Refreshing the strategy: 2010 update (June 2010)

Strategic Objective 1
Strategic partnerships and collaboration to deliver world-leading research and knowledge exchange that addresses the key environmental science priorities identified by NERC strategy

Scope
Strategic partnerships: with UK, European and international public policy users (including developing nations) and with private business users. Collaboration: through multi- and inter-disciplinary collaboration and cross-organisational working to enable organisations and researchers to work together and with user communities.

Challenges	
1.1	Influence the strategic priorities of other UK, European and international research organisations, funders, users and business to create opportunities for partnership and leverage in environmental research, monitoring and infrastructure
1.2	Enable the environmental science community to prioritise collaboration across the UK, Europe and internationally to deliver UK and NERC strategic priorities

Strategic Objective 2
Deliver impact from NERC-funded research, data and information by driving knowledge exchange between researchers and users

Scope
Engagement for knowledge exchange with the public sector, business, third sector, public, and within the research community, through a range of activities and mechanisms. Demonstrating how NERC-funded activity is used to deliver impact (in its broadest sense: including economic, policy and societal impact).

Challenges	
2.1	Strengthen engagement with business, the public sector and the voluntary sector to achieve impact through knowledge exchange
2.2	Strengthen public engagement with research
2.3	Ensure that society and the science community benefit from NERC's data and information holdings.

Strategic Objective 3
Build effective working relationships with HM Government so that the value of public investment in NERC science is recognised and prioritised.

Scope
Main focus on NERC's parent department (BIS) plus HM Treasury. Broader working with all influencers of public investment in science (e.g. other government departments and devolved administrations, advisors, RCUK, NGOs, business champions, learned societies, science community, public).

Challenges	
3.1	Promote the "excellence with impact" of RCUK science so that public investment in the research base is demonstrated to be essential for the UK economy
3.2	Promote the value and impact of NERC research in a RCUK context – directly to Government and indirectly through key influencers – so that environmental science, and public investment in it, is recognised as a strategic priority for the UK
3.3	Build and maintain effective working relationships with BIS

Strategic Objective 4
Ensure that NERC science strategy as a whole is coherent and balanced, to deliver a healthy UK environmental science base, excellent science and impact

Scope
Ensures that the overall NERC science strategy is greater than the sum of its separate science objectives. Encompasses all four NERC research activities and funding streams: national capability, research programme, responsive mode and knowledge exchange.

Challenges	
4.1	Meet BIS goals for an excellent UK environmental science base
4.2	Through RCUK and other partners, align strategic priorities to optimise the delivery of UK grand challenges and impact
4.3	Optimise the balance of investment across NERC funding streams: national capability (NC); research programme (RP); responsive mode (RM); knowledge exchange (KE)
4.4	Through strategic and investment planning processes, optimise cross-linkages between funding streams and between science themes

Strategic Objective 5
<u>Climate system theme</u> Develop risk-based predictions of the future state of the climate on regional and local scales, from days to decades.

Scope
In the global context, and in partnership with others, NERC will play a leading role in observation, understanding and risk-based prediction of the climate system – on regional and local scales, spanning days to decades, and under different scenarios of future anthropogenic forcing – enabling society to build future mitigation and adaptation strategies.

Challenges	
5.1	Develop high resolution regional scale predictions for decision making.
5.2	Enable society to develop mitigation and adaptation strategies through climate science.
5.3	Improve and expand observations to validate climate change detection and prediction.
5.4	Increase knowledge of the physical, chemical and biological feedback processes.
5.5	Improve understanding and modelling of key processes determining the sensitivity of the climate system.
5.6	Improve understanding of natural variability and the link with climate change.
5.7	Improve understanding of the changing water cycle and how it will affect water availability and quality.
5.8	Assess the climatic implications of geo-engineering to intentionally alter and manage the global carbon cycle and/or climate system.

Strategic Objective 6
Biodiversity theme Understand the role of biodiversity in key ecosystem processes

Scope
The huge variety of life provides a multitude of services from providing food and fuel, purifying water, regulating climate, disposing of waste to less tangible benefits that inspire people. This theme aims to understand the role of biodiversity in key ecosystem processes. Environmental change makes this research more pressing because it can lead to loss of biodiversity, associated ecosystems services and the resilience of ecosystems to change.

Challenges	
6.1	Improve understanding of how biodiversity affects the resilience of different ecosystems in the face of environmental change.
6.2	Enable society to predict and mitigate effects of biodiversity change on processes and services that sustain life.
6.3	Develop integrated tools for assessing the value and benefits of biodiversity and associated services, from very small to very large scales and across different ecosystems.
6.4	Develop new approaches and technologies to describe, understand and quantify biodiversity and associated functions.

Strategic Objective 7
Sustainable use of natural resources theme Provide the science to optimise the use of renewable and non-renewable natural resources whilst living within the Earth's environmental limits.

Scope
The global demand for natural resources continues to grow. Society needs better knowledge of how environmental resources - non-renewable (e.g. minerals, fossil fuels) and renewable - can contribute to a sustainable economy, with secure supplies of food, water and energy, whilst managing resource use within the Earth's environmental limits.

Challenges	
7.1	Extending the resource base.
7.2	Meeting the renewables challenge.
7.3	Sustaining water and soil life support systems.
7.4	Valuing environmental services comprehensively.

Strategic Objective 8
Earth system science theme Increase knowledge of the drivers and feedbacks in the Earth system from its core to the upper atmosphere.

Scope
To understand the whole Earth system, and how its components affect each other at present and over geological time. This will inform all other themes and the management of the environment in the face of current global change pressures. This theme addresses two broad areas: A) biogeochemical (including rock and sediment) fluxes and feedbacks in the cryosphere / ocean / atmosphere / Earth surface system; B) processes that created the crust / mantle / core system, control its continued evolution and govern its interaction with surface biogeochemical processes (A above).

Challenges	
8.1	Understand the biogeochemical forces and feedbacks that drive the Earth system.
8.2	Understand the long-term development of the Earth and its habitability.

Strategic Objective 9
Natural hazards theme Increase knowledge to improve the forecasting and mitigation of natural hazards.

Scope
Since 1990 over 1 million people have died in natural disasters and over £1 trillion of economic losses have been reported. NERC has a leading role to play in the science of forecasting and mitigating the risks of natural hazards in the geophysical environment, such as earthquakes, volcanoes, flooding, storms, tsunamis, coastal erosion and landslides. Scientific advances will lead to tangible economic and humanitarian benefits.

Challenges	
9.1	Enable better forecasting and mitigation of the risks of hydro-meteorological hazards.
9.2	Enable better forecasting and mitigation of the risks of geo-hazards.

Strategic Objective 10
Environment, pollution and human health theme Provide science to reduce damaging health effects of pollutants and pathogens.

Scope
The behaviour of pollutants and pathogens and their movement and reactions in the environment are often poorly understood. As the environment changes, so the behaviour of pollutants and pathogens will also change in different and complex ways. This theme will provide: (i) new approaches to predicting the future behaviour of pollutants and pathogens; (ii) solutions to issues such as the spread of infectious disease and human exposure to pollutants through water, soil and air.

Challenges	
10.1	Improve measurement and monitoring of the distribution of pollutant and pathogens at required time and space scales.
10.2	Improve knowledge of processes and models of the dynamics of transport and transformation of pollutants and pathogens in the environment.
10.3	Improve assessments of pollutant and pathogen exposure and risk to humans
10.4	Understand the impacts of waste management activities on the environment and human health.

Strategic Objective 11
Technologies theme Develop the tools and technologies needed for cutting-edge environmental science.

Scope
Technology will play an essential role in enabling solutions to this century's most pressing environmental challenges. Technologies are used to observe and monitor the environment, provide sophisticated models of environmental processes to predict the future state of the environment and to assess the effectiveness and impact of mitigation solutions. New technologies will help us to improve data collection and quality whilst reducing measurement uncertainties and costs. This theme aims to develop people and a culture of effective technological innovation throughout environmental science.

Challenges	
11.1	Improve remote sensing instruments, their reliability and the platforms that carry them.
11.2	Create a framework for NERC technology development.
11.3	Deploy field sensors that work independently.
11.4	Deploy novel laboratory/analysis instruments in critical fields (e.g. genomics and proteomics).
11.5	Make use of the latest developments in computing power, architecture and tools for exploiting large and complex scientific data sets.

Strategic Objective 12
Responsive funding Support excellent research to sustain the UK's position as a world leader in environmental sciences.

Scope
Responsive mode (RM) supports excellent research in response to unsolicited ideas in any area relevant to NERC's remit. It embraces the full spectrum of research drivers and approaches, including pure, applied, policy-driven, technology-led, adventurous, collaborative and multi- or inter-disciplinary research.

Challenges	
12.1	Encourage and value the full spectrum of research drivers and approaches (see scope).
12.2	Provide a mix of RM schemes, and balance of funding between them, to sustain the UK position as a world leader.
12.3	Manage demand and success rates to provide incentive to attract excellent research proposals from the best scientists.
12.4	Improve the identification and selection of the best proposals.
12.5	Ensure RM outcomes can inform the next generation of strategic priorities.
12.6	Recognise and promote the outcomes, impacts and potential benefits of responsive funding.

Strategic Objective 13
Ensure that NERC national capability meets the needs of current and future strategy priorities.

Scope
Covers the full range of National Capability (NC) activities, research facilities and infrastructure (as defined in the NERC funding definitions and guidance document). Supports research programme and responsive mode, and the delivery of excellence and impact and national good.

Challenges	
13.1	Work with UK, European and international partners to plan and deliver shared NC
13.2	Build the NC Action Plan process to identify future strategic requirements and priorities for integrated NC and asset management
13.3	Build a process to deliver NC Action Plan priorities, including mechanisms for initiating, adjusting or sunsetting long term NC activities
13.4	Ensure that NC provision is widely available to, and proactively supports, the whole NERC community in a transparent way

Strategic Objective 14
Ensure skilled people to deliver current and future science priorities

Scope
The right quality and quantity of skilled people are available within the environmental sciences community

Challenges	
14.1	Encourage greater flexibility in our people resource including NERC Staff and the environmental science community.
14.2	Attract and develop the best people for NERC, for the environmental science community and for the wider economy.
14.3	Determine and respond to NERC and the UK's training needs and priorities to address future skills gaps.
14.4	Strengthen the role NERC plays in encouraging people of all ages into environmental science.

Strategic Objective 15
Run a forward-looking organisation that is efficient, effective and flexible, underpinned by sound governance and risk management.

Scope
NERC planning and delivery operations, including business processes and structures needed to deliver the strategy (i.e: governance; strategic planning and performance management; funding delivery and peer review; SSC; HR and communications; finance; Gershon efficiencies; estates; IT & IS; environmental management; health & safety; risk management).

Challenges	
15.1	Ensure financial sustainability of NERC
15.2	Continue embedding the new strategic planning, delivery and funding processes through transition to full operation
15.3	Align the role and funding of Centres to ensure sustainability
15.4	Increase effectiveness and efficiency, so that NERC can deliver more science for less cost, including efficiencies in support services and systems through SSC
15.5	Deliver improved infrastructural capability to support science delivery
15.6	Build better working systems across the NERC family
15.7	Ensure NERC's strategic risk management processes safeguard NERC business and resources whilst providing incentive for novel approaches to strategy delivery
15.8	Achieve timely delivery of investment from Action Plan approval to actual payment

Issues to address at next refresh

Variable number of challenges per objective: need more consistency of focus and deliverability?

Variable kinds of challenge: need more consistency?

- Some are clear, deliverable, measurable objectives
- Some are aspirational
- Some start “increase knowledge and understanding of…”

Science theme challenges capture scientific need and impact: do they adequately capture user (business and policy) needs, and hence drive wider impact?

Earth oriented solar terrestrial physics is new to the NERC remit and is covered by RM… does this area need to be acknowledged in the strategy as a science priority?

Clarify ESS / Climate / Biodiversity theme boundaries

Rationalise / reduce the number of challenges in the Climate theme

Review RM challenges in light of the evaluation of RM excellence and impact, and whether RM informs future strategy priorities