



House of Commons
Science and Technology
Committee

The Work of the Natural Environment Research Council

Fifth Report of Session 2002–03



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*Report, together with formal minutes, oral and
written evidence*

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The Science and Technology Committee

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Committee staff

The current staff of the Committee are Chris Shaw (Clerk), Nerys Welfoot (Second Clerk), Alun Roberts (Committee Specialist); Ana Ferreira (Committee Assistant) and Simali Shah (Committee Secretary)

Contacts

All correspondence should be addressed to The Clerk of the Science and Technology Committee, Committee Office, 7 Millbank, London SW1P 3JA. The telephone number for general inquiries is: 020-7219-2794; the Committee's e-mail address is: scitechcom@parliament.uk .

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Summary

This inquiry forms part of the Committee's rolling programme of scrutiny of all the seven Research Councils. The Committee sought to examine the administration, strategy and policy of the Natural Environment Research Council (NERC), and to inquire into the reasons for the cancellation of the standard research grant round in July 2002.

We encountered widespread support for the science priorities identified in the Five Year Strategy published by NERC in 2002 and, from most quarters, there was praise for its efforts to engage the environmental science community in discussions about future priorities. We considered complaints from the earth sciences about the reduction in NERC's support for this discipline and have found them to have some validity. NERC should be explaining the reasons for this reduction rather than seeking to deny it. We have also called for greater clarity in the aligning policies on the awarding of grants with the identified strategic science priorities.

We looked closely at the reasons underlying the cancellation of the July 2002 research grant round and found both NERC and OST responsible in part for not preparing adequately for the full implications of the introduction of resource accounting and budgeting. However, in deciding to cancel the July grant round, NERC acted unnecessarily hastily. We believe that, with a more measured response and a more co-operative approach from OST, NERC could have sought to recoup its deficit from elsewhere and avoided the cancellation of a whole grant round. We approve the steps the NERC has since taken to strengthen its financial management but still have concerns that liaison between the Research Councils, OST and the Treasury is still not as close as it should be.

We have highlighted some positive steps NERC is taking, such as the establishment of an Environmental Funders' Forum and a new peer review college. But we have found evidence of serious shortages in certain disciplines in environmental science and have urged NERC to take more responsibility for nurturing these areas by liaising closely with universities.

1 Introduction

1. This Committee is appointed by the House of Commons to examine the expenditure, administration and policy of the Office of Science and Technology (OST) and its associated public bodies.¹ These “associated public bodies” are not clearly defined: the non-Departmental Public Bodies associated with the OST are, strictly speaking, sponsored by its parent Department, the Department of Trade and Industry (DTI) rather than by OST itself. We have taken the term to mean the seven Research Councils and the Council for Science and Technology, and (in part) the Human Genetics Commission and the Agriculture and Environment Biotechnology Commission.²

2. As part of our scrutiny of the Research Councils, we are holding separate scrutiny sessions with each of them, with the objective of calling in all seven over the course of the Parliament. So far, we have published Reports on the Particle Physics and Astronomy Research Council (PPARC) and the Medical Research Council (MRC).³ We announced our inquiry into the Natural Environment Research Council (NERC) on 27 January and invited evidence from interested parties. We visited those Research Councils based in Swindon on 1 April and held an informal meeting with NERC representatives by way of introduction to this inquiry. We received 11 memoranda of written evidence and held one oral evidence session on 30 April with the Chief Executive of NERC, Professor John Lawton, the Director, Science and Innovation, Dr David Lynn, the Director, Finance and Information Systems, Mr David Bloomer and Professor Anne Glover, a NERC Council Member. We subsequently received further memoranda of evidence from NERC and OST in answer to supplementary questions. The written evidence received and a transcript of the oral evidence session are published with this Report.

3. In this short inquiry we have examined the administration, strategy and policy of NERC and explored some of the concerns expressed in the written evidence. In the light of the cancellation of the July 2002 standard research grant round we also devoted some attention to NERC’s financial management. In holding the management of NERC to account, we hope that this Report will help to raise awareness of NERC’s activities and highlight issues which need to be addressed.

4. These short inquiries are to a certain extent reliant on the evidence submitted to us. The publication of our recent Report on the MRC elicited a great deal of correspondence on the performance of that Research Council and on some of the issues raised in the Report. Whilst we welcome this feedback, in future we would urge stakeholders to submit their views to us at the outset of inquiries on each Research Council so as to enable us to take account of as wide a cross section of interests as possible. We are very grateful to all those who submitted evidence to this inquiry and to NERC for the co-operative manner in which staff there have responded to our many requests for information.

1 House of Commons Standing Order No. 152.

2 The Human Genetics Commission is jointly sponsored by OST and the Department of Health. The Agriculture and Biotechnology Commission is jointly sponsored by OST and the Department of the Environment, Food and Rural Affairs.

3 First Report from the Science and Technology Committee, Session 2002–03, *The Work of the Particle Physics and Astronomy Research Council*, HC 161; Third Report, Session 2002–03, *The Work of the Medical Research Council*, HC 132.

2 Background

Origins and structure

5. NERC was established by Royal Charter as an independent Non-Departmental Public Body in 1965. It owns four research centres and is a partner in a further 15 Collaborative Centres.⁴ Some 2,600 people are employed by NERC. Around 1,400 Masters and PhD students receive support from it at any one time. NERC is run by the Chairman, Chief Executive and a Council. Following a working group report in June 2001, NERC introduced a new management structure in 2002. This established a new NERC Executive Board to implement the decisions of Council. A Science and Innovation Strategy Board advises Council on strategy and new initiatives and an Audit Committee oversees financial management. The NERC Council is the principal decision making body of the organisation.

Mission and aims

6. NERC summarises its mission as follows:

- To promote and support, by any means, high quality basic, strategic and applied research, survey, long-term environmental observation and related postgraduate training in the environmental sciences
- To advance knowledge and technology and to provide services and trained scientists and engineers, to meet the needs of users and beneficiaries, thereby contributing to the economic competitiveness of the UK, the effectiveness of public services and policy, and the quality of life
- To provide advice on, disseminate knowledge of, and engage society in, the environmental sciences.⁵

In pursuit of this mission and following an extensive consultation exercise, NERC identified five strategic priorities for the period 2002–07. These are set out in the Strategic Plan, entitled *Science for a Sustainable Future 2002–07* (referred to hereafter as the Strategic Plan) in 2002:

- **Science:** to prioritise and deliver world-class environmental sciences to understand the Earth system
- **Using knowledge:** to use NERC-funded science to identify and provide sustainable solutions to environmental problems
- **Skilled people:** to train and develop skilled individuals to meet national needs
- **Leadership:** to provide effective national and international leadership for the environmental sciences and to deliver these four priorities

4 Listed at Annex A.

5 NERC, *Science for a Sustainable Future*, p 4

- **Organisation:** to ensure that NERC is a flexible, fit-for-purpose organisation, and to achieve excellence in service delivery and customer focus.

Income and expenditure

7. Almost three quarters of NERC's funding comes in the form of grant-in-aid from central Government. NERC's share of the overall Science Budget is 10.5%.⁶ Other income is derived from research carried out for Government departments and agencies in the public and private sector. For the 2003–04 financial year, NERC's resource budget is £290.7m.⁷ Table 1 summarises planned income and expenditure in the current planning period. NERC's financial management is dealt with in section four of this Report.

Science Budget 2002

8. Following the settlement for science announced in the 2002 Spending Review, NERC's income from the Science Budget will increase from £219m in 2002–03 to £350m in 2005–06. In the December 2002 Science Budget Allocations NERC received an uplift of £21.5m to its baseline in addition to sums allocated for specific priority areas.⁸ The transfer from DTI to NERC of the funding of Earth Observation science supported by the British National Space Centre (BNSC) accounts for £41m per year of the increase and resource budgeting changes account for a further £45m.⁹ NERC will benefit from four of the five cross-Council priority funding areas outlined in the Science Budget Allocations (see Table 2) and is taking the lead in the sustainable energy programme.

6 DTI Annual Report, Cm 5416, p 59

7 NERC, Operating Plan 2003–04, p 44

8 Department of Trade and Industry, Science Budget Allocations, 2003–04 to 2005–06

9 Ev 3

Table 1: Resource budget and planned expenditure (£million)

	2002-03 Forecasts of Quantum	2003-04 Plan	2004-05 Plan	2005-06 Plan
Resource budget RC's Administration Strategy Add: EYF Agreed 2000-01 & 2001-02 b/f Agreed 2002-03 c/f Unagreed EYF Virement to capital Virement to capital from private Sector grants	216.0 9.1 (1.4)	290.7 0.4 14 (4.8) (1.5)	300.3 8.5 (5.0)	322.4 8.5
Total resources available	223.7	299.2	303.8	330.9
Expenditure				
Science Budget expenditure:				
Research	154.8	234.3	236.0	263.9
Training	19.4	26.9	27.8	27.7
Knowledge transfer	3.5	5.0	6.0	6.5
Science in Society	1.9	2.0	2.0	2.1
Notional charge against capital	12.0	6.3	7.0	8.5
Depreciation	14.0	13.2	13.2	13.2
Provisions	8.0	0.3	0.6	0.6
Administration costs:				
Staff	1.5	1.6	1.6	1.7
Other	1.0	1.1	1.1	1.2
Total expenditure	216.1	290.7	295.3	325.4
Overall result against budget	7.6	8.5	8.5	5.5
Expenditure to other Research Councils	5.5	5.8	5.8	5.2

Notes

* Balance of 2001-02 surplus	5.4
2002-03 b/f	1.4
Forecast 02-03 surplus	7.6
<i>Total</i>	14.4

** Excludes capitalised finance leases £1.2m
Source: NERC, Operating Plan 2003-04, p 44

Table 2: Science Budget allocations to NERC for cross council programmes

£million	Resource			
	2003–04	2004–05	2005–06	Total
Rural economy and land use	0.0	1.7	5.7	7.5
Sustainable energy	0.0	1.8	6.1	8.0
e–Science	4.0	4.0	4.0	12.0
Post–genomics	4.0	4.9	7.0	15.9

Source: Letter from DGRC to Chief Executive of NERC, 28 March 2003

The general uplift to its baseline was in line with that given to other Research Councils. The Earth Observation funding is simply a transfer of DTI's Earth Observation budget for science to bring it within the Science Budget. In addition, capital funding of up to £23m in the 2002 Spending Review period will be made available towards the cost of a new oceanographic research vessel.¹⁰

Priorities

9. In its Strategic Plan, NERC identifies three science priority areas which it seeks to encourage over the five years until 2007:

- **Earth's life support systems**—water, biogeochemical cycles and biodiversity
- **Climate change**—predicting and mitigating its impact
- **Sustainable economies**—identifying and providing sustainable solutions to the challenges associated with energy, land use and hazard mitigation.¹¹

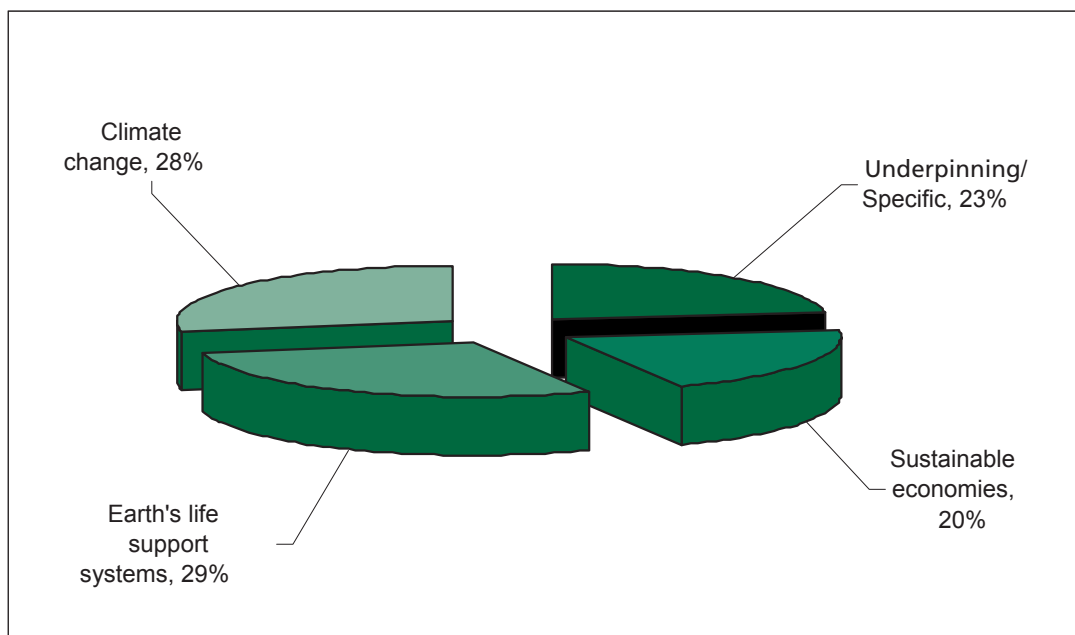
These three priorities were established after a consultation process involving 200 individuals in the UK, elsewhere in Europe and the US. Professor Glover, a member of NERC Council, told us that the strategy was based upon an assessment of where the most impact can be made and where a difference can be made at a national and international level.¹² The strategy will cover the 2003–04 to 2005–06 spending review period and also part of the next one.

¹⁰ Letter from DGRC to NERC Chief Executive, 28 March 2003.

¹¹ NERC Strategic Plan, p 7

¹² Q 10

Chart 1: Priority Science Areas (Planned) 2003–04 from total Science Budget allocation



Source: NERC, evidence p 13

It will be reviewed in 2004–05 after the next spending review outcome is announced to see if it is still relevant.¹³ The strategy forms the basis of certain research funding decisions, although not those on non-thematic research, which are based primarily upon the quality of the science. We were pleased that Professor Lawton, the Chief Executive of NERC, was able to assure us that NERC was independent in practice as well as in theory—it is not influenced by Government departments in its choice of priority areas.¹⁴ The priorities set out in the Strategic Plan were, by and large, endorsed in the written evidence we received. **We support the bottom-up approach adopted by NERC to the development of a strategic framework within which to take decisions on funding.**

3 Research support

Funding modes

10. NERC has divided its Science Budget funding into the following four elements:

- **Core strategic:** used to maintain expertise in key areas of environmental science; also for long term funding of core activities such as research institutes, and monitoring, collation and supply of environmental data
- **Thematic:** supports basic and applied science and training within selected themes which accord with strategic priorities. Thematic funding equates to the managed mode or directed funding of other Research Councils

13 Q 16

14 Q 9

- **Non-thematic:** supports “blue skies” research, training and technology development in areas selected by the applicant (equivalent to responsive mode grants of other Research Councils)
- **Infrastructure:** provides support for equipment, services and facilities, including research ships and the British Antarctic survey.¹⁵

A new funding framework was introduced from 1 April 2003. This divides NERC’s activities into the following ten categories, in place of the existing four:

- Strategic data and knowledge
- Knowledge transfer
- Infrastructure
- Shared services and facilities
- Specialist major infrastructure
- Research centre capability
- Major capital projects
- Training
- Science and society
- Research

This reform was generally welcomed by those who submitted evidence. It is designed to provide a clearer picture of NERC’s activities to outsiders and therefore make collaboration with others simpler. It is not yet apparent how funding in the existing four categories will map onto the new framework. The change in systems will make analysis of funding patterns over time problematical, particularly if spending on thematic and non-thematic grants is not published in the same way. **We recommend that NERC publishes in its Annual Report or Operating Plan financial information so as to make funding under the new and old frameworks comparable.**

Table 3: Allocation of NERC Science Budget by Funding Mode*

	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
Science Budget**	£167.8m	£159.3	£166.6m	£172.9m	£177.7m	£183.3m	£187.8m
	%	%	%	%	%	%	%
Infrastructure	42.6	42.5	40.7	41	39	39	43
Core strategic	23.0	23.6	24.6	26	25	24	25
“Blue Skies” and training (non-thematic)	18.8	19.1	21.9	20	22	21	22
Directed (thematic)	15.6	14.8	12.8	13	13	10	10
Joint Infrastructure Fund	0	0	0	0	1	6	0

*These modes were implemented in 1995/96. Therefore, figures for these modes are not available prior to this date.

**Science Budget allocation total

*** Infrastructure includes: shared facilities open to the environmental community, the running costs of NERC research ships and aircraft and the British Antarctic Survey infrastructure.

Source: NERC Evidence, p 10

11. Table 3 indicates the distribution of funding in different categories since 1995–96. One of the strategic aims announced in NERC’s Strategic Plan was to increase the proportion of investment in non-thematic (responsive mode) research.¹⁶ Professor Lawton explained that it was an aspiration to ensure that all the highest quality grant applications (alpha 4 and 5) were funded in future.¹⁷ Although the total value of new non-thematic grant awards increased from £19m in 1999–2000 to £35m in 2001–02 the number of awards in these two years was almost identical.¹⁸ This was due to the rising costs of environmental science which had led to an increase in the average value of a research grant from £150,000 to £200,000 over the last ten years.¹⁹

12. The proportion of the budget allocated to thematic grants has gradually decreased from 15% in 1995–96 to 10% in 2001–02.²⁰ It was announced following the 2002 Spending Review that an extra £11.6m would be added to the £64.8m already committed to blue skies research over the spending review period. This is in line with NERC’s strategy to increase overall investment in blue skies research.²¹ We were told that the increase in

16 Strategic Plan, p 22

17 Alpha 5 applications are defined as having “exceptional scientific merit and originality; expected to make a major impact on the field” and Alpha 4 are “at the forefront of the field and likely to advance its understanding significantly.”

18 Ev 11, Table 6

19 Q 6, ev 4

20 See Table 3.

21 NERC Operating Plan 2003–04, p 14

investment was needed in order to meet the aspiration of funding all of the alpha 4 and 5 rated applications, which tended to be around 25% of applications.²² The policy of sacrificing thematic funding in order to ensure that all the best blue skies is funded receives support from the Head of the School of Earth Sciences at the University of Leeds, who argues that thematic funding should be allowed to fall to a level consistent with that of other Research Councils.²³ (Our evidence suggests that NERC is already below other Research Councils in terms of the proportion of funding devoted to thematic grants.) In contrast, other evidence from the University of Leeds suggests that thematic funding should be reserved for achieving the objectives of the five year strategy, and non-thematic research reserved for the “long term nurturing of the scientific discipline, blue skies research and training of the next generation of scientists.”²⁴

13. At present, there seems to be a lack of clarity in NERC’s Strategic and Operating Plans as to exactly how the different modes of funding relate to the pursuit of NERC’s strategic priorities. Whilst the overall split between funding science priorities is indicated,²⁵ nowhere in these documents are details given about the extent to which the three science priorities identified in the Strategic Plan are taken into account in awarding non-thematic grants. How these priorities will be reflected in decisions relating to training and knowledge transfer is also vague. Professor Lawton acknowledged in evidence that there were “some misconceptions” in certain quarters about the type of work that could be funded in responsive mode.²⁶ Potential applicants for funding should have the benefit of as much information as possible about the criteria governing awards and the strategy behind these criteria, as well as an indication of the type of sums available in each mode. The aim to organise grant funding to ensure that all of the best quality blue skies research can be funded is laudable and, at present, apparently achievable. Of course, demand may be too great in future, in which case the criteria for rejecting some alpha 4 proposals need to be established in advance: those in priority areas could be given priority, for example.²⁷ The remaining money for thematic grants could be split into separate funds specifically earmarked for strategic priorities areas and for sustaining the skills base by supporting research in shortage areas. These are matters which NERC should take forward in consultation with its user community. **We recommend that NERC include in its Operating Plan a clear summary of the principles underlying the allocation of different categories of grant according to the identified strategic priorities.**

Research and training across science areas

14. Two of NERC’s five strategic priorities are:

- To train and develop skilled individuals to meet national needs
- To prioritise and deliver world-class environmental sciences to understand the Earth system.

22 Q 70

23 Ev 51

24 Ev 53

25 See chart 1.

26 Q 31

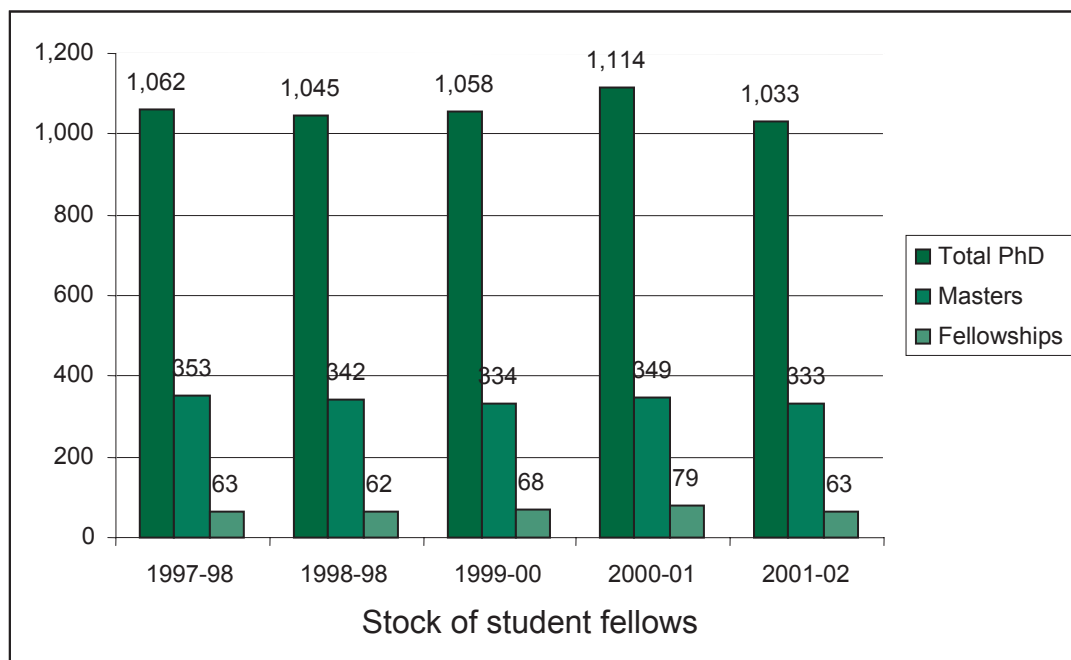
27 See para 28 for discussion of new criteria for grant awards.

It is largely through its provision of a mixture of research grants and financial sponsorship of studentships that NERC seeks to pursue these strategic objectives. The main research awards it offers are:

- **Standard Research Grant:** for sums of over £30,000 for basic blue skies research, usually for a 3 year period. There are two grant rounds each year, in July and December
- **Small Research Grant:** for sums of up to £30,000 for basic, strategic or applied research. The two grant rounds each year are in June and October
- **New Investigators competition:** held annually, this award is for individuals who have not been Principal Investigators. It provides sums of up to £50,000
- **Urgency applications:** for applications in response to a sudden event providing a scientific opportunity (eg. an earthquake) which is time critical
- **Consortium grants:** to support focussed, co-ordinated, collaborative research into specific issues that cannot be addressed through other NERC funding modes. Grant rounds are held twice a year in July and December.

In addition to these grant schemes, NERC supports around 1400 postgraduate students each year at UK universities. Numbers have remained fairly stable over the last five years, as indicated in Chart 2.

Chart 2: Grant Application Success Rates



Source: NERC, Annual Report 2001-02, p 36

15. Some of the evidence we received suggested that these two closely linked strategic priorities were not being pursued with great success. There was a strong current of concern about the level of support given to earth sciences.²⁸ The Geological Society of London

28 See Annex B for definitions of the remit of each science area.

expresses concern that NERC's focus on certain priorities would cause fundamental earth science to suffer. It claims that "Research and training in the Earth Sciences are in the process of being cut back substantially, despite the outstanding international record of the UK in this discipline."²⁹ The lack of funding for students had led to the closure of courses and the representations from earth scientists on this subject during the consultation on Earth System Science "fell on deaf ears" they claim.³⁰ The low profile of fundamental earth science in the Strategic Plan is also criticised by the School of Earth Sciences at the University of Leeds, the Head of which complains that the integrated and complex nature of earth science cannot be unravelled in order to pick out specific priorities in the way the Plan anticipates.³¹

Table 4: Allocation of Science Budget by Science Area

	1992/ 93	1993/ 94	1994/ 95	1995/ 96	1996/ 97	1997/ 98	1998/ 99	1999/ 00	2000/ 01	2001/ 02
Science Budget(£m)	130	141	153	168	159	167	173	178	183	188
	%	%	%	%	%	%	%	%	%	%
Marine & Atmospheric***	25	27								
Marine			25	27	20	20	24	26	22	26
Polar	20	18	19	25	27	26	24	26	29	26
Earth	31	27	23	18	24	23	20	20	20	20
Terrestrial	25	27	24	18	19	18	16	17	19	18
Earth Observation	0	0	6	7	5	10	9	7	6	5
Atmospheric			3	5	5	4	6	4	4	5

*Equates to NERC's old science and technology boards and used for reporting purposes up until 2001-02.

**Science Budget allocation total.

***For the financial years 1992-93 and 1993-94, Marine and Atmospheric Sciences were classified as single science area.

Source: NERC evidence, p 10

16. Professor Lawton rejected outright the accusation that funding for earth sciences had declined. He told us that "over the last seven or eight years the level of funding for earth sciences has not changed at all" and pointed out that neither the number of earth science MSc students being funded nor the number of Fellows had declined.³² Table 5 provides a breakdown of courses and studentships by subject area. It shows that since 1998-99, the number of Earth science MSc courses has fallen from 35 to 17 and the number of studentships from 149 to 94.³³ Even allowing for the reclassification of four of these courses

29 Ev 44

30 Ev 43

31 Ev 50

32 Q 18

33 Ev 56

and 22 studentships, this represents a massive fall. Professor Lawton's assertions relating to MSc students are not backed up by NERC's own figures.

Table 5 Masters Provision by Science Area (Studentship Allocations 1998/9–2000/01)*

	Course		Studentships	
	1998/9–2000/01	Current	1998/9–2000/01	Current
Marine	7	8	19	48
Atmospheric	5	5	17	28
Freshwater	9	7	36	38
Earth	35	17	149	94
Terrestrial	9	15	25	83

* The Masters Provision review was carried out in 2001 and changes were made to the number of Earth sciences courses NERC supported. One outcome of the Review was to re-classify some MSc courses. This resulted in 4 Earth science courses (22 Studentships) being reclassified for the next 5 years under either Freshwater or Terrestrial science.

Source: NERC, evidence pp 56–57

17. In terms of the number of PhD studentships granted in the last six years, earth sciences have suffered a significant drop (very significant if the 2002–03 provisional figures are confirmed) while other disciplines (with the exception of marine science) have remained fairly stable or increased (see Table 6).

Table 6 NERC "Blue Skies" PhD Studentships New Starts by Science Area

	1997–98	1998–99	1999–00	2000–01	2001–02	2002–03*
Marine	38	44	40	46	31	31
Atmospheric	28	35	46	46	41	37
Freshwater	29	38	40	37	29	42
Earth	92	91	75	81	71	53
Terrestrial	78	91	93	87	84	85

* Figures for 2002–03 are provisional, pending a small number of nominations.

Source: NERC evidence p 56

18. The overall proportion of NERC's Science Budget funding allocated to earth sciences has declined from a high of 30.5% in 1992–93 to the current plateau of 20%.³⁴ Professor Lawton said that there had been a reduction in some areas "a bit longer than seven years ago" following an assessment of priorities.³⁵ He acknowledged that in proportionate terms there had been "some shifts" but stressed that the earth science community "receives the

34 See Table 4.

35 Q 18

biggest proportion of NERC funds.”³⁶ This assertion seems to depend on the definition of earth science employed: Table 4 indicates that both marine and polar science receive higher proportions than earth science of NERC’s funding and terrestrial science received more money in new research grants awarded in 2001–02.³⁷ NERC has a heavy responsibility for the earth sciences as they are, to a greater degree than many other disciplines, heavily dependent on it for its research funding.³⁸ **The earth sciences are ahead of other disciplines in terms of the funding of masters courses and fellowships and overall provision remains healthy. This no doubt reflects the fact that earth science is the largest subject area. NERC has used this high level of support to play down the fact that support for training in earth science has dropped in recent years and that the proportion of its Science Budget funding allocated to this area has also fallen. For a Research Council that prides itself on openness and transparency this is extremely disappointing. If support has been cut in order to support other areas of higher priority or because the quality of research proposals is below par, NERC should not be shy of acknowledging this; but it should be taking active steps to explain and justify this outcome to its user community. We recommend that NERC publishes figures in its Operating Report which indicate clearly the level of support given to each science discipline each year.**

Skills shortages

19. There was a high degree of consensus in the evidence we received about those areas in which there are serious skills shortages. The Environment Agency was not alone in expressing concern about the shortage of trained hydrogeologists. We were surprised to hear that there are only two Masters courses left, following the removal of NERC support.³⁹ Professor Lawton was well aware of the shortage of hydrogeologists, and regretted that one of the courses funded by NERC had been closed by the University of Reading.⁴⁰ He spoke of “a national shortage which we will need to address” and explained that the whole of MSc course provision would be reviewed in 2005, as part of a five year review cycle. The Geological Society of London accuse NERC of being “in the process of dramatically reducing the number of earth scientists being trained in the UK, without attempting to determine the demand for these graduates from employers, and the consequences of large cutbacks.”⁴¹ English Nature report a “significant shortfall of potential employees with adequate field skills” in nature conservation which “we understand is beginning to impede research”.⁴² Geology and geophysics were other areas identified in which funding for MSc courses has declined. Professor Lawton also reported a shortage of skills in E-science, mathematics and IT skills which affected environmental science.⁴³

36 Q 20

37 Ev 12, Table 7.

38 Ev 43

39 Ev 47, 44

40 Q 22

41 Ev 43

42 Ev 50

43 Qq 33 and 38

20. We do not agree with the Geological Society of London's suggestion of decoupling the research from the training function—the two should be closely linked—but we concur with their view that the “training of postgraduates should be done with a long-term aim of providing skilled personnel in areas of national need.”⁴⁴ The fact that skills shortages in the earth sciences have developed suggests that NERC has not been giving sufficient priority to this part of its mission over recent years. There is no need to wait for a quinquennial review of MSc courses to start addressing weak areas. **We recommend that NERC takes immediate action to focus its support for masters students to support those disciplines in which there are clearly identified and agreed shortages.**

21. The level of PhD stipend is a tool which NERC is using to attract students to shortage subjects. The main bulk of the £6m funding to meet the increase in stipends from £9,000 to £12,000 recommended by the Roberts review is due to come on stream in 2005–06. NERC has announced that it will implement this recommendation earlier than other Research Councils, from October 2003. We welcome this commitment. We also support the flexible approach to levels of stipend adopted in order to fill shortage subject areas. For example, £16,000 will be awarded for E-science PhD studentships.⁴⁵ We are not convinced that increased stipends alone will be sufficient. Other factors, such as post doctorate marketability, will come into play. NERC is committed to reviewing the impact of the increased stipends on take up of PhDs.⁴⁶ We welcome this follow up. **We recommend that NERC, as a matter of routine, monitors the reasons for the take-up rates of PhD stipends in subjects and feeds the results into its funding strategy.**

Inter-disciplinary approach

22. It is acknowledged that the boundaries between the sciences are likely to get increasingly blurred. To reflect this, there is a strong emphasis on interdisciplinary research in NERC's five year Strategic Plan. This was welcomed by most of those who submitted evidence. The increasingly interdisciplinary nature of research and the growing emphasis on cross-council working mean that NERC will need to take into account the strategy of other Research Councils in pursuing its objectives and we hope that Research Councils UK will provide a forum in which such co-operation can flourish.

23. NERC is already promoting and supporting the increasingly inter-disciplinary nature of research and reflecting it in its grants and awards. A number of “disciplinary hopping” awards are now sponsored by NERC designed to teach interdisciplinary skills, such as project management and communication, to enable people to transfer more easily from one discipline to another.⁴⁷ This is sensible. In 2001 NERC introduced the Consortium Grants Scheme to support collaborative research into specific issues which cannot be addressed through standard programmes. This will provide up to £2m per grant for up to five years.⁴⁸ A joint Medical Research Council and NERC scheme provides funding for research in the relationship between human health and the environment. In May it was announced that NERC and the BBSRC had agreed to allow researchers from their

44 Ev 44

45 Q 36

46 Operating Plan, 2003–04, p 25

47 Q 34; Operating Report, 2003–04, p 25

48 NERC Operating Report, p 5

institutes to bid into each other's blue skies and responsive mode funds up to a value of £2m per year.⁴⁹ This is designed to provide funding for scientists working at the interface between respective disciplines. The new peer review college should also assist in judging proposals at the boundaries of scientific disciplines.⁵⁰ We are aware, as the Environment Agency notes, that "cross-council working has not always been as effective as it might have been in the past."⁵¹ There is evidence that this is changing. **We welcome NERC's efforts to work in partnership with other Research Councils to provide a range of opportunities to scientists working at the cusp of different scientific disciplines. We would encourage OST and Research Councils UK to promote more such initiatives, particularly in the context of the cross-council programmes.**

Grant application success rates

24. If the system of grant applications is to be reasonably efficient and to maintain the confidence of applicants there needs to be an acceptable success rate of applications. Over the last ten years the number of applications for the non-thematic (responsive mode) research grants has increased from around 700 to 1000 while the success rate has fallen from 35% to 23%.⁵² The rate has not been better than one in four over the last five years. This seems a worryingly poor ratio. The success rate for non-thematic small grant applications (graded alpha 3–5) has fallen from 92% in 1992–93 to only 30% in 1999–2000, although it has crept up to 36% in 2001–02.⁵³ In 1992–93 NERC funded all top quality research (alpha 4 and 5 graded proposals) but by 2000–01, only 48% of such proposals were funded.⁵⁴

25. Professor Lawton explained that the aspiration to increase success rates for blue skies research to 25% is designed to fund all the alpha 4 and 5 grade applications but that "if there were fewer high quality applications that percentage would fall".⁵⁵ He argued that the success ratio of applications was "the wrong question" and that the emphasis should be on funding all the internationally competitive science.⁵⁶ We agree that this should be the priority but believe that NERC also has a duty to seek to keep success rates above the current levels. For 75% of proposals to be considered not worth funding is not only a waste of an huge amount of effort by applicants and reviewers alike but is also a sorry indictment of the quality of proposals coming forward. **We welcome the effort to fund all top quality research proposals but would view it as a very disturbing sign of the health of environmental science if it was quality of applications rather than limited funds that kept the success rate down at recent levels.**

26. Professor Lawton acknowledged that NERC's performance in this respect had been amongst the weakest of the Research Councils but pointed to an improvement to nearer 30% in the latest grant round. He explained that a screening process, whereby outline

49 www.nerc.ac.uk

50 See para 28 below.

51 Ev 46

52 Ev 4, 12–13, Tables 10 and 11

53 Ev p 12, Table 10

54 Ev 4

55 Q 70

56 Q 73

proposals were examined in advance of full application being made, was used in some disciplines and could have the effect of taking success rates up to 30–40%.⁵⁷ Such interaction early in the application process has the potential to save applicants a large amount of fruitless energy in preparing weaker applications, as well as giving NERC an indication of the nature of proposals forthcoming. Whilst NERC has no ultimate control of the number of applications it receives, it can nonetheless exert a strong influence by developing closer links with universities. The Engineering and Physical Sciences Research Council (EPSRC), for example, has undertaken a survey of success rates of applications from different universities to enable efforts to be made to assist the poorer performers. It has established a team of University Interface Managers to develop links with universities, mainly on a regional basis. The introduction by NERC of the new peer review college⁵⁸ should have a positive impact on success rates. But this is only a start. **We recommend that NERC sets itself challenging targets for both thematic and blue skies awards success rates and takes decisive steps to achieving them by improving its dialogue with the research community.**

27. There is considerable year-on-year variation in the sums awarded by peer review committees for new blue skies grants to the different scientific disciplines, as illustrated by Table 7. Whilst the levels of funds awarded are dependent to a large extent of the quality and number of applications, some degree of predictability and stability will be in the interests of potential applicants and disciplines as a whole. Professor Lawton acknowledged the problem and said that the comparable quality of different areas of science had been a concern for some time and “partly explains some of those fluctuations.”⁵⁹ The creation of a new mechanism for awarding grants—a peer review college—would, Professor Lawton argued, help to manage this issue. In view of the increasingly inter-disciplinary nature of research we discussed earlier,⁶⁰ it will be in the interests of the Research Councils and especially their users to standardise their working practices as far as possible. The development of a standardised application process for grants (Joint e-Submission or Je-S) is a welcome step in the right direction. Confidence in the application process would be improved by a degree of uniformity in the procedures used by different Research Councils. Some convergence in grant application success rates would be another worthwhile goal. **We recommend that Research Councils UK take the lead in promoting compatibility and greater uniformity in the practices and procedures of the grant awarding process amongst the six grant awarding Research Councils.**

57 Q 72

58 See para 28 below.

59 Q 74

60 See paras 22–3.

Table 7: Value of new “blue skies” grants (excluding training) awarded by Peer Review Committee in different science areas *(£m)

	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	2000–01	2001–02
Marine and Atmospheric		2.6	3.6					
Marine	2.1			3.3	3.3	3.7	2.1	3.3
Atmospheric	0.6			1.6	1.7	1.4	0.8	2.3
Freshwater	1.8	1.8	2.4	2.5	2.6	2.1	1.3	2.7
Earth	3.5	3.9	4	2.8	4.1	3.6	1.8	3.9
Terrestrial	3.5	5.2	5.1	6	4.8	5	2.4	6.1
Earth Obs**	0.9	0.6	1					

*Prior to this date, figures were reported by Standing Committee (see Table 8).

**After 1996, applications and awards were handled by 5 Peer Review Committees only (Marine, Atmospheric, Freshwater, Earth, and Terrestrial)

Source: NERC evidence, p 12

Peer review college

28. The establishment of a new peer review college in place of the existing group of committees is part of an attempt to respond to the increasingly inter-disciplinary nature of research and to offset the problem of a lack of willing peer reviewers. There were around 650 applicants to join a new 250 strong college which started work in July 2003. Reviewers will judge grant applications in a two stage process. First, three members of the college will make an initial assessment of quality and only the best 50% of applications will then go forward for further review by external referees. A multidisciplinary moderating panel drawn from the college will then consider the referees' comments and make proposals for funding. College members, appointed for a three year term, might be expected to review 12–15 applications per year in return for an honorarium of £1000. It is expected that the number of externally reviewed proposals will be halved as a result of the filtering out of the weaker proposals in the initial assessment.⁶¹ New criteria for assessing applications have also been developed and focus on relevance to strategic priorities, excellence, risk–reward, and cost–effectiveness. These criteria are sensible. Some guidance on their interpretation is given on the website but a further explanation for applicants of how they will be applied, in practice, would be helpful. Grant applicants will want to know the period of time over which cost–effectiveness is judged and will want assurance that the risk–reward criteria will not mean that only safe bets are funded. They will also want assurance that the two stage process will not increase the time it takes to process applications. NERC should also be vigilant in monitoring the costs of the new college.

29. The new two stage system involving external assessors should help NERC to improve accountability and promote fairness. Concerns were expressed privately to us about the

61 Ev 7; www.nerc.ac.uk/funding/preaward/index.shtml

proportion of grant money that has been awarded to fellow peer review steering panel members. For example, in the RAPID (Climate Change) special topic in 2002, eight out of 18 grants went to steering committee members. In the Lowland Catchment Research Programme (LOCAR) first round awards in February 2002, five out of 10 went to steering committee members.⁶² We have not conducted a full scale investigation into the proportion of grant money that goes to peer reviewers and we recognise that it might be expected that panel members are eminent in their field and therefore might expect to do relatively well in grant rounds. However, the whole community needs to be satisfied that the system is scrupulously fair. **In principle, we welcome the establishment of the new peer review college. We recommend that NERC publishes guidelines on how it will operate, establishes targets for the processing of applications and monitors the cost of the new system. We also recommend that the process is made as transparent as possible, with the publication of the names of referees in respect of each grant application.**

Distribution of research grants to universities

30. Some 80% of NERC's funds go to 20 universities, a common pattern amongst the Research Councils, although not the same 20 for all councils.⁶³ We asked NERC to provide figures relating expenditure on research grants and training awards to the Research Assessment Exercise (RAE) ratings of university departments.⁶⁴ Chart 3 illustrates the heavy concentration of funding in departments rated 4, 5 and 5* and the increase in this concentration from the 1996/97 to the 2001/02 RAEs. In 2001–02 the level of concentration of funding in the top rated departments suddenly increased from a steady 80% to 92% for research grants and 94% for training awards, a leap explained in part at least by the impact of the 2001 RAE exercise on the grading of university departments.⁶⁵

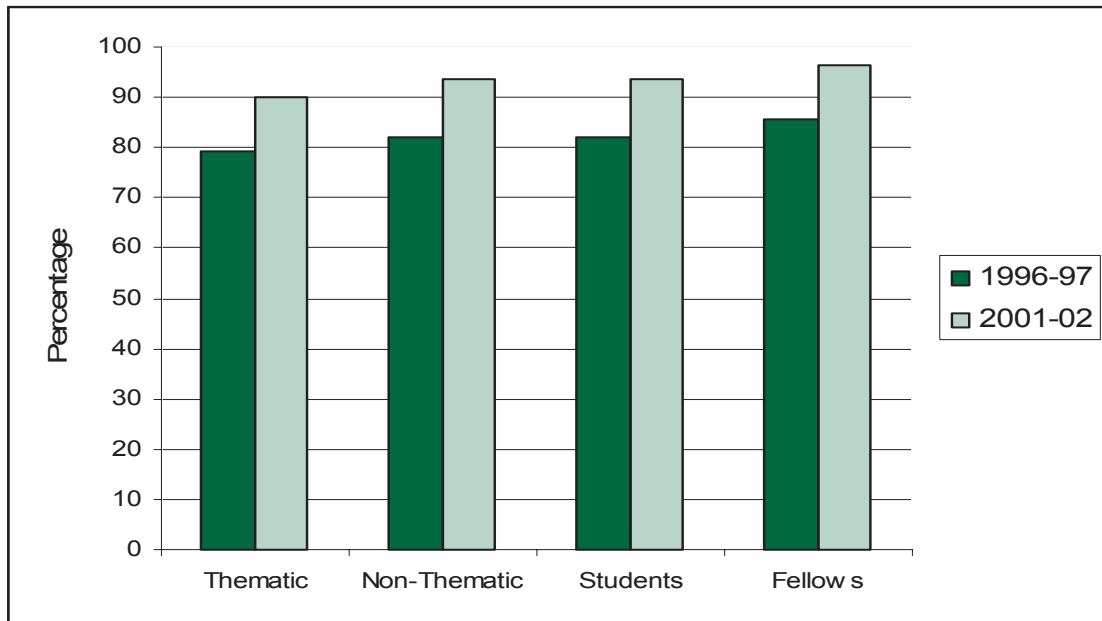
62 As above.

63 Q 113

64 Ev 38–39

65 As above.

Chart 3: Proportion of funding awarded to 4, 5 and 5* university departments



Source: NERC evidence pp 38-9

31. It is of course natural that the best research departments will attract the majority of grant funding. But there is no need for NERC to support the increasing concentration of excellence in environmental sciences at fewer universities, so as to reduce choice for students and scientists alike. Professor Lawton maintained that grants would be awarded “if the science was good enough” and regardless of the RAE rating of the department, as long as the university had the necessary infrastructure.⁶⁶ He argued that it was not the role of NERC to help 3 rated departments improve further.⁶⁷ There is evidence to suggest that the depth of environmental science excellence throughout the universities is not great. Professor Lawton acknowledged that these departments did not score particularly highly in the last RAE.⁶⁸ This could be because the best quality science is not being supported or, more likely, that it is just not up the standards of other fields.

32. Since the publication of the Higher Education White Paper, there is an increased danger that high quality environmental science will be restricted still further to an elite group of universities. Professor Lawton agreed that “too much concentration would be very detrimental to the national science base.” He argued that this would threaten excellent departments in smaller universities and that such concentration makes it difficult for other departments to catch up with the best.⁶⁹ We are concerned that if second tier departments attract less and less funding, in time, neither the infrastructure nor the quality of students will be there to make successful applications for funding. If the recent sharp increase in concentration is sustained or even grows, there will be precious little incentive for some departments to apply for funding, regardless of NERC’s stated policy. We accept that NERC does more than support the environmental sciences and that the preservation of university departments is not necessarily its prime concern. But if NERC does not seek to

66 Qq 103 and 114

67 Q 103

68 Q 102

69 Q 113

play a role in nurturing the subject, it is difficult to see who else will. There is much it can do outside awarding the awarding of grants and studentships to support university departments and to encourage high quality applications. **NERC should not turn a blind eye to the impact on environmental science departments in universities of its policies but should instead make concerted efforts, in conjunction with the Department for Education and Skills, to support the development and maintenance of a strong environmental base across the university system.**

Grant applications by post–doctorate research assistants

33. At present, NERC does not permit post–doctoral research assistants to apply for grants in their own right as Principal Investigators in line with the practice adopted by most other Research Councils. In our view, this is an unnecessary and unfairly restrictive policy.⁷⁰ As a result of it, as Professor Lawton openly acknowledged, young post–doctoral researchers with proposals of their own have to find a member of academic staff to front the application and take the credit for it, even though the work is done by the assistant.⁷¹ This issue was discussed by NERC Council in April 2002 and NERC recently undertook a consultation exercise on the website on this issue. Although the universities are apparently not prepared to offer partial funding for such grants, Professor Lawton said that NERC was “almost certainly” going to implement such a change, providing that the applicant has a member of academic staff as a co–investigator. It was announced on 18 June 2003 that post–doctoral research assistants could be named as a Co–Investigator if they contributed substantially to the application and could apply to have their own salary paid for the duration of the grant. This is a welcome move but it could have gone further: we would like post–doctoral research assistants to be able to apply as Principal Investigators. We recognise the need to protect NERC from a flood of weak applications. Therefore, **we recommend that NERC seeks to establish on a bilateral basis arrangements with universities to monitor the quality of grant applications. Where such arrangements are satisfactorily established, NERC should relax its rules to permit post–doctoral research assistants to apply for funding in their own right as Principal Investigators.**

Research institutes and centres

34. The four institutes and 15 collaborative centres in which NERC is a partner range from the 780 strong British Geological Survey to the Sea Mammal Research Unit, staffed by fewer than 10 people.⁷² Centres such as the British Antarctic Survey and Centre for Ecology and Hydrology are highly regarded institutes which supply the raw data to basic and applied environmental science throughout the UK and beyond. Expenditure on these institutes is categorised as core strategic programmes, which amounted to £46m in 2001–02.⁷³ The institutes help to attract the external funding that NERC receives—some £31m in

70 For a discussion of these issues, see the Eighth Report from the Science and Technology Committee, Session 2001–02, HC 1046, paras 93 ff.

71 Q 76

72 The full list is at Annex A.

73 See Table 3.

2002–03. The great majority of NERC staff—around 2,400—are employed at these centres.⁷⁴

35. Witnesses reported good working relationships with the research institutes, with the staff attracting praise for their expertise.⁷⁵ The School of Earth Sciences at Leeds University criticises the performance of the institutes in delivering research training on the grounds that they lack experience of student supervision. It also expresses concerns about the numbers of PhD research studentships awarded to the institutes.⁷⁶ The institutes and centres compete for research funding with universities. Professor Lawton assured us that the institutes did not receive favourable treatment, explaining that grant proposals were judged on exactly the same basis whether they were for external or internal applications. He told us that when they compete for grants they do at least as well the best university departments and that the quality of science output is “at least as high as that in the universities.”⁷⁷ The Chief Executive also insisted that in the financial adjustments made prior to the decision to cancel the July 2002 grant round NERC looked first to make savings at its own centres before moving on to the universities.⁷⁸

36. We questioned whether NERC needed to retain all these institutes itself.⁷⁹ Professor Lawton said that consideration had been given to closures but he was of no doubt that they provided value for money. In order to monitor quality, their programmes are externally and internationally peer reviewed every five years. Professor Lawton described them as “pretty mean and lean organisations.”⁸⁰ Nonetheless, some are evidently finding it difficult to justify their existence as stand alone facilities. We note that while administration costs at Swindon are expected to fall to 1.2% by 2005–06—well below the Research Council target level of 4%—at the major research centres they are expected to rise slightly over the same period to between 3.4–7.8%.⁸¹ One way of keeping administrative costs down is to reduce the number of free standing centres. Professor Lawton referred to NERC’s “active policy” of rationalisation, of moving small isolated centres, preferably to university campuses.⁸² There are plans to transfer the Proudman Oceanographic Laboratory from the Wirral to the Liverpool University site (with NERC maintaining responsibility) and the CEH Merlewood laboratory to Lancaster University. Responsibility for Dunstaffnage Marine laboratory in Scotland recently passed from NERC to the Scottish Association for Marine Science.⁸³

37. One reason why some research institutes have struggled is that they have found it increasingly difficult to attract funding from government departments. Funding has dropped from £18m in 1995–96 to £15.4m in 2002–03 and is expected to fall slightly further over the current planning period.⁸⁴ Income from Government departments in

74 www.nerc.ac.uk/publications/nercfacts/

75 Ev 48

76 Ev 51

77 Q 15

78 Q 63; see para 52 below.

79 Q 107ff

80 Q 15

81 Operating Plan, 2003–04, p 64

82 Q 108

83 NERC Accounts 2001–02, Session 2002–03, HC 1264, p 5

84 NERC Output and Performance Indicators, 2001–02, p 14; NERC Operating Report, 2003–04, p 49

2001–02 was £1.5m less than originally forecast.⁸⁵ NERC conducted a review of the causes of the decline in research funding from Government departments in 2000. It concluded that, although departments were generally extremely satisfied with the quality of the science provided by NERC institutes and centres the following factors contributed to the problem:

- Competition: the opening up of Government research since 1993 had led to an expansion in the number of research contractors
- Overheads: Treasury rules requiring NERC institutes to charge full economic costs allowing universities to undercut them
- Interdisciplinary research: an increasing move towards research which overlaps traditional boundaries of Research Councils' subjects areas.⁸⁶

The overheads problem may be eased if the Government's plans to encourage Higher Education institutes to charge the full economic costs of research are implemented.⁸⁷ But competition is likely to remain strong and research seems destined to become increasingly interdisciplinary. **NERC institutes will have to demonstrate that they can compete effectively in the changing research environment if they are to maintain their value.**

38. We accept that there are some tasks, such long term environmental surveying, which are better carried out at directly funded institutes rather than by universities, where priorities and interests may not always be compatible with those of NERC. However, the high number of NERC centres ensures that universities face stiff competition in recruiting the best people. This may be one factor in the relatively modest performance of environmental science departments in universities in the last RAE. **We applaud NERC's efforts to monitor closely the performance of their institutes and centres and support the policy of rationalisation, where this can be justified on grounds of costs and where reasonable guarantees can be given that there will be no detrimental effect on environmental research.**

Communication with user groups

39. In its published material and in evidence to us NERC has placed great emphasis the efforts it makes to engage with co-funders and users of environmental sciences. In implementing its five year strategy, NERC says that "we are changing the way we do business with our community, making it more customer-focused and transparent."⁸⁸ Examples of this new approach in action include the peer review college, the development of the new funding framework,⁸⁹ the use of on-line consultations and the provision of comprehensive information on its website on the type and distribution of grants currently in place. The publication of papers discussed at council meetings and the opening of such meetings to the public have also been innovative steps in the direction of transparency and

85 NERC Operating Report, 2001–02, p 53

86 Ev 30

87 See Office of Science and Technology, *The Sustainability of University Research*, May 2003.

88 Ev 2

89 See para 10.

accountability. In terms of statistical and business information at least, we have found that NERC provides far more than some Research Councils on its website. **We commend the actions NERC has taken to improve its provision of information to user groups and to give an insight into its decision making processes. We believe that NERC has set a good example for other Research Councils.**

40. The evidence we received suggests that NERC's performance in engaging with its scientific community has been mixed. The consultation on the Strategic Plan was widespread and, whilst the choice of priorities was inevitably not to the satisfaction of all, the process of formulating the strategy attracted no complaint. We were told that NERC and its institutes have developed good links and working relationships with the Environment Agency⁹⁰ and have been proactive in beginning to work more closely with the Regional Development Agencies in knowledge transfer activities.⁹¹ We are aware of a wide range of activities undertaken by NERC designed to engage directly with individual pressure groups and with wider cross sections of the research community in public forums.⁹²

41. English Nature are not so positive about engagement. They report a "reduction in our contribution to the strategic direction of NERC" and express surprise at the limited engagement between NERC and public and private sector bodies involved in nature conservation.⁹³ The skills shortages in nature conservation cited by English Nature appeared to come as news to NERC.⁹⁴ Dr Lynn told us that this view had not been heard and that "clearly there is an issue there we need to discuss with them."⁹⁵ Professor Lawton undertook to talk to English Nature about their concerns and indicated that our inquiry was valuable in flagging up such concerns. **Perhaps English Nature have not been articulating their concerns loudly enough, but we were nonetheless surprised that NERC had been unaware of the reports of skills shortages in nature conservation from an organisation with interests so central to NERC's mission.**

42. NERC has sought to improve its ability to identify gaps in environmental skills and training and to promote the coherence of the funding of environmental science through the establishment in 2002 of the Environmental Funders' Forum. This comprises Government departments and agencies which fund or use environmental research and trained scientists. It is chaired for an initial two year period by Professor Lawton. The aim is to ensure that funding strategies are complementary, that skills gaps are identified and that "horizon scanning" is conducted in a joined-up way.⁹⁶ The Environmental Funders' Forum is currently conducting a SWOT analysis (strengths, weaknesses, opportunities and threats) of environmental science in order to inform future decision making on science priorities

90 Ev 46

91 Ev 52

92 www.nerc.ac.uk; Q 31

93 Ev 49

94 See para 19.

95 Q 26

96 www.erff.org.uk; Q 41

and funding. This analysis will be undertaken by NERC, the Environment Agency and Defra and will involve a series of regional meetings inviting views from interested parties.⁹⁷

43. The evaluation of the state of the environmental sciences should be part of NERC's ongoing activities. Such an evaluation, based upon extensive consultation, presumably formed the basis of the Strategic Plan. We are surprised that it should be necessary to conduct such an analysis so soon after the Strategic Plan was agreed. However, the publication of the results of this exercise should provide a clearer basis for NERC and others to address the skills shortages that have already been identified.

44. There is a danger that the addition of another body to an already crowded institutional landscape may confuse NERC's dialogue with user groups. At present, the body is a Funders' Forum only. It does not include representatives of interest groups, although the web site states that: "other organisations will be invited to participate in the Forum's activities and for each major activity the Forum will consider how to engage a broader range of stakeholders."⁹⁸ Dr Lynn confirmed that "there is no reason why the forum cannot discuss their [English Nature's] membership."⁹⁹ There needs to be some clarity of purpose here: user groups and interested parties should be left in no doubt about their best channels of communication to NERC and to other funders of environmental science. **We welcome the aim of the Environmental Funders' Forum to improve strategic decision making and coherence across the environmental science sector. We recommend that NERC sets out clearly how the work of the Forum feeds into its own strategic decision making to enable its community to engage appropriately with the Forum and NERC's existing consultative mechanisms.**

4 Financial management

Introduction: cancellation of the July 2002 standard research grant round

45. **In 2002 NERC found itself in such financial difficulties that it decided to cancel its regular July standard research grant round that year.** This saved NERC some £10m but resulted in around 50 projects, and a similar number of fixed term appointments, not being funded.¹⁰⁰ Apart from the obvious loss of opportunity for NERC's research community the cancellation damaged NERC's own reputation for administering its Science Budget allocation. In view of the seriousness and unprecedented nature of this situation we felt obliged to try to discover how NERC managed to get into this predicament and to examine the action it has taken subsequently to improve its financial management.

46. In addition to the briefing on this we received from the Director of Finance during our visit to Swindon in February, we asked for and received a number of documents from NERC relating to its financial position, some of them in confidence, and received answers to some follow up questions from OST.¹⁰¹ Answers to Parliamentary Questions tabled by

97 www.erff.org.uk

98 As above.

99 Q 41

100 Ev 5

101 Ev 54–55

the Chairman of this Committee provided further background information. Box 1 provides a chronological summary of the relevant events leading to the announcement of the cancellation of the grant round on 10 May 2002, so far as we have been able to establish. Some of the reasons underlying these financial problems stem from the introduction of Resource Accounting and Budgeting (RAB)¹⁰² to Government accounts and the impact of this on the calculation of End Year Flexibility (EYF).¹⁰³

Development of the problem

47. In its written evidence NERC reports that savings of £9–14m were required over the period 2002–03 to 2003–04 because of the

“unexpected, retrospective application of new accounting procedures as required by DTI and HMT and because NERC planned to carry forward a £3.8m overspend from 2000–01 under the previous accounting arrangement.”¹⁰⁴

The Finance Director, Mr Bloomer, explained in evidence that in February 2002 “it became apparent that in 2000–01 the accounting rules had been changed”.¹⁰⁵ The application of the rules relating to End Year Flexibility (EYF) were to be backdated and applied to 2000–01 on a RAB basis. This had the effect of causing a £9m shortfall which would have to be recovered in 2003–04. NERC had already over-committed by £5–10m for the 2003–04 financial year, so it was now faced with recouping between £14–19m.¹⁰⁶ This problem was compounded by the decision in April 2002 of the NERC Council to build in a reserve of 2% of turnover—some £5m—to the accounts for the 2003–04 financial year.

102 Resource Accounting and budgeting replaced cash accounting and requires all Government departments and agencies to follow accepted accounting practice. The main changes are the adoption of accruals accounting for all departmental expenditure and the inclusion of depreciation and cost-of-capital charges in departmental budgets. RAB was introduced in two phases, the first starting in April and the second in April 2003.

103 End Year Flexibility (EYF) is the arrangement by which a unspent provision in one year to be carried forward to the next to encourage good financial management.

104 Ev 5

105 Q 42

106 Q 42

Box 1**Cancellation of the July 2002 Standard Research Grant Round: A Chronology**

23 March 2001	Treasury circular indicating that 2000–01 underspends would be calculated on a RAB basis
April 2001	OST circular & letter to Research Councils indicating that NDPBs should move to RAB forthwith and explaining that existing rules on EYF to be retained “as a temporary measure” pending further consideration
Start of 2002	OST notified Councils that “funding flexibilities” could be set to relieve their financial pressures
January 2002	Research Councils’ Finance Officers Group meeting to discuss application of RAB for EYF NERC request to OST for carry over of £6. 5m turned down
February 2002	It “became apparent” to NERC that accounting rules had changed and EYF rules were to be backdated
6 March 2002	Financial position presented to NERC Executive Board
4 April 2002	Council meeting discussed actions to save money
5 April 2002	Announcement that savings of £13. 2m were necessary
April 2002	Actions taken to reduce costs; discussions with OST
7 May 2002	Virement of £6. 6m agreed with the Treasury
10 May 2003	Decision taken on cancellation of grant round and announcement made

48. To blame the situation on the introduction of RAB seemed surprising to us, given that its introduction had hardly been sprung upon the public sector. The policy was first set out in a White Paper in 1995.¹⁰⁷ DTI had been in “extensive discussions” with Research Councils about its implementation and training had been provided over the previous two years.¹⁰⁸ The Treasury sent out a circular in April 2001 setting out the need for NDPBs to move to RAB forthwith. OST then advised Research Councils to retain the existing rules relating to EYF “as a temporary measure” whilst it explored further with the Treasury how

107 HM Treasury, *Better Accounting for Taxpayers Money*, 1995

108 HC Deb, 28 April 2002, col 109 W

the rules would apply in practice to Research Councils. It appears that the potential implications of the RAB introduction was not lost on everyone. Confidential evidence we have seen suggests that the impending problem was at least raised with Council during 2001.¹⁰⁹ However, no formal discussion of the issue seems to have been held in Council that year. It was not until the beginning of 2002 that the outcome of OST's talks with Treasury was determined and communicated to the Research Councils. These were discussed at the Councils' Finance Officers Group meeting in January 2002.¹¹⁰ It should have been at this point, rather than in February, that the extent of the financial difficulties emerged, although this would still have been too late. MRC raised questions with DTI in January about this issue and these were "satisfactorily resolved."¹¹¹ We note that OST is careful not to define with any clarity exactly what was determined at the January meeting.¹¹²

49. We were interested to discover why other Research Councils had managed to avoid such drastic action. Mr Bloomer explained that they were affected by the introduction of RAB but not to the same extent as NERC. He contended that NERC's possession of institutes put it in a different position: institutes counted as capital as opposed to resource in the new accounting regime.¹¹³ MRC is in a similar position to NERC in respect of their ownership of institutes, and that is presumably why they went to OST in January 2002. Mr Bloomer explained that NERC was unique in that it would hand back cash under EYF arrangements and then get it back the following year as a top up.¹¹⁴ **We fail to see why NERC should be treated differently for the purposes of End Year Flexibility from other Research Councils.**

50. It took nine months from the initial Treasury circular in April 2001 for OST to clarify with the Treasury how EYF would be applied under the new financial regime. OST acknowledges that

"prolonged exchanges between the appearance of the Treasury circular in April 2001 and the final resolution of the application to the Research Councils may have added to uncertainties."¹¹⁵

OST must take responsibility for taking so long to resolve this issue. By failing to inform the Research Councils of the basis of the End Year Flexibility calculations until three months before the end of the financial year, OST left those Research Councils in financial difficulties with very little room for manoeuvre. But NERC knew that discussions on this issue were ongoing and should have made sufficient provision to cater for an unfavourable outcome. Neither OST nor NERC showed the necessary urgency or foresight throughout 2001 in seeking to resolve this issue.

109 Extract from Report of NERC Council Audit Committee, December 2002; not printed.

110 Ev 55

111 HC Deb, 28 April 2002, col 109 W

112 Ev 55

113 Q 48

114 Q 48

115 EV 55

51. NERC acknowledges that they would have been able to cope with the carry over problem had they not already been financially overstretched. The Director of Finance told us that the Council had become too overcommitted and that “over-tensioning is good but £10 million is probably too much”.¹¹⁶ **NERC had not built up any reserves to enable it to cope with unforeseen expenses, in spite of the uncertainties surrounding the introduction of Resource Accounting and Budgeting. This was short-sighted and unresponsive financial management in the face of emerging difficulties.**

The solution

52. Having established that some £19m in savings needed to be made in the following financial year, NERC took a number of cost saving measures, including the delaying of initiatives and programmes and the reduction of its own office costs.¹¹⁷ We were told that NERC “bent over backwards to find the savings from within NERC’s own centres before we moved on to universities.”¹¹⁸ These savings were broadly equivalent to those made by the cancellation of the grant round.¹¹⁹ After negotiations with OST, NERC managed to secure a virement of £6.6m from capital to resource from the Treasury.¹²⁰ This avoided the need for any further drastic action. Options considered by Council to raise the money required included the delaying of the October 2002 non-thematic grant round and the cancelling of new PhD studentships and Masters courses for one year. These options were rejected on the grounds that would do more long term damage to environmental science in the UK. This was a fair assessment. Another option outlined was the delaying of the October 2002 non-thematic grants round and consolidating it with the March 2003 round.¹²¹ This was evidently not pursued. Little serious consideration appears to have been given to allowing more time to try to find savings elsewhere and to exploring these options with OST and the Treasury, with the option of cancelling or cutting funding for the December standard grant round if such efforts were unsuccessful. This response would at least have had the advantage of giving potential applicants more notice.

53. We asked whether NERC sought to explore the possibility of borrowing from Government. Mr Bloomer, who had only been with NERC since January 2002, told us that OST “did not at that time see the opportunity for another Council to help us”¹²² and said that OST did look at the potential of using other money within the Science Budget.¹²³ We suspect that OST did not try terribly hard to find NERC a loan, possibly for fear of being seen to accept some responsibility for the problem. This it has certainly sought to avoid. In a letter to *The Times* shortly after the news broke, the Director General of the Research Councils, Dr John Taylor, did not accept that the changes to accounting rules were the culprit, noting that “as NERC have made clear, the decision [to cancel the grant round] was its own.”¹²⁴

116 Q 42

117 Ev 4

118 Q 63

119 Ev 5

120 Q 43

121 www.nerc.ac.uk/aboutus/council.cnc1040402-finance.shtml

122 Q 53

123 Q 54

124 Letters to the Editor, *The Times*, Saturday 1 June 2002

54. When it became clear that the sum of the savings identified was insufficient, in spite of the £6.6m virement, the decision was taken on May 10 to cancel the standard research grant round, the closing date for which was 1 July. The NERC community was informed immediately. **We believe that NERC acted prematurely in cancelling the July 2002 grant round. However, in view of the part it played in contributing to NERC's financial difficulties, OST should have done more to help the Research Council find the money over ensuing financial years to avoid the need for any cancellation of a grant round.**

55. Response to the cancellation was relatively muted. NERC reports that only seven letters of complaint were received and point out that there had been no surge of applications in the following grant round of December 2002.¹²⁵ It may well be too early to judge the impact of the cancellation properly. The University of Leeds report that applicants were discouraged from competing in the December grant round because they assumed that it would be oversubscribed and were further discouraged by NERC informing them that, as a result of the cancellation, grant applications with minor errors in procedure would not be considered in December 2002.¹²⁶ The number of applications in the July 2003 grant round will reveal much about the true impact of the cancellation. **NERC should be prepared for a higher than usual number of high quality applications in the July 2003 grant round. If this is the case, we recommend that NERC gives careful consideration to devoting more resources than usual to funding the best applicants, without jeopardising budgets for future years.**

Steps taken to improve financial management

56. Since May 2002 NERC has taken a number of steps to improve its financial planning. It was already in the process of establishing a contingency reserve of 5% of the total budget and this decision was taken in April 2002. This is a sensible step, even if, at the time, it squeezed the budget still further and exacerbated NERC's financial difficulties. Two further qualified accountants were appointed and monthly reports began to be given to the new NERC Executive Board. In addition, OST has established a budgetary contingency reserve of £10m per annum to deal with any unforeseen financial pressures in any part of the Science Budget.¹²⁷ We were told that OST now shows all the Research Councils each others' results, so the situation would not arise now.¹²⁸ It is regrettable that such leadership and collegiality was not evident at the time. Research Councils already met regularly together: there was no excuse for them to miss this emerging problem. Professor Lawton believed that the establishment of RCUK would ensure that such matters were dealt with in a more cross-council, corporate way.¹²⁹ **Whilst we welcome the many steps that have been taken to improve financial control, it is too early for us to share the Chief Executive's confidence about RCUK's ability to help avert future problems.**

57. Since the problems of spring 2002, the financial situation has eased somewhat for NERC. This is in part due to unexpected recouping of £4m from the Science Budget as a

125 Ev 5

126 Ev 53

127 It is envisaged that this would not be carried forward.

128 Q 52

129 Q 53

result of NERC not attracting the expected sums from the European framework programme. NERC, along with another Research Council had to press OST and the Treasury hard to establish that the gap in EU target income could be bridged by OST and that such payments could be backdated to 2000–01. The application of the principle of EU additionality has been the subject of much confusion.¹³⁰ We note that the rules have recently been changed to enable Research Councils to offset half of their income won from EU framework programmes against spending within their departmental expenditure limits.¹³¹ We are examining this issue as part of our inquiry into *UK Science and Europe: value for money?*

Who was to blame?

58. **Although NERC has co-operated fully in providing us with the financial information we have requested, it has proved extremely difficult to extract with certainty the full story. From both NERC and OST there has been a strong reluctance to accept responsibility for error and a not quite so strong reluctance to point the finger elsewhere.** The financial mess in which NERC found itself in May 2002 was partly of its own making. It was guilty of poor planning in over-committing itself financially, a failure to establish a contingency reserve and a failure to put pressure on OST at an early enough stage to clarify all the financial implications of the introduction of RAB. This situation was not helped by the apparent lack of communication between the Research Councils on this issue. OST should also take a large share of the blame. The cancellation of a grant round could have been avoided had OST had resolved outstanding areas of confusion over the application of EYF at an earlier stage. Failing this, when NERC did go cap in hand to OST towards the end of the financial year, the Government could have done more to find the necessary money by way of a loan. We can understand why, given the situation, NERC chose to cancel a grant round but we believe that this action was unnecessarily hasty. The evidence we have seen—some of it in confidence—persuades us that the grant round need not have been cancelled at all. NERC could have given itself the opportunity to find the necessary savings elsewhere, given time. The latest forecast is that NERC will have a surplus of £7.6m for the 2002–03 financial year—almost enough to have funded the cancelled grant round.¹³² The final Accounts for the 2002–03 financial year will help clarify the picture further. **Although NERC was responsible for some poor financial management, we do not believe that OST was serving its Research Councils as well as it should. OST appeared to be incapable or unwilling to obtain straight answers at a timely stage from the Treasury on behalf of the Research Councils. We recommend that OST holds regular meetings with the Treasury and Research Council Finance Directors in order to resolve issues of concern and to engage in horizon scanning for future problems.**

130 Ev 31; NERC Audit Committee report; The evolution of the NERC financial position over the past eleven months, not printed.

131 HC Deb, 8 May 2003, col 807 W

132 See Table 1.

5 Knowledge transfer

59. The Strategic Plan pledges that NERC will increase investments significantly in commercialisation activities.¹³³ In line with this, NERC is spending an additional £4.5m over the 2002 Spending Review period to the existing £5m per year. This is in addition to the £600,000 over a two year period that NERC won from the OST Public Sector Research Establishment Challenge Fund. NERC has matched this investment and plans to support the activity with £1.1m over the next three years. The targets NERC has set for the for the spending of this Fund include:

- The identification of around 100 new ideas per year with commercial potential
- Developing business proposals for around 20 new cash generated ideas per year
- Developing and commercialising 2–3 significant business concepts per year.¹³⁴

60. NERC's current range of knowledge transfer activities form part of its exploitation strategy developed since 2000. A new knowledge transfer strategy agreed in June 2003 requires recipients of funding to try to ensure that the outcomes of research projects have an impact on enhanced competitiveness and quality of life and to report back on this. The aim is to promote entrepreneurship and the commercialisation of research and to promote partnership between research and users. All thematic and core strategic research programmes have an exploitation strategy which cover communication of results, the use of partnership and technology transfer schemes and intellectual property rights exploitation. Specific knowledge transfer activities which NERC run or participate in include:

- A £500,000 Innovation Fund launched in 2000 to provide assistance to NERC ventures in the early stages of commercialisation
- The small business research initiative to help build and support a research capability in small companies (£550,000 awarded to date)
- The Business Plan Competition to help researchers turn science into business (£74,000 provided by NERC in 2001–02)
- The Exploitation Best Practice Network, comprising representatives from all the NERC outposts
- The Capacity Building Project to help identify prospective new ideas for commercialisation
- Funding for two Faraday partnerships worth a total of £750,000
- Co-operative Awards in Science of the Environment (CASE studentships) to enable students to gain experience of industry (£2.65m expenditure in total in 2001–02)

¹³³ Strategic Plan, p 15

¹³⁴ Ev 35

- LINK programme to encourage innovative research with the potential for commercial exploitation (£183,000 spent in 2001–02)
- NERC Connect Scheme to promote interactions between researchers and users of the research (£337,000 in 2001–02)

It is perhaps too early to judge whether these schemes are bearing fruit, particularly at a time when raising venture capital for new start-ups is difficult. NERC has only one spin-out company in which it retains some equity. Formed in 1998 to exploit work at the Centre for Ecology and Hydrology, Evolutec operates as a virtual company, developing drugs for the treatment of asthma and other diseases.¹³⁵ It is apparently experiencing financial difficulties in a tough competitive environment. Partly in order to protect its own investment, NERC has loaned £262,000 to the company (and has secured an enhanced royalty in exchange).¹³⁶ Since 1999 three other companies have been spun out using NERC science, although it no longer retains a shareholding. The exploitation strategy is designed to support more such companies. There have been some success stories: in 2001–02 eight patents were registered by NERC funded scientists, making a total of 51 since 1997–98—a reasonable rate of return. But it is the exploitation of such patents that has too often been the weakness. We look forward to the publication later this year of the DTI's Innovation Strategy, which should address this issue in the context of providing a framework for future knowledge transfer support.

61. Although the innovation strategy is barely three years old, NERC is now carrying out a comprehensive review to assess the needs and preferences of users of the various knowledge transfer schemes. A report is expected by the end of 2003 and the aim is to produce a new knowledge transfer strategy by March 2004.¹³⁷ In spite of the fact that this review is not complete, NERC is planning to launch, in partnership with EPSRC and BBSRC a proof of concept fund to help demonstrate the commercial potential of ideas.¹³⁸ We hope that there are significant benefits in joining with other Research Councils to produce a bigger pot, which might be more attractive to companies whose activities do not fit easily under the umbrella of a single Research Council. This will be an improvement on the existing modestly funded innovation fund.

62. In spite of the welcome increases in spending on knowledge transfer activities over the 2002 Spending Review period, only around 3% of overall annual expenditure is devoted to them. The development of the new strategy should seek to identify what is a respectable “rate of return” for this expenditure. It should also investigate the possibility of establishing more of the knowledge transfer awards on a cross-council basis with one or more other Research Councils. The worldwide market for environmental goods and services is an estimated £335bn¹³⁹ and is forecast to grow to over £1,000bn by 2010. This is a growth area: **NERC should devote the necessary resources to a new knowledge transfer strategy in order to provide an opportunity to take full advantage of the immense commercial opportunities that might arise as a result of NERC's science.**

135 www.evolutec.co.uk

136 Ev 36

137 Operating Plan 2003–04, p 23; ev 37

138 Ev 37

139 Strategic Plan, p 15

6 Science in Society

63. Science in Society is a programme run by NERC designed to improve the public understanding of science at a cost of £2m per year. This money support activities such as:

- exhibits at museums
- visits by students to schools in order to promote careers in science
- an allowance for fundholders to pursue Science in Society activities (2% of the grant)
- the training of 150 people each year in communication skills and development of guidelines on how to undertake public dialogue.¹⁴⁰

The objectives of the programme are twofold: to promote a dialogue in science, including listening to common concerns about science; and to promote openness, transparency and accountability in the delivery of science.¹⁴¹

64. The aims of this programme are worthy and the expenditure is not disproportionate to its importance. The actual impact of these activities are, as NERC witnesses acknowledged, extremely difficult to measure, particularly if the aim is to isolate the impact of NERC's programme from other related activities.¹⁴² Some projects are more effective than others. For example, we were told that NERC had held an open Council meeting and forum in Birmingham but, in spite of the expenditure of "a lot of money on advertising" only 30 people attended. A similar meeting in Cardiff attracted a mere 20 people. In Birmingham the additional costs of holding the meeting in public amounted to just under £100 per person.¹⁴³ Whilst the commitment to openness is admirable, the focus in this case has been a touch misguided. Trying to attract people to routine Council meetings seems to be a particularly optimistic but fruitless exercise.

65. There are many exciting things going on under NERC auspices, and many are captured by its *Planet Earth* magazine. NERC has contributed directly to Government policy in forums like the International Committee on Climate Change and to addressing major problems such as the disposal of carcasses during the foot and mouth crisis in 2001.¹⁴⁴ NERC's programmes have supported pioneering work in ocean surveying, weather modelling and the development of satellite sensors, to cite but a few examples.¹⁴⁵

66. NERC should be in a strong position to promote its science and improve public understanding of the environment. It supports an area of science which is constantly in the news, partly as a result of the activities of vocal pressure groups. The DTI Annual Report maintains that "society's interest in environmental science is second only to medical

140 Q 82; ev 2

141 Q 84

142 Q 91

143 NERC News, Winter 2001, p 1

144 NERC Output and Performance Indicators, 2001–02

145 Ev 3; Q 31

science.”¹⁴⁶ Yet even in well trodden areas of environmental science, the public remains disappointingly ill-informed. A recent Report by the Economic and Social Research Council looked at the impact of media coverage on public understanding of science-related issues. It found that whilst “there is a fairly high degree of public awareness that human activities are said to cause climate change most people clearly don’t know what the greenhouse effect is or how it works”.¹⁴⁷ The media have a heavy responsibility for the state of public knowledge on science as on other issues, but it is up to the Research Councils to ascertain where and how they can most usefully get their message across and then to develop links accordingly. We believe that Science in Society activities are most effective if part of a co-ordinated campaign involving other Research Councils, Government departments, the Royal Society, learned societies and others. Professor Lawton was conscious of the limited success the science community has had in improving public understanding of science. He acknowledged that “we could do a better job in this area”¹⁴⁸ and he supported a common approach to improving national performance.¹⁴⁹ We are disappointed about the rate of progress of public communication on science, not least in the area of environmental science. **We accept that NERC is but one player in a large field, but we look to NERC to take responsibility for coming forward with imaginative and inclusive schemes to improve public understanding of environmental sciences.**

7 Representation of women and ethnic minorities

67. Research Councils, along with other public bodies, were set a target in the 2000 Science and Innovation White Paper of increasing female representation on decision making bodies to 40% by 2005. The previous target of 30% by 2000 was not met by NERC: only 19% of NERC Council members were women in 2000–01. Current representation is set out in Table 8 below. NERC has taken steps to improve the career prospects of women by reducing the use of fixed term appointments, conducting two equal pay audits and introducing a merit promotion scheme whereby all eligible staff are able to nominate themselves. NERC “remain concerned that within the research community more generally the opportunities arising from recent legislative changes are not being taken”.¹⁵⁰ Reaction has indeed been slow in many quarters, including NERC: it is only recently that it has extended open ended contracts to staff of both genders.¹⁵¹

146 DTI Annual Report, CM 5416, p 56

147 ESRC, Towards a better map: Science, the public and the media, p 50

148 Q 85

149 Qq 89 and 100

150 Ev 44; The Committee discussed the impact of short term contracts in its Eighth Report of 2001–02, Short term contracts in science and engineering, HC 1046

151 Ev 44

Table 8: Representation of Women on Major NERC Committees

Group	Membership	Women
Council	16	5 (31%)
Science & Innovation Strategy Board	17	3 (18%)
National Executive Board	11	1 (9%)

Source: NERC evidence, p 34

68. We note that NERC is to establish a working group to study perceived and actual barriers to the career progression of female NERC staff. It will look at the impact of NERC culture and working practices and suggest ways that these issues can be addressed. This is a serious and welcome attempt to address the problem, but it is overdue. We note that a mentoring scheme for women in 1999 was delayed owing to a wider study of career progression and gender issues.¹⁵² It is not clear what happened to this study. The problems of the success of women in science have been well documented, and the recommendations of the Greenfield Report of November 2002 should be taken into account in the work of the working group.¹⁵³ The situation has slowly improved over the last three years but, looking at the structure of the current workforce at NERC in Table 9, where the senior pay bands remain predominantly filled by men, the 40% target is not likely to be achieved.

152 NERC, Operating Report 2002, p 9

153 Report is available at http://www.set4women.gov.uk/set4women/research/the_greenfield_rev.htm

Table 9: Male and female staff representation in each of the NERC Bands from Band 4 (Senior Management) to Band 8 (junior) since 1998:

	1998		2001		2003	
	Male	Female	Male	Female	Male	Female
Band 4	361	28 (7%)	315	29 (8%)	297	39 (12%)
Band 5	325	62 (16%)	296	69 (19%)	344	85 (20%)
Band 6	407	176 (30%)	390	191 (33%)	399	218 (35%)
Band 7	221	227 (51%)	190	237 (56%)	189	251 (57%)
Band 8	111	304 (73%)	105	316 (75%)	109	311 (74%)

Source: NERC evidence, p 34

69. Efforts to improve representation from ethnic minorities have been even less successful. Research carried out in 1998 established that numbers of ethnic minority graduates in subjects from which NERC usually recruits were very low (0% in the earth sciences). In spite of some measures taken since then, numbers remain very low and concentrated in certain disciplines such as maths, physics and IT.¹⁵⁴ NERC has been implementing new initiatives aimed at encouraging applicants from the wider ethnic community, including selective advertising, but with little apparent effect. Difficulties in attracting a cross section of society have been experienced by the wider scientific community. We are pleased to note that the Research Councils are participating with the Government and industry in a working group addressing the causes of these recruitment difficulties.

70. NERC was quicker than some in recognising the unacceptability of an almost exclusively white, male work force. But it has not followed up and addressed the causes of this imbalance with vigour or much success. It is right that this situation is being addressed by all parties involved rather than by Research Councils in isolation. We see little merit in the Government setting unrealistically high targets when earlier lower targets have not been met. This risks placing unreasonable pressure on the recruitment process. Nevertheless, we welcome NERC's belated attempts to address assess those contributory factors which are relevant to itself, as well as its participation in broader programmes. We look forward to seeing how rapidly it takes forward the results of current work.

8 Conclusion

71. In this short inquiry we have not delved into every aspect of NERC's activities and performance. However, its centres and institutes seem to have developed strong links and working relationships with most, if not all, parts of its user community. There is more work to do in certain areas. We welcome and support further moves towards interdisciplinary approaches to the funding of environmental science, with grant schemes adjusted accordingly in co-operation with other Research Councils.

72. NERC sets a good example to other Research Councils on many fronts: in the open way it operates, the establishment of the peer review college and new financial framework are progressive moves. But we have detected a hint of complacency about NERC's role in supporting its science base. We believe that NERC should take more responsibility for the health of environmental science: it is already clear that immediate and imaginative attempts are needed to improve the strength of certain disciplines.

73. We have concluded that NERC's financial management was weak in the lead up to the introduction of resource accounting and budgeting. Having got itself into difficulties, NERC passed the burden to its user community rapidly and did not extricate itself as skilfully as it might have done. Nonetheless, NERC could have reasonably expected some more help from other Research Councils and OST. Since then, NERC has taken firm action to improve its financial management and its decision making capabilities, which should improve confidence in its performance. We are still left with concerns about the ability of OST to establish clear financial guidelines with the Treasury for the benefit of its Research Councils. We look to Research Councils UK to improve co-ordination between them and to ensure that similar financial problems are averted.

Conclusions and recommendations

Research support

1. We support the bottom–up approach adopted by NERC to the development of a strategic framework within which to take decisions on funding. (Paragraph 0)
2. We recommend that NERC publishes in its Annual Report or Operating Plan financial information so as to make funding under the new and old frameworks comparable. (Paragraph 0)
3. We recommend that NERC include in its Operating Plan a clear summary of the principles underlying the allocation of different categories of grant according to the identified strategic priorities. (Paragraph 13)
4. The earth sciences are ahead of other disciplines in terms of the funding of masters courses and fellowships and overall provision remains healthy. This no doubt reflects the fact that earth science is the largest subject area. NERC has used this high level of support to play down the fact that support for training in earth science has dropped in recent years and that the proportion of its Science Budget funding allocated to this area has also fallen. For a Research Council that prides itself on openness and transparency this is extremely disappointing. If support has been cut in order to support other areas of higher priority or because the quality of research proposals is below par, NERC should not be shy of acknowledging this; but it should be taking active steps to explain and justify this outcome to its user community. We recommend that NERC publishes figures in its Operating Report which indicate clearly the level of support given to each science discipline each year. (Paragraph 18)
5. We recommend that NERC takes immediate action to focus its support for masters students to support those disciplines in which there are clearly identified and agreed shortages. (Paragraph 20)
6. We recommend that NERC, as a matter of routine, monitors the reasons for the take–up rates of PhD stipends in subjects and feeds the results into its funding strategy. (Paragraph 21)
7. We welcome NERC’s efforts to work in partnership with other Research Councils to provide a range of opportunities to scientists working at the cusp of different scientific disciplines. We would encourage OST and Research Councils UK to promote more such initiatives, particularly in the context of the cross–council programmes. (Paragraph 23)
8. We welcome the effort to fund all top quality research proposals but would view it as a very disturbing sign of the health of environmental science if it was quality of applications rather than limited funds that kept the success rate down at recent levels. (Paragraph 25)

9. We recommend that NERC sets itself challenging targets for both thematic and blue skies awards success rates and takes decisive steps to achieving them by improving its dialogue with the research community. (Paragraph 26)
10. We recommend that Research Councils UK takes the lead in promoting compatibility and greater uniformity in the practices and procedures of the grant awarding process amongst the six grant awarding Research Councils. (Paragraph 27)
11. In principle, we welcome the establishment of the new peer review college. We recommend that NERC publishes guidelines on how it will operate, establishes targets for the processing of applications and monitors the cost of the new system. We also recommend that the process is made as transparent as possible, with the publication of the names of referees in respect of each grant application. (Paragraph 29)
12. NERC should not turn a blind eye to the impact on environmental science departments in universities of its policies but should instead make concerted efforts, in conjunction with the Department for Education and Skills, to support the development and maintenance of a strong environmental base across the university system. (Paragraph 32)
13. We recommend that NERC seeks to establish on a bilateral basis arrangements with universities to monitor the quality of grant applications. Where such arrangements are satisfactorily established, NERC should relax its rules to permit post-doctoral research assistants to apply for funding in their own right as Principal Investigators. (Paragraph 33)
14. We applaud NERC's efforts to monitor closely the performance of their institutes and centres and support the policy of rationalisation, where this can be justified on grounds of costs and where reasonable guarantees can be given that there will be no detrimental effect on environmental research. (Paragraph 38)
15. We commend the actions NERC has taken to improve its provision of information to user groups and to give an insight into its decision making processes. We believe that NERC has set a good example for other Research Councils. (Paragraph 39)
16. Perhaps English Nature have not been articulating their concerns loudly enough, but we were nonetheless surprised that NERC had been unaware of the reports of skills shortages in nature conservation from an organisation with interests so central to NERC's mission. (Paragraph 41)
17. We welcome the aim of the Environmental Funders' Forum to improve strategic decision making and coherence across the environmental science sector. We recommend that NERC sets out clearly how the work of the Forum feeds into its own strategic decision making to enable its community to engage appropriately with the Forum and NERC's existing consultative mechanisms. (Paragraph 44)

Financial management

18. We fail to see why NERC should be treated differently for the purposes of End Year Flexibility from other Research Councils. (Paragraph 49)
19. OST must take responsibility for taking so long to resolve this issue. By failing to inform the Research Councils of the basis of the End Year Flexibility calculations until three months before the end of the financial year, OST left those Research Councils in financial difficulties with very little room for manoeuvre. But NERC knew that discussions on this issue were ongoing and should have made sufficient provision to cater for an unfavourable outcome. Neither OST nor NERC showed the necessary urgency or foresight throughout 2001 in seeking to resolve this issue. (Paragraph 0)
20. NERC had not built up any reserves to enable it to cope with unforeseen expenses, in spite of the uncertainties surrounding the introduction of Resource Accounting and Budgeting. This was short-sighted and unresponsive financial management in the face of emerging difficulties. (Paragraph 51)
21. We believe that NERC acted prematurely in cancelling the July 2002 grant round. However, in view of the part it played in contributing to NERC's financial difficulties, OST should have done more to help the Research Council find the money over ensuing financial years to avoid the need for any cancellation of a grant round. (Paragraph 54)
22. NERC should be prepared for a higher than usual number of high quality applications in the July 2003 grant round. If this is the case, we recommend that NERC gives careful consideration to devoting more resources than usual to funding the best applicants, without jeopardising budgets for future years. (Paragraph 55)
23. Although NERC was responsible for some poor financial management, we do not believe that OST was serving its Research Councils as well as it should. OST appeared to be incapable or unwilling to obtain straight answers at a timely stage from the Treasury on behalf of the Research Councils. We recommend that OST holds regular meetings with the Treasury and Research Council Finance Directors in order to resolve issues of concern and to engage in horizon scanning for future problems. (Paragraph 58)

Knowledge transfer

24. NERC should devote the necessary resources to a new knowledge transfer strategy in order to provide an opportunity to take full advantage of the immense commercial opportunities that might arise as a result of NERC's science. (Paragraph 62)

Science in society

25. We accept that NERC is but one player in a large field, but we look to NERC to take responsibility for coming forward with imaginative and inclusive schemes to improve public understanding of environmental sciences. (Paragraph 66)

Representation of women and ethnic minorities

26. NERC was quicker than some in recognising the unacceptability of an almost exclusively white, male work force. But it has not followed up and addressed the causes of this imbalance with vigour or much success. It is right that this situation is being addressed by all parties involved rather than by Research Councils in isolation. We see little merit in the Government setting unrealistically high targets when earlier lower targets have not been met. This risks placing unreasonable pressure on the recruitment process. Nevertheless, we welcome NERC's belated attempts to address assess those contributory factors which are relevant to itself, as well as its participation in broader programmes. We look forward to seeing how rapidly it takes forward the results of current work. (Paragraph 70)

ANNEX A

Institutes owned by NERC are:

British Antarctic Survey, Cambridge

British Geological Survey, Nottingham

Centre for Ecology & Hydrology, based at 9 centres throughout the UK

Proudman Oceanographic Laboratory, Birkenhead, Merseyside

NERC collaborative centres are listed below:

Southampton Oceanography Centre (in partnership with University of Southampton)

Centre for Observation & Modelling of Earthquakes & Tectonics, Oxford University

Centre of Observation of Air-Sea Interactions & Fluxes, Plymouth

Centre for Polar Observation & Modelling, University College London,

Centre for Population Biology, Imperial College, London

Centre for Terrestrial Carbon Dynamics, University of Sheffield

Climate & Land Surface Systems Interaction Centre, University of Wales, Swansea

Data Assimilation Research Centre, University of Reading

Environmental Systems Science Centre, University of Reading

NERC Centres for Atmospheric Science, University of Reading

National Institute for Environmental eScience, Cambridge University

Plymouth Marine Laboratory, Plymouth

Scottish Association for Marine Science, Oban, Scotland

Sea Mammal Research Unit, University of St Andrews

Tyndall Centre, University of East Anglia

ANNEX B

REMIT AND OBJECTIVES OF NERC SCIENCE AREAS

Earth Sciences

Remit

- Geological Sciences
- Aeolian post depositional processes
- Surface geomorphology (i.e. slopes, erosion of land surfaces)
- Glaciology (Glacial tectonics, ice deformation and mechanics)
- Structural and Tectonic Studies;
- Mineralogy, Petrology and Geochemistry, Volcanology, Sedimentology, Palaeontology Planetology (where relevant to Earth System Science), Taphonomy, Terrestrial and Marine Geophysics
- Engineering and Resource Geology, Planetology; Dating methods
- Archaeological prospect techniques
- Processes affecting the archaeological record
- Development of trade and technology through the analysis of archaeological materials
- Analysis of archaeological materials and conservation of archaeological materials.

Terrestrial Sciences

Remit

"Research proposals must be focussed on environmental issues and must clearly demonstrate how the proposed work would directly benefit and improve our understanding of the terrestrial environmental sciences. The areas of research covered include:

- biology of terrestrial animals, plants and micro-organisms at the level of individuals, populations or communities in relation to their natural environment
- taxonomy and biodiversity studies relating to organisms in their terrestrial environment
- aspects of soil science
- remote sensing of terrestrial environments.

In addition, Science Based Archaeology is included within NERC remit. The areas of research covered by the Terrestrial Sciences PRC include:

- evolution of human diet, health and disease
- human evolutionary history
- modelling change in human ecosystems"

Freshwater Sciences

Remit

"Biology of freshwater animals, plants and micro-organisms at the level of individuals, populations or communities in relation to their natural environment. Taxonomy and biodiversity studies of freshwater organisms and environments. Hydrology and glacial hydrology; limnology; fluvial geomorphology and erosion of land surfaces by water; hydrogeology; chemistry of freshwaters and their associated sediments, and groundwater. Research proposals must be focused on environmental issues and must clearly demonstrate how the proposed work would directly benefit and improve our understanding of the freshwater environmental sciences."

Marine Sciences

Research proposals must be focused on environmental issues and must clearly demonstrate how they would directly benefit and improve our understanding of the marine environmental sciences. The areas of research covered include:

- physical, chemical and biological oceanography;
- coastal and estuarine processes (including sediment dynamics);
- biology and ecology of marine and estuarine organisms at the level of individuals, populations or communities in relation to their natural environment;
- taxonomy and biodiversity studies of marine and estuarine organisms and environments;
- sea ice/climate interactions;
- marine aspects of ocean-atmosphere interactions;
- Earth Observation science and technology related to marine processes and systems

Earth Observation Expert Group

NERC's Earth Observation programme aims to:

- allow NERC scientists to take advantage of new observations throughout the world
- access new science by developing techniques and new instrument concepts
- strengthen the NERC community to do both of these effectively

The Earth Observation Expert Group is an advisory panel that steers the NERC Earth Observation programme. The Group will:

- define and oversee the development of the NERC Earth Observation programme.
- identify the opportunities for the use of Earth Observation to enhance the scientific excellence of all NERC-sponsored science.
- monitor that excellent science using Earth Observation is not only supported but performed.
- work with other agencies and BNSC in particular to ensure that the observations necessary for the execution of NERC science are being obtained.
- identify and promote within the ESA programme the technology which is appropriate for NERC science to be carried out.
- liaise with UK industry to ensure the successful commercial exploitation of new scientific and technological developments.

Science-Based Archaeology Strategy Group

The Science-Based Archaeology Strategy Group (SBASG) primary objective is to represent the research community interest and to provide an integrated view of Science-Based Archaeology within NERC.

The Science- Based Archaeology Strategy Group (SBASG) will:

- review the integration and implementation of the Strategy for Science- Based Archaeology by the SISB, ensuring that it complements other NERC strategies;
- review and assess the core capability and infrastructure of research and postgraduate education and training necessary to sustain the national SBA activity in relation to the overall requirements of Council and SISB;
- provide a focus for, and maintain links with, the SBA User community;
- provide advice on, and facilitate links with, international aspects of Science- Based Archaeology;
- monitor NERC support in SBA- related research areas, having particular regard for research activity in areas not formally part of NERC's remit;
- advise the Science and Technology Board on the provision and development of appropriate SBA- related scientific services; and
- receive and comment on reports from relevant Thematic Programme Steering Committees, Review Groups and other ad hoc Working groups, jointly with SISB.

Atmospheric Science

NERC Atmospheric Science objectives are as follows:

- To understand the fundamentals of atmospheric processes together with relevant aspects of the underpinning chemistry, mathematics and physics.

- To understand the behaviour of coupled systems; eg ocean-atmosphere coupling, land-atmosphere interactions, the interaction of chemistry, radiation and transport.
- To improve predictive capabilities, eg through establishing the underlying causes of climate change, extreme weather events and pollution episodes.
- To develop interdisciplinary research aimed at climate change impacts.

Formal minutes

Monday 7 July 2003

Members present:

Dr Ian Gibson, in the Chair

Dr Brian Iddon
Mr Robert Key

Geraldine Smith

The Committee deliberated.

Draft Report (The Work of the Natural Environment Research Council), proposed by the Chairman, brought up and read.

Summary agreed to.

Paragraphs 1 to 73 read and agreed to.

Resolved, That the Report be the Fifth Report of the Committee to the House.

Ordered, That the Chairman do make the Report to the House.

Ordered, That the Appendices to the Minutes of Evidence taken before the Committee be reported to the House.

[Adjourned till Monday 14 July at 4.00pm.]

Witnesses

Wednesday 30th April

Page

Professor John Lawton, Chief Executive, **Dr David Lynn**, Director, Science and Innovation and **Mr David Bloomer**, Director, Finance and Information Systems, Natural Environment Research Council, **Professor Anne Glover**, Department of Molecular & Cell Biology, University of Aberdeen and NERC Council Member.

Ev 14

List of written evidence

1	Natural Environment Research Council	Ev 1: Ev 29: Ev 55
2	Geological Society of London	Ev 42
3	Environment Agency	Ev 43
4	English Nature	Ev 46
5	School of Earth Sciences, University of Leeds	Ev 49
6	Hanson Quarry Products Europe Limited (HQPE Ltd)	Ev 50
7	South East England Development Agency (SEEDA)	Ev 51
8	Environmental Industries Commission	Ev 51
9	University of Leeds	Ev 52
10	Secretary of State for Environment, Food and Rural Affairs	Ev 53
11	DTI Office of Science and Technology	Ev 53

Reports from the Science and Technology Committee since 2001

The following reports have been produced by the Committee since the start of the present Parliament. The reference number of the Government's response to the Report is printed in brackets after the HC printing number.

Session 2002–03

First Report	The Work of the Particle Physics and Astronomy Research Council	HC 161 (HC 507)
Second Report	Annual Report 2002	HC 260
Third Report	The Work of the Medical Research Council	HC 132 (CM 5834)
Fourth Report	Towards a Non-Carbon Fuel Economy: Research, Development and Demonstration	HC 55-I (HC 745)
First Special Report	Government Response to the Science and Technology Committee's Fifth Report, Session 2001-02, Government Funding of the Scientific Learned Societies	HC 53
Second Special Report	Government Response to the Science and Technology Committee's Sixth Report, Session 2001-02, the National Endowment for Science, Technology and the Arts: A Follow-up	HC 276
Third Special Report	Government Response to the Committee's Seventh Report, Session 2001-02, The Office of Science and Technology: Scrutiny Report	HC 293
Fourth Special Report	Government Response to the Committee's Eight Report, Session 2001-02, Short-term Contracts in Science and Engineering	HC 442

Session 2001–02

First Report	Cancer Research – A Follow-Up	HC 444
Second Report	The Research Assessment Exercise	HC 507 (HC 995)
Third Report	Science Education from 14 to 19	HC 508-I (HC 1204)
Fourth Report	Developments in Human Genetics and Embryology	HC 791
Fifth Report	Government Funding of the Scientific Learned Societies	HC 774-I
Sixth Report	National Endowment for Science, Technology and the Arts: A Follow-Up	HC 1064
Seventh Report	The Office of Science and Technology: Scrutiny Report 2002	HC 860
Eight Report	Short-Term Research Contracts in Science and Engineering	HC 1046
First Special Report	The Government's Response to the Science and	HC 360

	Technology Committee's Fourth Report, Session 2000–01, on The Scientific Advisory System	
Second Special Report	The Government's Response to the Science and Technology Committee's Sixth Report, Session 2000–01, Are We Realising Our Potential?	HC 361
Third Special Report	The Government's Response to the Science and Technology Committee's Seventh Report, Session 2000–01, on Wave and Tidal Energy	HC 377
Fourth Special Report	Government Response to the Committee's Third Report of Session 2000-01, on Scientific Advisory System: Scientific Advice on Climate Change	HC 493