / Valuation includes £17,415,659 in respect of Freehold Land which is not depreciated (2007-08: £18,393,278).

(ii) Including specialised Antarctic Vehicles.

(iii) The NBV of the leased ship is £23,593,066 (2007-08: £22,424,234). The annual depreciation charge on this asset held under the finance lease was £1,818,586 for the year (2007-08: £1,971,735).

(iv) The impairment costs of £1,081,720 relate to the reduction in value to below the depreciated historical costs of L&B properties of £266,629 following downwards indexation and a Dornier Aircraft of £815,091 following a professional valuation in 2008-09.

(v) Includes donated assets with a value of £269,861 and is offset by a donated asset reserve. There is no restriction on the use of these assets.

(vi) The Assets Under Course of Construction within Plant and Equipment include the Council's individual share of £7,721,164 (2007-08: £3,224,471) of the Shared Services Centre currently being developed by the seven Research Councils.

b. The net book value of land, buildings and Antarctic stations comprises:

	2009 £000	2008 £000
Freehold	48,025	48,625
Long leasehold	103,251	106,965
Short leasehold	767	560
Antarctic stations	14,143	15,192
Under construction	42,994	33,122
Total Net Book Value	**209,180**	204,464

c. Fixed asset investments

	2009 £000
Valuation as at 1 April 2008	47
Disposal	(47)
Valuation as at 31 March 2009	-

The Council disposed of its 252,000 shares in Evolutec Group PLC for £64k in December 2008.

The shares are publicly traded on the Alternative Investment Market of the London Stock exchange and had an open market value of 25.75 pence per share upon disposal. NERC's shareholding represented 0.97% of the issued capital of Evolutec Limited upon disposal.

d. Other investments

	2009	2008
	£	£
'A' share in RCUK Shared Services Centre Limited	1	1
'B' shares in RCUK Shared Services Centre Limited	1,622,660	-
	1,622,661	1

The Council owns one 'A' ordinary share of £1 in the 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. The investment has been classified as 'other investment' as each Council's individual share is 14%.

During the year the Council acquired 1,622,660 'B' shares of £1 in the SSC Ltd. These shares represent 20.54% of total shares issued of 7,900,000 and have no voting rights. The investment has been classified as 'other investment' as NERC's individual share is 20.54%, while the other six Research Councils own the remaining 79.46% or 6,277,340 shares.

SSC Ltd was incorporated on 1 August 2007 to set up the Shared Services Centre. In 2008-09 implementation of procurement services and information technology services for all seven Research Councils took place, as well as the human resources services for two Councils. For the period ended 31 March 2009 the draft financial statements of RCUK Shared Services Centre Limited shows revenue of £25.8m (2007-08: £1.2m) and administration costs of £27.2m (2007-08: £1.2m) resulting in a loss for the year of £1.4m (2007-08: nil). The balance sheet totals are £7 'A' shares and £7,900,000 'B' shares issued to the Research Councils and £7.1m cash.

10. Debtors

			2009		2008
		£000	**£000**	£000	£000
a.	*Amounts falling due within one year:*				
	Trade debtors		5,527		4,693
	Intra Government				
	Central Government bodies	15,715		5,531	
	Local authorities	198		205	
			15,913		5,736
	Other debtors		3,261		4,930
	Early retirement lump sum repayments		1,360		1,352
	Pre-payments		18,259		13,490
	Accrued income		5,733		6,560
	Provision for bad debts		(448)		(139)
			49,605		36,622
b.	*Amounts falling due after one year:*				
	Early retirement costs in respect of former employees due from Pension Fund on normal retirement date.		**3,465**		4,021
	Total debtors		**53,070**		40,643

11. Creditors

			2009		2,008
		£000	**£000**	£000	£000
a.	*Amounts falling due within one year:*		3,929		4,795
	Intra Government				
	Central Government bodies	336		192	
	Local authorities	3		227	
			339		419
	Taxation and Social Security		26		1,175
	Other creditors		21,962		18,943
	Early retirements		1,847		1,762
	Accruals and deferred income		40,532		31,413
	Obligation under finance leases		1,198		1,101
	Monies held on behalf of EC Programme Collaborators		3,167		1,099
			73,000		60,707
b.	*Amounts falling due after more than one year:*				
	Obligation under finance leases	13,005		14,208	
	Early retirements	2,613		2,559	
			15,618		16,767
	Total creditors		**88,618**		77,474

12. Provisions for liabilities and charges

	Antarctic Treaty costs [2]	Shared Services Centre [4]	Early retirements	Other liabilities [3]	CEH restructuring	Total
	£000	**£000**	**£000**	**£000**	**£000**	**£000**
At 1 April 2008 [1]	7,829	788	3,553	2,604	9,957	24,731
Change in discount rate	-	-	(45)	(11)	-	(56)
Write back of provisions not required	(2,227)	(132)	(93)	-	(1,491)	(3,943)
Amounts provided in year	-	227	1,349	1,987	849	4,412
Unwinding of discount	172	-	48	61	224	505
Provision utilised in year	(183)	(70)	(1,671)	(1,019)	(3,429)	(6,372)
Provision at 31 March 2009	**5,591**	**813**	**3,141**	**3,622**	**6,110**	**19,277**

Notes :

1. *The discount rate used is 3.2% for pension provisions and 2.2% for all other provisions (2007-08: 2.5% for pension provisions and 2.2% for all other provisions).*
2. *Antarctic Treaty Costs represents the Council's Liability to remove the items no longer used from the Antarctic.*
3. *Other liabilities include Merchant Navy Ratings' Pension Fund, 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.*
4. *The Research Councils and RCUK Shared Services Ltd are in the process of developing a Shared Service Centre to carry out the central functions of Human Resources, Finance, Procurement and Information Technology across the Councils. As a result some Research Councils will incur redundancy costs, particularly where existing staff live a distance away from Swindon where the Centre will be situated. The Research Councils have collectively agreed that they will be jointly liable for all necessary redundancies. The Councils have calculated their likely redundancy liabilities in order to make a provision. A funding allocation model was developed and agreed by all the Research Councils and this identified the proportion of SSC project spend and liability that each individual Council would incur. The total provision for redundancies has been apportioned using this model. The table below shows, for each Council the amount that they need to provide for redundancies of their own staff in accordance with FRS 12 as determined at 31 March 2009. Some Councils will incur a cost for terminating their existing systems, and these costs are being shared between the Councils. The provision for all seven Councils are then split and shared in accordance with an agreed predetermined ratio as detailed in the table below. Each Council takes their agreed share of their own liability and then contributes or receives contributions from the other Research Councils to reach the provision which is recorded in their own balance sheet.*

NERC SSC provision	**£000**
At 1 April 2008	1,620
Change in discount rate	-
Write back of provisions not required	(396)
Amounts provided in year	-
Unwinding of discount	-
Provision utilised in year	(315)
Provision at 31 March 2009	**909**

	AHRC £000	BBSRC £000	ESRC £000	EPSRC £000	MRC £000	NERC £000	STFC £000	Total £000
Opening provision required for Council's own redundancies	68	152	-	-	999	1,620	-	2,839
Opening provision system termination fee	-	-	-	-	1,000	-	-	1,000
Opening total provisions	**68**	**152**	**-**	**-**	**1,999**	**1,620**	**-**	**3,839**
Net movement in provisions	-	279	-	-	31	(711)	520	119
Closing total provisions	**68**	**431**	**-**	**-**	**2,030**	**909**	**520**	**3,958**
% of total provision to be borne by the Council	1.33%	20.54%	1.83%	8.24%	26.98%	20.54%	20.54%	100.00%
Net provision required for each Council	**53**	**813**	**72**	**326**	**1,068**	**813**	**813**	**3,958**

13. Notional cost of capital

	2009 £000	2008 £000
Notional cost of capital	10,156	8,933

In accordance with Treasury guidance the reversal of the cost of capital charge has been written back to the Income and Expenditure reserve (see note 1j).

14. Government funds

	Government Grant Reserve [i] £000	Accumulated Income Expenditure Reserve £000	Revaluation Reserve £000	Donated Asset Reserves [ii] £000	Total Government Funds £000
Balance at 1 April 2008	3,313	179,980	97,200	308	280,801
Grant-In-Aid received	-	395,760	-	-	395,760
Funding received from other bodies	-	6,546	-	-	6,546
Revaluation in year	-	-	13,964	-	13,964
Reversal of notional cost of capital	-	10,156	-	-	10,156
Expenditure for year	-	(392,300)	-	-	(392,300)
Release to net expenditure	(489)	-	-	(38)	(527)
Transfer between reserves	-	4,672	(4,672)	-	-
Balance at 31 March 2009	**2,824**	**204,814**	**106,492**	**270**	**314,400**

Notes:
(i) The Government Grant Reserve relates to assets transferred from Southampton University to NOCS. The reserve is released to the Statement of Net Expenditure over the asset lives to match depreciation.
(ii) The donated reserve relates to assets which were donated in 2005/06 and were valued at current value on receipt and included in note 9.

15. Reconciliation of the operating costs before financing to net cash outflow from operating activities

	2009	2008
	£000	£000
Net operating expenditure	(380,974)	(358,898)
Depreciation charge	23,746	23,510
Release from Government Grant and Donated Asset Reserve	(527)	(468)
Impairment charged to Statement of Net Expenditure	1,082	5,359
Decrease in provisions	(5,317)	(7,781)
Increase in debtors	(12,427)	(4,207)
Increase in creditors	12,250	9,641
Net cash outflow from operating activities	**(362,167)**	(332,844)

16. Reconciliation of movements in cash to movements in net funds/(debt)

	2009	2008
	£000	£000
Increase/(Decrease) in cash	5,730	(7,342)
Capital element of finance lease payment	1,106	1,014
Change in net funds/(debt) resulting from cash flows	6,836	(6,328)
Net debt at 1 April	(6,437)	(109)
Net funds /(debt) at 31 March	399	(6,437)

Analysis of net funds/(debt)

	At 1 April 2008	**Cash Flows**	**At 31 March 2009**
	£000	**£000**	**£000**
Cash at bank	8,872	5,730	14,602*
Finance Lease	(15,309)	1,106	(14,203)
	(6,437)	6,836	399

*Note: * Figure includes £8,775,501 which relates to balance held at Office of Paymaster General as at 31 March 2009 (2008: £5,529,807).*

17. Forward commitments on approved Research Grants, Research Contracts and Studentships

	2009
	£000
2009-2010	127,976
2010-2011	77,624
2011-2012	40,196
2012-2013	19,096
2013-2014	7,563
2014-2015	854
	273,309

18. Amounts payable under Finance Lease Obligations

	2009 £000	2008 £000
Within one year	1,198	1,101
Within two to five years	5,812	5,444
Greater than five years	7,193	8,764
	14,203	15,309

19. Related party transactions

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

The DIUS is regarded as a related party. During the year, NERC has had various material transactions with the DIUS and with other entities for which the DIUS 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.

In August 2005, DIUS transferred to NERC the responsibility for the National Core Store (located at Gilmerton, Edinburgh). There is a minimum 5 year lease agreement in place where NERC lease the property in Edinburgh from the DIUS at an annual peppercorn rent. The property remains on DIUS's balance sheet. NERC are responsible for maintaining and running the Core Store and have received full year funding of £420,000 from the DIUS.

In addition 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	Amount £
Professor A Fitter	2	196,990
Professor A Watson	8	365,947

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	2,709
Professor P Curran	University of Bournemouth	114
Professor M Wilson	University of Leeds	11,937
Professor A Halliday Professor C Godfray	University of Oxford	5,898
Professor A Thorpe	University of Reading	11,804
Professor M Lockwood	University of Southampton	3,284
	Science and Technology Facilities Council	3,552
Professor T Meagher	University of St Andrews	3,343
Professor T Davies Professor A Watson	University of East Anglia	8,598
Professor A Fitter	University of York	3,335
Mrs K Morgan	University of the West of England	66

20. Losses and special payments

During the year there were 36 losses totalling £25,112 including a release of £12,643 re unidentified pre-1999 trade creditors.

21. Shareholdings

Other than shareholdings shown in note 9(c) and 9(d), the Council holds:

249 shares in Wallingford Hydrosolutions Ltd, a specialist technology transfer company. Wallingford Hydrosolutions Ltd is a leading research centre in the area of hydrology, water resources and environmental modelling. The shares are not publicly traded and currently have no open market value. At 31 March 2009 NERC's shareholding represented 24.9% of the issued share capital of Wallingford Hydrosolutions Ltd;

1,000 shares in Cybersense Biosystems Ltd, a biosensor company based at Oxford's Centre of Ecology & Hydrology, which is adapting the latest bioluminescent biosensor technology for industrial applications. In December 2008 Cybersense Biosystems Ltd was taken over by Severn Trent Water and its name changed to Gordons 1 Ltd, the holding company that will remain in existence for 5 years during which shareholders will receive payment based on sales of the new business unit. The shares are not publicly traded and currently have no open market value. At the time of take-over NERC's shareholding represented 0.06% of the issued share capital of Cybersense Biosystems 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 2009 NERC's shareholding represented 23.49% of the issued share capital of Microbial Solutions Ltd; and

21,900 shares in Oxford Expression Technologies Ltd. The company is best known for producing a technology called 'flashBAC' that enables researchers in both academia and industry to produce proteins more easily and more cost-effectively using automated, high throughput techniques. The proteins can then be used for a variety of purposes such as in the development of new drugs and for more targeted research on understanding how proteins work in health and disease. The shares are not publicly traded and currently have no open market value. At 31 March 2009 NERC's shareholding represented 15.12% of the issued share capital of Oxford Expression Technologies Ltd.

22. Capital and lease commitments

Capital commitments

As at the date of these accounts, NERC is committed to a sum of £24,887,340 in respect of capital contracts. This includes the building of the Antarctic base Halley VI for £10,044,000 due to be completed in 2010-11, the building at CEH Wallingford for £10,510,000 due to be completed in 2010-11, the William Smith Building in BGS Keyworth for £821,000 due to be completed in 2009-10, and the NERC share of the Shared Services Centre development of £3,512,340.

The SSC capital commitment represents the Council's individual share of the future committed spend on the Shared Services Centre. Costs incurred to 31 March 2009 have been recognised through the Statements of Net Expenditure account and the SSC Assets in the Course of Construction.

Lease commitments

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

	2009 £000	2008 £000
Operating leases which expire		
- in under 1 year	-	3
- in two to five years	32	-

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 £1,667,680 at 31 March 2009 (2007-08: £1,296,560).

23. Contingent liabilities

There are no outstanding contingent liabilities at this time.

24. Post balance sheet events

On 5 June 2009, the Government announced the creation of a new Department for Business, Innovation and Skills (BIS) whose key role will be to build Britain's capabilities to compete in the global economy. The Department was created by merging the Department for Business Enterprise and Regulatory Reform (BERR) and the Department for Innovation, Universities and Skills (DIUS). The sponsorship responsibility for the Council passed to BIS on that date.

There is no reason to believe that the expected government funding underlying the Council's going concern assertion will be affected by this change.

There were no other post balance sheet events between the balance sheet date and 6 July 2009, the date when the Accounting Officer approved the accounts. The financial statements do not reflect events after this date.

25. Financial instruments

FRS 25 Financial Instruments - Disclosure and Presentation, FRS 26 Financial Instruments – Recognition and Measurement and FRS 29 Financial Instruments – Disclosures have been introduced this year. There have been no adjustments to the financial statements in either the current nor prior year. They 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. Because of 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 business 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 FRS 25, 26 and 29 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), 9(a) and 18) and relatively insignificant 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 largely financed by Grant-in-Aid from its sponsor department, the Department for Innovation, Universities 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 any 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 is being managed with its sponsor department, the Department for Innovation, Universities and Skills.

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