

**GOVERNMENT RESPONSE TO THE HOUSE OF COMMONS
SCIENCE AND TECHNOLOGY COMMITTEE REPORT
“INVESTIGATING THE OCEANS”**

On 18 October 2007 the Science and Technology Committee published its Tenth Report of Session 2006-07, *Investigating the Oceans* [HC 470-I],

<http://www.publications.parliament.uk/pa/cm200607/cmselect/cmsctech/470/470i.pdf>

On 19 December 2007 the Government submitted a response to the Innovation, Universities and Skills Committee. The response is attached.

Government Response:

Introduction

The Government welcomes the Committee’s report which is timely and identifies a number of key issues which affect marine science, including its management and coordination. The report also highlights some important weaknesses in the current system and proposes a number of solutions, the central one being the creation of a new marine agency.

The Government accepts many of the Committee’s recommendations. It does not however accept that a new agency offers the best solution. This Response proposes adopting an alternative to the agency, and replies in detail to each of the 59 conclusions and recommendations. By its nature, the Committee’s report has covered some policy areas that are devolved to the administrations in Wales, Northern Ireland and Scotland. The reply has been prepared with their co-operation.

Recommendation for a marine agency

The Committee suggests that many of its recommendations can best be tackled through the creation of a new marine agency. Because of the prominence given by the Committee to the agency as a proposed solution the Government wishes to address this issue first.

The Committee’s report calls for the replacement of IACMST and the creation of a new agency in order to tackle many of the current weaknesses of marine

science management and co-ordination. Whilst the Committee states that this is its **preference** it also leaves open the possibility of other mechanisms being proposed. For example recommendation 37 asks that the marine agency “or an **equivalent body**” should facilitate the release of data; and recommendation 58 includes earlier reference to an executive body such as the agency or a **successor** body to IACMST with substantially greater powers to develop a marine science strategy.

The Government has carefully considered the Committee’s recommendation to establish a new marine agency, but has decided instead to adopt an alternative approach, that of creating a new committee which will replace IACMST and bring the principal funders together into an effective group.

The reasons why the Government rejects the Committee’s recommendation to create a marine agency in order to address current weaknesses are as follows:

- i. The creation of a UK marine agency is not feasible given current developments related to devolution.
- ii. The new agency will require additional funding at a time when budgets are under pressure.
- iii. The Government wishes to respond rapidly to the Committee’s recommendations and creating a new agency would, in the Government’s opinion, delay this.
- iv. UK marine science ranges from blue sky, basic research of the type supported by Research Councils, to “applied” research funded by Departments for the purpose of providing “evidence” to policy. A “one size fits all” approach to marine science as suggested by the creation of an agency is not seen as appropriate.
- v. Marine policy is the responsibility of a number of different departments and funding agencies. Each of these has specific requirements for marine science, including providing “evidence” on which to base specific marine policies and decision making. These departments and agencies are themselves responsible for ensuring that there is effective communication with stakeholders, developing collaborative links, ensuring facilities and vessels are used effectively etc. It would not be appropriate to pass some of these responsibilities to a new executive agency.

In summary the Government’s overall rationale for preferring an alternative to the agency is that the Departmental funders of marine science are best placed, and should be responsible for, the proper management of their science, including effective collaboration and coordination with others. The Government considers that creating an agency risks the science being too remote from those who need

it. The “marine” label implies a uniformity of purpose among agencies which is not in practice the case. Government agencies address a wide range of different policy issues which, though they all take place in a marine context and may interact, are no more closely linked than all terrestrial activities and are better managed separately. The Government considers that it is for the funders to tackle weaknesses, either individually or together as appropriate, rather than creating a new executive body.

Taking the above into account the Government proposes instead to create a new committee, the Marine Science Co-ordination Committee (MSCC), which will bring together the principal public investors in marine science to tackle cross-Departmental issues identified in the report.

Proposals for the Marine Science Co-ordination Committee

The Government accepts that the current cross-Departmental mechanisms for marine science management and co-ordination, undertaken by the Inter-Agency Committee on Marine Science and Technology (IACMST), has its weaknesses. IACMST has also had some successes which should not be overlooked. The Government wishes to tackle the weaknesses and build on the successes. This section of the Government’s response sets out the current thinking on the function, membership, working arrangements, governance, reporting and timing of the new Committee.

The time constraints placed on providing the Government response means that it has not been possible to reach detailed agreement on all aspects of the new committee, including reporting lines. However Defra¹, DIUS, Scottish Government, DARDNI, MOD, EA and BERR, the principal funders of marine science, have reached broad agreement that a new committee is a more practical and realistic option to that of creating a new marine agency.

Function

The MSCC will provide new leadership in coordinating and ensuring a strategic approach to marine science in the UK, working closely with the wide range of bodies involved in this area to add value to existing programmes and activities. An early priority will be to lead development of a marine science strategy, and to address other recommendations from the Committee’s report which cannot best be addressed either through current co-ordination mechanisms or by individual sponsors on their own.

Membership

MSCC will be composed of the main Government funders of marine science, including NERC. Meetings will be attended by senior Departmental/Agency

¹ Defra’s science programme takes into account research needs in Wales.

officials, including their scientific advisers, who have specific responsibilities for the funding and management of marine science, and are able to make decisions after the normal consultation process within their departments.

Working arrangements

A memorandum of understanding, collaborative agreement, or other such mechanism, will be developed and signed by all members. This will set out the agreed way of working for the committee including what is expected of each member, the level of annual funding to be provided for the committee's business and the adoption of a work plan. The committee will be supported by an appropriately resourced secretariat. The committee will also be supported by a number of working groups which will be commissioned to undertake specific pieces of work, resourced by the committee. Involvement of the wider stakeholders including industry will be through these groups. Specialists from academia and stakeholders including from industry will be invited to attend committee meetings as appropriate.

Governance and reporting

The MSCC will be chaired by a member of the committee, probably on a rotating basis. The committee will produce an annual report which sets out progress made during the year including any constraints encountered, how these are to be tackled, and setting out plans for the committee's work over the coming 12 months. MSCC's reporting arrangements have still to be agreed between the proposed members, and will be developed as part of detailed planning work for its establishment over the next 4-6 months, to ensure it has the right levers and authority to be able to deliver. Options include one or more of the following:

- Reporting through a Minister in a lead Department and in the Devolved Administrations.
- Reporting to the relevant ministers in member departments and the Devolved Administrations
- Reporting to the Chief Scientific Advisers in each member department and the Devolved Administrations , or their equivalent.
- On any interdepartmental issues that need resolving, reporting to the Sub-Committee on Environment and Energy of the Ministerial Committee on Economic Development subject to normal concordat arrangements in the formulation of the UK position.

In addition, the Committee might present a report annually to the Chief Scientific Advisers' Committee (CSAC), chaired by the Government Chief Scientific Adviser.

Timing

The committee will form and have its first meeting within four to six months of the date of this response. The committee's first priority will be to agree on the shape and content of a UK Marine Science Strategy, and to commission its drafting.

The above sets out the broad plans for the new committee. Further details are provided in the response to specific recommendations. Specific responses provided by the Research Councils are indicated in italics.

Government Response to Committee's Conclusions and recommendations

Exploitation of the oceans

- 1. We recommend that greater research effort be directed by UK public sector funders towards the understanding and mitigation of the impact of fishing on marine environments, and the coming Marine Bill must address this issue. (Paragraph 32)**

The Marine Bill will introduce new mechanisms for managing marine activities and protecting marine resources. In particular a new system of marine planning will enable us to take a strategic view of the way in which different marine activities, including fisheries, are interacting in particular areas of the sea, and the cumulative impact they are having on the environment and natural resources.

Research provides a valuable source of information to help ensure that any new planning and management processes introduced by the Marine Bill work effectively. There are already extensive research efforts into the impacts of fishing and mitigation methods and results have significantly advanced our knowledge in this area. For example research funded by Defra at Cefas has led to methods for predicting the effects of fishing on the structure of fish communities and the abundance of rare fish species. This has supported the development of indicators of the effects of fishing on marine food webs and rare and vulnerable species, all of which help to provide information on trends in marine biodiversity.

Research on other aspects of impacts of fishing includes work on fishery/seabird interactions funded by the Scottish Government, and research quantifying the effects of different gear types on the marine ecosystem and the length of time needed for ecosystem recovery at Plymouth Marine Laboratory.

Research has also helped identify practical measures that can be taken to reduce fishing impact. Collaborative research with the fishing industry has led to the re-design of fishing nets to reduce undesirable bycatches in fisheries where they are known to occur. An example is the development of a 'benthos release

panel' to reduce the impact of beam trawling on bottom-dwelling communities and small non-commercial fish.

Defra has also funded significant work with the Sea Mammal Research Unit of St. Andrews University which has provided a greatly improved understanding of the nature and scope of the problem of bycatch of small cetaceans in different fishing gears and of possible mitigation measures.

Taken together, this work provides a good knowledge base of fishing impact and advice for developing appropriate management measures. Much of the research referred to above (particularly work at Cefas and Fisheries Research Services, Aberdeen), has been at the forefront of science in this area at the European level and has leveraged additional funding from the European Commission.

While there is further work to be done, in particular in relation to fisheries indicators of ecosystem health and in relation to specific impacts on particular habitats, in many cases it is in the understanding of the range and diversity of marine habitats and species that there are greater gaps in knowledge than in understanding the impacts of fishing.

Priorities for marine research

- 2. The world's oceans are fundamental to the continuing ability of human beings to survive comfortably on this planet, and it is vital that efforts to understand them are pursued with clarity, co-ordination and purpose, but also with an open mind as to future areas of importance. (Paragraph 43)**

The Government shares the Committee's view of the importance of marine science, including the need to maintain a proper balance across the wide range of science themes and the need to support both policy related science and research into understanding the basics of the marine environment and its processes.

There is growing, but not yet complete, recognition of the vital role of the oceans in the functioning of the earth's life-sustaining processes. The oceans and seas offer the key to finding solutions to pressing human needs, many of which need further research and evaluation. These include energy, food, water, health, waste management, transport and quality of life. Understanding and predicting climate - and even medium-range weather - depends critically on knowing that the oceans and atmosphere behave as a completely coupled system.

Improving marine science coordination, strengthening links between science and policy, and developing more strategic approaches will be among the tasks to be tackled by MSCC.

Funding and organisation of marine science in the UK

- 3. We recommend that funding be identified by the sponsoring Government department for a regular survey of marine-related research and development in the UK by the IACMST or any successor body with responsibility for co-ordination in this area. (Paragraph 46)**

A high-level summary of the overall expenditure by Departments can provide a useful indication of budget size and distribution. However compiling data for detailed analysis between years and between funders is complicated by the different funding models adopted. For example research costs do not always include full cost of depreciation, capital costs, land and building costs etc.

The Pugh and Skinner publication referred to provided a useful snapshot but went wider than marine science, covering oil and gas production, tourism revenue and shipping. The MSCC will need to consider whether an annual summary of marine science spend is appropriate or whether current more targeted compilations such as that prepared by the Defra, Scottish Government, and DARDNI composed Fisheries and Marine Science Customer Group, and the ERFF Research Database is sufficient for specific sectors.

Research Councils: NERC

- 4. The declining trend in NERC funding for marine science is a worrying one and we seek an explanation from NERC as to why marine science has apparently been less of a priority than other areas within the NERC remit. (Paragraph 62)**

Given the Committee's conclusion, NERC has reviewed its funding contribution further. Full and corrected data regarding NERC funding for marine science show that there has been an upward trend in NERC expenditure on marine science over the past eight years. Marine science will remain a high priority for NERC as it delivers its new 5-year science strategy, Next Generation Science for Planet Earth.

NERC has produced a corrected version of the report's Table 6 (see Table 1 below), which provides information on all NERC marine science expenditure – with the exception of expenditure at the British Antarctic Survey, British Geological Survey and Centre for Ecology and Hydrology. This corrected table includes the responsive-mode funding and the marine funding elements of interdisciplinary programmes such as SOLAS, MFMB and of the Earth Observation Centres of Excellence. It also separates out the NERC expenditure on large exceptional items such as the new POL building, the RRS James Cook and the replacement of the RRS Discovery's scientific winch system.

Table 1 shows an upward trend in NERC expenditure both in cash terms and, using the Government's GDP deflator, also in NERC expenditure in real terms between 1999/00 and 2006/07 – with expenditure (excluding blue-skies and exceptional items) increasing in real terms by around £11M over this period. The corrected table show that “overall expenditure, excluding response mode grants” in 2006/07 was around £0.5M more in real terms than in 2003/04.

Total NERC expenditure (inclusive of blue-skies and exceptional items) was around £15M more in real terms in 2006/07 than 2001/02.

Table 1: NERC Marine Science Expenditure

	£m	£m	£m	£m	£m	£m	£m	£m	£m
Expenditure heading	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	Total
1. Ship operations expenditure in support of the NERC Cruise Programme	7.0	4.6	7.6	8.7	10.7	9.8	11.5	13.0	72.8
2. Marine centres expenditure	16.8	17.8	18.2	20.5	20.2	19.4	22.3	24.2	159.4
3. Directed programmes	6.6	7.4	8.5	9.9	12.9	11.4	11.1	10.5	78.3
Sub-Total (1+2+3)	30.4	29.8	34.3	39.1	43.7	40.5	44.9	47.8	310.5
4. Blues skies (responsive mode funding)*	**	**	5.2	5.8	5.4	6.0	7.0	7.9	37.3
5. Exceptional Items (e.g. large facilities capital, building costs, etc)				2.8	6.6	4.1	7.2	4.4	25.0
Total (1+2+3+4+5)	30.4	29.8	39.5	47.7	55.7	50.7	59.0	60.1	372.8

* Revised expenditure data include cruise costs

** Blue-skies expenditure data unavailable

5. We accept that NERC acts in good faith to support the best science in awarding funding under the responsive mode and that the number of applications is small, but we believe that the apparent bias against funding for marine science applications requires investigation and explanation from NERC. (Paragraph 66)

NERC recently carried out a responsive mode funding review which reported in February 2007 to NERC Council. As a part of this review the distribution of grants awarded against science area was investigated. There was no evidence of subject bias, although as indicated in paragraph 66 of the Committee's report, where numbers of applications are small it can be difficult to draw firm conclusions.

Despite not finding evidence of bias, NERC is planning a review of its Peer Review College which will, amongst other things, examine whether there is consistent and unbiased peer review across all areas.

- 6. We recommend that NERC commit funding to the full five years of the Oceans 2025 programme in order to enable proper planning and effective organisation. In doing so, it needs to ensure that the longer term programmes and facilities are not packaged together with the short term projects in the same project cycle, so that each can be assessed against their natural lifespan. (Paragraph 70)**

The Government's Comprehensive Spending Review covers only a three-year period, and Councils have to take this into account when committing funding to new research programmes. Councils are experienced in supporting long-term science investments which spread across one or more spending review period. Following the allocations to individual Councils announced in October, NERC Council will shortly decide the funding of the final three years of the Oceans 2025 programme.

Through NERC's new funding allocation and budgeting mechanism, programmes such as Oceans 2025 will have a national capability component and a research-programme component, and the funding of these components will be considered over the longer and shorter term, respectively.

- 7. We recommend that NERC review the use of the Strategic Ocean Funding Initiative, with a view to increasing the amount allocated to it within the Oceans 2025 programme and encouraging participation from universities in Oceans 2025. (Paragraph 71)**

The Strategic Ocean Funding Initiative is currently being implemented, but will be superseded from 2008 by NERC's new funding arrangements. These new arrangements will enable more collaborative programmes between universities and Centres in NERC-funded research programmes, complementing what is already planned through Oceans 2025.

- 8. We recommend that NERC review the need for a director of science for marine and atmospheric science. (Paragraph 74)**

NERC had a Director for Marine and Atmospheric Sciences from 1986 until 1994, when the decision was made to replace Directors of Science by Directors of Centres. The main emphasis in NERC's science strategy is now on themes (supported by national capability) which cut across the science areas. NERC has recently recruited Theme Leaders to provide greater direction and leadership in science delivery. NERC considers that a return to a sector-based directorate structure would inhibit development of interdisciplinary research programmes within the context of a broadly-based thematic strategy.

However, NERC will organise in a sector-based way the management of its long-term national capability functions (e.g. large facilities such as ships, sustained observing, data) which support thematic research programmes and responsive research. NERC considers that the Director of the National Oceanography Centre, Southampton (NOCS) would play a particular role in facilitating strategic oversight of NERC marine national capability within NERC's wider national capability portfolio.

Other Research Councils

- 9. We recommend that RCUK monitor applications and inquiries to ascertain whether there has been improvement in funding interdisciplinary work in marine science areas as a result of recent changes. (Paragraph 82)**

The Government agrees that it is important to ensure that there are no inherent barriers to multidisciplinary research. The Government and RCUK view this as an important issue across all fields of research, not as one specific to marine science. Research Councils already report on multidisciplinary input metrics to DIUS as part of their Performance Management System.

Multidisciplinary research is, by its nature, very difficult to label; it is therefore difficult to classify individual multidisciplinary research projects for monitoring and comparison on a disciplinary basis. The RCUK Performance Evaluation Group is, however, currently investigating ways of extending the monitoring of Research Council support for multidisciplinary research.

- 10. We recommend that scientists working in marine research in the UK be eligible to apply for funding to any of the Research Councils, regardless of their place of employment. (Paragraph 83)**

The Government recognises the Committee's concern that researchers should have access to appropriate funding. All UK Higher Education Institutions and Research Institutes (with which Research Councils have established a long-term involvement as major funders), as well as a number of Research-Council-recognised Independent Research Organisations (IROs) are eligible to apply for various types of Research Council funding.

The set of criteria for eligibility of IROs was agreed by Research Councils and DIUS, and is implemented collectively to ensure consistency; organisations which meet the published eligibility criteria and wish to become Research-Council recognised may contact any Council to begin a review of their status. Other individuals and organisations can act as subcontractors on Research-Council-funded programmes through collaborative association with an eligible institution and organisations.

NERC's eligibility criteria allow most UK marine scientists to apply for funding from NERC, providing that their main source of research funding is not a government department or other public sector body (unless that body is co-funding the research programme) or a business². Some independent research organisations³ are eligible only for managed-mode funding.

Government departments

- 11. We recommend a review be commissioned by Defra and NERC jointly on mechanisms for improving the relationship between the marine centres and the fisheries laboratories and for encouraging collaboration and co-ordination of research effort. (Paragraph 90)**

There are already a number of good examples of collaboration between marine centres and fisheries laboratories. For example this year NERC, Defra, FRS and AFBI jointly funded a successful £2.4 million "Sustainable Marine Bioresources" programme which was designed to meet joint strategic aims. In addition, several of NERC's Research and Collaborative Centres have been or are involved in other projects with the fisheries laboratories, and these interactions are fairly numerous – though generally more ad hoc and less strategic in nature.

More however can be done on collaboration and co-ordination and Defra and NERC will commission a review. Other fisheries departments will be invited to participate in this exercise.

- 12. We recommend that the role of the UKHO as a marine research establishment be explicitly considered as part of the MoD review of the future of the Office. (Paragraph 96)**

The MOD structural and ownership options review has considered the role of UKHO in the formation of marine policy and the support that UKHO bathymetric data and cartographic products provide to the UK's wider interests including marine research. This consideration was relevant to the report conclusions and recommendation that UKHO continue to operate as an executive agency, financed through a Trading Fund. This status should ensure the wider benefits to the UK from the expertise of the Hydrographic Office are sustained.

We accept the Committee's view that UKHO "analyses data from its own and external sources and also creates products from those data, both of which are research-driven activities". However, the UKHO does not carry out research; rather its activities take the outcomes of research conducted elsewhere and apply these to the development of products and services for its customers.

² <http://www.rcuk.ac.uk/cmsweb/downloads/rcuk/documents/eligibilitystatement.pdf>

³ <http://www.rcuk.ac.uk/research/eligibility.htm>

We agree that the UKHO's "core task of managing such large quantities of data gives the UKHO a central role in working on data standards so that the data can be easily accessed and interpreted by scientists and policy-makers in the marine sector." For example, the UKHO participates in the Open Geospatial Consortium, developing geospatial standards; and in the International Hydrographic Organization's development of its S100 standard for electronic charting. However, we do not consider that this activity constitutes research.

The UKHO Marine Environment Information Centre works only in support of UK Defence. In doing so, from time to time, it does identify gaps in research knowledge which can inform the Defence research programmes commissioned and carried out elsewhere. However the MEIC does not engage in or commission research.

Government will look to correct the listing of UKHO as a Public Sector Research Establishment (PSRE).

Overall funding

- 13. A full review of future needs for increases in funding marine science, along the lines of the work undertaken already on marine monitoring requirements, is urgently needed. Nevertheless, it is clear, even without such a detailed review, that a substantial increase in funding is necessary if marine science is to meet the challenges before it. (Paragraph 102)**

The future requirements for marine science funding have to be set against other priorities for science and to meet other pressures. The prioritisation and funding process is formalised through Departments' business plans that are submitted to Treasury. Improving co-ordination and collaboration within the UK, with other Member States and internationally is a practical way of reducing pressures on budgets, and promoting better co-ordination will be a core activity for MSCC. The development of a Marine Science Strategy will help identify science priorities and the need for improved co-ordination and collaboration.

Inter-Agency Committee for Marine Science and Technology (IACMST)

- 14. It is unacceptable for a Government-funded body chaired by a Chief Scientific Adviser to be ignorant of its formal reporting responsibilities. We recommend that reporting lines for the IACMST be clarified without delay. Defra and DIUS, including the Government Office for Science, need to discuss lines of**

responsibility and what reporting procedures are required and communicate the results clearly to the IACMST. (Paragraph 109)

As set out at the start of this response, It is proposed that MSCC will replace IACMST, and MSCC will adopt new and more effective reporting lines. These will be developed as part of detailed planning work for its establishment over the next 4-6 months, to ensure it has the right levers and authority to be able to deliver. Options include one or more of the following:

- Reporting through a minister in a lead Department and in the Devolved administrations.
- Reporting to the relevant ministers in member departments and the Devolved Administrations.
- Reporting to the Chief Scientific Advisers in each member department and the Devolved Administrations , or their equivalent.
- On any interdepartmental issues that need resolving, reporting to the Sub-Committee on Environment and Energy of the Ministerial Committee on Economic Development subject to normal concordat arrangements in the formulation of the UK position.

In addition, the committee might present a report annually to the Chief Scientific Advisers' Committee (CSAC), chaired by the Government Chief Scientific Adviser.

15. We recommend that DIUS play a more active part in the successor body to the IACMST which we recommend later in this Report. (Paragraph 110)

The membership of the proposed Marine Science Coordination Committee will need to be determined as detailed plans for its establishment are developed over the next few months. It will be important for the membership to match the specific role and functions set for the committee.

16. We do not believe that the IACMST as currently constituted is capable of fulfilling the role required of it by the challenges facing marine science. It is fundamentally flawed in its constitution, and minor amendments to its budget or resources will not transform the organisation of marine science in the UK. (Paragraph 114)

The Government accepts that for several reasons IACMST needs to be replaced by a strengthened body. As set out at the start of this response, it is proposed that MSCC will take over, build on and expand the responsibilities and function of IACMST.

Improving co-ordination of marine science and technology in the UK

- 17. We recommend that a new co-ordinating body for marine science, reporting to Defra, be established. This body should bring together all public-sector funders of marine research, together with stakeholders such as the universities and end-users of marine science, and should be properly resourced to fulfil its functions. Because of the range of activities for which greater co-ordination is required at an executive level, our preference would be for this co-ordinating function to be placed with a new marine agency, which should be given executive powers and a budget to oversee operational observations. (Paragraph 132)**

The Government agrees that for the reasons highlighted in the Committee's report an alternative to IACMST is required. The preferred option, as set out in this response, is for a new committee to be formed which will address the current weaknesses. To answer the specific points made in this recommendation:

- The reporting arrangements for the new committee will be developed as part of detailed planning work for its establishment over the next 4-6 months, to ensure it has the right levers and authority to be able to deliver.
- MSCC will bring together all the major public sector funders of marine science. Other stakeholders, such as universities and end users, of marine science will not sit on the committee. However the working groups that are commissioned to undertake specific tasks will provide good opportunities for stakeholder involvement.
- The MSCC will be reasonably resourced, taking into account current budgetary constraints.

- 18. We believe that the transfer of functions to the new marine agency should provide an opportunity to reduce the number of co-ordinating bodies operating in this area and we recommend that the Government review the organisations, committees and other bodies co-ordinating marine-related activities with this aim in mind. (Paragraph 133)**

The marine science sector is very complex, as illustrated in the report's own Figure 1. The "marine" label implies a uniformity of purpose amongst agencies and associated science which is not in practice the case. As in the terrestrial sector there is a need for effective co-ordination at a number of levels and on a wide range of topic areas.

Taking this into account, one of the tasks for the MSCC could be to examine whether there are opportunities to reduce the number of co-ordinating bodies. This task will need to be linked to the ERFF's plans to commission a review of co-ordinating bodies. ERFF aims to examine their roles, responsibilities and reporting lines, and to identify a rational arrangement that would reduce duplication of effort, for example in cross-cutting areas such as monitoring, science to policy activity and the skills base. MSCC will need to wait for the output from ERFF work before deciding whether this is a priority area.

Research Vessels

- 19. We believe that there is scope for better integrated management of the coastal fleet although this may well be limited in view of the demands upon it. A new marine body could act as a clearing house to co-ordinate research cruises and spare capacity on marine science vessels. (Paragraph 143)**

Research vessels are an integral part of marine science. They are also a major cost item of marine science programme budgets. Research vessel cruises are tasked to undertake a wide range of activities, for example assessing fish stocks, monitoring the state of the marine environment and undertaking discrete research projects. In practice it is frequently not possible to multi-programme individual cruises since each programme of research requires different gear, different scientific teams and covers different regional areas.

As part of routine good management practice the operators of research vessels already co-ordinate their activities on a number of fronts. For example CEFAS, FRS and AFBI cruise programmes are exchanged at the planning stage and collaboration does take place. There is also a very extensive co-ordination of fish stock surveys at the European level, overseen by ICES. For NERC the ocean-going nature of much of its ship-based research means that international ship barter arrangements are the most appropriate way of managing its fleet. A similar regional barter arrangement could probably be established by the owners of UK coastal vessels, although relying on the readiness of ship owners to participate, and the overall availability of vessels.

It is concluded that the co-ordination of research vessel activity is being reasonably well managed and co-ordinated at present, and it is best left to the vessel operators and science managers to identify where improvements might be made. The Committee's concerns are however noted and this aspect of co-ordination may need to be addressed by MSCC at some stage in the future.

- 20. We welcome the world-wide extension of the Continuous Plankton Recorder concept as an excellent initiative and we urge the UK Government to take the lead in promoting it to fellow Governments at the next GEO Ministerial. (Paragraph 146)**

NERC and Defra, as major funders of the Continuous Plankton Recorder Survey, welcome the world-wide extension of the CPR concept. SAHFOS, which runs the CPR Survey, participated in the GEOIV Ministerial Exhibition in Cape Town as an opportunity to demonstrate UK leadership for cost-effective monitoring of the biological health of the ocean. Based on the outcome of the Ministerial, the UK will discuss options for global CPR extension with the GEO Secretariat as part of the future GEO Work Plan.

21. We recommend that NERC investigate the costs and benefits of a scheme for the widespread use of commercial vessels to take ocean measurements, with a view to providing UK leadership on this project. (Paragraph 148)

NERC's Research and Collaborative Centres already make considerable use of commercial vessels. For example the Proudman Oceanographic Laboratory uses the Norfolk Line (part of Maersk), the National Oceanography Centre, Southampton uses the Pride of Bilbao and the Indo Trans Celebes for FerryBox work⁴ and the Plymouth Marine Laboratory has mounted data-gathering equipment on vessels crossing the Channel and the Atlantic.

NERC would be prepared to consider, with its marine research community, how more use could be made of commercial vessels, but it is clear that commercial vessels do not generally offer the bespoke facilities, specialist crew or flexibility afforded by dedicated research vessels, and expectations should be realistic. Commercial vessels are not suitable for some Research Centres' operations because of their specialist requirements, or because they are too expensive to charter or obtain time or facilities on. It must also be noted that no matter how cost-effective a proposed science programme on a commercial ship is, the proposed programme will need to be tested against the standards of excellence required for success in the competition for NERC funds.

22. We conclude that there is greater demand for ship-time than the current arrangements are capable of delivering and that vessel capacity is a limiting factor in marine research. (Paragraph 151)

The evidence gathered for this response indicates that it is budgets rather than ship-time that is the limiting factor. If future science budgets are to grow without additional vessel capacity then ship-time will indeed become a limiting factor, but that is not currently the case. NERC's own ships are well utilised for ocean going science, its international barter arrangements are very effective, and time can be booked on the RV Prince Madog for coastal science when necessary. NERC recognises, however, the interplay between science demand and platform availability and will review whether there is a case for a shelf sea research vessel capacity beyond what is already available including through charter or barter.

⁴ <http://www.ferrybox.org/>

- 23. We recommend that an independent review be conducted of the cost-effectiveness of NERC's operation of its research vessels and management of alternative arrangements for access to vessels. (Paragraph 154)**

The cost-effectiveness of NERC's ship operations was recently reviewed as part of the Office of Government Commerce's Gateway Review Process and the decision was made that NERC should continue to own and operate its new ship, the RRS James Cook. Another review will be conducted shortly as part of the procurement process for the new ship to replace RRS Discovery. The NERC Marine Facilities Review Group meets twice a year and provides independent advice on all aspects of the ship management and cruise planning (incl. bartering and cooperation) that enable the cost-effective delivery of NERC's sea-going science programmes. These existing reviews address the issues referred to in this recommendation.

- 24. We fully support the development of the new vessel planned for 2011 and recommend that the Government and NERC commit to ensuring that this vessel is delivered on time and to specification. (Paragraph 155)**

NERC welcomes the Committee's support for the development of the new vessel and we confirm that every effort will be made to ensure that a proper business case for the project is developed and submitted to the prioritisation process for the commitment of earmarked Large Facility Capital Funds and if successful, that the vessel is delivered on time and to specification.

- 25. We recommend that NERC develop a case for a new coastal vessel for submission to the large facilities roadmap and that DIUS look sympathetically upon such a bid. (Paragraph 155)**

The NERC facility, the RV Prince Madog, supports NERC science programmes in UK coastal waters and it has capacity to take on more work year-on-year if more coastal science programmes are funded in the future. In addition, the Plymouth Marine Laboratory and the Scottish Association for Marine Science operate three inshore vessels in support of their science and these can also support NERC-funded science programmes.

NERC keeps under review its provision of major facilities in the light of evolving science demand and is prepared to review the evidence as to whether there is a case for a shelf sea research vessel capacity beyond what is already available including through existing vessels, charter or barter.

Other facilities

- 26. We recommend that the provision of facilities be regularly reviewed as part of the mandate of the proposed new co-ordinating body**

which would be the best available independent body to obtain objective information from potential users and providers, especially from those outside the NERC community. (Paragraph 156)

The report notes that the current arrangements are working effectively. It can be added, for example, that NERC's marine facilities are already subject to regular review using community wide user groups to provide year on year review, and Defra is undertaking a capacity review.

It is therefore concluded that the individual funders and their science institutes are fulfilling their responsibilities for ensuring that facilities are adequate, and this is not therefore a role for MSCC.

27. We encourage the development of partnership arrangements within Europe for the provision of highly advanced underwater technologies and infrastructure. (Paragraph 157)

The Government welcomes this conclusion and NERC will continue to actively develop its partnerships and wider arrangements within Europe through its involvement with the Ocean Facilities Exchange Group. These activities currently include the development of a bi-lateral arrangement with CSIC (Higher Council for Scientific Research) in Spain to utilise geo-physics equipment that will be deployed by a trans-national team.

28. We recommend that NERC keep the use of Isis under review and ensure that its potential is not undermined by factors such as the availability of crews or platforms. We further recommend that NERC investigate whether there would be more demand for use of Isis, if more time were offered. (Paragraph 158)

NERC's utilisation of its marine facilities is regularly reviewed through the NERC Marine Facilities Review Group. It should be recognised that ISIS delivers only a part of the scientific needs of the Marine Facilities Programme and its use is balanced against the support of other requirements. NERC investment in sea-going programmes is science driven and should there be a requirement for increased support to ISIS the current support arrangements will be reconsidered.

Information technologies for marine science

29. We recommend that NERC keep under review the computing resources needed in the environmental sciences, particularly with regard to NERC's new theme of environmental change. (Paragraph 160)

NERC has recently increased capacity of both local clusters and national high performance computing (HPC) for its marine community. NERC is contracted for 10% of HPCx, the RCUK national service due to end in December 2008, and

22% of the new service, HECToR, which started operation in October 2007 and is scheduled to operate for 6 years. In addition to this increased capacity on the national HPC service, Oceans 2025 includes funding for local computer clusters at three marine centres, NOC, PML and POL. Computing provision will be continually reviewed by NERC's National Capability Advisory Group.

Government support

- 30. We regret the lack of attention paid by Government, in particular the OSI/DIUS, to marine science since the disbandment of the Marine Foresight Panel. We also regret that there has been no systematic attempt to track implementation of the recommendations made by the Marine Foresight Panel. We believe that greater effort is needed in horizon-scanning within the marine science and technology sector, and we recommend that this be included in the remit of the new marine body. (Paragraph 164)**

In 2002 the Foresight Programme moved away from its earlier structure of standing panels to a more flexible project based approach, focusing resources more clearly where these would add greatest value. The approach was designed to allow new issues to be targeted and picked up quickly, via a fluid, rolling programme of projects. A key feature of the new approach is that leading participants are required to agree an Action Plan to take forward the findings of the project once Foresight involvement ceases, specifically to address the tendency for reports to sit on the shelf and for recommendations not to be taken on board.

Once Foresight moved in this new direction OSI (as was) did not have the resources to maintain a parallel strand of activity to follow up the large number of earlier reports and areas of activity, including in relation to the Marine Panel. Moreover, it is unlikely that such an activity would have been productive, with diminishing returns over time as the context for the earlier work evolved.

The Government Office for Science, within which the Foresight team is based, would be happy to consider a further project relating to the oceans and the marine environment provided it fulfilled the relevant criteria, which includes the necessary cross-government support. It is also relevant to highlight the Flooding and Coastal Defence Foresight project, completed in April 2004, including aspects of marine science.

The Government agrees that the proposed MSCC should include horizon scanning within its remit.

Gaps in data

31. We recommend that social system indicators be part of future research and monitoring priorities for UK marine science. (Paragraph 172)

The Government and RCUK recognise the importance of social and economic factors in marine issues, and their relevance to marine policy and management. For example, NERC and the Economic and Social Research Council are currently co-funding an inter-disciplinary seminar series on marine ecosystem management, and the new Living With Environmental Change programme is expected to provide opportunities for inter-disciplinary research in this area.

The need for the further development and use of social system indicators has also been recognised within the UK Marine Monitoring and Assessment Strategy (UKMMAS). The Productive Seas Evidence Collection Group (PSEG) has been tasked with the further development of socio-economic indicators to support the monitoring and assessment of the marine environment. This task is on-going with a strong lead currently being demonstrated by The Crown Estate.

Funding and Co-ordination

32A We recommend that the new marine agency, proposed in this Report, be made responsible for marine monitoring. It should also be responsible for setting priorities for monitoring and should have a central budget for operational monitoring and long-term international projects such as Argo. (Paragraph 180)

The Government believes that the responsibilities for marine monitoring should remain under the UK's Marine Monitoring and Assessment Strategy (UKMMAS) umbrella, with budgets for marine monitoring remaining with the relevant departments who are required to undertake monitoring as part of UK and EU-related statutory duties. The UKMMAS Marine Assessment Policy Committee (MAPC), which is chaired by Defra and the Scottish Government, includes all the Government Departments and the Devolved Administrations with responsibilities and policy requirements for obtaining evidence of the state of the marine environment. MAPC has a remit to identify new funding or, where necessary, to re-align existing funding in order to meet current and emerging monitoring requirements.

Although the UKMMAS does not have a central budget, funding is made available by those Departments and/or Agencies which have a direct interest in obtaining the evidence. The UKMMAS are working hard to ensure there is a trusted forum within which priorities and monitoring commitments can be discussed and shared amongst those able to provide funding.

However, the Government agrees that the policy relevance of operational monitoring programmes, and long-term monitoring programmes like Argo, need to be recognised, and that they have a clearly defined sponsor and/or policy customer. We believe that the UKMMAS provides the best framework to achieve this.

In addition, the Environmental Observation Framework led by ERFF will be looking at financing mechanisms that will enable the UK to support sustained observations and monitoring in all natural environment disciplines. Observations in our oceans and seas will be regarded with equal weight to those on land or in the atmosphere. The priorities and the case for funding will need to be driven by the MAPC.

32B We also recommend that the £22m funding gap identified by UKMMAS be met from central Government funds. (Paragraph 180)

The £22m funding gap identified for monitoring and assessment of the marine environment was calculated through initial coarse estimates supplied by members of the UKMMAS. The estimates have never been subjected to challenge or agreed with funding organisations, and this figure has always been considered as a first estimate. Further work is planned shortly to strengthen the evidence and process by which this initial figure was derived. Once this figure has been refined, further consideration will be given to the need to address any gaps by Government Departments and Devolved Administrations in light of all other commitments and requirements.

33. We support the use of cost-benefit assessment to establish the value of maintaining or stopping long-term monitoring programmes and recommend that it be adopted by the new marine body to ensure the efficiency of the UK monitoring programme and secure individual projects against threat of closure merely because they drop out of fashion. (Paragraph 181)

The UKMMAS is designed to ensure monitoring is 'owned' and, as such, provides a mechanism by which the importance and relevance of specific programmes of monitoring can be judged. Discussions and recommendations pertaining to the value of maintaining or stopping long-term monitoring programmes are held at all levels of the UKMMAS, with strong emphasis on the consideration of costs and benefits in light of current and emerging priorities.

The UKMMAS process has already achieved a number of efficiency savings within marine monitoring programmes and will continue to do so as the process evolves. New partnerships between Agencies are being forged all the time and this will only serve to strengthen support for current programmes of monitoring and the ability use existing resources in a more efficient manner.

International ocean monitoring systems

- 34. We recommend that the UK Government renew its commitment to GOOS and ensure that the network of observatories is completed according to the timetable. (Paragraph 184)**

Good progress is being made to clarify the needs of GOOS in order to ensure they are adequately embedded and reflected within the UKMMAS process. The GOOS requirements, including the planned timetable for observatories, are being looked at in order to ascertain how they fit into current priorities.

- 35. We recommend that funding be guaranteed for the Argo programme from centralised funds. (Paragraph 185)**

The UKMMAS process is establishing a mechanism for identifying and progressing the need for new and continued programmes of monitoring. All requirements for the continuation of existing monitoring programmes, including the Argo programme, and for new monitoring will be progressed through the Marine Assessment Reporting Group (MARG). Where new funding or a re-alignment of existing funding is required the Marine Assessment Policy Committee (MAPC) will make an informed decision based on the best available evidence, including current and future priorities and recommendations from MARG, and within the constraints of available resources.

Satellites

- 36. We recommend that the new marine agency, proposed in this Report, become a partner of the British National Space Centre in order that the needs of the marine science community be fully represented when discussing and determining space issues. (Paragraph 189)**

The government welcomes strong end-user engagement within the BNSC partnership. There already exist formal and informal mechanisms by which the marine science community is or could be better represented. The Earth Observation Programme Board, a key BNSC advisory group, has had regular representation from senior marine scientists. Regular discussions occur on an informal basis. For instance, senior BNSC officials recently held bilateral discussions with representatives of the marine community on the issue of the European Global Monitoring for Environment and Security (GMES) programme. Defra membership of BNSC provides for a more policy-focused perspective on marine issues of relevance to the space community and has recently completed a study of marine observation requirements that will support this role. Future links with the marine science community can always be strengthened via one of these routes or by any new routes that emerge as a result of the current review of UK space policy.

Sharing data

- 37. We recommend that the principle of “collect once, use many times” be applied to marine data across Government, including the Royal Navy. We further recommend that the new marine agency which we have recommended, or an equivalent body, be charged with finding mechanisms to facilitate the release of data and interaction between producers, suppliers and users of data to maximise its value to the community at large. (Paragraph 198)**

‘Collect once, use many times’ is widely acknowledged across Government as a fundamental principle in the management of marine data and is a cornerstone of the UKMMAS. Government is acutely aware of the need to maximise the value of data in order to meet a number of its key priorities such as the EU INSPIRE Directive, the Marine Bill, and Marine Planning. Government Departments and the Devolved Administrations have committed to the principle of ‘Collect once, use many times’ through the continued support of several key initiatives including the Marine Data and Information Partnership (MDIP), the Marine Environmental Data Action Group (MEDAG), and the UK Directory of Marine Observing Systems (UKDMOS). It is through these initiatives and the on-going work within the UKMMAS that issues pertaining to the release of data will be addressed and interactions between producers, suppliers and users of data strengthened. MDIP and MEDAG currently report to their respective sponsor boards and through to IACMST. In future both will report to a new sponsor board. MSCC will continue to maintain an overview of marine monitoring and will establish links with the new board.

There are however some barriers to using data many times including issues relating to ownership and confidentiality. These are complex issues which will be tackled across government at the highest level as part of the Earth Observation Forum, and are being considered also by MAPC.

- 38. We recommend that the Government reconsider its opposition to discussions on a European Marine Observation and Data Network. (Paragraph 199)**

This European Marine Observation and Data Network (EMODN) was mentioned in the EU Green paper on the Maritime Environment in early 2007. The Government still reserves judgement on how this will relate to the numerous existing Europe-wide initiatives to share data, what additional burdens it will place on the UK, and whether it will be fruitful or not. The Government remains of the opinion that this initiative could not be supported until further details are available and particularly on how the initiative will provide any added value over SEIS, INSPIRE, GMES, WISE – Marine, GEOSS, ICES and data bases planned for OSPAR (see response 37 for UK Governments support of the ‘collect once use many times’ principle).

In addition the UK is committed to the EU Marine Strategy which places the burdens on member states to share data and make joint assessments of the state of the seas. This should be developed first and the EC encouraged to look at all the data systems and systems of systems they are proposing.

The importance of studying the polar oceans

- 39. We welcome NERC's commitment to the International Polar Year but consider that the additional funding dedicated to the UK contribution is less than generous. NERC must confirm that it will provide sustained funding to IPY projects after the end of the programme. (Paragraph 204)**

NERC makes an annual commitment of approximately £40m to Antarctic science and infrastructure every year through BAS, and spends an additional £3-4M on polar research every year through responsive-mode grants. This level of investment compares well with other European nations. The Arctic IPY programme, which started in 2006 and funded four consortia programmes, will run until 2010, beyond the end of IPY.

The UK's role in polar science

- 40. The UK effort in the Southern Ocean conducted through BAS is truly impressive and gives the UK a genuinely world-leading position in this area of expertise. We support the continuation of this research focus and the resources dedicated to it. (Paragraph 210)**

The Government welcomes this conclusion on the UK effort in the Southern Ocean and notes that this world-leading position has been established through the efforts of BAS and a range of other institutions including the National Oceanography Centre Southampton, the Proudman Oceanographic Laboratory, and UK universities.

- 41. We recommend that BAS be brought fully within the scope of NERC's marine policy as it affects the research centres. (Paragraph 210)**

The transition to new strategy delivery mechanisms, with revised funding arrangements, will allow for improved co-ordination of the marine science national capability and research programmes in all of NERC's Research and Collaborative Centres, including BAS and BGS, and with HEIs..

- 42. We recommend that NERC identify funding for an expansion of Arctic research in collaboration with other nations which already have substantial presence there. (Paragraph 217)**

In February 2007 NERC Council requested a working group be set up to look at the priority areas of research in the polar regions (Arctic and Antarctic) in the context of the new NERC strategy. The group's report is currently being finalised and will inform the development of Theme Action Plans by NERC's new theme leaders. Also, separately, NERC is examining the opportunities for collaboration with other nations, including consideration of access and infrastructure needs. In 2008 NERC Council will be drawing these analyses together to develop plans for its polar science portfolio.

Conservation of marine areas

- 43. We urge the Government to establish a number of full-scale MPA pilot sites immediately, ahead of the Marine Bill, in order to gather the evidence necessary to develop the science needed to underpin MPAs and to enable the UK to become a leader in conservation science. (Paragraph 223)**

The Government is committed to establishing an ecologically coherent network of well managed marine protected areas (MPAs). The UK already has a number of protected areas around our coastal waters (around 180) and has a programme of data collection and survey to identify further sites both inshore and offshore. These sites are designated in order to meet our European obligations, and will help to form the building block of a UK network of MPAs. We therefore already have a fairly good scientific understanding in relation to the current network of sites, and we intend to build on this to inform the development of our overall MPA network.

The proposed Marine Bill will provide the necessary mechanisms to complete our network of MPAs, by allowing Marine Conservation Zones (MCZs) to be designated for features of national importance, including rare, threatened and representative species and habitats. Our nature conservation agencies are developing a scientific rationale for selecting sites and the design principles for a network of MCZs. We are keen to complete the network of MPAs (consisting of both European sites and MCZs) as soon as possible and have received commitment from Natural England to enable a designated network of sites by 2012.

Pilot projects are not considered to be either feasible or advantageous, given the network of existing European sites which provide good case studies, and the need to carry out survey work and data collection before designating further sites (to complete our MPA network). There would also be insufficient time to adequately analyse the results of the pilot sites if the UK is to meet its goal of substantially having a network in place by 2012.

Designation of MPAs in Scotland is a matter for the Scottish Government.

The Marine Bill

44A We recommend that the draft Marine Bill be brought forward without further delay, despite concerns about Defra's ability to deliver a network of MPAs. We require an assurance from the department as to the speedy presentation of the draft bill and the subsequent bill itself, and a commitment to ensuring that the bill is enacted by the end of the next parliamentary session. We recommend that Defra publish a clear timetable for the bill to complete its passage through Parliament within this timeframe. (Paragraph 233)

The Government intends to meet its 2005 manifesto commitment to introduce a Marine Bill in this Parliament. We recognise that there is widespread support for a Marine Bill to be introduced as soon as possible to address the wide range of issues, including enhancement of the framework for marine nature conservation, set out in the Marine Bill White Paper published earlier this year.

We are committed to publishing a draft Marine Bill as part of the legislative programme in this 2007/08 session of Parliament. We expect this will be in Spring 2008.

Introduction of a Marine Bill to Parliament will be subject to the outcome of public scrutiny of the draft Bill and consideration of the Government's ongoing legislative programme. The Government is not at this point able to give a concluded view on what will form the full legislative programme in the coming session, and Parliament cannot give timetables for the passage of Bills in future sessions.

The Government is looking towards early consultation with the public next year on its draft legislative programme giving both Parliament and the public advance sight of what the Government is planning to bring forward in the forthcoming session. This will be accompanied by a publication outlining the Bills proposed as they stand at that point.

In Scotland, the Scottish Government has committed to consult stakeholders, including the fishing industry, on Scottish legislation for the marine area. Discussions to agree the interaction between the Marine Bill and a Scottish Marine Bill are not yet completed.

44B We recommend that Defra conduct and publish an assessment of what is needed to enable it to designate and monitor chosen sites. However, this assessment should not be used as an excuse to delay proceedings on the bill: if the department waits until it has all the necessary data, it will never proceed. (Paragraph 233)

The proposed Marine Bill will provide a mechanism for the designation of Marine Conservation Zones (MCZs). The provisions will allow for the selection and

designation of sites that contain species, communities of species or other natural characteristics that best represent the range of biodiversity of UK waters.

The Government will select sites on the basis of the best available evidence and the statutory nature conservation agencies are currently considering the approach to site selection and the level of evidence that would be needed for site proposals. Further details will be made public as this work progresses.

We will carry out monitoring of sites through the UKMMAS. This will ensure the co-ordination and streamlining of marine monitoring and help to establish the current and future condition of our marine ecosystems.

Technology transfer to the commercial sector

- 45. We commend projects such as EPSRC's efforts to stimulate work in sensor systems where Research Councils have identified a potential gap in the market and moved to address it. We believe that there is greater scope for such activity than has previously been explored and recommend that the Research Councils pursue an active approach to identify areas for technology development in the marine sector. (Paragraph 251)**

EPSRC will continue to identify and support broad themes for multidisciplinary research that fill gaps in the research landscape, such as the "Sensors in Extreme Environments" theme, through its normal priority-setting procedures. Marine technology research is covered as part of EPSRC's responsibility to manage its research portfolio and through its interactions with users of such research, in particular through EPSRC's Aerospace and Defence and Power sector activities.

NERC agrees that the development of marine technology is an important factor, and this is recognised in the new NERC strategy where Technologies is one of the seven strategic science themes. NERC supports the efforts of its Research and Collaborative Centres to engage industry in the development of marine technologies, and Technology Development is specifically addressed in the Oceans 2025 programme.

Technology and policy formulation

- 46. We believe that there is an important role for a marine agency to promote knowledge transfer from scientists to policy formulation. This could include publishing data in an appropriate format and promoting stakeholder engagement. (Paragraph 254)**

Promoting the transfer of knowledge generated and held by the Research Base to enhance economic growth is entirely in line with the Government's objective to make the most of the UK investment in science, engineering and technology.

For Departments, science is commissioned for a specific purpose, that of providing evidence on which to base policy development. Communication is an important aspect of the science/policy interface. It is a two-way process; policy needs to be clear as to what the “evidence” needs are and scientists need to deliver the answers in a clear and understandable way.

There are several initiatives that are looking at the science/policy interface. For example, as part of a Commission funded project, Defra has initiated a study aimed at developing good practice in the communication between scientists and fishery managers. NERC and its centres are already engaged in many knowledge transfer activities and ERFF recently published a report on using research to inform policy.

It is concluded that the funders of marine science should take the lead for ensuring that there is effective communication of their science. A potential role for MSCC is encouraging the sharing of good practice between members.

Industry and strategy

- 47. We believe that the development of marine technology should be an important component of the work of new marine body which should ensure that it engages with industry in developing its strategy and plan of work. (Paragraph 255)**

MSCC will ensure that wider stakeholders, including industry, are consulted during the process of developing the marine science strategy.

Skills

- 48. We believe that one of the key tasks of the new marine body should be to review the training needs required to support marine science and technology in the UK and to propose a strategy for tackling identified shortages. (Paragraph 264)**

The Government agrees that skills and training are an important aspect in helping to secure proper development of the UK’s marine science and technology capability. The MSCC will need to consider this aspect carefully before adopting an appropriate plan of action. Key stakeholders in this area, including the Research Councils, the Sector Skills Council for Science, Engineering and Manufacturing Technologies (SEMTE) and relevant industry bodies will need to be consulted as appropriate.

Education and outreach

- 49. We recommend that the Department for Children, Families and Schools investigate the US programme and other ways of integrating**

marine science into schools and adopt a strategic programme to encourage the study of marine science-related subjects in UK schools. (Paragraph 268)

The DCSF will look at the work undertaken by the National Science Foundation in the US and other programmes

The national curriculum statutory programmes of study at key stages 3 and 4 are now less prescriptive, having been slimmed down by expressing the content in more general terms without losing breadth, depth and challenge. This provides greater flexibility for teachers, allowing them to adapt their curriculum for the needs and circumstances of their pupils, and allowing the integration of subject areas such as marine science. The new curriculum opportunities section of the key stage 3 programme of study also indicates that the curriculum should provide opportunities for pupils to experience science outside the school environment, to study science in local, national and global contexts, and to recognise the importance of sustainability. Marine science is one of many areas of science that could address these.

The Government's ambitious programme of work to create an education and training environment that delivers the best in science teaching and learning at every stage will provide opportunities for both teachers and pupils to find out more about specific topics such as marine science through:

- Continuing Professional Development (CPD) opportunities – the Science Learning Centre South east has access to the unique facilities of the National Oceanography Centre. This enables the centre to provide courses that introduce teachers to ocean and earth science concepts suitable for use in the classroom. These can be accessed by teachers from across the nation.
- Learning outside the classroom – through The Learning Outside the Classroom Manifesto the Government wants to enable every young person to experience the world beyond the classroom as an essential part of their learning and personal development.
- Encouraging marine related organisations to link with Science and Engineering Ambassadors programme (a number of marine related organisations are already involved), after school science and engineering clubs, and the STEM careers campaign that will begin in early 2008.

It will be a matter for the Scottish Government to consider education policy in Scotland.

50. We recommend that DIUS and Defra jointly examine the US Sea Grant programme with a view to whether the new marine body could

usefully expend funds of its own to encourage marine research in the HEI sector. (Paragraph 268)

The MSCC will not have its own budget for research and will not therefore be in a position to expend funds to encourage research in the HEI sector. Departments commission research at a wide range of research institutes, including universities. To encourage the involvement of university teams in fisheries research NERC, Defra, DARDNI and the Scottish Government this year launched a jointly funded programme, 'Sustainable Marine Bioresources', which required universities to take the lead in preparing bids. Eighteen proposals were received, involving some 30 university teams. Six proposals have been selected for funding with a total budget of £2.4m. MSCC will consider whether other schemes, including the US Sea Grant programme, are an appropriate way of encouraging marine science in the HEI sector. It will be a matter for the Scottish Government to consider education policy in Scotland.

- 51. We believe that the learned societies have a role to play in outreach work and encouraging greater knowledge of ocean-related issues among the general public and in promoting careers in marine science. We recommend that the new marine body, proposed in this Report, develop links with the learned societies for this purpose. (Paragraph 270)**

MSCC will commission working groups to undertake specific studies. Learned societies will need to be included in these working groups as appropriate, building on the links already established by Departments. Learned Societies will be among the many stakeholders that will be consulted in the course of developing the marine science strategy.

Increasing public awareness

- 52. The new marine body should be charged with raising public awareness of marine issues, including better use of facilities such as science centres and public aquaria. A focus on extreme environments (space and oceans) would entice young people into science. There should also be a duty placed on the new body to raise awareness of marine sustainability issues so that the general public is accurately informed about the importance of the oceans in their lives. (Paragraph 271)**

Departments and their institutes already have a number of initiatives aimed at raising public awareness. For example NERC's Research and Collaborative Centres, including the marine centres, already engage in an extensive range of outreach activities and programmes including "classroom@sea" and the current BAS exhibition about Antarctic life and research hosted by the Science Museum.

Defra produces a quarterly publication Fishing Focus which includes a regular section reporting on results from its research programme.

The Government concludes therefore that raising awareness on matters such as marine sustainability is best accomplished by the individual Departments, or Devolved Administrations, rather than a central body such as MSCC.

International organisations

- 53. We recommend that a co-ordinating committee, within the new agency, be established to bring together UK representatives on all relevant international bodies in order to establish agreed common policy goals and to make optimal use of UK expertise and technology. (Paragraph 274)**

Current arrangements are that IACMST's International Sub-Committee maintains an overview of UK Government Policy relevant to the UK's interface with various intergovernmental marine-related agencies. The Committee does not formulate policy but it does provide a mechanism for the exchange of information, allowing policy to be developed. A similar provision will be needed for the future, and MSCC will need to ensure that the sub-committee continues, possibly as one of the working groups that will be commissioned to undertake specific work.

International projects

- 54. We recommend that NERC examine alternative mechanisms for funding long-term international projects in marine science. It may be that there is also a role for the new marine body here in helping with co-ordination across funders. We also recommend that more funding be made available by NERC or other funders of programmes to enable scientists to exploit the results of international projects. (Paragraph 278)**

Facilitating involvement in long-term international projects is important to NERC and the issue will be addressed in the development of NERC's International Strategy in 2008 as well as in NERC's Theme Action Plans. NERC regards the exploitation of results from all relevant programmes, whether national or international, as a high priority, as demonstrated by its support for data-utilisation in the Integrated Ocean Drilling Programme, for example. Both ERFF and the successor committee to the IACMST, as well as the new RCUK offices in China, India and the US, should be able to contribute to the co-ordination of international projects and the facilitation of UK involvement.

- 55. We conclude that NERC should continue to fund IPOs wherever possible and should provide direct support and assistance in the early stages of bidding for such offices, as well as during the period of operation. (Paragraph 281)**

Continued funding of IPOs will be dependent on budgetary planning decisions to be made in 2008. NERC will continue to assess the appropriateness of its involvement in IPOs against its strategic priorities, and where possible become involved at an early stage with offices whose programmes are a good fit.

EU marine research

- 56. We believe that the UK should participate fully in the development of marine science and technology under the European maritime Green Paper process and show leadership to maximise the influence of UK scientists. We are concerned that this may not be easy with the Department for Transport in charge of Government policy in this area and we urge full consultation between that Department and those with greater knowledge of marine science and technology. (Paragraph 284)**

These recommendations are founded on a misconception. The DfT is not “in charge of Government policy” on the European Maritime Green Paper. With the agreement of all the Government Departments, Devolved Administrations and Agencies concerned, the DfT was responsible for co-ordinating the UK Government response on the European Commission’s Maritime Green Paper. The response was developed following a UK-wide public consultation and full discussions between UK Government Departments and the Devolved Administrations. It was also subject to scrutiny by the UK Parliament, before being submitted to the European Commission.

Following the consultation on the European Maritime Green Paper, on 10 October 2007, the European Commission published the wide ranging Integrated Maritime Policy for the EU (“the Blue Book”), for further discussion by Member States. (available at: <http://ec.europa.eu/maritimeaffairs>) The development of individual elements of the new European Maritime Policy will be taken forward by the Government Departments, Devolved Administrations and Agencies with relevant policy responsibility. However, for the sake of coherence, it is likely that a central co-ordination point will still be required and the appropriate location of this within Government is currently under discussion.

- 57. We recommend that the UK continue to work closely with EU to exploit FP7 to the full in the area of marine science. (Paragraph 288)**

The Government agrees that there is much to be gained in working closely with the EU to maximise the opportunities available in FP7. We will continue to influence the FP7 work programmes through the relevant programme committees and through communication in other fora with the European Commission and other EU member states. Information and support will be provided to UK applicants through the FP7UK website, the national contact point

services provided by departments, and through the Research Councils sponsored UK Research Office (UKRO) based in Brussels.

Government departments and the Research Councils will continue to participate in European collaborative mechanisms funded by the Framework Programme, including the ERA-NETs in marine research, marine pollution and ocean drilling research, to ensure better coordination of national research programmes across Europe.

A UK marine action plan

58A We recommend that the UK Government develop a strategy for marine science, setting out priorities for fulfilment in the next ten years and identifying how these will be met. This strategy should be developed in full and open consultation with the science community, the private sector and all those with an interest in the health and exploitation of the oceans, including those involved in education.

Individual departments and the Devolved Administrations have responsibilities for developing their own science strategies. For example Defra published its Science and Innovation strategy in 2005, and earlier this year developed a long-term vision for sustainability in the fishing sector which helps identify the future challenges for fisheries science. NERC has recently published its strategy for 2007-2012, "Next Generation Science for Planet Earth", covering its strategy and science priorities and clarifying its approach to funding national capability, including in marine science.

However the Government accepts that there is merit in developing a high-level marine science strategy. This strategy should not duplicate the strategies of individual departments but will focus on the cross-departmental science issues, especially the need for joined-up programmes, and the need for considering our 'national capability' to support marine science. Agreeing the content and scope of the strategy will be one of the first tasks of MSCC. It will be important to agree the extent to which the strategy will include technology, whether to include UK science undertaken in international waters, and how to cover science that crosses the land, air, sea sectors. Once the strategy has been scoped MSCC will commission the work possibly through one of the proposed working groups. Wide consultation will be part of the process. Scottish Government is currently considering its science strategy for 2011-2016, including marine science.

58B We further recommend that the marine science strategy be part of a larger holistic strategy or plan for maritime affairs, covering the range of uses of the sea, current and future. The priorities and objectives in this strategy should be underpinned by scientific data and evidence. (Paragraph 304)

This recommendation, which refers to the need to develop a larger holistic plan for maritime affairs, is noted by the Government. However this is more a matter of UK marine policy and is considered to fall somewhat outside the strict terms of reference of the Inquiry which has as its focus marine science.

Developing further clarity on the Government's marine objectives is an important line of work linked to the Marine Bill. Work is underway to develop a suite of high level marine objectives for the UK Government as a whole. These will clarify the UK Government's current vision of clean, safe, healthy, productive and biologically diverse oceans and seas.

The high level objectives will provide a framework to enable consistency and alignment between marine policy and science strategy and will cascade to more detailed and technical contributory objectives and indicators in the UK's Marine Monitoring and Assessment Strategy (UKMMAS) to ensure coherence of our policy with all of our science and monitoring activities.

The objectives will also underpin the development of a marine policy statement which will provide a more detailed framework to deliver sustainable marine development through a new system of marine planning that will create a set of marine plans for areas of sea (including the coast). This is a fundamental part of the forthcoming Marine Bill and the system's implementation will be underpinned by data and evidence. The plans themselves will take all marine resources and activities within the area into account, as well as outside influences, to develop scenarios of current and future development of that area and the activities within.

Accurate and reflective scientific data and evidence gathered during planning will provide the necessary understanding of the amount, nature and complexity of marine activity in an area, as well as ecological considerations and physical features, to help us ensure we can properly protect areas, for example marine conservation zones, that we need to. During the planning process, the planning body Marine Management Organisation (MMO) will liaise and consult with bodies and organisations with specific expertise or marine related responsibilities, including scientific advisors to ensure that the developing plans accurately reflect their policies, priorities and objectives, as set out in the UK marine policy statement. The Scottish Government is currently taking forward policy development for marine spatial planning and a marine management organisation for Scottish waters.

The Government concludes therefore that while a marine science strategy is necessary and will be developed by the MSCC, a larger holistic strategy or plan for maritime affairs is already being substantially addressed by departments through the Marine Bill process. As with all evidence-based policy making, the development of marine objectives is underpinned by science.

58C We recommend that the strategies be the day to day responsibility of a new marine agency, an executive body with powers to require the co-operation of Government departments. (Paragraph 304)

As indicated in our response to Recommendation 58A and 58B the Government accepts that there is merit in developing a high-level marine science strategy, and this will be a priority for the MSCC. Our response to Recommendation 58B concludes however that a larger holistic strategy for maritime affairs is already being substantially addressed. Consideration therefore only needs to be given to one strategy, that covering science, and this will be developed by the MSCC.

The MSCC will not be in a position to ‘require the co-operation of government departments’ nor does the Government consider this an appropriate way of achieving successful collaboration between departments and/or Devolved Administrations. As set out at the start of this response members of the committee will agree how they will work together through a memorandum of understanding or other form of agreement. This will include joint ownership of the strategy.

58D At the top of this new structure, we recommend the designation of a Minister for Marine Science within Defra, who should act as the Government champion for the whole maritime strategy. (Paragraph 304)

The Government recognises the case for improving co-ordination and developing a more strategic focus. The reporting arrangements for the new committee will be developed as part of detailed planning work for its establishment over the next 4-6 months, to ensure it has the right levers and authority to be able to deliver.

Key factors that will need to be taken into account include:

- There is no lead Minister for marine policy. Marine policy is the responsibility of a number of different departments, Devolved Administrations and funding agencies. Each of these has specific requirements for marine science, including providing “evidence” on which to base specific marine policies and decision making.
- These departments, administrations and agencies are themselves responsible for ensuring that there is effective communication with stakeholders, developing collaborative links, ensuring facilities and vessels are used effectively etc.
- The funders of marine science are best placed, and should be responsible for, the proper management of their science, including effective collaboration and coordination with others.

- The “marine” label implies a uniformity of purpose among agencies which is not in practice the case. Government agencies address a wide range of different policy issues, which, though they all take place in a marine context and may interact, are no more closely linked than all terrestrial activities and are better managed separately.
- The need to ensure robust arrangements and clarity of responsibilities for coordinating and ensuring coherence in the UK’s overall approach, and to address cross-cutting issues.

To secure the improvement in co-ordination and to strengthen opportunities for increasing efficiency the Government considers that the proposed new Marine Science Co-ordination Committee (MSCC) will be the key vehicle to fulfil this role. Members of the committee will be able to escalate issues through the normal channels to their own ministers. Where there are interdepartmental issues that need to be resolved these can be reported to the relevant Cabinet sub-committee or dealt with under established arrangements for any matter of devolved policy. The mechanism for this and the detailed reporting arrangements for MSCC will be developed as part of planning work for its establishment over the next 4-6 months, to ensure it has the right levers and authority to be able to deliver.

The MSCC might also present an annual report to the Chief Scientific Advisers’ Committee, chaired by the Government’s Chief Scientific Adviser.

59. Under this new arrangement, it would be illogical to leave the Department for Transport in charge of Government policy on the European maritime Green Paper. We recommend that this responsibility be passed to the new marine agency. (Paragraph 305)

The proposals for a new Integrated Maritime Policy for the European Union are set out in the so-called “Blue Book”, published by the European Commission in October 2007, following a year-long consultation on the Maritime Green Paper. The proposals are very wide-ranging and cover a number of different policy areas. These include maritime security and surveillance; labour law; careers and employment; maritime transport; maritime clusters; regional policy; tourism; migration; and international relations, as well as marine science and technology, fisheries, climate change and spatial planning. Although the Department for Transport is currently acting as the UK Government focal point for co-ordinating work on the new European maritime policy, responsibility for negotiating and developing individual policy areas continues to rest with the Government Departments, Devolved Administrations and Agencies concerned.

Appendix 1 List of Acronyms

ARGO

Array for Real-Time
Geostrophic Observations

BAS

British Antarctic Survey

BERR

Department for Business,
Enterprise & Regulatory
Reform

BGS

British Geological Survey

BNSC

British National Space
Centre

CPD

Continuing Professional
development

CPR

Continuous Plankton
Recorder

CSIC

Higher Council for Scientific
Research

DARDNI

Department of Agriculture
and Rural Development of
Northern Ireland

DCFS

Department for Children,
Families and Schools

DFT

Department for Transport

DIUS

Department for Innovation,
Universities and Skills

EA

Environment Agency

EPSRC

Engineering and Physical
Sciences Research
Council

ERFF

Environment Research
Funders' Forum

FP7

Framework Programme 7

FMSCG

Fisheries and Marine
Science Customer Group

GEO

*Global Environment
Outlook*

GEOS

*Global Earth Observation
System of Systems*

GMES

Global Monitoring for
Environment and Security

GOOS

Global Ocean Observing
System

HECToR

High End Computing
Terascale Resource

HEI

Higher Education Institutes

HPC

High performance
computing

IACMST

The Inter-Agency
Committee on Marine
Science and Technology

ICES

International Council for the
Exploration of the Sea

EU INSPIRE Directive

Infrastructure for Spatial
Information in the European
Community

IPY

International Polar Year

IROs

Independent Research
Organisations

ISIS

Name of Remotely
Operated Vehicle (ROV)

MAPC

Marine Assessment Policy
Committee

MARG

Marine Assessment
Reporting Group

MCZs

Marine Conservation Zones

MDIP

Marine Data and
Information Partnership

MEDAG

Marine Environmental Data
Action Group

MFMB
Marine and Freshwater
Microbial Biodiversity

MMO
Marine Management
Organisation

MOD
Ministry of Defence

MPAs
Marine Protected Areas

MSCC
Marine Science Co-
ordination Committee

NERC
Natural Environment
Research Council

NOCS
National Oceanography
Centre

PML

Plymouth Marine
Laboratory

POL
Proudman Oceanographic
Laboratory (part of NERC)

PSEG
Productive Seas Evidence
Collection Group

RCUK
Research Council UK

RDAs
Regional Development
Agencies

SAHFOS
Sir Alister Hardy
Foundation for Ocean
Science

SEMTA
Sector Skills Council for
Science, Engineering and

Manufacturing
Technologies

SOLAS
Surface-Ocean Lower
Atmosphere Study

STEM
Science, Technology,
Engineering and
Mathematics (Support
Centres)

UKDMOS
UK Directory of Marine
Observing Systems

UKHO
United Kingdom
Hydrographic Office

UKMMAS
UK's Marine Monitoring and
Assessment Strategy

UKRO
UK Research Office