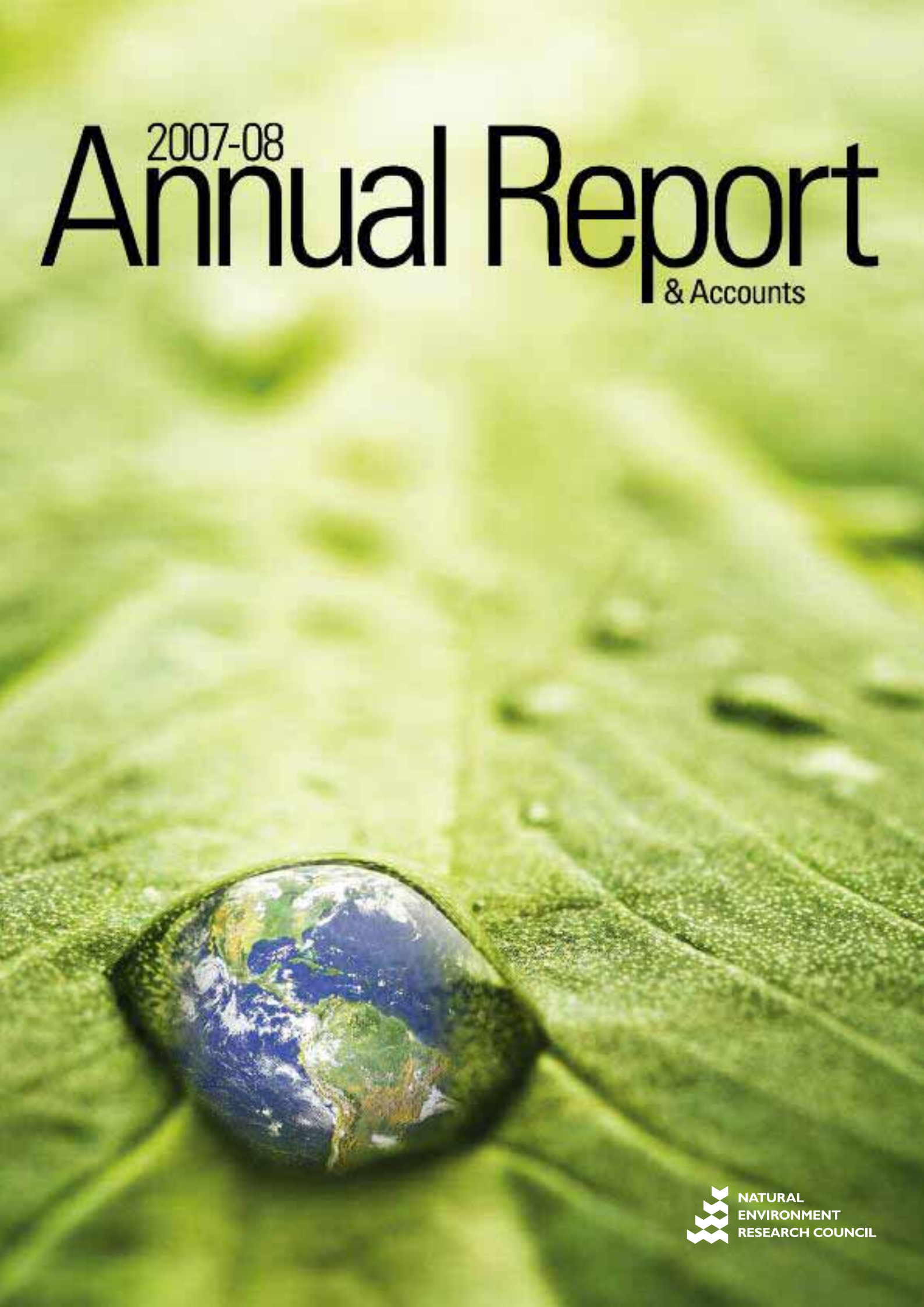
2007-08 Annual Report & Accounts



NATURAL ENVIRONMENT RESEARCH COUNCIL

The Clear English Standard
applies only to pages 1-48

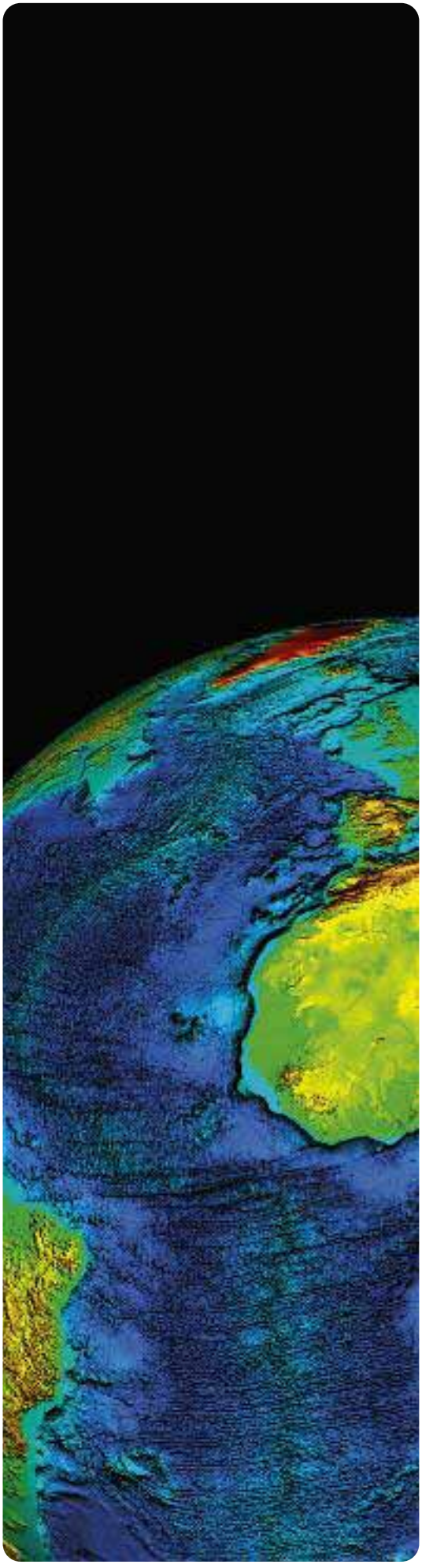
INVESTOR IN PEOPLE

Some research reported here may not yet have been peer-reviewed or published. For a list of NERC Council members see page 51. For members of our other committees see our website www.nerc.ac.uk.

Natural Environment Research Council
Annual Report and Accounts 2007-08

Presented to the Houses of Parliament under the Science and Technology Act 1965, c.4, s.2 (2).
Ordered by the House of Commons to be printed on 17 July 2008.

HC 748 London: The Stationery Office £18.55



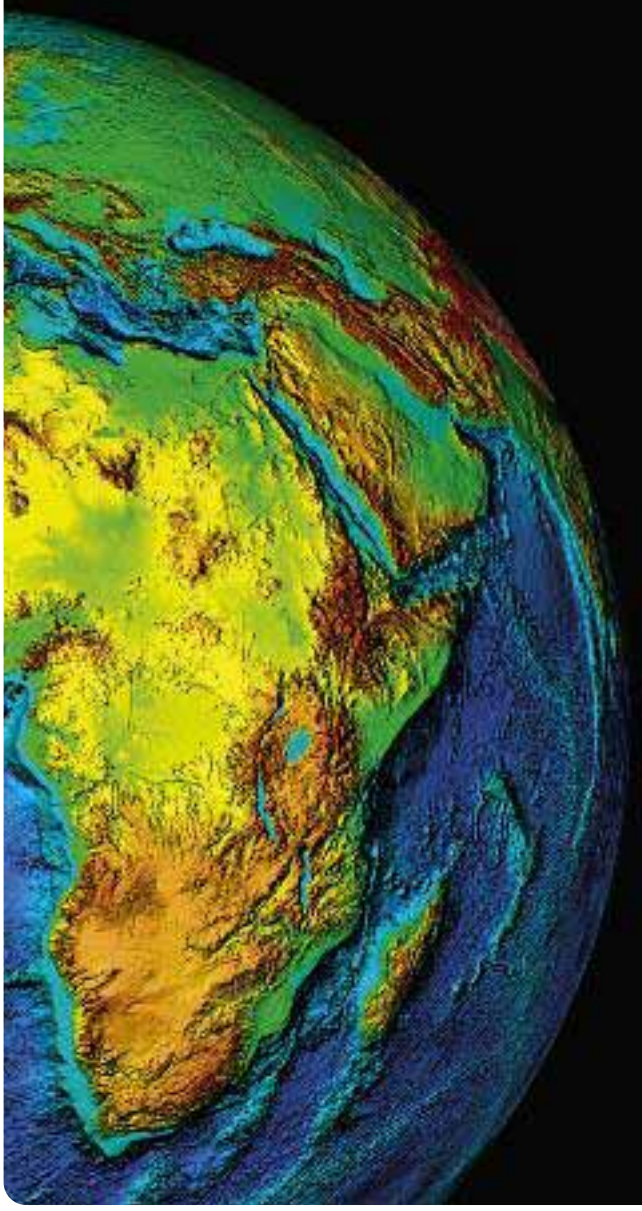
Next Generation Science for Planet Earth

The Natural Environment Research Council (NERC) funds independent environmental research in the United Kingdom. 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 monitor environmental change on a global scale.

NERC's research and collaborative centres maintain and develop UK national capability across the disciplines that make up environmental science. We fund centres and universities to carry out research and to train and support a world-class community of environmental scientists.

NERC is one of the seven UK research councils.



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.

This annual report to Parliament describes selected achievements from 1 April 2007 to 31 March 2008. 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 Innovation, Universities and Skills' Science and Innovation Group, 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 year in review

Once again, the government's citation analysis has shown that the UK is second only to the USA in terms of total citations for published environmental research. The UK can rightly describe its environmental research community as 'world-class'.

This year has been one of special significance. In December 2007, the Nobel Peace Prize was awarded to the UN's Intergovernmental Panel on Climate Change (IPCC). Many UK-based scientists, including those funded or employed by NERC, contributed to the IPCC fourth assessment report . The report's significance cannot be overstated: it will form the basis of global policy on this challenge for the next few decades.

We applaud and congratulate all those honoured by the committee and all the support staff in research centres and universities throughout the UK who helped make it possible.

A month earlier, in November, NERC launched its new strategy *Next Generation Science for Planet Earth, 2007–2012*. The IPCC report, the Stern Review on the economics of climate change and the Millennium Ecosystem Assessment helped shape the strategy, which recognises the urgent need to find solutions to the global environmental challenges threatening life on Earth.

A central part of *Next Generation Science for Planet Earth* is NERC's contribution to a £1 billion research/policy initiative *Living with Environmental Change*. This ten-year programme, supported by 17 organisations, signals a new approach to collaboration across the UK environmental science communities and beyond into other disciplines. It will bring together research councils, other funding bodies, industry and government departments and agencies from across the UK.

A central part of *Next Generation Science for Planet Earth* is NERC's contribution to a £1 billion research/policy initiative *Living with Environmental Change*.

The strategy launch coincided with the government's announcement of the Comprehensive Spending Review detailing the Science Budget allocation. NERC's allocation for the next three years represents a 5.4 per cent average annual increase. It includes a component to allow us to pay 80 per cent of the full economic cost associated with research grants in universities.* Allowing for the full economic cost, NERC's allocation was among the best across the research councils, reflecting the powerful case for investment in the science needed to address the environmental problems facing the planet.

Two major new facilities demonstrate NERC's commitment to collaboration: the Environment Centre Wales, a joint venture with Bangor University and the Centre for Ecology & Hydrology; and the new national high-performance computing facility in Edinburgh funded by the research councils. We have also created a new National Centre for Earth Observation to coordinate NERC's research with Earth observation satellites. In 2007, a satellite instrument developed from technology funded by NERC recorded the unprecedented loss of sea ice during the Arctic summer.

Closer to home, NERC scientists provided vital and timely information to operational agencies such as the Environment Agency and the Met Office during the summer floods, the two earthquakes that struck the UK, and the storm surge that threatened the east coast of England.

Amid all these strategic achievements, 2007-08 saw much inspirational research. A grant awarded to scientists at University College London for climate research relating

John Giles/PA Wire

to water in Earth's atmosphere led to the discovery of water in the atmosphere of a planet in a solar system 63 light years away (page 16).

The world-class research contained in this document is further evidence for the government's citation analysis, which shows the UK to be second only to the USA in the number of citations published in environmental research – we can feel justly proud of this achievement. During 2007-08, a key priority has been improving the flow of this world-class research into policy and industry: grants must now contain a knowledge exchange component.

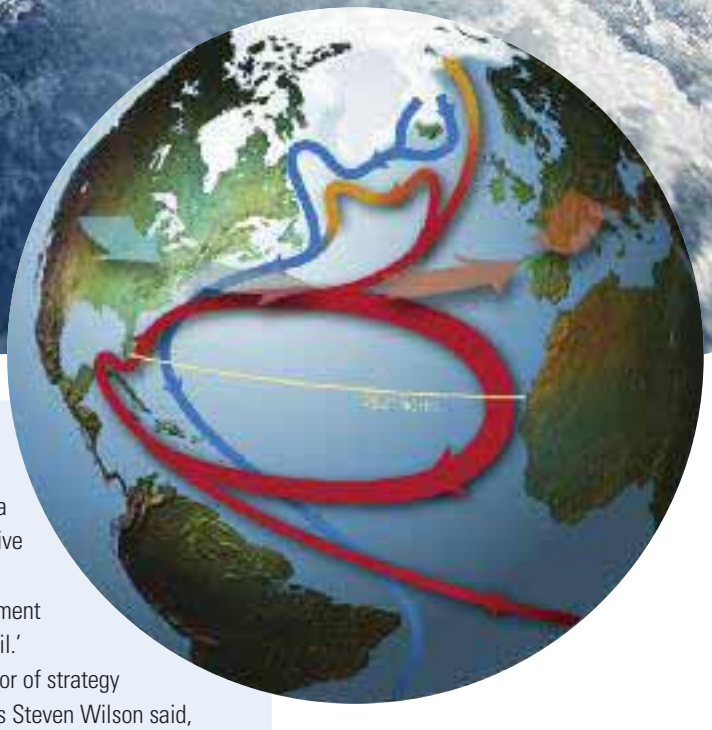
It has been an excellent year for NERC. Our new strategy and the allocation of funding for the next three years mean that we can look forward to rapidly advancing the science to address the challenge of sustaining life on Earth.

Ed Wallis, *Chairman*
Alan Thorpe, *Chief Executive*
30 June 2008

**3.3 per cent increase excluding contribution for full economic cost.*

Climate system

Improving predictions, reducing and quantifying uncertainty



Rapid climate change

Until 2007, scientists had no precise knowledge about the daily, weekly and monthly variability of the Atlantic Meridional Overturning Circulation, or Atlantic Heat Conveyor – the ocean circulation that contributes to north-west Europe's temperate climate.

All that changed when two landmark papers from NERC's Rapid Climate Change programme were published in the same issue of the American journal *Science*. The papers were based on an array of scientific instruments across the Atlantic Ocean between North Africa and Miami. For the first time, scientists could say with confidence that the average strength of the conveyor from 29 March 2004 to 31 March 2005 was 18.7 Sverdrups*.

John Church, the former chairman of the Joint Scientific Committee of the World Climate Research Programme, described the programme as 'a bold new initiative led by the UK Natural Environment Research Council.'

NERC's director of strategy and partnerships Steven Wilson said, 'Funding this project was high risk as nothing like it had ever been done before. But it has paid off and is providing some spectacular results.'

- The journal *Nature* listed both papers in its top ten papers for 2007.
- Temporal variability of the Atlantic Meridional Overturning Circulation at 26.5°N. *Science*, 2007.
- Flow compensation associated with the Meridional Overturning Circulation at 26.5°N in the Atlantic. *Science*, 2007.

**1 Sverdrup = a million cubic metres per second.*

Clouds and climate change

Cloud-cover change in a warmer world is one of the major uncertainties in climate research. Scientists from the National Centre for Atmospheric Science and the Met Office Hadley Centre have discovered that carbon dioxide can alter cloud cover on timescales of days to months – not just decades, as previously suggested.

Jonathan Gregory, based at the University of Reading, has found that, contrary to previous research, cloud cover is not linked only to the relatively slow pace of global climate change. If greenhouse warming changes the stability of the lower atmosphere, this could quickly inhibit atmospheric convection and so cloud formation.

Jonathan said, 'If we can tease this faster response from observations and properly account for it, which can be more significant than the slower response from the oceans, this may help improve models more rapidly, reducing a major uncertainty.'

Ozone destruction over Atlantic

State-of-the-art global atmospheric models are underestimating the loss of low-level ozone in the tropical Atlantic by around 50 per cent due to the action of halogens (for example, bromine and iodine) in the air, say scientists from the Universities of York and Leeds and the National Centre for Atmospheric Science (NCAS).

The findings are significant because halogen reactions remove ozone, a greenhouse gas, and increase levels of hydroxyl radicals. This in turn accelerates methane removal, the third most abundant greenhouse gas in the atmosphere.

Director of the NCAS Composition programme Alastair Lewis said, 'While the results from this study could be interpreted as a good-news story – greenhouse gases are destroyed over the ocean in greater quantities than previously thought – the research shows that this remote region cannot be taken for granted. Just a small increase of nitrogen oxides in the air, from shipping or longer-range transport of pollutants, could tip the balance from a sink region to a source for low-level ozone.'

The results come from the first full year of measurements from the recently established NERC-funded Cape Verde Atmospheric Observatory.

■ Extensive halogen-mediated ozone destruction over the tropical Atlantic Ocean. *Nature*, 2008.

Uncertainty over climate proxies

Researchers at the Open University have direct evidence that variations in the magnesium/calcium ratio (Mg/Ca) within tiny shells of marine plankton are not controlled by changes in seawater temperature as the plankton move up and down the water column.

This means that the Mg/Ca ratio of the shell is mainly regulated by the organism itself. The Mg/Ca ratio of shells is often used as a proxy for past ocean temperatures and so for past climate.

It is now clear that scientists need a better understanding of this biological process to define precisely the relationship between temperature and shell Mg/Ca ratio, which is crucial for reconstructing past climates and predicting future climates. The researchers based their study on material recovered from one of NERC's long-term ocean-monitoring stations.

Ozone halts CO_2 absorption

Rising levels of low-level ozone from industrial emissions will significantly hamper plants' ability to absorb CO_2, causing more of the greenhouse gas to accumulate in the atmosphere than previously estimated, according to research in the journal *Nature*.

The research, a collaboration between scientists at the Met Office, the Centre for Ecology & Hydrology and the University of Exeter, shows that this indirect effect of low-level ozone on climate could be at least as great as ozone's direct effect as a greenhouse gas.

The team's global model projects that between the years 1901 and 2100, gross primary productivity on land may decrease 14-23 per cent owing to plant ozone damage. Until now this factor has not been included in climate projections.

Peter Cox from the University of Exeter and director of the NERC Climate and Land Surface Systems Interaction Centre said 'Policies to limit increases in near-surface ozone must be seen as an even higher priority.'

■ Indirect radiative forcing of climate change through ozone effects on the land-carbon sink. *Nature*, 2007.

Monsoon shifts

India will see significantly more days of heavy rainfall as global carbon dioxide levels approach double pre-industrial levels, increasing the likelihood of damaging floods.

Researchers from the National Centre for Atmospheric Science (NCAS) say that, at the same time, cycles of very wet and less wet monsoon behaviour are likely to become more intense with more pronounced dry spells. This will have serious effects on agricultural productivity.

Related work at NCAS has also shown that short-lived but important surface temperature variations in the Indian Ocean may contribute to floods and droughts during the Indian summer monsoon, depending on their strength and location.

Director of the NCAS Climate programme Julia Slingo said, 'These studies using the Met Office Hadley Centre's climate model are giving us new and very important results for working out what will happen to the Indian Monsoon in the next few decades.'

The latest report from the UN's Intergovernmental Panel on Climate Change indicated this was a major area of uncertainty in climate prediction.

Prasanta Biswas/Majority World/Still Pictures

Climate models fail to represent observed tropical rainfall trends

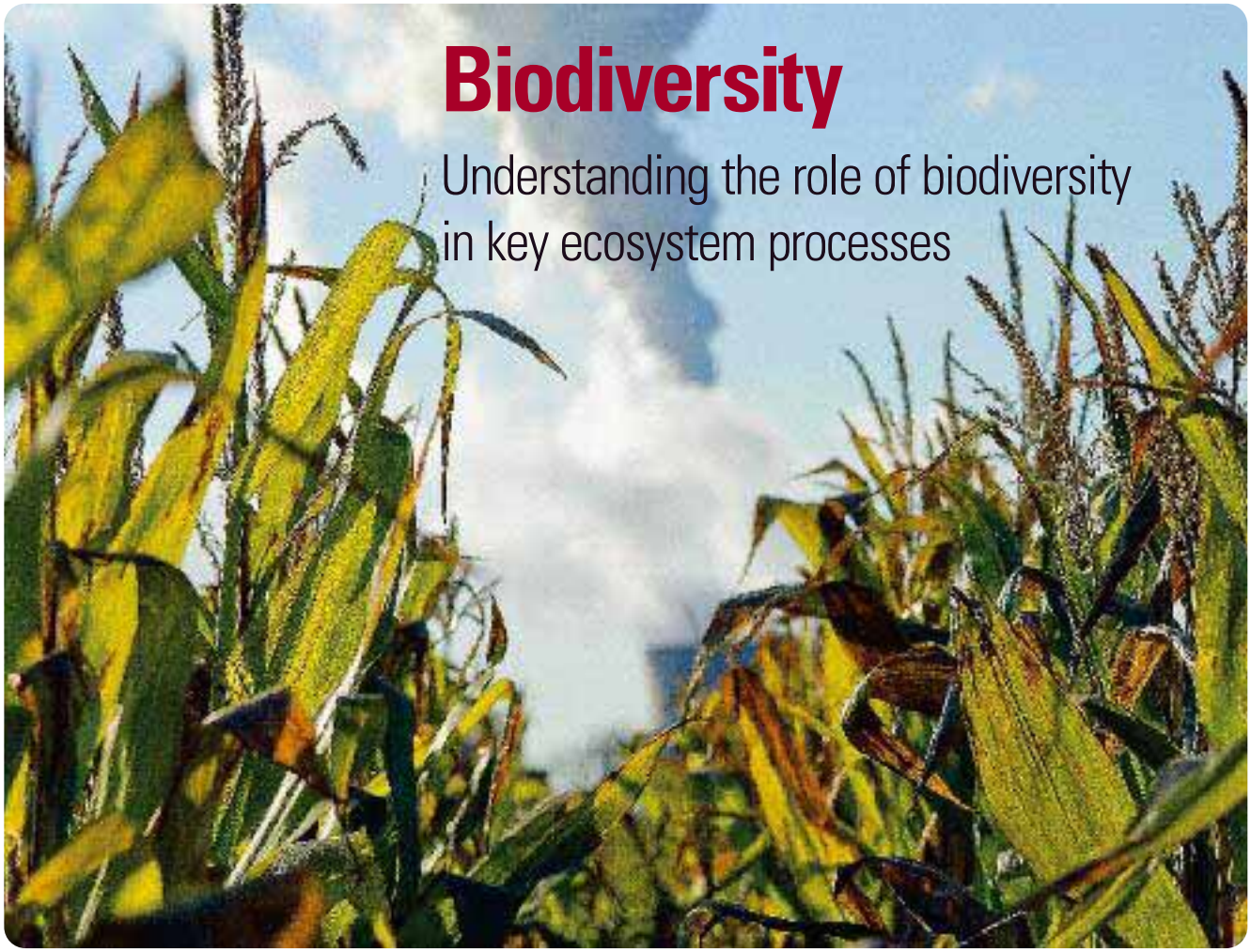
Since 1979, rainfall in the tropics increased rapidly in moist regions and decreased in already dry regions, according to research in the journal *Geophysical Research Letters*.

The size of the changes is substantially larger than state-of-the-art climate models predict. Environmental Systems Science Centre scientists and researchers at the University of Miami say this has important implications for future predictions; the reliability of satellites and other measuring systems; and how researchers monitor the global water cycle.

■ Large discrepancy between observed and simulated precipitation trends in the ascending and descending branches of the tropical circulation. *Geophysical Research Letters*, 2007.

Biodiversity

Understanding the role of biodiversity in key ecosystem processes



Chris Knapton / Science Photo Library

Northwest Passage brings new arrival to Atlantic Ocean

The Pacific diatom, a single-celled floating marine plant not seen in the North Atlantic in 800,000 years, has turned up in the Labrador Sea off the coast of Canada.

Researchers from the Sir Alister Hardy Foundation for Ocean Science (SAHFOS) in Plymouth found the diatom *Neodenticula seminae*, a species of plankton, during a routine survey of the region.

The team blame its arrival on a dramatic drop in Arctic sea ice cover, which has led to the opening of the Northwest Passage.

Lead author Chris Reid said, 'It appears that a threshold has been passed, marking a change in the circulation between the North Pacific and North Atlantic Oceans via the Arctic.'

■ A biological consequence of reducing Arctic ice cover: arrival of the Pacific diatom Neodenticula seminae in the North Atlantic for the first time in 800,000 years. *Global Change Biology*, 2007.

Keep it cool

Many marine species in Antarctica may not survive long-term temperature rises, according to researchers from the British Antarctic Survey.

A study of 14 species in Antarctica showed that the maximum temperature rise an average species could survive for a year is just 2.4°C.

Simon Morley and Lloyd Peck from the British Antarctic Survey said, 'We were also able to show that juveniles survive longer than bigger animals (the reproductive stock), and more active animals survive longest.'

The research shows that the effects of temperature change are complex, affecting not only survival rates, but also population reproductive capacity and food webs.

You are what you eat

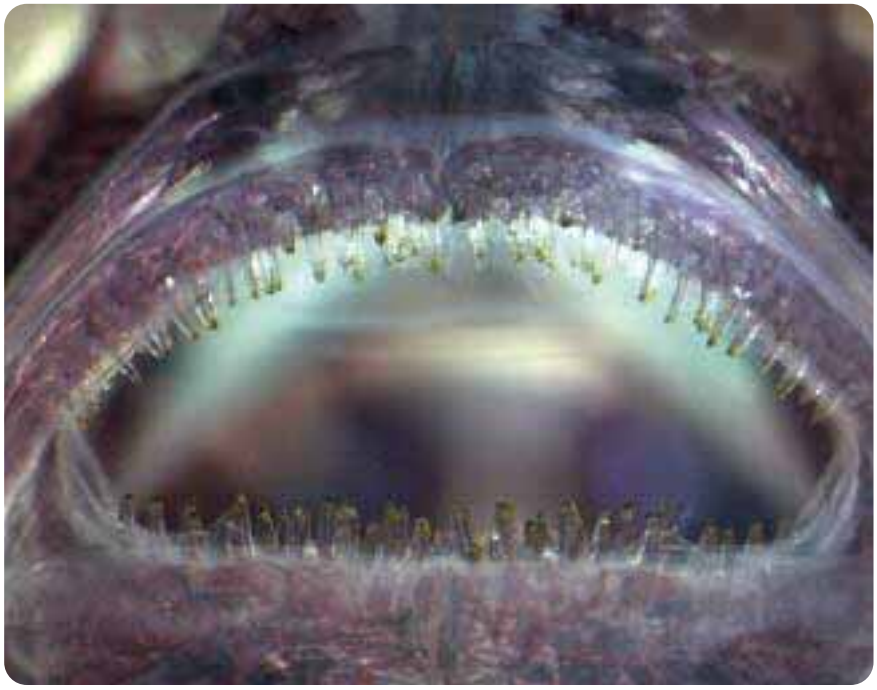
Complex ecosystems show unexpectedly far-reaching differences depending on the type of plant – even plants of the same species – at the base of the food chain, say researchers from NERC's Centre for Population Biology and the Wageningen University in the Netherlands.

The team examined the food webs around two closely related species: Brussels sprouts and their untamed relative, the wild cabbage.

Frank Van Veen from the Centre for Population Biology explains, 'Our study has shown that changing just one element, in this case plant quality, leads to a cascade of effects on species across the food web.

'What is exciting about our experiment is that although these effects appear very complex they can be understood from simple biological mechanisms,' he added.

■ Direct and indirect effects of resource quality on food web structure. *Science*, 2008.



Fish and chips

Chips and scratches on the teeth of ten-million-year-old fossil sticklebacks have shown for the first time how changes in the way an animal feeds control its evolution over thousands of years.

The researchers from the universities of Leicester and Stony Brook in the USA found that sticklebacks that feed from lake floors have very different tooth wear from those that eat plankton and swim in open water. It turns out that this is linked to the development of the armour from which the stickleback gets its name – as the fish evolved to feed further from the lake floor, it also evolved to have fewer spines.

Scientifically, this is highly significant because this is the first time that researchers have tested directly the relationship between feeding habits and evolution using fossils that record directional evolutionary change over many thousands of years.

■ Correlated Evolution and Dietary Change in Fossil Stickleback. *Science*, 2007.

24-hour gene linked to seasonal clock

The internal 24-hour clock that drives an animal's daily rhythms is linked to the seasonal clock that helps organisms adapt to the seasons, at least in the fruit fly, say researchers from Leicester and Padova, Italy. The results were published in two back-to-back papers in the American journal *Science*.

A chance event made the discovery possible: a recent mutation in one species of fruit fly in southern Italy made the particular species better adapted to European seasons. This allowed the new gene to spread rapidly throughout the continent.

Eran Tauber from the University of Leicester said, 'Our results reveal, for the first time, a molecular link between the seasonal timer and the circadian clock, but more importantly, provide an understanding of the molecular basis of a rarely observed phenomenon: a recent selective event.'

■ Natural selection favors a newly derived timeless allele in Drosophila melanogaster., *Science* 2007

■ A molecular basis for natural selection at the timeless locus in Drosophila melanogaster. *Science*, 2007.

Was Darwin wrong about earthworms?

Charles Darwin maintained that the humble earthworm's calciferous glands 'served primarily as organs of excretion'.

Perhaps, but Nick Ostle from the Centre for Ecology & Hydrology and colleagues from the University of Lancaster and Universidad de Vigo, Spain, now contend that these glands make a far more important contribution to the soil carbon cycle. According to their research, the glands remove substantial quantities of carbon dioxide from the soil atmosphere, locking it below ground as carbonate granules for some considerable time.

Nick said, 'The role of earthworms in carbon cycling is certainly underestimated.'

'This work should remind us to carefully consider the physiology and ecology of soil biodiversity as climate change alters the terrestrial carbon cycle,' he added.

■ Stable isotopes reveal that the calciferous gland of earthworms is a CO2-fixing organ. *Soil Biology and Biogeochemistry*, 2008.

Top 25 challenges to UK biodiversity

Environmental scientists and policy-makers have drawn up a top 25 of the new and most pressing issues likely to affect biodiversity in the UK before 2050. The exercise shows how 'horizon scanning' could help foresee issues that have taken scientists and policy-makers by surprise in the past, such as the UK public's response to genetically modified crops, as well as highlighting areas where research effort should be focused.

The list includes issues such as artificial life and biomimetic robots (robots that mimic natural biology); nanotechnology; the impact of geo-engineering the planet to mitigate climate change; and the effect of rising demand for biofuels.

The inventory is the outcome of an innovative two-day meeting organised by Bill Sutherland from the University of Cambridge and funded by NERC. It involved 35 representatives from government, environmental organisations and academia. It builds on a hugely successful exercise conducted in 2006 to identify the 100 ecological questions policy makers most wanted answered.

Sustainable use of natural resources

Living within the Earth's limits

Steve Allen Travel Photography / Alamy

Major review of aggregate resource management in England

Aggregate resources in England are unevenly distributed: highest levels of demand are in London and the south east, but resources are most abundant in the north and west.

In 2007, the British Geological Survey led a team of consultants with expertise in land-use planning, economic modelling and extraction engineering to investigate the environmental, social and economic impacts of the system used to manage aggregate supply in England. The team will also examine the likely effects of a range of regulatory and supply alternatives.

This research will influence sustainable management practices of major construction projects such as the 2012 Olympic Park, Crossrail and Thames Gateway. It will also influence the UK's approach to sourcing raw materials for climate-change adaptation and mitigation, for example coastal flood defences.

Chris Gomersall/Nature Picture Library

Material with massive thermal expansion discovered

Researchers on NERC's *e*Science programme have discovered a material with an unprecedented thermal expansion. The team, led by Andrew Goodwin from the University of Cambridge, looked at how the crystal silver hexacyanocobaltate behaved across a range of temperatures. They found that when heated, the crystals expanded massively in two directions, and shrank by an equally large amount in the other.

The new compound could be used to stabilise sensitive devices facing extreme temperatures, for example optical space telescopes, which regularly face severe temperature changes.

■ Colossal positive and negative thermal expansion in the framework material Ag3[Co(CN)6]. *Science*, 2008.

Geologists help 2012 Olympics

Contractors for the 2012 Olympics will use a detailed 3D geological model of the Olympic Park Development Zone, produced by the British Geological Survey, to guide the building project. The model can help locate ground conditions that may be difficult to build on by assessing the thickness, geometry and distribution of individual geological units. It can also identify potential threats to groundwater quality caused by construction.

Andrew Parsons/PA Wire

Aerial view of construction work on the main stadium for the 2012 London Olympics.

Adaptation of barley to climate

The genetic mutation that enables cultivated barley to grow successfully in the cold, wet climate of northern Europe originated in wild barley in Iran 9000–6000 years ago, say researchers. The mutated gene controls flowering time.

'Flowering later in the year is an important adaptation to the northern European climate as it enables a longer period of growth before setting seed,' explained Huw Jones from the National Institute of Agricultural Botany (NIAB).

With the University of Manchester, the NIAB team has shown that the flowering time mutation is common in northern Europe but rare in the south.

Terry Brown from Manchester said, 'We think this development was important for prehistoric agriculture.'

■ Population-based re-sequencing reveals that the flowering time adaptation of cultivated barley originated east of the Fertile Crescent. *Molecular Biology and Evolution*, in press.

Spring and neap upwelling

For the first time, researchers at the Proudman Oceanographic Laboratory and the universities of Bangor and Southampton have measured the rise of nutrients from the depths of the ocean at the edge of the continental shelf during spring and neap tides.

This nutrient supply to the surface water at the shelf edge fuels very localised growth of phytoplankton, small marine plants at the base of the ocean's food chain. This draws large fish populations to these areas.

The implication is that researchers can link the physics of turbulence and mixing at the shelf edge with phytoplankton growth. This could provide useful information to commercial fishermen and regulators.

■ Spring-neap modulation of internal tide mixing and vertical nitrate fluxes at a shelf edge in summer. *Limnology & Oceanography*, 2007.

Clear to brown: upland waters return to natural state

Falling levels of acid rain, not climate change, are causing upland waters to turn brown, say researchers from University College London (UCL), the Centre for Ecology & Hydrology (CEH), the Environmental Protection Agency in the United States, and international colleagues.

The work was part of a major international assessment of dissolved organic carbon concentrations in 522 remote lakes and streams across Northern Europe and North America. Dissolved organic carbon has increased over the last two decades – an early indication that climate change may be affecting upland ecosystems such as peatlands, some research has suggested.

But the new study reveals that policies put in place in the 1970s to reduce acid rain, which have led to reduced acidity of soils, may be more important. The reduction in acidity means that organic matter from plant and animal remains becomes more soluble and so more of it washes into rivers.

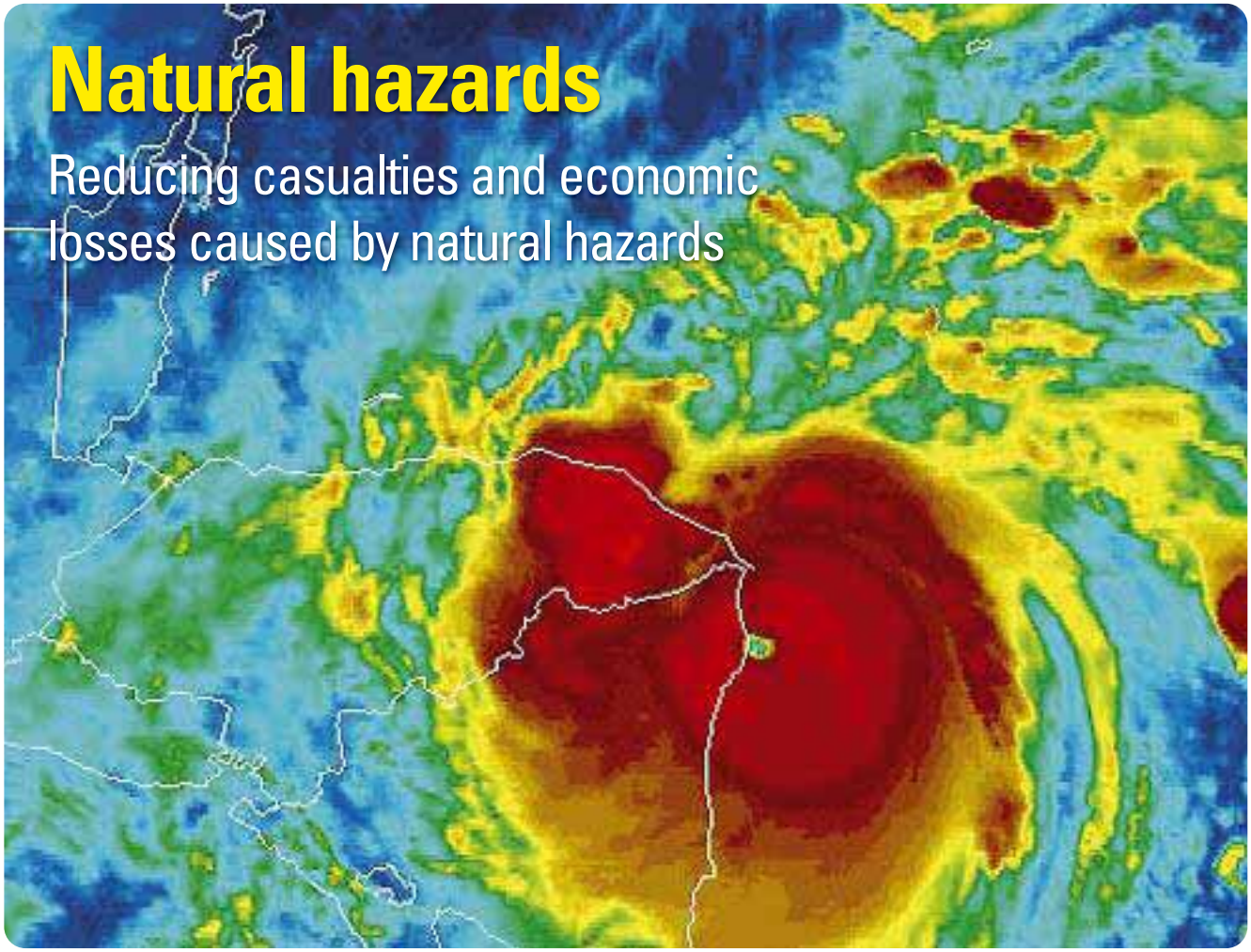
Chris Evans from CEH said, 'If correct, this explanation requires a complete reassessment of rising dissolved organic carbon levels because it suggests that surface waters across formerly polluted areas of Europe and North America are returning to a more natural condition.'

Future upland management and water treatment infrastructure may need to change to take account of this.

■ Dissolved organic carbon trends resulting from changes in atmospheric deposition chemistry. *Nature*, 2007.

Natural hazards

Reducing casualties and economic losses caused by natural hazards



NOAA / Science Photo Library

Massive landslip off Africa

A giant underwater landslide caused the longest single flow of sand and mud ever documented on Earth, according to Peter Talling at the University of Bristol and colleagues at the National Oceanography Centre, Southampton (NOCS) and the universities of Aberdeen and Bremen.

The landslide occurred off the coast of north-west Africa 60,000 years ago and caused a slip that travelled 1500 kilometres – the distance from London to Rome.

Understanding how these flows erode the seafloor and deposit sandy sediments is important to the oil and gas industry. Russell Wynn from NOCS said, 'Many of the world's largest oil and gas reservoirs are found in deep-sea sands deposited by giant submarine flows. Our data are revealing that seabed erosion and subtle changes in seafloor gradient strongly affect the quality and extent of these sands.'

■ Onset of submarine debris flow deposition far from original giant landslide. *Nature*, 2007.

Eruptions linked to sea-level rise and fall

Volcanic eruptions cause sea levels to rise by around nine millimetres in the first year after eruption. The rise is followed by a seven millimetre fall. Sea level eventually returns to normal after about three years, say researchers from Proudman Oceanographic Laboratory and colleagues from the University of Lapland.

'Contrary to model results, we showed that five major eruptions in the last 150 years caused a significant rise followed by a dip in sea level,' says Svetlana Jevrejeva from the Proudman laboratory.

The team suggests the eruptions disturb the global water cycle, upsetting the balance between ocean evaporation and worldwide rainfall, snowfall and river run-off.

■ Observational evidence for volcanic impact on sea level and the global water cycle. *Proceedings of the National Academy of Sciences*, 2007.

Stronger tropical storms coming

As the global climate changes, the number of tropical storms is likely to reduce slightly in the future but their strength will increase, say researchers from the Environmental Systems Science Centre and colleagues from the Max Planck Institute and the Leibniz Institute of Marine Sciences in Germany.

'Modern climate models such as the Max Planck Institute's ECHAM5 model, run at high spatial resolution, can produce credible simulations of the distribution, structure and behaviour of tropical cyclones. But we need to increase the model's resolution to capture the correct intensities of the storms,' says Lennart Bengtsson from the centre.

■ How may tropical cyclones change in a warmer climate? *Dynamic meteorology and oceanography, Tellus* 2007.

Mediterranean tsunami

A tsunami similar in size to the one that devastated the Egyptian city of Alexandria in 365 AD could strike the eastern Mediterranean on average every 800 years, according to researchers writing in *Nature Geoscience*.

The team, led by scientists from the Universities of Cambridge and Oxford, located the source of the ancient tsunami – an earthquake off the coast of western Crete. By carbon-dating coral around Crete, the researchers showed that the ground suddenly rose an astonishing ten metres at the time of the 365 earthquake.

GPS measurements suggest that similar earthquakes are generated around the southern Aegean about once every 800 years. 'This result is important,' says lead author Beth Shaw, 'because the most recent such devastating earthquake was in 1303.'

■ Eastern Mediterranean tectonics and tsunami hazard inferred from the AD 365 earthquake. *Nature Geoscience*, 2008.

Tsunami from volcanic collapse

UK scientists were on hand to measure a flank of a volcano as it collapsed into the sea. The major lava dome collapse – the largest of its kind in the historical record – occurred on the volcanic island of Montserrat.

An international team of researchers used instruments in the borehole observatory on the Caribbean island to measure and monitor over 200 million cubic metres of lava collapsing over five hours.

This is the first time scientists have had the opportunity to document a huge volcanic landslide so close to the sea in such detail.

The researchers used the borehole instruments, funded by NERC and the National Science Foundation in the US, to correlate the volume of molten debris from the eruption with the subsequent tsunami wave height.

The UK contingent included Steve Sparks and Peter Talling from the University of Bristol and scientists from the British Geological Survey and the British Antarctic Survey.

Tsunami risk to the UK

Following the 2004 Indian Ocean tsunami, the Department for Environment, Food and Rural Affairs commissioned Proudman Oceanographic Laboratory (POL) to analyse the risk to the UK of an Atlantic Ocean tsunami caused by an earthquake.

With help from geologists from the British Geological Survey, the researchers examined the tsunami of 1755 that destroyed Lisbon and generated three-metre-high waves along the Cornish coast.

They found that only one in six earthquake simulations produced waves as high as in 1755.

Chris Wilson from the Proudman Oceanographic Laboratory said, 'Under certain conditions, the shape of the seafloor can focus tsunami waves into patterns which have similar run-up heights to those observed in 1755. Fortunately, the UK is at quite low risk thanks to strong sea defences and being far from tsunami generation regions, allowing time for early warnings to be issued.'

Human population survived super-eruption

Tools discovered in southern India dating from before and after one of the largest volcanic eruptions in human history indicate modern humans had settled the area much earlier than previously thought. The research also suggests that populations may not have crashed irreparably following the explosion.

The Toba super-eruption 74,000 years ago left Indonesia and much of southern Asia under a layer of ash 2.5 metres thick.

Lead author Michael Petraglia from the University of Cambridge said, 'The ash blanketed the landscape. It would have affected plants and animals as well as human populations. We think it would have polluted freshwater sources, such as rivers and lakes.'

Researchers believe it could have all but wiped out early human populations in the region. But the team working on NERC's Environmental Factors in the Chronology of Human Evolution and Dispersal programme found that the tools above and below the ash bore remarkable similarities, indicating related populations inhabited the region either side of the eruption, and that these populations were widespread. The equipment – mainly scrapers on flakes and blades – shows a surprising level of sophistication for that time in southern India.

■ Middle Paleolithic Assemblages from the Indian Subcontinent Before and After the Toba Super-Eruption. *Science*, 2007.

Environment, pollution and human health

Developing solutions to reduce the damaging health effects of pollutants and pathogens

Infectious parasites linked to economic growth

The world is getting smaller: human and agricultural populations are more connected than ever before. Theory states that this may lead to more infectious strains of parasites developing. An experiment by scientists at the University of Sheffield, using moth larvae infected with a virus, has given the first empirical support for this idea.

Lead author Mike Boots said, 'As populations become more mixed, we might expect that not only will the extent of disease outbreaks increase, but also that more infective strains of parasites may emerge.'

The finding has implications for how society manages more virulent disease in human and wildlife populations.

■ Local Interactions Select for Lower Pathogen Infectivity. *Science*, 2007.

New treatment for malaria?

Algae found in coral from Australia's Sydney Harbour has potential as a new treatment for malaria and other parasites, according to research at the NERC collaborative centre, the Scottish Association for Marine Science (SAMS).

Australian co-researchers, who shipped the algae to SAMS for analysis in NERC's Culture Collection of Algae and Protozoa, were unaware of what they had discovered. As part of an international team, scientists at SAMS revealed that the algae is the first close relative in the plant kingdom of a parasite that infects over 500 million people worldwide each year.

David Green, a researcher at SAMS, said, 'It turns out to be an important evolutionary missing link between free-living photosynthetic marine plants and a large group of parasites, including the one responsible for malaria.'

This algae contains chloroplasts – cellular structures where photosynthesis takes place in plants and algae. The malaria parasite contains remnants of these chloroplasts, known as apicoplasts. But, because apicoplasts are not found in humans, scientists can target them in new malarial drug treatments.

■ A photosynthetic alveolate closely related to apicomplexan parasites. *Nature*, 2008.

Discovery of genes for roundworm disease

Dozens of new genes that allow parasitic worms to infect and cause disease, have been found by scientists at the University of Liverpool.

The team, led by Steve Paterson, say that these genes could lead to new drugs or vaccines to treat roundworm disease.

Steve said, 'Roundworms infect around a billion people in the developing world, and much of UK livestock. These parasites are now developing resistance to the drugs we currently use against them, so we desperately need to develop new treatments.'

■ Microarray analysis of gender- and parasite-biased transcription in the parasitic nematode *Strongyloides ratti*. *International Journal for Parasitology*, 2008.

New test for depleted uranium

A new test to detect depleted uranium in Gulf War veterans has unexpectedly uncovered high levels of the radioactive material in the urine of former workers and residents around a disused weapons factory in upstate New York.

Researchers at the NERC Isotope Geosciences Laboratory (NIGL), based at the British Geological Survey, with partners in government and universities, developed urinary uranium isotope tests of unprecedented sensitivity. The team tested 800 Gulf War veterans: all results came back negative for depleted uranium. But depleted uranium showed up in a related study by the team near a former munitions plant in upstate New York. The US plant closed in 1982 amid controversy over health and safety breaches.

Head of NIGL Randy Parrish said, 'We found depleted uranium contamination 5.8km from the plant and it is likely to have travelled even farther.'

■ Depleted uranium contamination by inhalation and its detection after 20 years: implications for human health assessment. *Science of the Total Environment*, 2008.

Nanoparticles can harm wildlife

Nanoparticles in rivers can cause brain damage in fish and alter their behaviour, according to scientists working on the Environmental Nanoscience Initiative. The research is the first evidence of the adverse effects of nanoparticles, such as carbon nanotubes – tiny, hollow tubes used by the electronics industry – on wildlife.

Richard Handy from the University of Plymouth, who led the research, said, 'The fish showed quite extraordinarily aggressive behaviour.'

Nanoparticles can enter the environment through sewage works. Concentrations in rivers are minute, but can accumulate.

The team's research fed into a Defra report on the known dangers of nanomaterials. The report sets out the UK's position for the Organisation for Economic Co-operation and Development (OECD).

■ The ecotoxicology and chemistry of manufactured nanoparticles. *Ecotoxicology,* 2008.

■ Toxicity of single-walled carbon nanotubes to rainbow trout (*Oncorhynchus mykiss*): Respiratory toxicity, organ pathologies, and other physiological effects. *Aquatic toxicology*, 2007.

Is pollution driving antibiotic resistance?

'Pollution may be driving the evolution of antibiotic-resistant bacteria in the environment', say Elizabeth Wellington, William Gaze and colleagues from the University of Warwick.

When the researchers analysed bacteria in soil contaminated with industrial effluent, they found some bacteria carried new genes that may confer resistance to antibiotics.

Co-investigator Peter Hawkey, professor of clinical bacteriology at the University of Birmingham, said, 'This antibiotic resistance could be transferred to bacteria, directly causing human infections.'

The team demonstrated that mobile genetic elements, able to transfer resistance genes between bacteria, were more prevalent in soils contaminated with disinfectants and detergents. The diversity of novel genes was also significantly higher in contaminated compared to control soils.

■ Molecular epidemiology of class 1 integrons and cassette gene diversity in industrial effluent and sewage contaminated soils. 2008, *in prep.*

Coloured scanning electron micrograph of roundworms.

Eye of Science/Science Photo Library

Earth system science

Increasing knowledge of the component parts of the Earth system and the ways they interact

ESA

Water found on a planet outside this solar system

For the first time, scientists have discovered water on a planet outside our own solar system. The team of researchers used NASA's Earth-orbiting Spitzer telescope, to discover the planet named HD 189733b.

The landmark discovery of water in the planet's atmosphere was based on measurements of key wavelengths in the infrared region to pick out the unique signature of water. Painstaking analysis was backed up by highly accurate water absorption parameters devised by Bob Barber and Jonathan Tennyson from University College London and based on work developed under a NERC grant.

The grant, entitled 'Infrared and visible wavelength absorption by water vapour', allowed the researchers to create a definitive database of water absorptions across these parts of the electromagnetic spectrum. This is essential for climate change research because water vapour is the most powerful greenhouse gas in the Earth's atmosphere. It absorbs both incoming sunlight and heat leaving the Earth's surface.

But researchers from the European Space Agency and NASA had another use for this new database: locating water on a planet 63 light years from our sun.

The planet, a gas giant similar to Jupiter, is unlikely to support life as it is too close to its sun.

■ Water vapour in the atmosphere of a transiting extrasolar planet. *Nature*, 2007.

Artists impression of the planet HD 189733b. The planet orbits a star 63 light years from the sun.

NASA/ESA/G. Bacon (STScI)

Carbon sink begins to buckle

Evidence that carbon sinks have weakened has been found by researchers from the University of East Anglia (UEA), the British Antarctic Survey (BAS) and the Max Planck Institute for Biogeochemistry.

An increase in winds over the Southern Ocean, caused by ozone depletion and greenhouse gases, caused a release of CO_2 stored in the ocean into the atmosphere. This is preventing further absorption of the gas.

Lead author Corinne Le Quéré of UEA and BAS said, 'For the first time, we see climate change affecting a CO_2 sink. Models predict that many such feed backs will occur this century.'

In the North Atlantic, Andrew Watson and Ute Schuster of UEA also found a dramatic decline in the CO_2 sink between the mid 1990s and mid 2000s.

■ Saturation of the Southern Ocean CO_2 sink due to recent climate change. *Science*, 2007.

■ A variable and decreasing sink for atmospheric CO_2 in the North Atlantic. *Journal of Geophysical Research*, 2007.

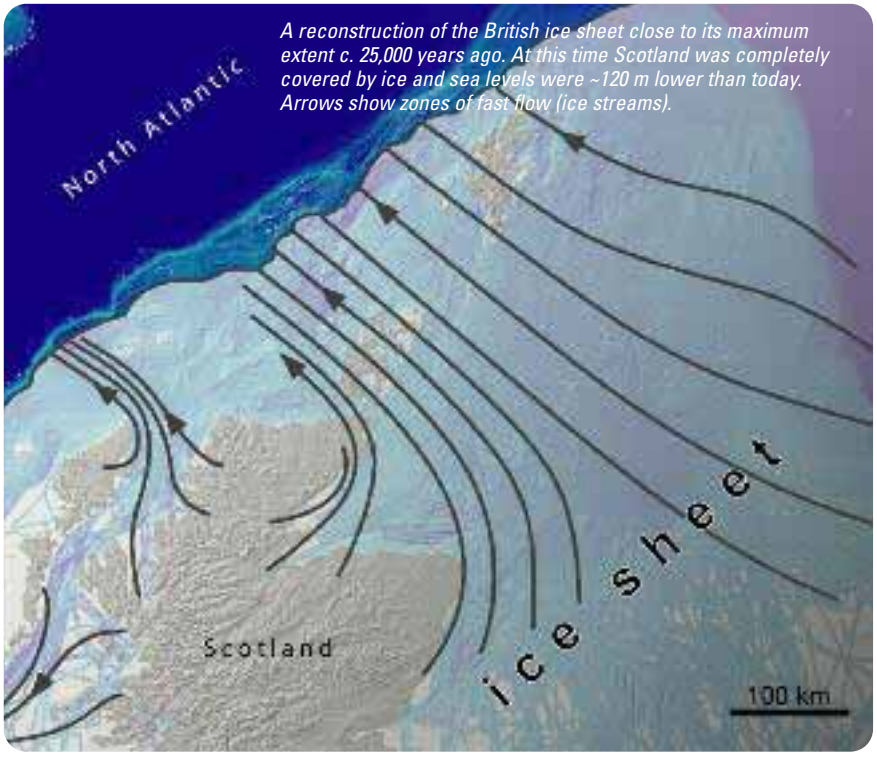
Sea-level predictions too conservative

Sea levels rose 1.6 metres per century during the last interglacial period 124,000-119,000 years ago, indicating that recent best estimates of sea-level rise in the coming century may be too low.

Lead author, Eelco Rohling of the University of Southampton's School of Ocean and Earth Science, based at the National Oceanography Centre, said, 'Until now, there have been no really convincing data of the full rate of past sea-level rises above the present level.'

Temperatures during the period were up to two degrees warmer than the present and sea levels settled at 4-6 metres above today's average.

■ High rates of sea-level rise during the last interglacial period. *Nature Geoscience*, 2007.



A reconstruction of the British ice sheet close to its maximum extent c. 25,000 years ago. At this time Scotland was completely covered by ice and sea levels were ~120 m lower than today. Arrows show zones of fast flow (ice streams).

Footprint of a collapsing ice sheet

Using remarkable new seabed imagery, researchers at the British Geological Survey have discovered unambiguous evidence of the collapse of the British and Scandinavian ice sheets around 20,000 years ago, at the end of the last ice age.

The high-resolution echo-sounder dataset is allowing scientists to reconstruct the effects of climate and sea-level change on the last British ice sheet, including why, and at what rate, it collapsed.

■ The northern sector of the last British Ice Sheet: maximum extent and demise. *Earth Science Reviews*, 2008.

Global hydrogen budget

In the future the global economy may run on hydrogen rather than carbon. But the global hydrogen budget is poorly understood. Now scientists from the National Centre for Atmospheric Science (NCAS) have created detailed models of the present-day hydrogen budget.

'We've compiled up-to-date emissions datasets of atmospheric hydrogen for both human emissions and natural sources,' says NCAS researcher Nicola Warwick.

These datasets provided the information for 3D global model simulations of hydrogen, and for the first time a global simulation of heavy hydrogen (known as deuterium, a stable isotope of hydrogen). These accurate simulations will improve researchers' ability to estimate the impact of a future hydrogen economy.

Volcano found beneath ice

A layer of ash across an area larger than Wales is the first evidence of a volcanic eruption beneath Antarctica's most rapidly changing ice sheet, say scientists from the British Antarctic Survey.

The team, led by Hugh Corr, say the volcano on the West Antarctic ice sheet erupted in 325 BC but remains active.

Hugh says, 'We believe this was the biggest eruption in Antarctica during the last 10,000 years. It blew a substantial hole in the ice sheet, and generated a plume of ash and gas that rose around 12 kilometres into the air.'

■ A recent volcanic eruption beneath the West Antarctic ice sheet. *Nature Geoscience*, 2008.

BAS Twin Otter in flight during the aerial survey

Technologies

Developing the tools for innovative environmental science

World depth record broken

Scientists carrying out the first direct investigation of the distribution and behaviour of the deepest-living fishes have broken the world depth record for successfully operating an unmanned autonomous submersible.

On 12 July 2007, one of two submersibles specially built for the mission by engineers at OceanLab at the University of Aberdeen reached a depth of 10,015 metres in the Tonga Trench in the South Pacific Ocean. This is just shy of the deepest part of the ocean, the Challenger Deep, at 10,896m in the North Pacific.

The research, led by Monty Priede in the UK, is a collaboration between Oceanlab and the Universities of Tokyo, Japan and Tübingen, Germany and will continue in 2008.

Monty said, 'We were amazed to see swarms of fast-moving shrimps arriving at bait within five minutes at this extreme depth; life is much more active than we previously thought. We look forward to seeing videos of the fishes that must be living there.'

New digital technology improves Countryside Survey

The Countryside Survey is a unique study or 'audit' of the natural resources of the UK's countryside, carried out at regular intervals since 1978 by the Centre for Ecology & Hydrology. New digital technology, used by scientists in the field to capture data, has meant that the latest Countryside Survey will publish its results 18 months early and save around £1.2 million.

For the first time, researchers digitally recorded all the species data and habitat mapping in the field, improving data quality and saving time and money. Results are due in late 2008.

Knowledge exchange

Research grant proposals now include a knowledge exchange plan

Earthquake monitoring in Ethiopia

Violent earthquakes and volcanic activity are ripping apart the Afar Depression in Ethiopia, once described as the cruellest place on Earth. The area is unique: the exposed bare landscape is allowing scientists to witness tectonic processes that normally occur deep beneath the ocean.

In 2007, NERC awarded £2.8 million to a consortium of researchers led by Tim Wright from the University of Leeds to investigate plate tectonics in the region. In collaboration with researchers from Ethiopia, New Zealand, France and the US, the team are carrying out interdisciplinary geological, geochemical and geophysical research to measure rifting, volcanism and tectonics.

Tim said, 'Through our Ethiopian collaborators, we are communicating the latest information about the ongoing hazards to the regional authority in Afar.'

■ www.see.leeds.ac.uk/afar

Extending the UK's territorial waters

Geologists and geophysicists at the National Oceanography Centre, Southampton (NOCS) have delivered independent scientific evidence to the United Nations that could have a major impact on the UK's territorial sovereignty.

The UK's sovereignty extends beyond dry land to include a sizeable area of the seabed that forms the continental margin. According to the UN Convention on the Law of the Sea, a state has sovereign rights to a 200 nautical-mile Exclusive Economic Zone and beyond that, up to a further 150 nautical miles of continental shelf.

NOCS staff led the UK technical team in preparing and presenting submissions to the UN which could secure UK sovereignty over continental shelf areas beyond 200 nautical miles.

NOCS is a world leader in providing this type of technical advice.

Protecting marine life

Regulators use marine reserves to prevent over-fishing and conserve biodiversity, but uncertainties remain about their ideal design.

A European team including Paul Somerfield from the Plymouth Marine Laboratory has shown that increasing the size of the zone in which all fishing is banned (the no-take zone) increases the density of commercial fish stocks within the reserve. But increasing the area of limited fishing around the no-take zone (the buffer zone) has the opposite effect: fewer fish in the reserve.

The researchers used 58 datasets from 19 European marine reserves to arrive at this conclusion. They also showed the positive effects of marine reserves on commercial fish stocks and how species richness has increased since reserves have been set up. The research has strong implications for managing coastal areas.

■ Marine reserves: size and age do matter. *Ecology Letters*, 2008.

The Coastal Simulator

Protecting Norfolk's cliffs from erosion is increasing the flood risk of neighbouring low-lying lands, according to the Tyndall Coastal Simulator, which identifies how the future coastline will evolve as the climate changes.

The simulator, developed by the Tyndall Centre for Climate Change Research and the Environment Agency, has also been used by scientists at Proudman Oceanographic Laboratory to show how two realistic scenarios of future greenhouse gas emissions would affect the UK coastline. Both emissions scenarios showed that in a warmer world more stronger, larger waves will reach the UK coast.

The Meeting Place – a new way to stimulate debate

For the second time, the UK Energy Research Centre's Meeting Place organised a workshop attended by a high-profile international group of energy experts. The results of this meeting are feeding into the G8 decision-making process in Japan in 2008.

The Meeting Place brings together UK researchers, stakeholders and overseas experts to develop solutions and further the energy debate. It promotes interdisciplinary working and provides a forum for collaborative projects addressing key issues.

In its first four years of operation, the venue has attracted more than 3000 people from 35 countries.

Cliff erosion at Happisburgh, Norfolk.

David Moore / Alamy

Spin-out sells for $275 million

In June 2007, Norwegian oil giant Petroleum Geo-Services (PGS) bought Scotland's largest academic spin-out company for $275 million. The spin-out, formed just three years before, uses a new method to prospect for oil and gas deep beneath the ground. NERC-funded PhD student David Wright and his supervisors Anton Ziolkowski and Bruce Hobbs invented the new system at the University of Edinburgh. Traditionally, geophysicists use seismic exploration to find new oil and gas fields. But MTEM Limited (Multichannel Transient ElectroMagnetics) uses an electromagnetic system to detect variations in electrical resistance deep beneath the surface. This reduces the need to drill expensive and unproductive wells.

David, who completed his PhD in 2003, said, 'When my PhD started to yield some exciting results it was clear that there was much commercial potential.'

Protecting satellites

British Antarctic Survey (BAS) researchers have discovered that low-frequency radio waves accelerate electrons within Jupiter's magnetic field. This finding, which improves understanding of how electrons are accelerated, will help scientists protect satellites at risk from high-energy charged particles.

According to lead author Richard Horne from BAS, 'We've shown before that very low frequency radio waves can accelerate electrons in the Earth's magnetic field. But this new work shows that the same theory works on Jupiter, where the magnetic field is 20,000 times stronger.'

The research, published in *Nature Physics*, overturns a theory that has held sway for more than a century.

High-energy particles encircling the Earth in the Van Allen radiation belts can damage satellites. The number of particles in the radiation belts can change dramatically within minutes, which is why more accurate forecasting is needed.

■ Gyro-resonant electron acceleration at Jupiter. *Nature Physics*, 2008.

Ozone is damaging crops in 16 European countries

For the first time, scientists have provided conclusive evidence that ozone damage to crops and natural vegetation is widespread across Europe. The research produced by the Centre for Ecology & Hydrology has also shown that risk maps based on ozone uptake by plants are better predictors of damage than those based on ozone concentration.

Ozone pollution forms when sunlight acts on pollutants from vehicle exhausts and industry. It is widespread across Europe during spring and summer, causing characteristic yellow or brown blotches on leaves, and reducing growth, seed production and the ability to over-winter.

The report, produced for a major international programme that is coordinated by CEH and reports to the United Nations, collated 16 years' evidence of ozone damage from 1990 to 2006.

■ Evidence of Widespread Ozone Damage to Vegetation in Europe (1990–2006).

Cochrane Collaboration approach for environmental science

With large volumes of environmental research out there, how can anyone find the most accurate, up-to-date information to make decisions?

The environmental research community is learning from the medical profession and has set up the Collaboration for Environmental Evidence (CEE), based on the Cochrane Collaboration established in 1993 by the British epidemiologist Archie Cochrane. The new approach will systematically review specific areas of environmental research for the global scientific community.

The Cochrane Collaboration is dedicated to making up-to-date, accurate information about the effects of healthcare readily available worldwide. It is the gold standard for determining effective healthcare interventions.

Andrew Pullin from the University of Bangor has developed this new collaboration with the help of a knowledge transfer grant from NERC.

■ www.environmentalevidence.org

Ozone injury on Centaurea nigra, *North Wales Nature Reserve*

Removing toxic waste

Bacteria that can break down toxic chemicals used in the aerospace and car manufacturing industries will help a new spin-out company from the Centre for Ecology & Hydrology (CEH) compete in Europe's $1 billion metalworking-fluids treatment market.

The bioremediation company Microbial Solutions Ltd is based on research developed by Christopher van der Gast and Ian Thompson at CEH and has successfully raised £1.2 million to develop industrial applications.

The technology allows engineering industries to safely treat toxic metalworking fluids in an environmentally friendly way.

NERC's Commercialisation Team has collaborated with the Oxford-based firm H2O Venture Partners to develop the project.

Royalties and licence income by research centres (£k)

Centre	2006-07	2007-08
BAS	13	31
BGS	1,692	2,279
CEH	197	405
POL	75	48
Swindon Office	10	5
Total	**1,987**	**2,768**

Patents filed

2004-05	6
2005-06	7
2006-07	6
2007-08	10

These patents were filed by NERC research centres and grant holders.

Trends in publications with industry

	2004			2005			2006			2007		
Funding type	No. ISI® listed papers	No. with private sector co-author	%	No. ISI® listed papers	No. with private sector co-author	%	No. ISI® listed papers	No. with private sector co-author	%	No. ISI® listed papers	No. with private sector co-author	%
Responsive (Blue skies)	833	26	3	1,392	39	3	1,455	37	3	1,574	44	3
Core strategic	1,462	61	4	1,671	75	4	1,713	71	4	1,711	92	5
Directed	280	13	5	397	25	6	446	22	5	444	18	4
Infrastructure	187	9	5	236	3	1	293	11	4	306	4	1
Unclassified				88			3					
Total	**2,762**	**109**	**4**	**3,784**	**142**	**4**	**3,910**	**141**	**4**	**4,035**	**158**	**4**

Direct income to NERC data centres from the sale of data and software licences (£k)

Data centre income	2004-05	2005-06	2006-07	2007-08
British Oceanographic Data Centre	18	23	26	27
Environmental Information Centre / National Water Archive	343	340	500	651
National Geosciences Data Centre / National Geosciences Information Service	1,341	2,092	1,278	1,250
NERC Earth Observation Data Centre	-	-	236	-
Total	**1,702**	**2,455**	**2,040**	**1,928**

Note: Two of the NERC data centres do not raise income through the licensing of data or software. These are the Antarctic Environmental Data Centre and the British Atmospheric Data Centre.

Storm database for insurance industry

A new storm database that stores the properties of thousands of tropical cyclones is exciting insurance companies in Japan and the UK.

Scientists from the National Centre for Atmospheric Science (NCAS) produce the database by running global climate models under a variety of different conditions, from pre-industrial emissions levels to future climate scenarios. Insurance analysts can integrate this data into the catastrophe models used by the insurance industry to assess risk from weather-related disasters.

Leading scientist Pier Luigi Vidale said, 'Up until now, most catastrophe models have relied on limited observations from storms and statistical modelling techniques. Having access to this dynamical database, which we can adjust over time to incorporate the effects of climate change, will enable climate scientists and the insurance industry to predict more accurately the location, occurrence, frequency and strength of future cyclones across the globe.'

The work is part of NCAS's contribution to the Willis Research Network – a unique academic-industrial partnership with one of the worlds largest reinsurance brokers, Willis Re.

The database has also generated substantial interest in Japan, where NCAS has strong scientific links.

■ Contact: Dr Pier Luigi Vidale, Dr Jane Strachan, email: p.l.vidale@reading.ac.uk

Endocrine disruption to fish in England and Wales

A system developed by scientists from the Centre for Ecology & Hydrology (CEH) has become the Environment Agency's main tool for managing endocrine disruption in fish.

Scientists believe the active ingredients of the contraceptive pill, steroid oestrogens, can enter UK rivers causing endocrine disruption – the chemicals interfere with a fish's hormone function.

The system is the world's first national river catchment-based risk assessment for steroid oestrogens. The team say some 39 per cent of the rivers modelled in England and Wales are at risk from endocrine disruption.

Online repository for NERC research

In 2007, NERC launched a new service to collect for the first time all published academic papers from NERC's research centres. The NERC Open Research Archive, or NORA, is an online repository for storing the research outputs from the British Antarctic Survey, the British Geological Survey, the Centre for Ecology & Hydrology and the Proudman Oceanographic Laboratory.

The repository now has over 2000 entries, mainly from 2007 and 2008, but it holds information on research papers published as far back as 1972. The service is managed by library staff from all four NERC centres.

■ http://nora.nerc.ac.uk/

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

	2003-04	2004-05	2005-06*	2006-07*	2007-08*
UK Private sector	5.5	8.1	13.3	9.3	5.4
Total at 2007-08 prices	6.1	8.7	14.0	9.5	5.4

** Figure for 2005-06 onwards include Integrated Ocean Drilling Program income to BGS of 2005-06: £4.5m; 2006-07: £1.8m and 2007-08: £1.1m. This is a change of classification on 2004-05.*

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

Centre	2006-07	2007-08
BAS	1,475	1,464
BGS	19,468	16,127
CEH	9,463	10,237
NOC	1,065	2,062
POL	1,346	1,604
Swindon Office	1,088	1,941
Total	**33,905**	**33,435**

People

Success in delivering world-class science depends on the skills, knowledge and dedication of everyone in the NERC community

Nobel Peace Prize awarded to climate researchers

In 2007, the Nobel Committee awarded the Nobel Peace Prize to US politician Al Gore and the United Nations Intergovernmental Panel on Climate Change (IPCC) 'for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change'.

Many UK scientists funded or employed by NERC have contributed to the UN panel and its four landmark reports.

NERC Chief Executive Alan Thorpe, said, 'This award is a tribute to all the scientists and others whose research has produced the evidence that human actions are changing the climate.

'All our staff can take pride in the fact that we, along with the Met Office, Defra and others, have supported many of the researchers honoured,' he added.

Jonathan Gregory from the National Centre for Atmospheric Science played a significant role as a drafting author on the latest report and also lead author on two of the eleven chapters. He said, 'I'm thrilled. Working as part of the IPCC has been a great privilege for me – I feel honoured to have been able to serve the public good in this way.

'The IPCC assessments have involved a massive effort, literally from thousands of scientists. It has certainly been a tremendous opportunity for us all to exchange scientific knowledge and ideas across the international science arena,' he added.

Climate modeller Chris Huntingford, from the Centre for Ecology & Hydrology, is one of a team whose work is cited in the fourth assessment. He said, 'The IPCC process produces well-balanced and methodical reports, free from the emotion that so often surrounds the issue of climate change. The process has allowed policy-makers and politicians access to key scientific information on the connection between human activities and global warming.'

Odd Andersen/AP/PA Photos

Nobel Peace Prize winner Rajendra Pachauri, the UN climate panel's chief scientist, holding his medal and diploma. Many scientists funded or employed by NERC contributed to the panel's landmark reports.

Next generation polar scientists for planet Earth

Attracting the next generation of polar scientists starts young with Ice Station Antarctica – a major new interactive exhibition developed in partnership between the British Antarctic Survey (BAS) and the Natural History Museum in London.

Ice Station Antarctica is aimed at families, especially with children aged seven and over. The exhibition challenges kids to survive the extreme conditions faced by scientists researching the frozen continent, and to find out how Antarctica affects the rest of the planet.

Ice Station Antarctica opened in May 2007 and ran until April 2008, before embarking on a world tour. Over 200,000 visitors saw the exhibition during its 12-month run in London.

Classrooms get their own earthquake monitoring systems

UK schoolchildren now have their own earthquake monitoring system set up in their classrooms, thanks to British Geological Survey (BGS) staff.

Paul Denton from BGS said, 'The project has the wow factor. The sheer destructive power of earthquakes has always held a fascination for children and the detector is sensitive enough to record signals from large earthquakes on the other side of the world.'

During 2007-08, the project installed 60 seismometers, costing about £300 each, in secondary schools across England, with financial support from industrial sponsors and NESTA (National Endowment for Science, Technology and the Arts). In 2008-09 the project is working with university earth science departments to put seismometers in more schools and to provide a wider support network. Universities involved include Leicester, Leeds, Liverpool, Open University, Imperial, Royal Holloway, Durham, Oxford, Cambridge, Keele and Southampton.

■ www.bgs.ac.uk/schoolseismology

Training

NERC is supporting joint interdisciplinary research studentships with the Economic and Social Research Council to foster greater interaction between the social and environmental sciences. The scheme will fund about 20 studentships a year and will help develop capacity for the Living With Environmental Change programme.

Beacons for public engagement

In partnership with other research councils and funders, NERC has helped launch the Beacons for Public Engagement to help change attitudes to public engagement within the academic community. The six beacons and one national coordinating centre will create an environment where public engagement is a valued part of an academic's promotion criteria.

Training senior policy-makers

The Tyndall Centre for Climate Change Research hosted a training week for 14 senior policy-makers from the Department for International Development on adaptation to climate change. The week was organised by Tyndall's Overseas Development Group at the University of East Anglia.

Descartes Prize for ice core scientists

Ice core scientists from the British Antarctic Survey, led by Dr Eric Wolff, were joint winners of a major European science prize awarded by the European Commission. The European Project for Ice Coring in Antarctica (EPICA) – which retrieved two deep ice cores that have revealed how Earth's climate behaved over the last 800,000 years – was one of three projects to be awarded the 2007 Descartes Prize for excellence in collaborative research. Three winning trans-national research teams shared the €1.36 million prize.

Prizes

Professor Brian Hoskins from the University of Reading received a knighthood.

Professor Michael Bickle from the University of Cambridge became a Fellow of the Royal Society.

Dr Philip Donoghue was awarded the Bigsby Medal by the Geological Society.

Ice sculptures and SERPENTs at the Royal Society

The prestigious Royal Society Summer Exhibition hosted two exhibitions from the NERC community: International Polar Year and SERPENT – a partnership that gives scientists access to remotely operated submersibles owned by industry.

Staff, students and fellows

	2004-05	2005-06	2006-07	2007-08
Directly employed staff*	2,727	2,736	2,659	2,573
Staff in HEIs**	690	1,216	1,227	1,300
Fellows	84	98	97	100
PhD	1,042	1,032	996	969
Masters***	325	335	383	371

Notes:
** Total number of individuals*
*** Staff in higher education institutions employed on research grants.*
**** 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

Research facilities and equipment: essential infrastructure for environmental science

The Environment Centre Wales.

Gordon Brown opens new environmental research centre

Prime Minister Gordon Brown officially opened the £7 million Environment Centre Wales, a collaboration between the Centre for Ecology & Hydrology and Bangor University, on 15 February 2008.

'You are drawing on the talents of people across this country and Europe. I believe this is a fine example of how cooperation in a major area of research should work in the future,' said the Prime Minister.

The new building complies with the highest environmental assessment rating for its design and construction. It sports solar panels, ground-source heat pumps, rainwater recovery systems and a combined heat and power plant. The builders used locally sourced materials where possible and they landscaped the grounds by planting native flora.

East coast storm surge

Accurate advanced warning helped minimise damage and disruption on 9 November 2007 when the worst storm surge in 20 years struck the east coast of England.

Head of the National Tidal and Sea Level Facility (NTSFL) Kevin Horsburgh said, 'The long-range forecast on 6 November 2007 suggested that the type of storm that can cause severe surges was approaching. By lunchtime the next day our tide-surge forecasting system produced a prediction of the size of the surge. Each subsequent output from the models told the same story. When the surge finally struck our models were accurate to within ten per cent, a really excellent outcome.'

Researchers at NTSFL, based at NERC's Proudman Oceanographic Laboratory, use tide and surge models for coastal flood warnings. These models run four times a day on supercomputers at the Met Office, producing predictions up to two days in advance.

The Storm Tide Forecasting Service, a partnership between Proudman, the Environment Agency and the Met Office, gives advance storm surge warnings, reducing the risk to life and property.

Summer floods and long-term trends in the UK

The ferocity of the 2007 summer floods surprised everyone and left parts of north-east and southern England submerged.

During the crisis, scientists from the Centre for Ecology & Hydrology (CEH), the British Geological Survey (BGS) and NERC's Flood Risk from Extreme Events (FREE) programme provided essential information to the media and operational services such as the Environment Agency, Defra, the Met Office and others. BGS and FREE scientists scrambled research aircraft to survey the affected regions.

Following the floods, the National Hydrological Monitoring Programme (NHMP), operated jointly by CEH and BGS, published a comprehensive report, *The summer 2007 floods in England and Wales – a hydrological appraisal*. The report stated that the floods have 'no close modern parallel for the June-August period' and that summer 2007 was a 'very singular episode, which does not form part of any clearly emerging pattern or long-term trend consistent with currently favoured climate change scenarios.'

Coincidentally, BGS launched a new service, Geological Indicators of Flooding, in June 2007, one day before the first torrential downpours hit Hull. The service will complement the Environment Agency's existing flood maps.

In separate research, FREE scientists published a report in 2008 showing that winter rain and snowfall has become more intense in the UK over the last 100 years. The team, led by Tim Osborn from the University of East Anglia, noted similar increases in heavy rainfall in spring and, to a lesser extent, in autumn.

CEH and BGS scientists contributed written and oral evidence to Sir Michael Pitt's independent review of the summer flooding for the government.

■ The summer 2007 floods in England and Wales – a hydrological appraisal. Available from the Centre for Ecology & Hydrology.

£113 million supercomputer launched

A new £113 million supercomputer, capable of 60 trillion calculations a second, officially opened in January 2008. The facility, known as HECToR (High-End Computing Terascale Resource), gives environmental researchers direct access to the most powerful computer in the UK – from a PC in their own office.

The Chancellor of the Exchequer Alistair Darling officially opened the cross-research council facility housed at Edinburgh University.

The HECToR team plan to keep pushing the computer's speed to the limits. While it starts out with a speed limit of 60 Teraflops, by October 2009 peak performance will hit 250 Teraflops.

■ www.nerc.ac.uk/research/sites/facilities/hpc

Tewkesbury, Gloucestershire, during the 2007 summer floods.

Partnerships

Environmental change is a global challenge. Strong national and international partnerships are crucial

Living With Environmental Change

NERC has helped bring together the UK's main funders of environmental research for a ten-year £1 billion programme Living With Environmental Change (LWEC). The unprecedented programme, announced in 2007, will focus on the regional and local impacts of environmental change from seasons to decades – the time and space scales needed by policy-makers.

The approach is unprecedented for two reasons: the size and extent of the environmental challenge facing the UK and the international community; and the way the research community and governments have come together to deal with it.

The LWEC approach will connect policy-makers, business and the public to researchers from the natural, engineering, economic, social, medical, cultural, arts and humanities disciplines. The reach will be national – partners include the Welsh Assembly and Scottish Government, and international – UK researchers will work with emerging and developing economies.

The programme will provide decision makers with the best information to effectively manage and protect vital ecosystems services.

Antarctica as never seen before

An international team has created the most geographically accurate, true-colour satellite photograph ever made of Antarctica. The mosaic is made up of more than a thousand images from over three years of satellite observations and is freely available online.

British Antarctic Survey scientist Andrew Fleming said, 'It will deliver the best satellite images of the entire continent. It has a 15-metre pixel resolution so the detail is stunning. And it's not just a pretty picture. The dataset has a range of applications in glaciology and geology.'

Robert Bindschadler from NASA's Goddard Space Flight Center said, 'I think the mosaic will confirm areas of the Antarctic that may hold the most potential for scientific discoveries.'

The mosaic is a collaboration between the British Antarctic Survey, NASA, the National Science Foundation and the US Geological Survey, and is part of International Polar Year.

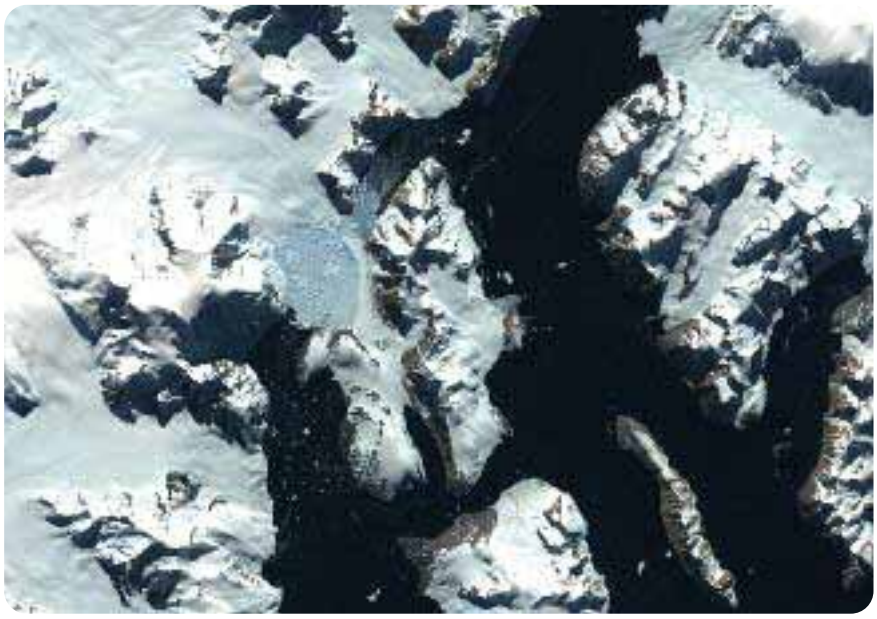
■ http://lima.usgs.gov

Setting global genomics standards

Research institutes around the world are producing vast amounts of genetic data. This rapidly expanding field needs to develop a common standard for describing genomes and metagenomes – all the genomes in a particular environment.

The Genomic Standards Consortium (GSC), led by Dawn Field and Tanya Gray from the Centre for Ecology & Hydrology with a range of international colleagues, is implementing its 'minimum information about a genome sequence' guideline to harmonise data collection and analysis within the wider genomics community.

Participants in the GSC include biologists, computer scientists, those building genomic databases and conducting large-scale comparative genomic analyses, and those with experience of building community-based standards. The work will have a lasting impact on the global genomics community.



European alien invasion assessment

The Centre for Ecology & Hydrology led an EU-funded research project DAISIE (Delivering Alien Invasive Species Inventories in Europe) to bring together information on alien species and their effects.

The project has identified over 10,600 species that are alien within Europe and has produced detailed profiles of '100 of the worst'.

Key findings: the arrival rate of new alien species to Europe continues to increase. At the current rate, one new alien mammal species is introduced to the continent each year; vertebrates tend to be deliberately released, invertebrates generally arrive as contaminants of plant material, and most plants escape from gardens; one in six European alien species are already known to have an ecological or economic impact.

The inventory and distribution maps are the first qualified reference system on invasive alien species for Europe.

■ www.europe-aliens.org.

New emissions service for capital cities

Cities all over Europe are queuing up for a new service that quantifies greenhouse gas emissions across a region's industries and economic sectors.

Four regions in Europe have already applied the new service from the Tyndall Centre for Climate Change Research at Manchester University. A further 21 regions are next in line, including ten capital cities: Madrid, Paris, Stockholm, Helsinki, Brussels, Athens, London, Oslo, Moscow, Ljubljana.

The system makes it easy for policy-makers, regulators and industry to produce energy scenarios for emissions reductions based on their own expertise and understanding. The system, known as GRIP (the Greenhouse Gas Regional Inventory Protocol) was co-funded by the Tyndall Centre, the Environment Agency, and the researcher Sebastian Carney as part of his PhD.

A new company, Carbon Captured Ltd, was founded in 2008 to meet further demand.

Sebastian said, 'Stakeholders engage with GRIP quickly as it enables energy scenarios to be formed in real time in a transparent and reflexive way.'

■ www.grip.org.uk

Delivering the strategy – vital statistics

Leadership, effectiveness, efficiency

Doug Perrine/Nature Picture Library

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.

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

This chapter may not be sufficient for a full understanding of NERC's financial position and performance. The full financial position is presented in NERC's Annual Accounts. www.nerc.ac.uk.

Statement of net expenditure 2007-08 (£m)

	Outturn
Programme expenditure	362.3
Notional charge against capital	8.9
Depreciation	23.5
Provisions	-8.2
Impairments	5.4
Administration costs	21.9
Income	-48.3
Net expenditure for the year	365.5

Trends in annual capital investment (£m)

	2004-05	2005-06	2006-07	2007-08
Major projects (>£400k)	14.9	21.4	27.1	25.5
Research Centre Infrastructure Fund	8.1	0.8	0.0	0.4
Minor projects and equipment (<£400k)	4.9	9.9	9.7	11.1
Profit on disposal of fixed assets (i)	0.0	-0.2	-0.3	-1.9
Capital grants to HEIs (ii) (excluding JIF)	0.0	0.0	13.2	11.6
Total	**27.9**	**31.9**	**49.7**	**46.7**

(i) from 2007-08 all disposals of fixed assets classified as capital
(ii) from 2006-07 capital grants classified as capital

HEI: Higher Education Institutions
JIF: Joint Infrastructure Fund

External funding

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

Openness and transparency

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

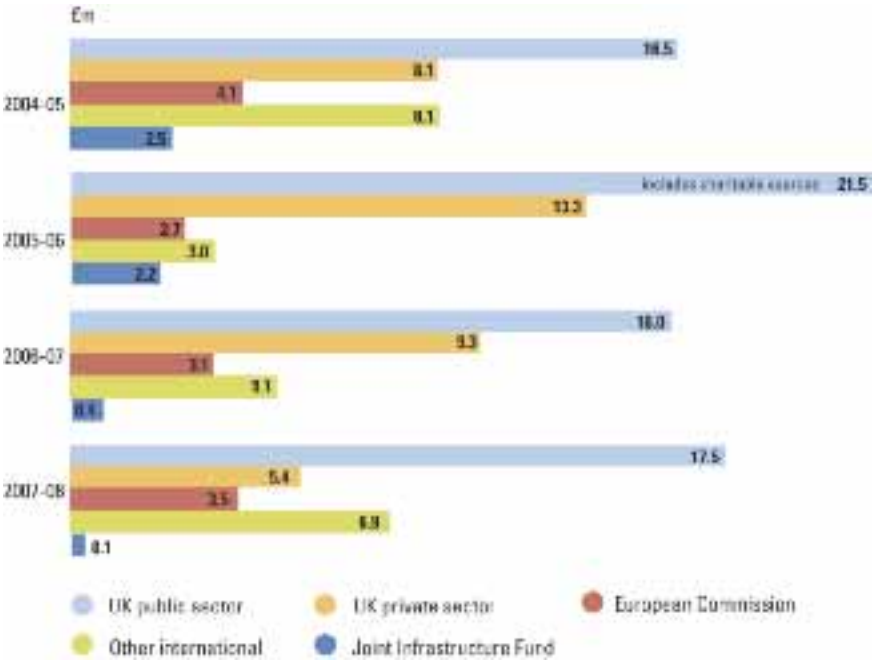
During 2007 we answered 26 requests for information under the legislation, covering a wide range of subjects from research outputs to personal information. We answered 88 per cent of our requests, some of which were very complex, either within the statutory time limit or within an agreed deadline extension.

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

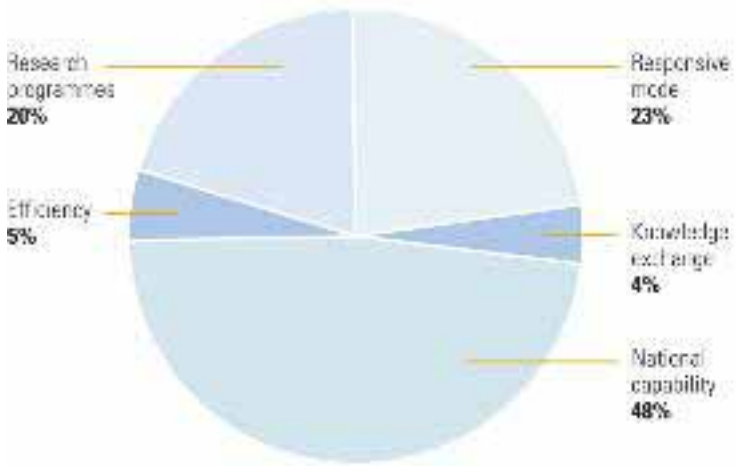
Requests made under the Freedom of Information Act

	2007
Research outputs	8
Research policy and operations	5
Funding applications	3
Business policy and operations	5
Personal information	2
Contracts	3
Total	**26**

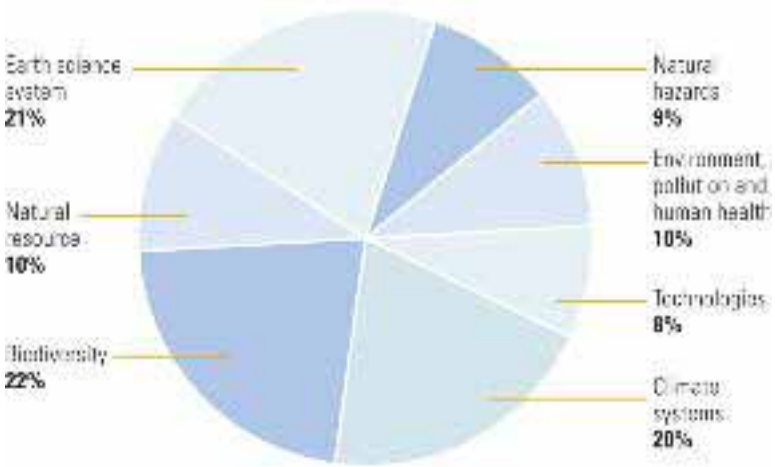
External funding for research (£m)



Allocation of science budget by funding streams 2007-08



Allocation of science budget by themes 2007-08



Environmental accounts and greening of NERC

This is the fifth year that NERC has produced a set of accounts that cost the environmental impact of our operations. NERC provides a world-class science whilst ensuring that we limit damage to the environment. The accounts cover areas of NERC over which we have 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.

The costs of energy marginally increased this year, gas in particular increased due to the prolonged winter. A new energy management system will be shortly implemented across NERC to better control our energy useage. The cost of airplanes has increased marginally in response to an increasing demand for atmospheric research overseas. The cost of ships, being the highest environmental cost to NERC, has decreased due to a reduction in Antarctic passage distances and repairs/maintenance activity. Finally, waste costs have reduced due to a number of initiatives on recycling and a resulting drop in the use of landfill.

NERC is continuing to resource a 'Greening Fund' for local initiatives to reduce its environmental footprint and to mitigate some of its restoration costs. Initiatives this year include a wind turbine at the British Geological Survey, a waste management area and cycle stores at the National Oceanography Centre, Southampton, solar panels and a heat recovery system at the British Antarctic Survey and the new Environment Centre for Wales has been opened with a BREEAM rating of 'excellent'. The British Geological Survey and the British Antarctic Survey have previously achieved ISO14001 environmental management accreditation, whilst the National Oceanography Centre, Southampton and NERC Swindon Office are now preparing to undertake the accreditation audits.

Restoration/avoidance costs

	2006-07 £	2007-08 £
Impacts to air		
Arising from :		
Energy		
Electricity consumption	147,700	153.000
Gas consumption	41,800	44,100
Oil consumption	2,500	2,600
Petrol consumption	400	200
Diesel consumption	11,200	11,700
Total energy	**203,600**	**211,600**
Transport		
Business mileage	108,800	114,300
Commuting	31,400	30,500
NERC ships	523,300	488,100
NERC planes	74,000	87,700
Total transport	**737,500**	**720,600**
Total impacts to air	**941,100**	**932,200**
Impacts to land		
Waste disposed to landfill	9,500	5,400
Total impacts to land	**9,500**	**5,400**
Impacts to water		
Water use and sewage	not quantified	not quantified
Total environmental costs	**950,600**	**937,600**
Staff costs	107,318,000	108,153,000
Other operating costs	92,712,000	94,127,000
Total operating costs	**200,030,000**	**202,280,000**
Total revised operating costs	**200,980,600**	**203,217,600**

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

	2006-07	2007-08
Carbon dioxide	46,400	38,700
Sulphur dioxide	100	100
Nitrous oxide, particulate matter, carbon monoxide, hydrocarbons	300	300
Methane	3	2

Equality matters and success rates

Staff

NERC embraces diversity and equality, and has introduced a wide range of measures to ensure that 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 childcare facilities and 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 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 has been relatively constant and success rates between men and women have been comparable over several years, but that the number of women within the system remains low.

For the 2007 fellowship round 36% (52 of 144) of applicants were female. Five out of 25 fellowships (20%) were awarded to female candidates. Although the percentage varies each year, this is disappointingly lower than in any of the previous four years. The percentage of fellowships being offered to female candidates in previous years was: 33% in 2006; 43% in 2005; 25% in 2004 and 32% in 2003.

For PhD and masters courses, studentships are awarded to universities and NERC research centres. Institutions select students within set eligibility criteria. NERC has no control over selection and does not have accurate data on success rates.

Of the 371 NERC-funded masters students starting in 2007, 50% are female – the same as 2006 (194 of 386). Of the 332 NERC-funded PhD students starting in 2007, 48% are female and 52% male. In 2006, 55% were female and 45% were male and in 2005, 53% were female and 47% male. So the 2007 data is still showing that studentship awards are split fairly evenly between male and female candidates.

Responsive mode standard and small grant applications and success rates

	2004-05	2005-06	2006-07	2007-08
Number of applications	596	864	825	848
Number of awards	153	176	190	184
Total £k	22,349	27,024	39,699	41,837
% success rate	26	20	23	22

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

Success rates for grants by gender

	2005-06		2006-07		2007-08	
	Men	Women	Men	Women	Men	Women
Number of applications	906	175	827	207	884	196
Number of successful applicants	212	39	207	39	243	36
% successful applicants	23	22	25	19	27	18

Success rates for fellowships by gender

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

Health and safety

NERC has sought to benchmark its safety management systems and performance against other organisations this year. Our responses to the Health and Safety Executive (HSE) benchmarking website CHaSPI (Corporate Health and Safety Performance Index) questionnaire gives us a good ranking on the list of 75 organisations participating. We have examined the specific areas of safety management where we did not rank top and are considering possible actions and priorities.

NERC has commissioned an external audit to confirm that all safety management systems are now in place and functioning as intended. We are reassured that we now have a fully functional safety management system in line with HSE's guidelines (Successful Health & Safety Management).

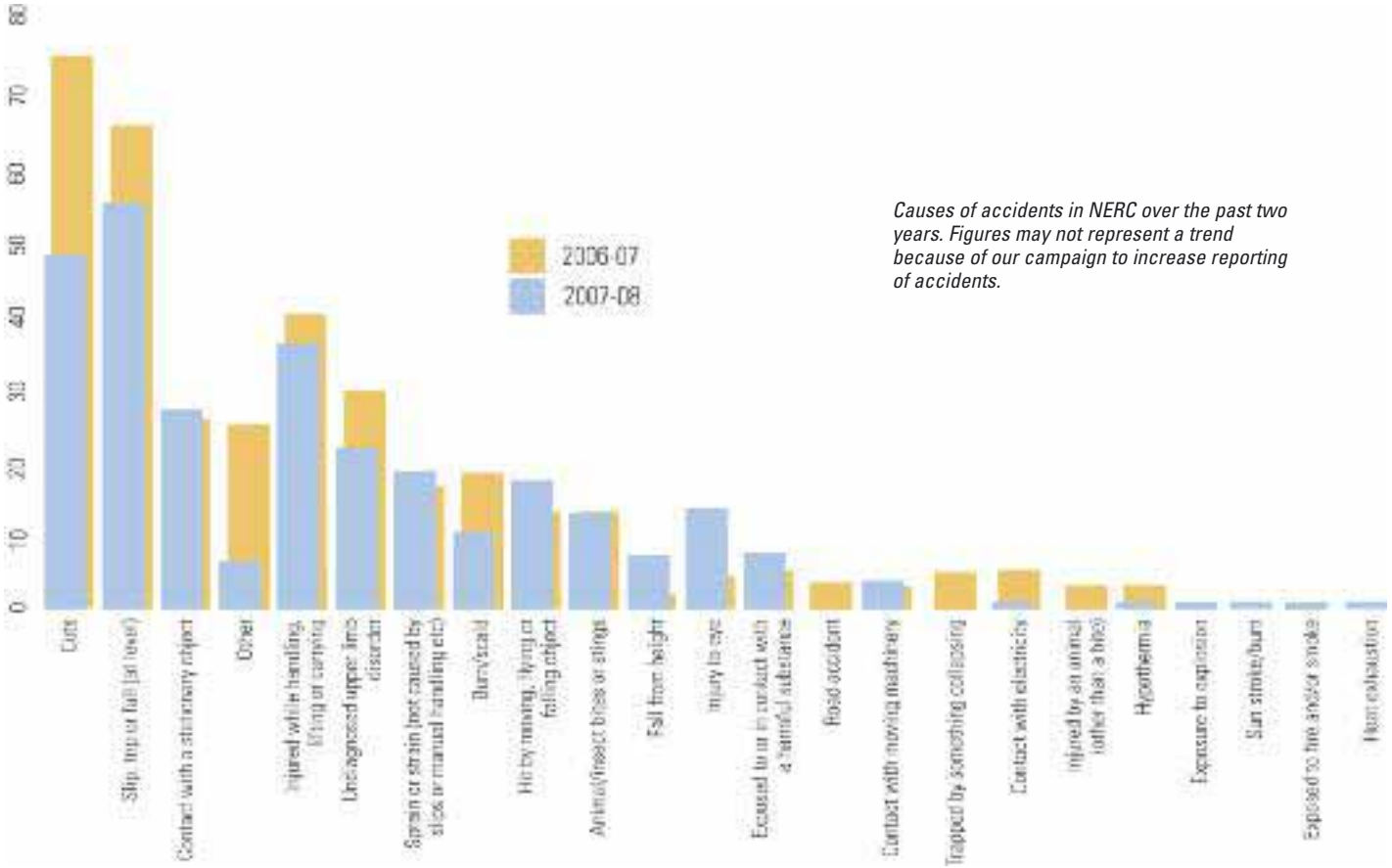
We have audited our priority areas for selected parts of all research and collaborative centres. These areas relate to musculoskeletal injury (upper limb disorder and manual handling) and to workshops and chemical hazards.

The auditing priorities extend to include safety-management systems and large-scale handling and storage facilities. Audits are complete on several NERC sites in these additional areas. Audit results continue to be encouraging for the most part; a single area identified as needing significant improvement has been managed and now complies with policy.

Accident reporting continues to improve. Where we have introduced new software systems, there is evidence of improved reporting of near-misses and incidents (damage to property rather than people). NERC will roll out the software throughout the next reporting year.

NERC has developed new initiatives to address two key issues: stress management and management of road risk. We have done this to reflect increased national concern in these areas and new government guidelines.

Accidents



Causes of accidents in NERC over the past two years. Figures may not represent a trend because of our campaign to increase reporting of accidents.

Meeting health and safety requirements is a top priority when out doing fieldwork.

SCIENCE BUDGET EXPENDITURE IN RESEARCH ORGANISATIONS

Expenditure £k	REPONSIVE AWARDS											
	Grants	PhD students	Masters	Fellowships	JIF grants	Knowledge exchange	Research programme grants	Research programme students	Research programme fellows	Research contracts/ progs	Collaborative centres	TOTAL
Bangor University	767	290	112	77		99	127	42				1,514
Birkbeck College	47											47
Bournemouth University	8											8
Brunel University	91	22				-5						108
Cardiff University	282	537		73			463	55				1,410
Central Science Laboratory							60					60
Cranfield University	122		60				107	13				302
Durham University	771	365		151		75	127	42		285		1,816
Edge Hill University							37					37
Glasgow Caledonian University							23					23
Heriot-Watt University		21	47				36	28				132
Imperial College London	1,676	936	374	432		1	628	202	22	186	1,008	5,465
Keele University	3	41										44
King's College London	81	124	146			100	139					590
Kingston University	35									208		243
Lancaster University	578	355	101	128		126	346	68				1,702
Liverpool John Moores University	65	14										79
London School of Economics and Political Science						21						21
Loughborough University	100	21										121
Napier University							39					39
Newcastle University	628	509	280	211		2	299	66				1,995
Northumbria University	30											30
Open University	336	192		99			192	19		43		881
Oxford Brookes University		20	36									56
Queen Mary, University of London	640	15	33	80		56						824
Queen's University of Belfast	153											153
Roehampton University	-9											-9
Royal Holloway, Univ of London	270	304	230	61			136	15		109		1,125
Swansea University	215	235		139		89	55	14		453		1,200
UHI Millennium Institute							9					9
University College London	1,218	852	166	112			1,028	45		632		4,053
University of Aberdeen	1,680	429	115	307		85	548	44				3,208
University of Bath	100	25		56					10			191
University of Birmingham	778	473	222	73		84	556	27				2,213
University of Bradford		49	152	13								214
University of Brighton	35											35
University of Bristol	2,704	1,098		439		63	1,171	75		1,559		7,109
University of Cambridge	2,117	1,344	41	393	59	109	833	124	-21	232		5,231
University of Cumbria								11				11
University of Dundee	28						29			394		451
University of East Anglia	1,923	853	175	104	33	105	1,611	96		196	2,227	7,323
University of Edinburgh	2,460	1,176	184	861		128	633	101		535		6,078
University of Essex	368	174		104			133	36				815
University of Exeter	885	417	67	165			140	43	46			1,763
University of Glamorgan							58					58
University of Glasgow	442	199		342		20	112			155		1,270
University of Hertfordshire	21	53				34	72	15				195
University of Hull	32	145		67								244
University of Kent	14	39						31				84
University of Leeds	3,548	1,041	378	307		309	900	139		2,745	6,212	15,579
University of Leicester	682	313	47	56		21	124	80		286		1,609
University Of Lincoln	34											34
University of Liverpool	1,494	627		61		32	398	67		35		2,714

Expenditure £k	REPONSIVE AWARDS											
	Grants	PhD students	Masters	Fellowships	JIF grants	Knowledge exchange	Research programme grants	Research programme students	Research programme fellows	Research contracts/ progs	Collaborative centres	TOTAL
University of Manchester	2,636	705	39	243			1,185	40		296		5,144
University of Nottingham	202	122	36	59			-10	11		133		553
University of Oxford	2,490	1,263	58	388	-10	15	829	82		535		5,650
University of Plymouth	486	162	37				336	51				1,072
University of Portsmouth		16				5	13					34
University of Reading	2,288	861	394	383		52	1,659	70		1,617		7,324
University of Salford	45	28				-5		12		40		120
University of Sheffield	1,606	610	9	365		40	900	72		799		4,401
University of Southampton	889	694		101		6	878	234		53		2,855
University of St Andrews	1,199	400	48	-11		21	102		19		1,077	2,855
University of Stirling	154	259	50			29	286	7				785
University of Strathclyde	38	75		88								201
University of Surrey		16					137					153
University of Sussex	227	77					26					330
University of the West of England							100					100
University of the West of Scotland							89					89
University of Ulster	28											28
University of Wales, Aberystwyth	255	234		19								508
University of Warwick	572	171		80			138					961
University of Worcester							8					8
University of York	1,500	313	149				402	80		306		2,750
Zoological Society of London	239	199		192								630
Centre for Environment, Fisheries and Aquaculture Science (CEFAS)							72					72
Diamond Light Source Ltd	7											7
Fisheries Research Services Marine Laboratory							15					15
H R Wallingford Ltd							43					43
John Innes Centre	49						59					108
London School of Hygiene and Tropical Medicine							45					45
Macaulay Land Use Research Institute							2					2
Marine Biological Association	206					19					1,186	1,411
National Institute of Agricultural Botany	28											28
Natural History Museum	396	21				5	204					626
Plymouth Marine Laboratory	305	192				108	571			860	1,111	3,147
Policy Studies Institute		279					3,286					3,565
Rothamsted Research							78					78
Royal Botanic Gardens – Edinburgh				56								56
Royal Botanic Gardens Kew	73						74					147
Sir Alister Hardy Foundation for Ocean Sciences						3					387	390
Scottish Agricultural College							9	14				23
Scottish Association For Marine Science	258	113				70	234			332	1,151	2,158
Scottish Crop Research Institute							2					2
Scottish Universities Environmental Research and Reactor Centre	32	50					50			1,719		1,851
STFC - Rutherford Appleton Laboratory	131					14	163			2,891		3,199
The Institute for European Environment Policy							65					65
TOTAL	**43,791**	**20,168**	**3,786**	**6,874**	**82**	**1,936**	**23,219**	**2,171**	**76**	**17,634**	**14,359**	**134,096**

GRANTS AWARDED IN 2007-08

	RESEARCH GRANTS									
	RESPONSIVE								RESEARCH PROGRAMMES	
	Small grant		Standard grant		Antarctic Funding Initiative		Consortium grant			
	Number	Value £k	Number	Value £k	Number	Value £k	Number	Value £k	Number	Value £k
Bangor University			6	1,491	1	200			3	396
Birkbeck College			1	48						
Bournemouth University	1	34								
Cardiff University	2	73	5	1,246					2	98
Cranfield University									1	57
Durham University	4	161	6	2,070						
Glasgow Caledonian University									1	88
Heriot-Watt University			1	16						
Imperial College London	2	109	7	2,065					3	544
Keele University	1	70								
King's College London			1	254					2	229
Lancaster University	1	44	6	1,257	1	33			4	599
Liverpool John Moores University										
Manchester Metropolitan University	1	64								
Marine Biological Association			1	379						
National Oceanography Centre			1	307					2	257
Natural History Museum	1	64	3	898			1	290	2	92
NERC British Antarctic Survey	2	91	2	566	6	246				
NERC British Geological Survey			1	22			1	742		
NERC Centre for Ecology and Hydrology	1	53	1	89			1	280	8	1,931
Newcastle University			6	1,891					3	243
Open University	2	94	2	597						
Plymouth Marine Laboratory	1	28	1	102					7	599
Proudman Oceanographic Laboratory			2	602					3	136
Queen Mary, University of London			4	944						
Queen's University of Belfast			2	295						
Roehampton University										
Royal Botanic Gardens Kew			1	280						
Royal Holloway, University of London	1	48	2	583			1	1,014		
Scottish Association For Marine Science	1	55	2	406	1	171			2	57
Scottish Universities Environmental Research Centre			1	330						
STFC - RAL			1	16					1	65
Swansea University	1	43	2	535	1	376			1	81
University College London	2	128	2	555					2	201
University of Aberdeen			2	767					2	229
University of Bath										
University of Birmingham			4	1,336					4	184
University of Bradford										
University of Brighton			1	227						
University of Bristol	5	263	3	1,188					4	502
University of Cambridge	3	107	8	1,889			2	1,738		
University of Cumbria										
University of East Anglia	2	151	3	952	3	961	1	213	6	879
University of Edinburgh	1	33	10	3,405	1	285	1	468	3	203
University of Essex	1	35	2	595						
University of Exeter	2	200	5	1,412					3	215
University of Glasgow			3	704			1	312		
University of Hull										
University of Leeds	7	439	9	1,245			4	3,133	5	356
University of Leicester	2	123	3	692			1	388	3	131
University of Liverpool	3	124	7	1,129					2	175
University of Manchester	1	55	7	2,438	1	142	3	2,026	2	98
University of Nottingham			1	249						
University of Oxford	3	160	8	2,925			2	1,152	5	1,153
University of Plymouth	4	214	1	246					2	123
University of Portsmouth									1	49
University of Reading	3	141	2	376			1	305	2	250
University of Salford							1	239		
University of Sheffield			10	2,268			1	200	3	155
University of Southampton	1	52	6	1,201	1	332	1	456	1	80
University of St Andrews			5	2,019			1	132	2	220
University of Stirling										
University of Strathclyde			1	133					2	323
University of Surrey										
University of Sussex			3	1,026						
University of Ulster	2	80								
University of Wales, Aberystwyth			1	278						
University of Warwick	2	50	3	703					2	163
University of York	1	110	2	659			1	119	3	253
Zoological Society of London			1	358						
Total	67	3,496	181	48,264	16	2,746	25	13,207	104	11,414

	KNOWLEDGE EXCHANGE		RESEARCH FELLOWS		RESEARCH STUDENTSHIPS				
			Post-doc fellow	Advanced fellow	Responsive PhD	Responsive project PhD	Open case	Research programme PhD	Research programme project PhD
	Number	Value £k	Number	Number	Number	Number	Number	Number	Number
	1	161	1		3				
	1	158							
					6	2			
					3	1	4		
				1	8	2	2	1	1
					1		1		
			1		2	1	2		1
					1				
					2				1
					4				
					1				
	1	24			8				
					4	4	1		1
			2		2		1		
					4				
					1				
	1	98			5				
							1		
			1		1		2		
	1	81			1		1		
							1		
	1	89							
					2				
			1		8	1			
					5		2		
				1					
					5	2	2		
					1				
			1		13	2	2		
	2	225	2		13	1			
								1	
					13	1	1		
			4		16		2	3	
					2				
			1		6		2	1	
				1	3		2		
					2				
			1		13	1	4	1	
					7			1	
					7				
					11		1		
					1			1	
	2	405	2	1	14	2	1		
					2		1		1
	2	194							
	1	83	2		9	2			
			3		7	3			
	1	165		1	10	1			
					5	1			
					2		1		
				1	2				
					1				
					3				
				1	3				
					5	1	1		2
					2				
	14	**1,683**	**22**	**7**	**250**	**28**	**38**	**9**	**7**

HOW WE SPENT THE SCIENCE BUDGET (£m)

	Allocation	Outturn	Variance
Directed Programmes			
Aerosol Impacts	0.867	1.293	0.426
Autosub under ice	0.129	0.104	-0.025
Clouds, Water Vapour and Climate	0.017	0.017	0.000
Core Strategic Measurements for Atmospheric Science	0.127	0.124	-0.003
Coupled Ocean-Atmosphere Processes and their Effect on Climate	0.016	0.015	-0.001
Depleted Uranium	-0.050	-0.361	-0.311
e-Science	2.299	2.169	-0.130
Ecology and Hydrology Funding Initative	1.036	0.596	-0.440
Environment and Health	0.540	1.156	0.616
Environmental factors in the chronology of human evolution and dispersal	0.011	-0.018	-0.029
Environmental Nanotechnology	-0.091	0.086	0.177
Flood Risk from Extreme Events	1.864	1.848	-0.016
Flood Risk Management Consortium	0.056	0.069	0.013
Integrated Ocean Drilling programme	5.266	2.510	-2.756
International Polar Year - Science programme	1.614	1.473	-0.141
Joint NERC/EPSRC Environmental Maths & Statistics programme	-0.216	-0.193	0.023
Low Carbon Innovation	0.097	0.109	0.012
Lowland Catchment Research	0.182	0.166	-0.016
Ocean Drilling Programme	0.088	0.011	-0.077
Ocean Margins LINK Programme	0.353	0.300	-0.053
Marine & Freshwater Microbial Biodiversity	0.000	0.013	0.013
Polluted Troposphere	0.157	0.137	-0.020
Post Genomics	2.809	2.509	-0.300
Quantifying the Earth System	6.210	4.218	-1.992
Rapid climate change and the stability of the thermohaline circulation	2.656	2.564	-0.092
RAPIDWATCH - Rapid climate change and the stability of the thermohaline circulation Phase II	0.815	0.166	-0.649
Rural Economy & Land Use	2.563	2.565	0.002
Strategic Oceans Funding Initiative	0.412	0.003	-0.409
Study of composition and structure of the lower stratosphere and upper troposphere at middle latitudes (OZONE)	0.037	0.039	0.002
Surface Ocean Lower Atmosphere Interactions	3.077	2.718	-0.359
Sustainable Energy	1.711	1.290	-0.421
Sustainable Maine Bioresources	0.000	0.063	0.063
Other Programmes			
Earth Observation programmes	0.811	1.072	0.261
Eurocores - Mineral Sciences	0.150	0.422	0.272
Eurocores - Biodiversity	0.194	0.131	-0.063
International Subscriptions	2.231	1.329	-0.902
Knowledge Transfer	4.589	3.723	-0.866
Commercialisation	1.395	0.409	-0.986
Theme Leaders	0.676	0.367	-0.309
Data Centre Support	0.842	0.583	-0.259

	Allocation	Outturn	Variance
MBA Library	0.334	0.309	-0.025
Other minor programme activities	0.777	1.376	0.599
Collaborative Centres			
EO Centres of Excellence	7.168	4.648	-2.520
Centre for Population Biology	1.392	1.300	-0.092
National Centre for Atmospheric Science	6.952	8.746	1.794
UKPopNet	0.819	0.649	-0.170
Tyndall Centre for Climate Change Research	1.359	1.351	-0.008
Continuous Plankton Recorder Survey of the North West European Shelf and the North East Atlantic (SAHFOS)	0.387	0.387	0.000
Sea Mammal Research Unit	1.067	1.027	-0.040
Plymouth Marine Laboratory	4.330	4.266	-0.064
Scottish Association for Marine Science	2.269	2.231	-0.038
Marine Biological Association	0.929	0.948	0.019
European Space Agency	45.183	45.255	0.072
Scientific Facilities & Technology			
Marine Barter Bank	0.060	0.114	0.054
Marine Procurement Resource	-0.025	0.000	0.025
OCEANS 2025 Restructuring	0.579	0.397	-0.182
Oceans 2025 Science Coordinators	0.058	0.051	-0.007
Facility for Airborne Atmospheric Measurement	1.412	0.528	-0.884
Services & Facilities	5.944	6.421	0.477
Large Facilities Diamond	0.081	0.000	-0.081
Airborne Remote Sensing Facility	0.640	0.760	0.120
High Performance Computing	3.139	3.009	-0.130
Services & Facilities	*1.295*	*0.369*	*-0.926*
Large Facilities High Performance Computing Capital	*2.250*	*2.300*	*0.050*
Large Facilities ISIS	*0.050*	*0.000*	*-0.050*
FAAM Capital Refurbishment	*0.150*	*0.000*	*-0.150*
Airborne Remote Sensing Facility - LIDAR	*1.000*	*0.791*	*-0.209*
Responsive Mode Grants			
Standard Grants	33.983	31.025	-2.958
Small Grants	2.360	2.065	-0.295
New Investigator	1.008	1.211	0.203
Antarctic Funding Initiative (AFI)	1.586	1.499	-0.087
Consortium grants	6.802	8.073	1.271
Responsive Mode Training			
Studentships	23.480	23.954	0.474
Fellowships	6.261	6.874	0.613

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

	Allocation	Outturn	Variance
British Antarctic Survey			
Core Infrastructure	26.217	25.962	-0.255
Arctic Station	0.125	0.143	0.018
RRS Ernest Shackleton	1.700	1.700	0.000
Antarctic Bases Environmental Clean Up	1.126	1.074	-0.052
BAS for non-BAS use of JCR	0.684	0.684	0.000
Research Centre Science Programme	10.134	10.237	0.103
Core Capital	*3.110*	*1.592*	*-1.518*
Capital Maintenance	*0.403*	*0.489*	*0.086*
Halley 6	*13.426*	*13.893*	*0.467*
Rothera Redevelopment	*0.180*	*0.201*	*0.021*
British Geological Survey			
Core Infrastructure	9.108	7.553	-1.555
Research Centre Science Programme	16.305	17.059	0.754
Core Capital	*1.454*	*1.175*	*-0.279*
Capital Maintenance (Capital Investment Strategy)	*0.704*	*0.652*	*-0.052*
Keyworth Blocks A-F	*3.318*	*1.985*	*-1.333*
Centre for Ecology & Hydrology			
Research Centre Science Programme and infrastructure	21.894	21.895	0.001
Environment Centre Wales	0.100	0.100	0.000
Capital Maintenance (Capital Investment Strategy)	*2.143*	*2.713*	*0.570*
Environment Centre Wales	*0.325*	*0.155*	*-0.170*
CEH Transition and Integration	10.184	5.691	-4.493
CEH Transition and Integration	*1.217*	*1.377*	*0.160*
National Oeanography Centre, Southampton			
NOCS	9.348	8.365	-0.983
National Marine Facilities Division	11.157	12.216	1.059
NOCS	*2.117*	*2.470*	*0.353*
National Marine Facilities Division	*1.993*	*2.128*	*0.135*
Proudman Oceanographic Laboratory			
POL Science	2.270	2.270	0.000
Core Infrastructure	1.228	1.139	-0.089
British Oceanographic Data Centre	0.977	0.925	-0.052
Core Infrastructure	*1.212*	*1.075*	*-0.137*
Capital Maintenance (Capital Investment Strategy)	*0.096*	*0.070*	*-0.026*

	Allocation	Outturn	Variance
Other Infrastructure			
Swindon Office	13.008	11.300	-1.708
Provisions & Contingent Liabilities	1.504	1.275	-0.229
Electronic Records Management System	0.361	0.249	-0.112
Resource Management System (RMS)	0.170	0.149	-0.021
Corporate Systems Development (CSD)	0.300	0.628	0.328
GRID Highband Width Connection	0.549	0.719	0.170
Shared Services Centre Service Costs	0.000	0.245	0.245
Shared Services Centre Implementation Costs	2.900	2.380	-0.520
Shared Service Centre Capital Costs	*2.000*	*3.224*	*1.224*
Discovery Replacement Project	*0.150*	*0.125*	*-0.025*
Corporate Capital	*1.768*	*0.166*	*-1.602*
Restructuring	2.389	2.359	-0.030
Public Funding Initiative Scored Outside DEL	-1.014	-1.014	0.000
Balance Sheet Provisions	-5.577	-8.179	-2.602
Cost of Capital	9.193	8.933	-0.260
Depreciation	21.046	23.510	2.464
Asset Disposals	*-2.050*	*-1.928*	*0.122*
Overcommitment against Science Budget	-19.759		19.759
Overcommitment against Science Budget	*-2.675*		*2.675*
TOTAL NERC EXPENDITURE	**389.137**	**388.858**	**-0.279**
Comprises:			
Resource*	**353.501**	**353.836**	**0.335**
Capital	***35.636***	***35.022***	***-0.614***

Capital Expenditure in italics

** Resource figure differs from the Statement of Net Expenditure by £11.712m, which is broken down as follows:*

	£m
Funding received from other bodies (recorded as financing in Table 14)	*8.177*
AME impairments	*5.359*
Asset Disposals (recorded under Capital)	*-1.928*
Change in discount factor	*0.104*
	11.712

Statutory basis

These financial statements have been prepared in accordance with the 2007-08 Government Financial Reporting Manual (FReM) issued by the Department for Innovation Universities & Skills (DIUS). This manual is available from NERC Corporate Finance, Polaris House, North Star Avenue, Swindon SN2 1EU. The 2007-08 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 addition to the Science Budget of £362m, NERC won external support from government departments, other UK and overseas public sector bodies, the European Union and industry. In 2007-08, earned income totalled £48m, an increase of £1m from the previous year.

The Statement of Net Expenditure records a total income of £48m and a total expenditure of £407m resulting in net operating expenditure in the year of £359m. The total net book value of the fixed assets is £333m. Government Funds at 31 March 2008 amounted to £281m.

Following the necessary accounting policies, the accounts show net expenditure for the year. Whilst accurate, this is calculated on a different basis from the figures used by NERC and the Department for Innovation, Universities and Skills to monitor its performance. On this basis NERC showed a balanced position.

Reconciliations can be found in Table 1 on page 45.

Developments during the year

Strategy launch

NERC's new five-year strategy was launched on 15 November 2007. *Next Generation Science for Planet Earth* tackles some of the most important environmental challenges facing society. The strategy is dynamic: NERC will regularly refresh and update it, in consultation with stakeholders, as priorities change.

Delivering the NERC strategy

In parallel to *Next Generation Science for Planet Earth*, NERC has developed a new approach to managing performance. This has led to new and improved processes for planning, funding and managing science. These include two new funding modes: research programmes and national capability. NERC's four wholly owned research centres are aligning their mission statements, strategies and delivery plans to *Next Generation Science for Planet Earth*. Implementation starts 1 April 2008.

Delivery Plan 2007

In December 2007, NERC published its latest Delivery Plan setting out what NERC intends to achieve during the Comprehensive Spending Review (CSR) 2007 period 2008-11. The plan contributes to the delivery of HM Treasury's fifth public policy challenge for the CSR, and the Department for Innovation, Universities and Skills' strategic objectives: pursuing global excellence in research and knowledge; promoting the benefits of science in society and delivering science and technology skills in line with employer demand; and accelerating commercial exploitation through innovation and research.

Shared Service Centre

The seven research councils have agreed to establish a Shared Services Centre (SSC), based in Swindon. The SSC will provide finance, grants, human resources, information systems, procurement and payroll operational services to each of the councils and their institutes. The aim of the SSC is to reduce spending by sharing and standardising processes.

The SSC is incorporated as Research Councils UK Shared Services Centre Limited. There is a phased implementation plan for transferring the councils' services during 2008-09.

The Engineering and Physical Sciences Research Council (EPSRC) is hosting the shared services centre project on behalf of all councils to develop and establish the SSC. The councils have agreed to share all these costs and NERC's agreed share is 21 per cent. Those costs for 2007-08 have been accounted for in NERC's books as £1,887k as expensed, £788k as provisions for redundancy and system termination costs and £3,224k as assets in the course of construction.

The transition to shared services centre is regarded as a business critical project.

National Centre for Earth Observation

In February 2008, NERC Council approved the science programme and funding allocation for the National Centre for Earth Observation (NCEO) to start April 2008. NCEO will have responsibility for the existing Earth Observation Centres of Excellence, which use data from Earth observation satellites to monitor global and regional changes in the environment.

Knowledge Exchange activities

Commercialisation: to develop the entrepreneurial culture within our research centres NERC has sought to increase the number of new ideas identified by research centre scientists and the commercialisation team. In 2007-08 more than 50 new ideas were proposed, against an annual target of 40.

Follow-on fund: NERC invested £493k in 2007-08 for proof-of-concept projects in the Follow-on Fund. This represents a significant increase over previous years and will help to speed up the commercialisation of new ideas.

Knowledge exchange plans: responsive mode grant applications must now include knowledge exchange plans relevant to the proposal. This is to encourage researchers to embed plans for knowledge exchange within initial planning for all NERC research investments.

Integrated Ocean Drilling Program (IODP)

NERC has agreed funding for Phase II of the UK Integrated Ocean Drilling Program (IODP). NERC will provide £7m investment over the next five years to enable the UK to maintain influence within IODP. Overall NERC's investment in IODP will be £12.6m over the CSR period.

Table 1

Reconciliation between annual accounts 2007-08 and DIUS reported outturn

	Resource £000	Capital £000
Net expenditure for the year (i)	365,548	
Less: AME impairments (i)	(5,359)	
Funding from other bodies	(8,177)	
Treatment of capital grants	(11,649)	11,649
Capital (ii)		36,950
Profit on the disposal of fixed assets (i)	1,928	(1,928)
The change in discount factor	(104)	
DIUS Outturn (resource and capital)	**342,187**	**46,671**
DIUS Science budget	342,323	46,814
Surplus reported to DIUS (iii)/(iv)	**136**	**143**

Notes:
(i) - taken from the Statement of Net Expenditure for the year ended 31 March 2008.
(ii) - taken from Note 9a - Tangible Fixed Assets.
(iii) - resource credit comprises £4,247k near-cash surplus and £4,111k non-cash deficit.
(iv) - capital surplus comprises £614k capital surplus and £471k capital grant deficit.

Replacement of RRS *Discovery*
The RCUK Executive Group has approved the business and science cases for the replacement of the Royal Research Ship *Discovery*. The project has now entered the procurement stage.

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 2007-08 is given in the Remuneration report (page 51). 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

Communications

We are increasing dialogue with stakeholders. Following an open consultation to develop the new strategy, we are planning several major community events in 2008-09. These events will allow researchers and stakeholders to help identify our research priorities. They are also designed to help to create the vibrant, integrated research communities needed to deliver the strategy. We are improving and strengthening our internal communications to support this aim.

The strategy highlights the need to engage more with the public and to discuss science achievements and their implications. This is a key element of our knowledge exchange activity. During 2007, we supported several public exhibits to encourage dialogue with the public on research issues such as shrinking ice sheets and rising sea levels in a warmer world. Our science in society activities, which link to the RCUK Science in Society unit, aim to stimulate and engage children in environmental science issues to attract more young people into science careers. The results of the latest Public

Attitudes to Science Survey commissioned by RCUK and DIUS and published in March 2008 will inform our ongoing public engagement activities.

Each year, NERC organises six two-day training courses on communicating science to the public for PhD students and grant holders. These remain some of the most popular courses run by the research councils.

Equal opportunities

It is NERC policy that everyone has an equal opportunity for employment and advancement within the council on the basis of their abilities, qualifications and fitness for work. We do not tolerate discrimination against anyone on grounds of sex, age, race, religion, religious beliefs or sexual orientation; this applies in recruitment, training, promotion and to all aspects of employment within NERC. Nor do we unlawfully discriminate on the basis of disability, but prefer to offer each candidate or member of staff the opportunity to demonstrate their ability to carry out the work required. NERC is committed to the Two Ticks scheme as approved by the Employment Service.

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. During 2007-08, 82% of payments were made within 30 days of the invoice date (2006-07: 83%). In accordance with the guidance given in Statutory Instrument 1997/571 the figure for creditor days is 23 days (2006-07: 21 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).

Data security

In accordance with Cabinet Office guidance NERC reported one data security incident in 2007-08. As a consequence of a violent robbery from a third-party courier van, the paper payslips of all staff working at one of NERC's scientific sites were stolen in September 2007. This incident was not caused by a failure of NERC internal controls.

Foreign exchange risk

NERC is a contributor to the European Space Agency. Our agreed forward commitment is €201m over the Comprehensive Spending Review period (2008-09 – 2010-11). Funding is provided in sterling.

Going concern

The Accumulated Income and Expenditure Reserve carried forward at the 31 March 2008 shows a surplus of £180m.

Grant-in-aid for 2008-09, 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 three Council members, and is attended by the Chief Executive. The committee meets four times a year to review internal and external audit and establishment 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 is £54k. All of this cost relates 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.

Events since the end of the financial year

FRS 21 Events after the Balance Sheet Date requires the disclosure of the date on which the financial statements were 'authorised for issue' and who gave that authorisation. The financial statements were authorised for issue on the 8 July 2008 by Professor Alan J Thorpe. There have been no events after the balance sheet date requiring an adjustment to the financial statements.

Forward look

Living With Environmental Change

On 18 June 2008, the Secretary of State for Environment, Food and Rural Affairs, Hilary Benn MP, the Minister for Science and Innovation, Ian Pearson MP, and Lord Selborne, a member of the Lords Science and Technology Select Committee, launched the £1 billion *Living With Environmental Change* (LWEC) programme. NERC is the lead research council in this unprecedented interdisciplinary research and policy partnership.

During 2008, all 17 partners will design the strategic objectives, deliver an outline programme of work and create an evaluation and assessment strategy. Total NERC investment in LWEC over the Comprehensive Spending Review period (2008-11) will be £237m. This will be achieved through reorientating current activities and investing in new activities.

Nanoscience: engineering to application

NERC will invest up to £2m over the CSR period in the cross-council *NanoScience through Engineering to Application* programme. This will build on the research

capacity developed through the *Environmental Nanoscience Initiative*, a collaboration between research councils and government departments and agencies.

The Energy programme
NERC will invest £22m over the CSR period in the cross-council Energy programme. This will include a commitment of up to £4m in phase two of the cross-council initiative, the UK Energy Research Centre.

Global Threats to Security
NERC will invest up to £1m in the Global Threats to Security cross-council programme over the Spending Review period to create links with the Living With Environmental Change programme.

Lifelong Health and Well-Being
NERC will invest up to £1m in the Lifelong Health and Well-Being programme over the CSR period to collaborate on researching environmental factors relevant to ageing and human health.

Science Impacts Database
NERC will launch a science impacts database in 2008 to provide a central evidence source of the impact of NERC science.

National Capability Advisory Group
NERC will set-up a National Capability Advisory Group (NCAG) to maintain an overview of NERC's portfolio of National Capability and horizon-scan future needs and opportunities.

Technology Strategy Board
NERC will continue to work with the Technology Strategy Board to increase business interaction with the environmental science community.

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 that was successfully completed by the research councils at the end of 2007-08.

Halley VI
By the end of 2010, NERC will complete construction of the Halley VI science base in Antarctica to support polar environmental research. NERC will invest £45-£50m over the life of the project.

Professor Alan J Thorpe
Chief Executive and Accounting Officer
30 June 2008

Remuneration report

Remuneration policy

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

Mr E Wallis, Chairman NERC
Mr E Jenner, 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.

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

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

Employment contracts

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

All senior officers covered by this report, apart from the Chief Executive, hold appointments, 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 is for a period of four years.

The emoluments of the Chief Executive, including taxable benefits, were £114,365 (2007: £107,106). This included basic salary of £110,270 (2007: £102,375) and performance related bonus of £4,095 (2007: £4,731). A charge of £23,487 (2006: £21,805) was also incurred in respect of employer's pension contributions. This was assessed as 21.3% of basic salary (2007: 21.3%). The Cash Equivalent Transfer Value for the Chief Executive at the 31 March 2008 was £1,032,062. The real increase in the cash equivalent transfer value for the period was £66,004. 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 (2007-08)

Name	Note ref.	Total emoluments 2007-08	Total emoluments 2006-07	Pension increase in real terms	Accrued pension at 31/03/08	Lump sum at 31/03/08	Cash [4] equivalent transfer value as at 1/04/07	Cash [5] equivalent transfer value as at 31/03/08	Cash equiv. transfer value increase in real terms
		£000	£000	£000	£000	£000	£000	£000	£000
Professor A Thorpe		110 - 115	105 - 110	2.5 - 5	0 - 5	-	844	1,032	66
Professor C G Rapley	1	50 - 55	105 - 110	0 - 2.5	5 - 10	125	986	1,006	1
Professor P Nuttall		100 - 105	105 - 110	0 - 2.5	35 - 40	115	738	852	13
Professor A Willmott		75 - 80	65 - 70	2.5 - 5	0 - 5	-	430	518	43
Mr J Hansford		85 - 90	85 - 90	0 - 2.5	35 - 40	123	921	1,019	0
Professor A E Hill		95 - 100	95 - 100	0 - 2.5	10 - 15	84	406	500	15
Mr D Bloomer		85 - 90	80 - 85	0 - 2.5	5 - 10	-	89	122	15
Mrs J Timberlake		85 - 90	80 - 85	0 - 2.5	0 - 5	-	64	74	14
Dr S Wilson		85 - 90	80 - 85	0 - 2.5	10 - 15	41	143	185	9
Professor J Ludden		95 - 100	65 - 70	0 - 2.5	0 - 5	-	19	51	25
Professor N Owens	2	45 - 50	-	2.5 - 5	0 - 5	93	528	666	62

Notes
1 Professor Rapley left NERC on the 31 August 2007.
2 Professor Owens became Director of British Antarctic Survey on 1 September 2007.
3 The average annual earnings increase for senior employees (excluding Chief Executive) was 3%.
4 Cash Equivalent Transfer as at 01/04/07 or date of starting if later.
5 Cash Equivalent Transfer as at 31/03/08 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 the Civil Service (CS) Vote has received a transfer payment commensurate with the additional pension liabilities being assumed. They also include any additional pension benefit accrued to the member as a result of their purchasing additional years of pension service in the scheme at their own cost.

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

Remuneration of Council Members
Members of Council receive an Honorarium of £6,490 per annum to cover all work for the Council including membership of Council's Boards and Science Management Audits. The Chairman of Council, Mr Wallis, received a salary of £15,595. These rates are effective from 1 October 2006 and are formulated by the Department for Innovation, Universities and Skills.

Council members are normally employed on fixed term contracts not exceeding four 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 NERC Council (2007-08)

Name	Affiliation	Period of appointment	Total emoluments £'000		Note Ref
			2007-08	2006-07	
Mr E Wallis	Chairman	01 Jan 2007 - 31 Dec 2010	15 - 20	0 - 5	
Professor A Thorpe	Chief Executive and Deputy Chairman	01 Apr 2005 - 31 Mar 2009	0	0	1
Professor M Anderson	Professor of Physical Geography and Assistant Director, Institute for Advanced Studies, University of Bristol	01 Aug 2001 - 31 Jul 2007	0 - 5	5 - 10	2
Professor H Dalton	Chief Scientific Adviser (CSA), Department for the Environment, Food and Rural Affairs (Defra)	01 Apr 2002 - 30 Sept 2007	0	0	1,2
Professor H Davies	Institute of Atmospheric & Climate Science, EHT	01 Aug 2005 - 31 Jul 2008	5 - 10	5 - 10	
Professor T Davies	School of Environmental Sciences, University of East Anglia	01 Nov 2001 - 31 Jul 2008	5 - 10	5 - 10	
Professor A Fitter	Department of Biology, University of York	01 Aug 2005 - 31 Jul 2008	5 - 10	5 - 10	
Professor A Glover	School of Medical Sciences, University of Aberdeen, Chief Scientific Advisor for Scotland	01 Aug 2007 - 31 Jul 2010	5 - 10	5 - 10	
Professor A Halliday	Department of Earth Sciences, University of Oxford	22 Nov 2004 - 31 Jul 2008	5 - 10	5 - 10	
Mr P Hazell	Chairman of the Argent Group, Non-executive Director of UK Coal Plc, BRIT Insurance Plc, and Smith & Williamson, Member of the Competition Commission and Chair of Audit Committee	22 Nov 2004 - 31 Jul 2008	10 - 15	10 - 15	3
Mr E Jenner	Technology and business consultant, formerly of AstraZeneca Plc	01 Apr 2002 - 31 Jul 2008	5 - 10	10 - 15	
Mrs K Morgan	Vice Chairman of the Royal Agricultural College, Pro Chancellor of the Universtiy of West of England, Deputy Chairman of WaterAid	01 Aug 2002 - 31 Jul 2008	5 - 10	5 - 10	
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	0 - 5	
Professor J Mitchell	Chief Scientist, Met Office	10 Oct 2006 - 30 Sep 2010	0	0	1
Professor M Lockwood	Professor at the University of Southampton, Chief Scientist at the Rutherford Appleton Laboratory's Space Science Department	01 Mar 2007 - 31 Jul 2010	5 - 10	0	
Professor M Wilson	Pro-Dean for Research in the Faculty of Environment, University of Leeds	01 Mar 2007 - 31 Jul 2010	5 - 10	0 - 5	
Mr C Paynter	Chief Executive Officer of EADS Astrium Ltd	01 Mar 2007 - 30 Nov 2007	0	0	2
Professor T Meagher	Professor and Chair of Plant Biology at the University of St Andrews	01 Aug 2007 - 31 Jul 2010	0 - 5	0	
Professor R Watson	Chief Scientific Advisor to Defra	01 Dec 2007 - 01 Dec 2011	0	0	1

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 Anderson left on 31 July 2007, Professor Dalton left on 30 September 2007 and Mr Paynter left on the 30 November 2007.

3 Mr Hazell received standard Council member rate and additional remuneration in respect of activities undertaken as the Chair of the Audit Committee.

Professor Alan J Thorpe
Chief Executive & Accounting Officer
Date: 30 June 2008

Annual accounts 2007-08

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 Council is required to prepare a statement of accounts for each financial year in the form and on the basis directed by the Department for Innovation, Universities and Skills with approval of HM Treasury. The accounts are prepared on an accruals basis and must show a true and fair view of the Council's state of affairs at the year end and 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 judgments 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 the 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 on 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 2008 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 Information Systems (to be known as Director Finance and Operations with effect from 1 April 2008) 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 and Delivery Plan targets.

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 and laboratories. 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 Delivery Plan Targets. 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 / Delivery Plan Targets 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 achieving NERC Delivery Plan Targets.

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:

- Directors' 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 the NERC Health and Safety Adviser and Security Adviser. The network is chaired by the NERC Head of Finance on behalf of the Director Responsible for Risk and meets at least twice a year, ad hoc meetings may be convened to discuss and prepare advice on issues of urgency.

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 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: 30 June 2008

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

I certify that I have audited the financial statements of the Natural Environment Research Council for the year ended 31 March 2008 under the Science and Technology Act 1965. These comprise the Statement of Net Expenditure, the Balance Sheet, the Cash Flow Statement and 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 are responsible for preparing the Annual Report, the Remuneration Report and the financial statements in accordance with the Science and Technology Act 1965 and the Department 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 Department for Innovation, Universities and Skills directions made thereunder. I report to you whether, in my opinion, the information, which comprises the Management Commentary, given in 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 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. 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 Chief Executive 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 Secretary of State for the Department for Innovation, Universities and Skills, of the state of affairs of the Council as at 31 March 2008 and of its net expenditure 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 Secretary of State for the Department for Innovation, Universities and Skills; and
- information, which comprises the Management Commentary included in the Annual Report, is consistent with the financial statements.

Audit 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.

T J Burr
Comptroller and Auditor General
National Audit Office, 151 Buckingham Palace Road, Victoria, London, SWIW 9SS
Date: 8 July 2008

Statement of net expenditure for the year ended 31 March 2008

	Notes	**2008 £000**	2007 £000
Expenditure			
Staff costs	4(b)	**108,153**	107,318
Staff early retirements	5	**2,422**	1,577
Grants and training	6	**128,409**	113,068
Other operating costs	7	**139,382**	130,473
Depreciation	9(a)	**23,510**	20,611
Impairment of fixed assets	9(a)	**5,359**	286
Total expenditure		**407,235**	373,333
Income	3	**(48,337)**	(47,119)
Net operating costs		**358,898**	326,214
Notional cost of capital	13	**8,933**	7,686
CEH restructuring	12	**(2,269)**	958
Finance lease interest		**1,320**	1,401
Interest receivable	8	**(56)**	(137)
Unwinding of discount	12	**650**	476
Profit on disposal of fixed assets		**(1,928)**	(2,629)
Net expenditure for the year	14	**365,548**	333,969

Accumulated Income and Expenditure Reserves are shown at note 14.

All activities are continuing.

The notes on pages 60-72 form part of these accounts.

Balance sheet as at 31 March 2008

	Notes		**31 March 2008**		31 March 2007
		£000	**£000**	£000	£000
Fixed assets					
Tangible assets	9	**333,444**		297,387	
Investments	9 (c)	**47**		44	
			333,491		297,431
Current assets					
Debtors	10	**40,643**		36,436	
Cash at bank and in hand		**8,872**		16,214	
		49,515		52,650	
Current liabilities					
Creditors falling due within one year	11 (a)	**(60,707)**		(52,744)	
Net current liabilities			**(11,192)**		(94)
Total assets less current liabilities			**322,299**		297,337
Creditors falling due after more than one year	11 (b)		**(16,767)**		(16,078)
Provisions for liabilities and charges	12		**(24,731)**		(34,131)
Net assets			**280,801**		247,128
Capital and reserves					
Government Grant Reserve	14		**3,313**		3,059
Revaluation Reserve	14		**97,200**		73,111
Accumulated Income and Expenditure Account	14		**179,980**		170,600
Donated Asset Reserve	14		**308**		358
Total Government Funds	14		**280,801**		247,128

The notes on pages 60-72 form part of these accounts.

Professor Alan J Thorpe
Chief Executive & Accounting Officer
Date: 30 June 2008

Cash flow statement for the year ended 31 March 2008

	Notes		**2008**		2007
		£000	**£000**	£000	£000
Net cash outflow from operating activities	15		**(332,844)**		(304,123)
Returns on investments and servicing of finance					
Interest received	8	**56**		137	
Interest element of finance lease payments		**(1,320)**		(1,401)	
			(1,264)		(1,264)
Capital expenditure					
Payments to acquire tangible fixed assets		**(36,950)**		(36,772)	
Receipts from disposal of tangible fixed assets		**2,998**		2,898	
			(33,952)		(33,874)
Net cash outflow before financing			**(368,060)**		(339,261)
Financing					
Grant-in-Aid received	2	**353,555**		340,630	
Funding received from other bodies		**8,177**		5,137	
Capital element of finance lease payments		**(1,014)**		(932)	
			360,718		344,835
(Decrease)/Increase in cash	16		**(7,342)**		5,574

Statement of recognised gains and losses for the year ended 31 March 2008

	2008	2007
	£000	£000
Net expenditure for the year	**(365,548)**	(333,969)
Impairment of assets recorded through Revaluation Reserve	**(4,530)**	(26)
Gain on revaluation of fixed assets	**32,882**	17,193
Recognised gains and losses during the year	**(337,196)**	(316,802)

The notes on pages 60-72 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 SAVP and RICS guidance notes. 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, MRICS in 2006/07.

RRS *James Clark Ross* and RRS *Ernest Shackleton* were revalued in 2006/07 by Mr Bruce Buchan M.A., F.C.I.Arb. The aircraft were also valued in 2006/07 by the International Bureau of Aviation Group Limited. RRS *Discovery* was independently and professionally revalued by Mr Bruce Buchan M.A., F.C.I.Arb in 2005/06.

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 assets less their estimated residual values over their estimated useful economic lives using straight-line 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 depreciated replacement cost
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
Personal computers	-	3 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 belong to the Institution and are 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 costs 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 costs 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 1.8% (2006/07: 2.8%). 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 (2006/07: 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 1.8% 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.

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 2007/08 (see note 14):

	2008 £000	2007 £000
Grant-in-Aid received	**353,555**	340,630
Funding received from other bodies	**8,177**	5,137
Total	**361,732**	345,767

3. Income

	2008 £000	2007 £000
(a) Income from Government departments		
Department for Environment Food and Rural Affairs	4,995	3,067
Department of Business Enterprise & Regulatory Reform	858	644
Ministry of Defence	269	-
Department for International Development	885	1,617
Environment Agency	1,004	2,783
Department of Enterprise, Trade and Investment Northern Ireland	1,190	2,959
Foreign and Commonwealth Office	988	-
Department for Communities and Local Government	402	-
Other Departments (i)	2,651	691
Total Income from Government departments	**13,242**	11,761
(b) Income from Other Bodies		
European Community	3,490	3,108
Other Research Councils	1,308	1,872
Other Public Sector	3,088	2,693
Private Sector	12,307	14,471
Total income from other bodies	**20,193**	22,144

	2008 £000	2007 £000
(c) Other operating income		
Software and data sales	2,041	2,624
Scientific publications	472	458
Library and administrative services	1,189	1,108
Property and equipment rentals	1,675	1,034
Sales of products	76	80
Lecture fees, seminars and training courses	144	267
Promotional items	306	296
Royalties and licence fees from intellectual property	2,768	1,987
Reimbursement of expenditure	3,406	3,088
Other income	2,307	1,732
Total other operating income	**14,384**	12,674
(d) Release of Government Grant Reserve	518	540
Total income	**48,337**	47,119

(i) Other Government Departments include Met Office £1.6m and Joint Nature Conservation Committee £0.4m.

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:

	2008 No.	2007 No.
Administrative	604	648
Scientific	1,260	1,299
Professional and Technical	376	371
Marine and Antarctic Contract	266	266
Staff on inward secondment/loan	3	4
Agency/temporary and contract staff	126	101
	2,635	2,689

Note: The total number of staff reported in the Annual Report are calculated based on head count as at 31 March 2008, whereas the above figures are average FTE's for the year.

Staff numbers that have been capitalised during the year have been estimated as 11.4 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. The total amount capitalised for staff costs in 2007/08 is £626,322 (2006/07: £707,000).

(b) Staff costs

	2008 £000	2007 £000
Salaries and wages	84,965	84,273
Social Security costs	6,690	6,840
Other pension costs (note 4d)	16,498	16,205
	108,153	107,318

In 2007/08 staff on secondment/loan/temporary and contract staff totals £5,316,079 (2006/07: £4,164,000) and are included in the figures above. Agency costs of £1,527,622 (2006/07: £851,000) have been included in operating costs.

(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.

	2008 £000	2007 £000
Council Members' fees	113	103
Committee Members'/Peer Review	300	289
Other emoluments	108	78
	521	470

Committee members may receive £160 (2006/07: £160) per day.

Committee Chairman may receive £215 (2006/07: £215) per day.

British Geological Survey Programme Board members receive £3,000 per annum (2006/07: £3,000).

British Geological Survey Programme Board Chairman receives £4,000 per annum (2006/07: £4,000).

British Antarctic Survey Independent Board members receive £5,000 per annum (2006/07: £5,000).

Chairmen of Boards of Council receive £8,540, £8,750 with effect from 1/10/07 (2006/07: £8,540).

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

	2008	2007
	No.	No.
Council Members*	15	16
Committee/Peer Review College and Board Members	366	305
	381	321

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

	2008	2007
	No.	No.
£0 to £5,000	368	311
£5,001 to £10,000	11	8
£10,001 to £15,000	1	2
£15,001 to £20,000	1	-
	381	321

** includes Chief Executive and Chairman*

(d) Superannuation

Pension scheme payments

	2008	2007
	£000	£000
Payments in respect of the Research Councils' Pension Scheme (RCPS)	15,947	16,175
Payments to pension schemes other than the RCPS:-		
Merchant Navy Officers' Pension Fund	409	115
Merchant Navy Officers' Pension Plan	5	6
Merchant Navy Ratings' Pension Fund	-	(207)
Merchant Navy Ratings' Pension Plan	5	5
Partnership Pensions	132	111
	16,498	16,205

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 current contribution rate is based on an assessment for the year ending 2001/02. An actuarial valuation for the scheme was carried out on 31 March 2002 and reported a required increase from 10.1% to 21.3% effective from 1 April 2005. NERC paid costs in the year of £15,946,937. A new actuarial valuation is being undertaken during 2008.

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%	2005
Merchant Navy Ratings' Pension Plan	5.1%	2000

^ No current liability outstanding.

** The Merchant Navy Ratings' Pension Fund closed on 31 May 2001. This Fund has a deficit, the liability for which is shared between members' employing organisations. We currently hold a provision for our share amounting to £702,000. This relates to the additional liability arising from the withdrawal of one of the voluntary contributors. A legal challenge has been made by one of the compulsory employers contesting the legality of the voluntary contributor withdrawing from the scheme, and payment of the additional liability is therefore dependant upon the ruling on the case. On closure of the fund members transferred to the RCPS or the new Merchant Navy Ratings' Pension plan which is a money purchase scheme. 2% of the residual employer's contributions are still paid to the closed scheme for members who opted for section 148 revaluation of accrued pension.*

5. Staff restructuring/early retirements

	2008 £000	2007 £000
Annual Compensation Payments	9	844
Redundancy Compensation Payments	484	229
Early Retirement Lump Sums	735	461
Provision for Early Retirement Liability (Note 12)	1,999	687
Recoverable Early Retirement Lump Sums	(805)	(644)
	2,422	1,577

6. Grants and training

	2008 £000	2007 £000
(a) Research grants - analysis by scientific area		
Atmospheric Science	16,254	12,923
Earth Science	9,665	8,787
Marine Science	12,696	10,405
Terrestrial and Freshwater Science	22,777	19,125
	61,392	51,240
(b) Research contracts - analysis by scientific area		
Atmospheric Science	10,323	9,578
Earth Science	4,062	2,544
Earth Observation Science	4,014	3,947
Marine Science	4,391	6,019
Terrestrial and Freshwater Science	4,000	1,318
Scientific Services	6,067	8,207
	32,857	31,613
(c) Post-graduate training awards		
Research Masters	4,003	3,740
Research Studentships	23,041	21,550
Research Fellowships	7,116	4,925
	34,160	30,215
Total grants and training awards	**128,409**	113,068

7. Other Operating Costs

	Note	2008 £000	2007 £000
Rent and rates		2,884	3,086
Maintenance, cleaning, heating and lighting		5,595	8,802
Office supplies, printing and stationery		4,276	2,922
Laboratory supplies, computing and field equipment		15,019	13,465
Postage, telephone and other telecommunications		1,489	1,467
Hospitality		657	680
Audit fee		54	58
Travel and subsistence		9,053	8,422
Ships and aircraft operations		10,525	10,298
External training		1,206	1,285
Professional and research services by outside bodies	(i)	88,629	79,934
Operating leases		4	119
Decrease in provision for bad debt		(9)	(65)
		139,382	130,473

Note:
(i) The cost for professional and research services by outside Bodies includes international subscriptions of £49m, bought in services of £25m and other services including consultancy, advertising, waste disposal and medical/legal costs.
NERC was the host Council for the Joint Training Section and also host to the Research Councils' Procurement Organisation. The total operating expenses for these services are included within the Other Operating Costs above. The contributions from other Councils, which exclude any RCPO and JTS staff costs met directly by each Council, were £945,048 (2006/07: £764,159). These receipts are included under Other Operating Income at note 3c.

8. Interest receivable

	2008 £000	2007 £000
Interest on bank balances	**56**	137

9(a). Tangible fixed assets

Cost or Valuation	Land, buildings and Antarctic stations (i) & (iv)	Plant and equipment (v) & (vi)	Ships and aircraft (iii)	Motor vehicles (ii)	Total
	£000	**£000**	**£000**	**£000**	**£000**
At 1 April 2007	280,104	96,392	161,553	7,452	545,501
Additions	19,027	14,335	2,866	722	36,950
Revaluation	26,246	2,610	4,958	(51)	33,763
Disposals	(2,192)	(4,906)	-	(337)	(7,435)
Impairment	(10,268)	-	-	-	(10,268)
At 31 March 2008	312,917	108,431	169,377	7,786	598,511
Depreciation					
At 1 April 2007	104,416	61,628	77,030	5,040	248,114
Charge for the year	5,607	11,182	5,786	935	23,510
Revaluation	-	-	-	-	-
Disposals	(1,191)	(4,663)	-	(324)	(6,178)
Impairment	(379)	-	-	-	(379)
At 31 March 2008	108,453	68,147	82,816	5,651	265,067
Net Book Value At 31 March 2008	**204,464**	**40,284**	**86,561**	**2,135**	**333,444**
At 1 April 2007	175,688	34,764	84,523	2,412	297,387

Notes:
(i) Cost / Valuation includes £18,393,278 in respect of Freehold Land which is not depreciated (2006/07: £14,278,252).
(ii) Including specialised Antarctic Vehicles.
(iii) The NBV of the leased ship is £22,424,234 (2006/07: £23,286,947). The annual depreciation charge on this asset held under the finance lease was £1,971,735 for the year (2006/07: £1,882,045).
(iv) The impairment cost of £5,358,802 in the Statement of Net Expenditure relates to the impairment following a professional revalution of Land and Buildings. In accordance with FRS11 the net balance of £4,530,198 has been debited to the revaluation reserve and has been included in the Statement of Recognised Gains and Losses.
(v) Includes donated assets with a value of £308,309 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 £3,224,471 of the Shared Services Centre currently being developed by the seven Research Councils.

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

	2008 £000
Freehold	48,625
Long leasehold	106,965
Short leasehold	560
Antarctic stations	15,192
Under construction	33.122
Total Net Book Value	**204,464**

9(c). Fixed Asset Investments

	2008 £000
Valuation as at 1 April 2007	44
Revaluation in the year	3
Valuation as at 31 March 2008	**47**

Notes :
The Council holds 252,000 shares in Evolutec Group PLC, a company engaged in the commercial development of NERC inventions and know-how. This equity provision was received in return for company access to NERC intellectual property. The shares are publicly traded on the Alternative Investment Market of the London Stock Exchange and had a current open market value of 18.75 pence per share at 31 March 2008. NERC's shareholding represented 0.97% of the issued capital of Evolutec Group PLC at 31 March 2008.

9(d) Other investments

	2008 £	2007 £
Other investments	**1**	-

During the year the Council acquired one 'A' ordinary share of £1 in the RCUK Shared Services Centre Limited (RCUK SSC Limited). Each of the seven Research Councils acquired one share and are all joint investors in the project. RCUK SSC Limited was incorporated on 1 August 2007 and has commenced setting up the Shared Services Centre. For the period ended 31 March 2008 the draft financial statements of RCUK Shared Services Centre Limited shows revenue of £1,225,593 and administration costs of £1,225,593 with a nil profit/loss result. The balance sheet totals are £7 from share capital issued to the Research Councils and £7 cash.

The investment has been classified as 'other investment' as each Council's individual share is 14%.

10. Debtors

	£000	2008 £000	£000	2007 £000
(a) Amounts falling due within one year:				
Trade Debtors		4,693		5,103
Intra Government				
Central Government bodies	5,531		4,426	
Local Authorities	205		102	
		5,736		4,528
Other Debtors		4,930		4,730
Early Retirement lump sum repayments		1,352		1,444
Pre-payments		13,490		10,747
Accrued Income		6,560		6,092
Provision for bad debts		(139)		(148)
		36,622		32,496
(b) Amounts falling due after one year:				
Early Retirement costs in respect of former employees due from Pension Fund on normal retirement date.		**4,021**		3,940
Total Debtors		**40,643**		36,436

11. Creditors

		2008		2007
	£000	£000	£000	£000
(a) Amounts falling due within one year:				
Trade Creditors		4,795		5,028
Intra Government				
Central Government bodies	192		458	
Local Authorities	227		1,036	
		419		1,494
Taxation & Social Security		1,175		15
Other Creditors		18,943		19,352
Early Retirements		1,762		1,604
Accruals & Deferred Income		31,413		21,916
Obligation under finance leases		1,101		1,013
Monies held on behalf of EC Programme Collaborators		1,099		2,322
		60,707		52,744
(b) Amounts falling due after more than one year:				
Obligation under finance leases	14,208		15,310	
CEH Early Retirements	2,559		768	
		16,767		16,078
Total Creditors		**77,474**		68,822

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 2007 [1]	8,404	-	4,035	3,908	17,784	34,131
Change in discount rate	-	-	104	-	-	104
Write back of provisions not required	-	-	(71)	(794)	(2,355)	(3,220)
Amounts provided in year	313	788	1,999	312	86	3,498
Unwinding of discount	185	-	93	92	280	650
Provision utilised in year	(1,073)	-	(2,607)	(914)	(5,838)	(10,432)
Provision at 31 March 2008	**7,829**	**788**	**3,553**	**2,604**	**9,957**	**24,731**

Notes :

1. *The discount rate used is 1.8% for pension provisions and 2.2% for all other provisions (2006-07: 2.8% 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 includes 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 Services Centre to carry out the central functions of Human Resources, Finance, Procurement and Information Technology across the Councils. As a result some Research Councils 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 2007-08 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 2008. 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.*

	AHRC	BBSRC	ESRC	EPSRC	MRC	NERC	STFC	Total
	£000	£000	£000	£000	£000	£000	£000	£000
Provision required for the Council's own redundancies	68	152	-	-	999	1,620	-	2,839
System termination fee	-	-	-	-	1,000	-	-	1,000
Total provision	**68**	**152**	**-**	**-**	**1,999**	**1,620**	**-**	**3,839**
% of liability to be borne by the Council	1.33%	20.54%	1.83%	8.24%	26.98%	20.54%	20.54%	100.00%
Amount borne by the Council	(1)	(31)	-	-	(540)	(333)	-	(905)
Contributions towards Councils redundancy and system termination provision received from/provided to other Councils	(16)	668	70	316	(423)	(499)	789	905
Net provision required for each Council	**51**	**789**	**70**	**316**	**1,036**	**788**	**789**	**3,839**

Further costs may be incurred in future years.

13. Notional cost of capital

	2008 £000	2007 £000
Notional cost of capital	8,933	7,686

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

14. Government funds

	Government Grant Reserve [2] £000	Accumulated Income & Expenditure Reserve £000	Revaluation Reserve £000	Donated Asset Reserves [1] £000	Total Government Funds £000
Balance at 1 April 2007	3,059	170,600	73,111	358	247,128
Grant-in-Aid received	-	353,555	-	-	353,555
Funding Received from Other Bodies	-	8,177	-	-	8,177
Revaluation in year	722	-	32,882	-	33,604
Impairment of fixed assets	-	-	(4,530)	-	(4,530)
Reversal of notional cost of capital	-	8,933	-	-	8,933
Expenditure for year	-	(365,548)	-	-	(365,548)
Release to Net Expenditure	(468)	-	-	(50)	(518)
Transfer between reserves	-	4,263	(4,263)	-	-
Balance at 31 March 2008	**3,313**	**179,980**	**97,200**	**308**	**280,801**

Notes:

1. *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. All capital Grant-in-Aid received in previous periods and credited to the Government Grant Reserve was received for general capital purchases and has therefore been transferred to the Income and Expenditure Reserve via a prior year adjustment.*
2. *The Government Grant Reserve relates to assets transferred from Southampton University to NOCS. Two of the assets have been revalued in 2007-08. The reserve will be released to the Statement of Net Expenditure over the asset lives to match depreciation.*

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

	2008 £000	2007 £000
Net operating expenditure	(358,898)	(326,214)
Depreciation charge	23,510	20,611
Release from Government Grant Reserve	(468)	(540)
Impairment charged to Statement of Net Expenditure	5,359	286
Decrease in provisions	(7,781)	(2,902)
Increase in debtors	(4,207)	(3,522)
Increase in creditors	9,641	8,158
Net cash outflow from operating activities	(332,844)	(304,123)

16. Reconciliation of movements in cash to movements in net debt

	2008 £000	2007 £000
(Decrease)/Increase in cash	(7,342)	5,574
Capital element of finance lease payment	1,014	932
Change in net debt resulting from cash flows	(6,328)	6,506
Net debt at 1 April	(109)	(6,615)
Net debt at 31 March	(6,437)	(109)

Analysis of net debt

	At 1 April 2007 £000	Cash Flows £000	At 31 March 2008 £000
Cash at bank	16,214	(7,342)	8,872*
Finance Lease	(16,323)	1,014	(15,309)
	(109)	(6,328)	(6,437)

*Note * Figure includes £5,529,807 which relates to balance held at Office of Paymaster General as at 31 March 2008 (2007: £11,325,268).*

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

	2008 £000
2008-2009	132,383
2009-2010	80,402
2010-2011	47,877
2011-2012	12,922
2012-2013	2,554
2013-2014	234
	276,372

18. Amounts payable under finance lease obligations

	2008 £000	2007 £000
Within one year	1,101	1,013
Within two to five years	5,444	5,011
Greater than five years	8,764	10,299
	15,309	16,323

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).

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 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 and the Arts and Humanities Research Council.

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 DIUS. In addition NERC has had various material transactions with other Government departments and other central Government bodies.

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

Council Member	Number of Awards or Contracts	Amount £
Professor A Fitter	2	199,062

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	Number of Awards or Contracts	Amount £000
Mrs K Morgan	Plymouth Marine Laboratory	32	819
	University of the West of England	2	82
Professor A Glover	University of Aberdeen	35	2,109
Professor T Davies	University of East Anglia	77	3,095
Professor A Halliday	University of Oxford	80	3,145
Professor A Thorpe	University of Reading	65	3,130
Professor A Fitter	University of York	41	1,491
Professor M Lockwood	University of Southampton	48	2,155
	STFC	14	260
Professor M Wilson	University of Leeds	96	4,351
Professor T Meagher	University of St Andrews	27	1,128

20. Losses and special payments

During the year there were 48 losses totalling £49,505 including two compensation payments totalling £8,313.

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 2008 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. The shares are not publicly traded and currently have no open market value. At 31 March 2008 NERC's shareholding represented 0.25% 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 2008 NERC's shareholding represented 19.94% of the issued share capital of Microbial Solutions Ltd; and

1,000,000 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 2008 NERC's shareholding represented 14.10% 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 £27,385,000 in respect of capital contracts. This includes the building of the Antarctic base Halley VI for £13,349,000 due to be completed in 2010/11, the William Smith Building in BGS Keyworth for £7,617,000 due to be completed in 2009/10 and the NERC share of the Shared Services Centre development of £4,930,000. It is anticipated that the remaining capital contracts will be completed in 2008/09.

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 2008 have been recognised through the Statement of Net Expenditure account and the SSC Assets in the Course of Construction.

Lease Commitments

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

	2008	2007
	£000	£000
Operating leases which expire		
- in under 1 year	3	21
- in two to five years	-	3

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 £1,296,560 at 31 March 2008 (2006-07: £674,612).

23. Contingent liabilities

There are no outstanding contingent liabilities at this time.

24. Post balance sheet events

FRS 21 Events after the Balance Sheet Date requires the disclosure of the date on which the financial statements were "authorised for issue" and who gave that authorisation. The financial statements were authorised for issue on 8 July 2008 by Professor Alan J Thorpe. There have been no events after the balance sheet date requiring an adjustment to the financial statements.

25. Financial instruments

Financial Reporting Standard Number 13, Derivatives and Other Financial Instruments, requires 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 13 mainly applies. 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 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 not therefore 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 the Department for Innovation, Universities and Skills.

Printed in the UK for The Stationery Office Limited
on behalf of the Controller of Her Majesty's Stationery Office
ID5837541 07/08

Printed on Paper containing 75% recycled fibre content minimum.

Produced by the Natural Environment Research Council.

Editor: Owen Gaffney. Designer: Candy Sorrell.

Front cover picture: iStockphoto.com/nasa

Printed by Beacon Press on Revive 100 Uncoated, a recycled grade, containing 100% post consumer waste and manufactured at a mill accredited with ISO 14001 environmental management standard. The pulp used in this product is bleached using an Elemental Chlorine Free process (ECF).

NATURAL ENVIRONMENT RESEARCH COUNCIL

Natural Environment Research Council
Polaris House, North Star Avenue, Swindon, SN2 1EU, Wiltshire, UK.

Tel: 01793 411500
Fax: 01793 411501
www.nerc.ac.uk

TSO
information & publishing solutions

Published by TSO (The Stationery Office) and available from:

Online
www.tsoshop.co.uk

Mail, Telephone Fax & E-Mail
TSO
PO Box 29, Norwich, NR3 1GN
Telephone orders/General enquiries 0870 600 5522
Order through the Parliamentary Hotline Lo-Call 0845 7 023474
Fax orders: 0870 600 5533
E-mail: customer.services@tso.co.uk
Textphone: 0870 240 3701

TSO Shops
16 Arthur Street, Belfast BT1 4GD
028 9023 8451 Fax 028 9023 5401
71 Lothian Road, Edinburgh EH3 9AZ
0870 606 5566 Fax 0870 606 5588

The Parliamentary Bookshop
12 Bridge Street, Parliament Square,
London SW1A 2JX

TSO@Blackwell and other Accredited Agents
and from the **Natural Environment Research Council** *Email requests@nerc.ac.uk*

ISBN 978-0-70-295579-8
9 780102 955798