



House of Commons  
Science and Technology  
Committee

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**Marine science**

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**Ninth Report of Session 2012–13**

***Volume II***

***Additional written evidence***

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## Science and Technology Committee

The Science and Technology Committee is appointed by the House of Commons to examine the expenditure, administration and policy of the Government Office for Science and associated public bodies.

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### Powers

The Committee is one of the departmental Select Committees, the powers of which are set out in House of Commons Standing Orders, principally in SO No.152. These are available on the Internet via [www.parliament.uk](http://www.parliament.uk)

### Publications

The Reports and evidence of the Committee are published by The Stationery Office by Order of the House. All publications of the Committee (including press notices) are on the Internet at <http://www.parliament.uk/science>. A list of reports from the Committee in this Parliament is included at the back of this volume.

The Reports of the Committee, the formal minutes relating to that report, oral evidence taken and some or all written evidence are available in printed volume(s). Additional written evidence may be published on the internet only.

### Committee staff

The current staff of the Committee are: Dr Stephen McGinness (Clerk); Jessica Montgomery (Second Clerk); Xameerah Malik (Senior Committee Specialist); Victoria Charlton (Committee Specialist); Darren Hackett (Senior Committee Assistant); Julie Storey (Committee Assistant); Henry Ayi-Hyde (Committee Office Assistant); and Nick Davies (Media Officer).

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# Written evidence

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## Written memorandum submitted by Dr Peter J.S. Jones, University College London (UCL)

1. This submission relates to the first part of Term of Reference 4. Has the selection of proposed Marine Conservation Zones (MCZs) been based on robust scientific evidence? In summary, it argues that a balance needs to be struck between ensuring a sufficiently robust scientific evidence base for the design of MCZs, and allowing for the MCZ process to move forward in the face of uncertainty, recognising the precautionary principle and providing for the designation of a coherent and effective MCZ network on the basis of reasonably obtainable best evidence

2. The UK government's Ministerial Statement on the creation of a network of marine protected areas (MPAs) on 11 October 2010 included a commitment to designate a representative and coherent network of MCZs on the basis of the best available evidence.

3. Section 2, subsection 1 of the Marine and Coastal Access Act states that "It is the duty of the MMO to secure that the MMO functions are so exercised that the carrying on of activities by persons in the MMO's area is managed, regulated or controlled.. (b) taking account of all relevant facts and matters (see subsection (3))", but subsection (3) clarifies that "For the purposes of subsection (1)(b), the facts and matters that may be taken into account include each of the following (a) scientific evidence, whether available to, or reasonably obtainable by, the MMO" [my emphasis, as throughout]

4. The process of recommending MCZs by the four regional projects was (a) based on the best available evidence, as compiled by the regional project support teams; (b) undertaken through the Regional Stakeholder Groups, including representatives of a wide range of sectoral and societal interests; and (c) following the Ecological Network Guidance produced by Natural England and the JNCC. Natural England/JNCC's Ecological Network Guidance states that whilst "MCZ identification and designation should be based on the best available evidence. Lack of full scientific certainty should not be a reason for delaying network design and planning, including decisions on site identification".<sup>1</sup>

5. The final report of the MCZ Science Advisory Panel concluded that ecological coherence could be achieved if all the recommended MCZs were implemented, but that there were deficiencies and uncertainties in the evidence base for many of the recommendations.<sup>2</sup>

6. The Ministerial statement on MCZs of 15 November 2011 stressed the essential need for an adequately robust evidence base to justify MCZ designations and subsequent restrictions. This could be interpreted as placing a greater burden of proof on the conservation agencies than "best available evidence" (Ministerial Statement of 11 October 2010, but this burden of proof needs to be commensurate with the evidence base that is "reasonably obtainable" and with the precautionary principle.

7. The recent advice package on the recommended MCZs to DEFRA provided by Natural England and the JNCC states that "scientific confidence in whether the feature is present (or not) is "high" for less than 50% of the features recommended. However, it should be noted that an assessment of "low confidence" does not mean that a feature is not present but that more data are needed to confirm presence throughout the site. There is a programme of survey work to collect additional information on some rMCZs and a further literature review to improve confidence for features in some sites."<sup>3</sup>

8. Given the extensive, complex and submarine nature of England's marine territory, it is unreasonable to expect the same detail of scientific evidence for the selection of MCZs to be obtained as for terrestrial SSSI designations<sup>4</sup>

9. It is also unreasonable to apply the evidence requirements for marine SACs (purely top-down designations of European importance) to MCZs (collaborative designations of national importance).<sup>5</sup>

10. The precautionary principle is a particularly important commitment in relation to MCZ designation processes. It is defined as "Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation"<sup>6</sup>

11. The precautionary principle was an integral and accepted part of the official documents antecedent to the draft Marine Bill, e.g. White Paper on the Draft Marine Bill, Paragraph 8.153 "The UK Government and the devolved administrations set out their strategy for the conservation and sustainable development of our marine environment in Safeguarding our Seas. We explained that our vision of clean, healthy, safe, productive and biologically diverse oceans and seas would be delivered by pursuing policies that promote sustainable development, integrated management, stakeholder involvement, robust science and the precautionary principle.

<sup>1</sup> Design Principle 7, p.4, [http://jncc.defra.gov.uk/pdf/100705\\_ENG\\_v10.pdf](http://jncc.defra.gov.uk/pdf/100705_ENG_v10.pdf)

<sup>2</sup> <http://www.defra.gov.uk/environment/marine/protect/mpa/mcz/sap>

<sup>3</sup> <http://jncc.defra.gov.uk/page-6240#evidence>

<sup>4</sup> <http://jncc.defra.gov.uk/page-2303>

<sup>5</sup> <http://www.defra.gov.uk/publications/files/pb13598-grahambryce-independent-review-marine-sacs-110713.pdf>

<sup>6</sup> 1992 Rio Declaration on Environment and Development.

12. The precautionary principle is widely accepted as an important justification for the designation of networks of MPAs to address uncertainty in the face of marine ecosystem complexity, coupled with the difficulties of studying marine ecosystems [Lauck T *et al.* (1998) Implementing the precautionary principle in fisheries management through marine reserves. *Ecological Applications*, 8(1), S72–S78; Murray SN *et al.* (1999) No-take reserve networks: sustaining fishery populations and marine ecosystems. *Fisheries*, 24(11), 11–25]

13. The precautionary principle is also integral to EC policies. According to Article 191 of the Treaty on the Functioning of the European Union (TFEU, 2010), policy on the environment “shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source”. The Marine Strategy Framework Directive accordingly requires that “Member States should then establish and implement programmes of measures which are designed to achieve or maintain good environmental status in the waters concerned, while accommodating existing Community and international requirements and the needs of the marine region or subregion concerned. Those measures should be devised on the basis of the precautionary principle and the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source and that the polluter should pay.” (Preamble 27). It further requires that “Programmes of measures and subsequent action by Member States should be based on an ecosystem-based approach to the management of human activities and on the principles referred to in Article 174 of the Treaty, in particular the precautionary principle.” (Preamble 44).

14. I provided written to the Joint Committee on the Draft Marine Bill. This evidence was cited in supporting the Joint Committee’s Recommendation that the precautionary principle should be employed to select Marine Conservation Zones where there is limited knowledge.<sup>7</sup>

15. The need for an evidence-based approach is recognised by DEFRA and wider UK policies, and this need is being emphasised by some user groups, such as the MPA Fishing Coalition.

16. The need for an evidence-based approach needs to be balanced with the need to proceed in the face of inevitable uncertainties on the basis of reasonably obtainable best available evidence, in keeping with the precautionary principle.

17. Delaying the designation of MCZs or, worse still, abandoning the designation of some MCZs without designating alternative substitute MCZs, will undermine the potential for an ecologically coherent and representative MPA network, as required by Article 12(4) of the Marine Strategy Framework Directive and as committed to in the original Ministerial Statement on the creation of a network of MPAs.

18. Certain industry stakeholders are emphasising the need for an evidence-based approach as they have vested interests in minimising the impacts of MCZs on fishing activities. This aim, however, should not undermine the need to designate an ecologically coherent and representative network of MPAs, including MCZs. A broader range of stakeholders participated in the regional processes that led to the MCZ recommendations, and are committed to the MCZ network. This broader stakeholder commitment, along with the UK government’s commitment to such a network, should not be undermined.

19. The deliberations and recommendations of the Marine Science Advisory Committee need to recognise that the need for a robust evidence base needs to be balanced against (a) the obligations to implement the precautionary principle; (b) obligations and commitments to designate a representative and coherent network of MPAs, along with broader stakeholder support for such a network; and (c) the level of evidence that is “reasonably obtainable” given the realities of the scale of England’s marine territory and the scientific challenges of extensively surveying and understanding it. The focus should be on obtaining a reasonably available best evidence base rather than delaying or undermining the process in an unrealistic quest for a completely robust and incontrovertible evidence base.

#### FURTHER READING

Jones P.J.S. (in press) Marine Protected Areas in the UK: challenges in combining top-down and bottom-up approaches to governance. *Environmental Conservation*. Open Access paper available at <http://dx.doi.org/10.1017/S0376892912000136>

Declaration of interests—I am an independent academic researcher who has been focusing on marine conservation, particularly MPA governance, issues for over 20 years. I am a Ministerial Appointee to the Sussex Inshore Fisheries and Conservation Authority. <http://www.geog.ucl.ac.uk/~pjones>

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<sup>7</sup> para. 126, page 55, Volume I of JCDMB Report <http://www.parliament.uk/business/committees/committees-archive/jcdmb/>

**Written evidence submitted by Professor Andrew Watson FRS, School of Environmental Sciences,  
University of East Anglia**

**SUMMARY OF THE MOST IMPORTANT POINT**

In this country we consistently fail to reach our potential, or even do our fair share, of the long-term observations needed to document global change. Comparison with the efforts of other countries suggests this is because there is no agency charged with this specific duty and with the authority to co-ordinate the efforts of those engaged in the observations. I suggest we should remedy this.

**MY BACKGROUND**

I have 35 years experience in marine, atmospheric and planetary research, with currently around 150 peer reviewed publications in these fields. I worked for 14 years at marine institutes in Plymouth (the Marine Biological Association and Plymouth Marine Laboratory) before moving to a university position in 1996. I currently hold a Royal Society Research Professorship, and I am the recipient of several awards for marine science.

**DECLARATION OF INTERESTS**

I have been a member of NERC Council since 2008—my expertise is the most recognizably “marine” of current NERC Council members. I hold a number of research grants funded by NERC and DEFRA, and I am a user of national marine facilities such as NERC research ships.

The views expressed here are entirely my own opinions. In particular, I am not representing NERC Council or employees of NERC.

*Q5. How effectively does the NERC support marine science in polar and non-polar regions?*

1. I speak as a user: I have been on numerous research cruises, on US, German, New Zealand and Finnish vessels as well as on UK ships, I was last at sea on *RRS James Cook* in March this year.

2. I give NERC good marks for their support for this kind of “traditional” marine science. The research ships are world-class and deliver a generally excellent service. They are well equipped and skilfully staffed. They have an excellent safety record.

3. The marine facilities need to be more efficiently run. For example, the Antarctic ships are controlled from Cambridge while the general purpose ships are based at Southampton, resulting in some duplication of effort and resource. The ships seem generously staffed compared to those of other countries. NERC is aware of these issues, and the merger of the National Oceanography Centre and the British Antarctic Survey will provide an opportunity to address them. I am concerned when that happens however, that we retain the best elements of both management teams and styles.

*Q6. How well are the current and potential impacts of global warming on the oceans... being monitored and addressed by Government and others?*

4. Maintenance of long term observations is absolutely essential in order to document the effects of global warming, acidification and also of and other important global change (for example pollution from plastics, hydrocarbons, and persistent organics, eutrophication, biodiversity loss and the effects of over-exploitation—all these are now affecting the oceans globally).

5. The USA, Japan and Australia all have a good track record when it comes to long-term observations of global significance, and much of our knowledge about what is happening to the planet as a whole comes from the work done by these nations over the last 50 years. By contrast, the UK is notably weak in its commitment to, and ability to sustain, long-term observations, even in our own backyard.

6. In my view this comes from the lack of a co-ordinating body charged with, and funded for, this task. The nations mentioned above all have organizations that take overall responsibility for this work, and which take a unified approach to observations (NOAA in the USA, CSIRO in Australia and JAMSTEC in Japan) In our country by contrast, these tasks are supposedly shared; in the marine realm by the Met Office, NERC institutes, CEFAS, Marine Scotland and various other institutes; in the atmosphere by the Met Office, DEFRA and DECC, and by many and various others on the land surface. All these agencies and institutes have many other tasks too. The result is that these organizations can play pass-the-buck on any given responsibility, and the necessity of maintaining their long-term observations is too far down their priority lists for the UK to be able to get its act together when it comes to global change observation.

7. Examples to illustrate this are legion. Here are a few:

- (1) Despite regularly surveying our waters for fisheries monitoring, the chemical measurements to observe acidification and CO<sub>2</sub> uptake in our waters were not carried out by CEFAS until the beginning of last year.

- (2) Uniquely among the developed nations, the UK has not supported long-term observation of atmospheric CO<sub>2</sub> (my information is from 2007, see E. Nisbet, *Nature*, 450, 789–790, 2007; long-term observations had been made up to this time at a site in Scotland, but these were performed by the Australians and later by Germany).
- (3) Independent of government, in 1903, researchers based at Plymouth began regular sampling of sea temperatures and other measurements at a site about 20 miles south of Plymouth Sound (see figure). The time series was continued through the 20th century, with understandable interruptions during World Wars I and II. However the longest and most damaging interruption in the series is from 1985 to 2002. Not a world war this, but simply the low priority assigned to it (by NERC, which by that time controlled the funding) leading to the abandonment of the work. It seems clear from the data on either side of the break that there was a substantial increase in temperature at the site during that missing period. The value of the time series, and 100 years of work, was seriously compromised by the decision to suspend it over this time interval.

8. We should learn from the nations that do this well, and reform the way in which we observe the environment. We should form a marine and atmospheric agency with responsibility for tracking long-term changes. This would co-ordinate (and control the funding for) the efforts of those organizations who actually do it—units within the Met Office, the NERC institutes, CEFAS fisheries laboratories, DECC and DEFRA responsibilities on observations of emissions. I doubt this would require much restructuring at the level of the individual laboratories and institutes who do this work (or at any rate would like to be able to do it if they were allowed to), but it would entail a restructuring of their governance, and how they interact with government via the departments and ministries.

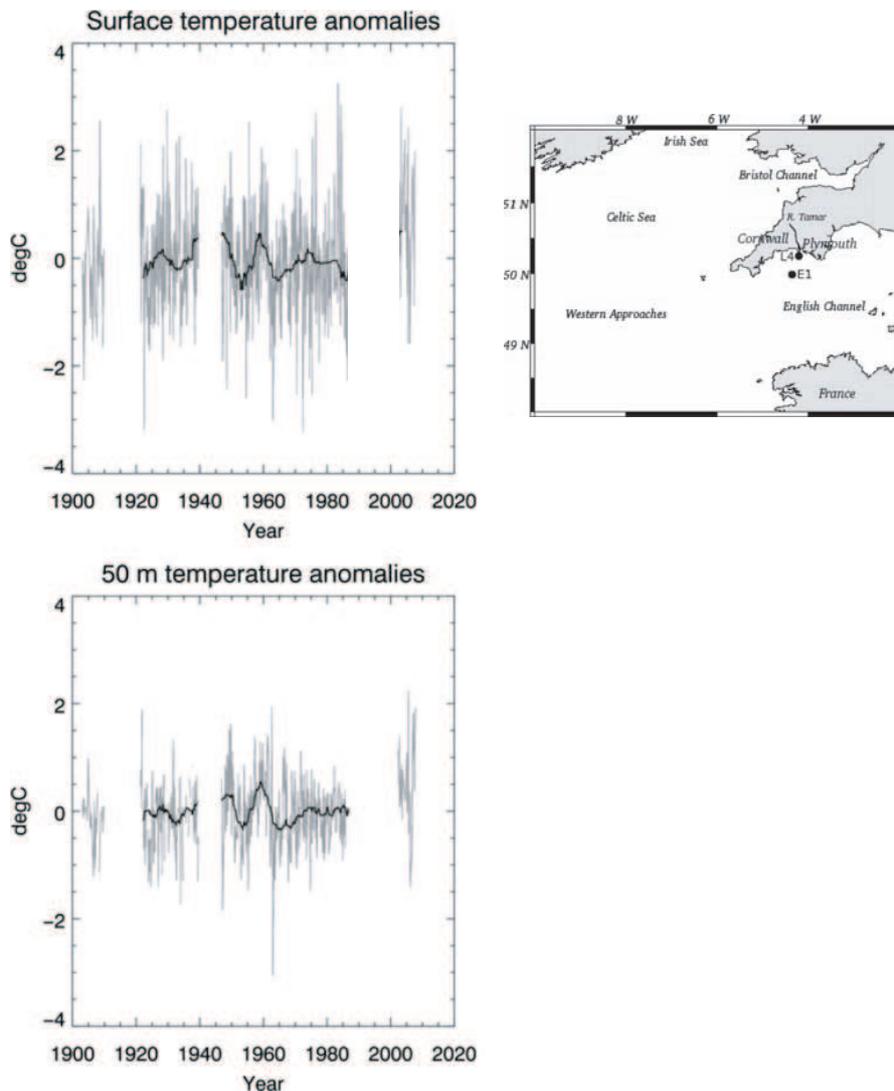


Figure: Sea Temperatures from station E1 in the Western English Channel (see chart). The three interruptions in the data correspond to WWI, WWII, and failure of funding from 1985–2002.

(Figures redrawn from Smyth, T. J. *et al.* “A broad spatio-temporal view of the Western English Channel observatory”. *Journal of Plankton Research* 32, 585–601, doi:10.1093/plankt/fbp128 (2010). In the original

top left figure, the missing data 1985–2002 for the surface temperature is estimated by splicing in satellite data: I've removed that in this version, to show only the in-situ record.)

September 2012

### Written evidence submitted by the Marine Climate Change Impacts Partnership (MCCIP)

The following statement provides an introduction to the Marine Climate Change Impacts Partnership (MCCIP) and outlines how the partnership is being used to advance knowledge of the impacts of climate change on the marine environment.

#### 1. *What is MCCIP?*

MCCIP is a partnership between scientists and sponsors from government, its agencies and NGOs (see Appendix I for details). Our principal aim is to provide a co-ordinating framework for the UK, so as to be able to transfer high quality evidence on marine climate change impacts, and guidance on adaptation and related advice, to policy advisors and decision makers.

For the purposes of this partnership, we consider marine to include the coastal fringe, UK shelf seas and, where appropriate, beyond (e.g. large-scale ocean processes, such as the Atlantic heat conveyor, that have a profound influence on the UK).

The objectives for MCCIP are to:

- A. Develop and maintain a coordinating framework for marine climate change partners in the UK.
- B. Build the knowledge base and consolidate evidence of marine climate change impacts, with emphasis on the spatial dimension where possible.
- C. Provide effective mechanisms for the efficient transfer of marine climate change knowledge from the scientific community to policy advisers and decision makers.
- D. Develop guidance and build upon best practice for adaptation tools and strategies available to stakeholders.
- E. Identify present shortcomings in UK marine climate science (i.e. what other science could be done/supported to help decision makers and UK marine industries).
- F. Actively engage with partners and consult wider communities on requirements for climate change tools and information (e.g. marine scenarios of climate change).

The intended target audience of MCCIP is marine and coastal stakeholders including policy makers requiring marine climate change knowledge in an accessible format, enabling them to make informed decisions based upon quality assured science.

#### 2. *Why was it formed?*

The Marine Climate Change Impacts Partnership (MCCIP) was launched in March 2005 as one of the actions from the UK government and devolved administration report *Charting Progress: An Integrated Assessment of the State of the UK Seas*, which identified climate change and unsustainable fishing as the two main threats facing the UK's marine environment.

#### 3. *How is it structured?*

The institutional structures for MCCIP include a Steering Group of key stakeholders (chaired by the United Kingdom Department for Environment, Food and Rural Affairs), a secretariat based at Cefas and working groups to deliver MCCIP products.

The Steering Group is the funding provider and manages the direction of MCCIP, overseeing primary partnership outputs. A full list of Steering Group members is provided in Appendix I.

#### 4. *Progress made*

Since we reported on the early work of MCCIP for the 2007 House of Commons Select Committee Report "Investigating the Oceans", MCCIP has matured to become established as the focal point for the provision of scientific evidence on marine climate change impacts for government.

As a well established and highly respected partnership, it is frequently highlighted (both in the UK and internationally) as a model programme for knowledge transfer between science and policy.

This section summarises our key outputs, and wider influence over the past five years.

a. *MCCIP Report Cards*

Since 2006, MCCIP has been producing report cards which summarise current understanding of marine climate change impacts.

*Full report cards*

Our full MCCIP report cards (2006, 2007–08, 2010–11), include contributions from over 100 leading marine specialists, spread across 40 institutes and covering over 30 topics, ranging from temperature change and acidification right through to impacts on industry, such as fisheries and shipping. Backing papers are peer reviewed, to ensure the science is robust, and include information on socio-economic consequences and knowledge gaps. All contributions from authors, reviewers and working group members are provided on an in-kind basis.

The “report cards” provide an “at-a-glance” summary of the information in the backing papers and are structured around the UK vision of “healthy and biologically diverse, clean and safe and commercially productive seas”. The report cards include information on “what is already happening” and “what could happen” and include confidence ratings for both.

*Special topic report cards*

These report cards focus on specific issues of interest to decision makers, advisors and stakeholders.

In 2009, the “special topic” card reported on “ecosystem linkages”. The topics covered ranged from broad-scale to local-scale issues (acidification; arctic sea ice; food webs; non-natives; and coastal economies and people). The report card was aimed at improving understanding of the inter-connected nature of climate impacts and their effects on ecosystem goods and services.

In May 2012, our latest special topic investigated the impacts of climate change on “fish, fisheries and aquaculture”. This was in direct response to a request from the British-Irish council meeting of environmental ministers who wanted to know how climate change is affecting fish and shellfish, and its social and economic consequences. MCCIP commissioned three groups of scientists to produce journal review papers on these issues (published in a special issue of the *Journal of Aquatic Conservation*). Over 40 scientists from across the UK and Ireland contributed to these review papers, which formed the basis of a 12 page MCCIP report card.

MCCIP is currently working on its next full report card, to be launched mid-2013. Full report cards are updated every two years to ensure that end users have the latest information on what is a rapidly evolving area of science.

b. *Contributing to national and international reporting*

All major UK and Devolved administration reports with a marine climate change component have either been co-authored through MCCIP, or used MCCIP outputs as their principal source of information on marine climate change.

The stakeholder community represented on the MCCIP steering group also provides guidance *back* to the scientific community, for example on marine stakeholder requirements for the most recent UK marine climate projections (UKCP09).

Some examples are provided below:

*UKCP09 Marine and Coastal Projections (2009)*

MCCIP co-authored the UKCP09 marine and coastal projections report and provided advice on user requirements (e.g. marine and coastal variables, resolution, graphical outputs and set up of the user interface).

MCCIP will continue to provide advice on developments that the policy community would like to see in future projections (e.g. probabilistic outputs; nearer time horizons).

*OSPAR Quality Status Report (2010)*

Given the comprehensive nature of evidence collated since 2006 by MCCIP of relevance to the whole Northeast Atlantic, Cefas (through the MCCIP secretariat) was commissioned to draft the climate change assessment for the 2010 OSPAR Quality Status Report. The OSPAR Quality Status Report “provides policy makers and the wider public with a condensed overview of current knowledge on trends in pressures and impacts and the quality status of the North-East Atlantic and its Regions”.

*Charting Progress 2 The state of the UK seas (2010)*

MCCIP was commissioned to write the climate change chapter for *Charting Progress 2* (CP2) published in July 2010. In their Ministerial Foreword to CP2, ministers from the UK Government and the Devolved Administrations state that it “gives us the evidence for our seas, which we need to inform policy decisions on their future management”.

Given that one of the major limitations identified in the first Charting Progress (2005) was that it was unable to assess climate change impacts (and was indeed the reason for MCCIP being created), having a chapter dedicated to climate change in Charting Progress 2 marked a significant step forward.

#### *Scotland's Marine Atlas (2011)*

The climate change section of Scotland's Marine Atlas, published in 2011, drew heavily on information from the 2010–11 MCCIP Annual Report Card. The Atlas “is a key step in developing Scotland's first national marine plan, for all Scottish waters out to 200 nautical miles”.

#### *First UK Climate Change Risk Assessment (2012)*

In January 2012, the first ever UK climate change risk assessment was laid before UK parliament, the first in an ongoing series of reports every five years. The marine sector report highlighted the important contribution made by MCCIP in laying out the evidence base required to undertake the risk assessment.

#### *c. Helping to identify key knowledge gaps*

MCCIP published an eight page “Knowledge Gaps” paper in April 2012. This provides a summary of marine climate change evidence gaps to inform research priority setting exercises for a wide range of users, including evidence providers, funders of science, policy makers and industry. The Marine Science Coordination Committee was closely involved during the development of the paper, in order to ensure it was suitable for their needs.

The paper adds value to existing marine status reports, drawing primarily on the MCCIP Report Card 2010–11 Science Reviews, with additional information from Charting Progress 2 and the marine sector report for the UK Climate Change Risk Assessment (2012), as well as the EU FP7 CLAMER synthesis report on marine climate impacts (2011). Collectively, these synthesis reports provide the most complete overview of scientific understanding on marine climate change we have ever had.

#### *d. MCCIP “Climate Smart Working”*

To share knowledge, experiences and achievements, and to promote appropriate responses, MCCIP has launched Climate Smart Working. This aims to bridge the gap between our knowledge of marine and coastal climate change impacts and the capacity of organisations to respond.

As a first stage we have drawn together examples of marine adaptation, ranging from the global to local scale, to help share best practice amongst the stakeholder community. This will be regularly updated to provide a first port of call for organisations wanting to understand how others are approaching adaptation.

We are now engaging more actively with key marine and coastal sectors to understand their own particular needs. Initially we are working with the British Marine Federation and talking to marina managers about how their businesses could be affected by climate change. Lessons learned from this sector will be shared with the wider marine stakeholder community.

#### *e. Wider influence*

##### *Media*

MCCIP has helped to raise the public profile of marine climate change impacts in the UK and internationally, both through print and broadcast media. For example, the 2007–08 report card featured in almost 100 print/online media articles across the globe and there were a number of local and national TV and Radio interviews (including BBC Radio 4 and BBC News 24).

##### *Membership of other marine science groups*

MCCIP SG members have been (and in many cases still are) involved in many other UK marine science groups. These include the MSCC, UKMMAS Groups, EAs new climate ready programme on adaptation, UKCP09 Steering Group and User Group, National Centre for Ocean Forecasting (NCOF) Working Group on Shelf Seas Climate and Impacts; Living with Environmental Change (LWEC) climate challenge; Cross-government arms length delivery group for the natural environment and the Natural Environment part of the National Adaptation Programme.

The MCCIP Secretariat also plays an active role as part of the Challenger Society, the UK's largest learned society for marine science. We have been part of its organising committee for all biennial conferences held since the last Select Committee inquiry, and at the last society conference at NOC, the secretariat convened the first dedicated session to communicating science to policy makers.

*Parliamentary/Ministerial/Government agency advice (UK & Devolved Administrations)*

All MCCIP Report Cards have had a ministerial launch. MCCIP outputs have also been used at the British Irish Council and the Northern Ireland Assembly Committee for the Environment Inquiry into Climate Change and there have been numerous parliamentary questions raised in response to our publications.

At the May 2012 launch of our special topic on fish, fisheries and aquaculture, both the UK Minister for the Marine Environment, Richard Benyon and Scotland's Cabinet Secretary for Rural Affairs and Environment Richard Lochhead committed to the future of MCCIP, emphasising its important role in providing "robust scientific information which helps inform future policies to tackle climate change".

Supporting MCCIP, and using its outputs to guide decision making are an integral part of the marine climate change adaptation strategies of both UK and Scottish Government to help address the impacts of marine climate change. Various UK and Devolved Administration adaptation plans, including those for Defra, the Environment Agency, SNH and the Scottish Government's marine sector action plan have all used MCCIP outputs, and pledged continued support for MCCIP.

*Citations in academic literature*

A preliminary review, using Google Scholar, of papers/thesis/books and reports that refer to MCCIP shows 50 citations in Journal articles, 9 in book chapters, 3 in dissertations/thesis and 27 in reports. Nearly three-quarters of these are from 2010, 2011 and 2012 and show that MCCIP products have been used in the US, Australia and China.

*Adoption of MCCIP approaches by others*

In the UK, the MCCIP secretariat has played a substantial role in guiding the development of new terrestrial report cards (under the auspices of LWEC) for the water and biodiversity sectors. EU EPOCA report cards on acidification have been based on "best practice developed by the MCCIP" and the Australian government has produced a number of report cards since 2007 based on the MCCIP approach.

*Formal recognition of achievements*

The UK marine science strategy states that "Ocean information will be essential and integral to the development and continual improvement of climate information. In this context, the Marine Climate Change Impacts Partnership (MCCIP), in which many organisations contribute to regular assessments of current and future changes, is an example of good practice which the Strategy will seek to support and encourage".

5. CURRENT LIFETIME AND FUNDING

Following a successful first phase of MCCIP (running from 2005–10), a second expanded phase (2010–15) is now underway. In order to assure financial security over this five-year period, a detailed partnership agreement has been negotiated and put in place between the MCCIP funding bodies. The *Phase II* budget is approximately £180,000 per annum, but the in-kind contributions received from both MCCIP partners and contributing scientists push the value to over £400,000 per annum.

6. THE FUTURE

The transfer of scientific knowledge to government on marine climate change impacts will continue to be the main focus of MCCIP's work. MCCIP will need to respond to new challenges and policy requirements such as helping to integrate climate change preparedness into marine planning and licensing and ensuring that policy design and implementation allow for "changes in prevailing conditions". MCCIP will have an increasingly important role to play in supporting the development of marine adaptation strategies within Defra and the Devolved Administrations, as well as providing "on the ground" support for marine industries through MCCIP Climate Smart Working.

This requirement for MCCIP to continue to evolve is critical given the prominent role that our seas play in both shaping and regulating our climate. What seems clear from our work is that the marine environment is being affected by climate change and society needs to be able to adapt to the wide-ranging impacts such changes are likely to have.

As part of the *Phase II* work programme, we have developed an evaluation framework and report on progress on an annual basis (using an independent evaluator) to ensure we have a successful work programme. In addition we have a mid-term review scheduled for 2013, which will seek formal input from marine science and policy leads (for instance the 2008 "phase I" mid-term review included input from NERC on the quality of our science outputs).

*September 2012*

## APPENDIX I

### MCCIP PARTNER ORGANISATIONS

The following partners are on the MCCIP Steering Group, providing financial and/or in-kind contributions:

Agri-Food and Biosciences Institute, Northern Ireland; Centre for Environment, Fisheries and Aquaculture Science; Climatic Research Unit (UEA); Countryside Council for Wales; Department for Energy and Climate Change; Department for Environment, Food and Rural Affairs; Department of the Environment, Northern Ireland; Environment Agency; International Union for Conservation of Nature; Isle of Man Government; Joint Nature Conservation Committee; Marine Scotland Science; Marine Biological Association—Marine Environmental Change Network; Marine Institute, Ireland; Marine Management Organisation; National Oceanography Centre; Natural England; Royal Society for the Protection of Birds; Scottish Government; Scottish Natural Heritage; SeaWeb; Sir Alister Hardy Foundation for Ocean Science; States of Guernsey; States of Jersey; UK Met Office and Welsh Assembly Government.

### Written evidence submitted by Dr David J Webb

#### DECLARATION OF INTERESTS

I have carried out research on tides, ocean surface waves and large scale ocean circulation both experimentally and theoretically, primarily when employed by CSIRO in Australia and by NERC in the UK. As a visitor at the National Oceanography Centre I am still involved in research and publication.

Administratively my areas of responsibility have included developing the UK expertise in the global ocean models used for climate research. I was chairman of a WMO committee concerned with coordinating ocean model development worldwide—especially the aspects which most affected the coupled ocean-atmosphere models used for global climate prediction. I was also president the Ocean Sciences division of the European Geosciences Union and was a founding editor of the online open-access journal Ocean Science.

*The following comments relate to the questions:*

- Since 2007 has there been improved strategic oversight and coordination of marine science?
- How effectively does the Natural Environment Research Council (NERC) support marine science in polar and non-polar regions?
- How well are the current and potential impacts of global warming on the oceans (for example temperature changes and acidification) being monitored and addressed by Government and others?

#### 1. NERC'S SUPPORT OF STRATEGIC SCIENCE

1.1 I would contend that NERC's focus on Strategic Research is becoming less well focussed with time. Indirect evidence of this includes:

- Transfer of Resources to Blue Skies research.
- Redundancies among the scientific staff at the National Oceanography Centre.
- Limited expertise in Senior Scientific management level concerning the Thermohaline Circulation, Polar Ice, Ocean Acidification, Pollution, Overfishing.
- Within the strategic programmes a lack of clear leaders with the ability to redirect effort as the science develops. This is in marked contrast with for example the Hadley Centre.

These points are expanded on in the following sections.

1.2 I am aware of no other agency showing improved oversight or coordination of the science.

#### 2. TRANSFER OF RESOURCES TO BLUE SKIES RESEARCH

2.1 The Council of NERC seems to be moving resources to the fine grained research—with even the strategic research programs being broken down into small one or two post-doc type research projects. Such small projects tend to be fixed by contract at the start of the period, tend to be poorly integrated with each other and do not allow strategic projects to respond flexibly during the period of the project to new developments in the field.

2.2 These changes may be changing pressures on and within the Universities—who are well represented on NERC Council. From the University staff point of view there is an advantage in having many small low-risk projects each producing one or two papers in field where there are a large number of other researchers—so a good chance of many citations. Such projects usually employ cheap post-doctorates and can produce good overheads which are useful for paying for the expensive professorial and administrative staff but it is not obvious that they produce the best returns to the taxpayer.

2.3 On this basis a case could be made for changes at the Council level of NERC. This might involve removing the Council, changing its structure or strictly limiting the power of interest groups.

### 3. REDUNDANCIES AT THE NATIONAL OCEANOGRAPHIC CENTRE

3.1 The redundancies at the National Oceanographic Centre have weakened its ability to carry out strategic research. The sudden decision to fire a significant fraction of staff is indicative of poor planning and man management. At the same time its flagship climate change project (RAPID, which monitors the overturning at 24 N) has lost its principal scientist and it is clear that there was no long term planning for succession.

3.2 The cuts in science have also highlighted another trend, which is for the management of the National Oceanography Centre and the British Antarctic Survey to have more responsibilities concerned with the large hotel and equipment service demands of their ships and bases than with scientific research.

3.3 Given these problem areas, a case could be made that the two functions should be the responsibility of well separated sets of managers. Management of the service facilities at BAS and NOC could well be shared. Management of strategic scientific programs could then be the responsibility of a separate small well focused scientific management structure along the lines of a MRC unit or a Max Planck Institute in Germany.

### 4. LIMITED SCIENTIFIC EXPERTISE AT SENIOR SCIENTIFIC MANAGEMENT LEVEL

4.1 All that really needs to be said is that there are few people at a Senior Management Level who will be the natural choice of the BBC Today programme the next time an environmental news story breaks. They might ask for an ice expert from BAS (which has a good trade name) but otherwise they are much more likely to find someone from Woods Hole or Scripps.

### 5. FLEXIBILITY WITHIN THE STRATEGIC PROGRAMS

5.1 I think it would be worth the Committee's time to compare the way the Hadley Centre has developed the science of Climate Change with the way NERC is approaching Climate Change in the Ocean. My own view is that the NERC Council approach is less effective because of the factors discussed above. In particular the NERC funding model means that:

- Too many important decisions can only be made right at the start of a project.
- The method of funding and the review system encourages small isolated projects.
- The projects are not able to respond rapidly to changes in the science.
- The senior managers are expert managers, not experts in the field, so if you later question them, any failures will not have been their responsibility.

*September 2012*

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## **Written evidence submitted by Studland Bay Preservation Association (SBPA)**

### 1. SUMMARY

- (a) I am complaining about the Report submitted by Natural England/JNCC to Defra in mid July recommending which areas of sea should become MCZs and RAs. This report recommends that Studland Bay should become an MCZ with restrictions on Anchoring and Moorings because NE believes that the Eelgrass beds are suffering unsustainable damage from these two human activities. This is untrue and there is not a shred of evidence to support NE's theories.
- (b) Seastar Survey of Southampton was contracted by NE and Crown Estates to carry out a Survey of the effects of anchoring in the Eelgrass beds of Studland Bay. Their Report after two and a half years concluded that there was no evidence to support the claim that Anchoring was causing unsustainable damage. NE has ignored the best evidence of the Seastar Survey Report and papers written on Eelgrass and anchoring effects by Dr Michael Simons Phd. NE claim that the Reports were not available when Studland was assessed. The truth is they were available but were put to one side and not read. Perhaps intentionally?
- (c) NE decided at the start of the whole MCZ selection process that Studland Bay should become an MCZ and have throughout the process have manipulated and falsified the evidence which is now before Defra. It is right that Studland should be considered for MCZ status, along with the other 126 possible MCZs, because of its extensive Eelgrass beds but not for the reasons given by NE. NE is the Government's chief adviser on these matters and appears to have acted irresponsibly.
- (d) Defra will need to decide whether it is wise to make one of the busiest recreational areas on the South Coast and the most used anchorage an MPA. I would suggest this to be unwise, expensive to regulate and completely unnecessary.

### 2. MY BACKGROUND

I represent the Studland Bay Preservation Association (SBPA) which stands for leaving Studland Bay free of unnecessary regulations and that all recreational pursuits be allowed to continue. I have lived in Studland all my life except for my Army service years. I retired from the Army after 31 years in 1994. I then learnt the sea fishing trade and held a commercial licence for 12 years fishing with nets and pots in Studland Bay. I am

now retired. I have no financial interests or otherwise concerning the issues listed below. I just want to see fair play for the thousands of people who enjoy Studland. I know rather more about Studland Bay than the majority of persons currently deciding its future.

*Question MSSC Para 4. Has the selection of Marine Conservation Zones (MCZs) been based on robust scientific evidence?*

1. The answer to this in respect of Studland Bay is No. My reasons for this are that the best evidence available has been completely ignored by Natural England/JNCC. I refer to the Report by Seastar Survey Ltd into whether or not anchoring causes unsustainable damage to the Eelgrass beds of Studland Bay. Also the papers written by Dr Michael Simons phd on the matter have not been taken into account. The content of the Seastar Report was into NE in December last year and Dr Simons' paper at about the same time.

2. Studland Bay has extensive, healthy and expanding Eelgrass beds which are an excellent habitat for a variety of marine life. This is accepted by all and for this reason it is correct that it should be considered for MCZ status along with other areas of Eelgrass along the South coast. This is fine in itself but Natural England have added Anchor damage and Mooring damage as well as three FOCI to strengthen their case for making Studland an MCZ.

3. There is no evidence that Anchoring is causing unsustainable damage to the Eelgrass beds. The Moorings cause some scouring at their base but this is a tiny fraction (.001%) of the total area. NE has failed to take this into account. *Zostera Marina* is remarkably resilient to superficial anchor scrapes.

4. The 3 FOCI used to strengthen NE's case are Seahorses, Undulate Rays and Native oyster. These have been added to "beef up the dossier". Seahorses and Undulate Rays are found all around the coast of England and Wales. Seahorses are summer visitors to Studland. Media hype of "the only known resident breeding colony..." is misleading. They breed all around the coasts to support their widespread distribution and they are not resident in Studland Bay. They are not present between mid September and mid March. Native oysters are not in Studland Bay.

5. So in conclusion it appears that NE decided at the start of this whole process that Studland Bay should become an MCZ. Widespread participation by Studland stakeholders has been ignored. NE has added Anchor damage, Mooring damage and three FOCI which are not exclusive to Studland Bay. The reason why there has been so much coverage on Seahorses is because of The Seahorse Trust's relentless media campaign and extensive use of the Bay by divers.

*Question, MSSC Para 4. How well has the scientific evidence been balanced with socio-economic considerations and communicated to affected coastal communities?*

6. The answer is it hasn't. Studland Bay is one of the busiest and most heavily used Recreational areas on the South Coast. It is also a major anchorage for yachts and motor boats. There are 6,000 boats in the Marinas in Poole Harbour alone. Many of these like to come round to Studland bay during the summer months. Many stay at anchor overnight. This recreational aspect seems to have been given little significance by NE.

7. The economics have been researched in considerable detail but the emphasis appears to be on the benefits MCZs would bring rather than the disadvantages of regulations to the local economy. In the case of Studland the cafes, pub, restaurants, shop, B&Bs and hotels rely on visitors. Many of these come by boat. The Marinas, Chandlers, yacht clubs etc in Poole Harbour would all be seriously affected by unnecessary anchoring/mooring restrictions. The NE/JNCC Impact assessment is so detailed it is difficult to see the wood from the trees. Coastal communities are not inclined to study such a mass of data.

8. NE have tried hard and succeeded in putting their reports up on their web site. The problem is that people have neither the time nor the inclination to read them. So from that point of view NE have failed to communicate with Coastal communities who are in for a shock if some of the proposed MCZs go through. Studland being one of these.

#### 9. *Additional Information*

- (a) It is clear to SBPA that NE decided at the start of the whole process that Studland Bay should be an MCZ with restrictions on Anchoring and Moorings. NE even altered the Eastern Boundary of EU Special Area of Conservation (SAC) to allow for Studland Bay to become an MCZ. The Eastern boundary was to be entrance to Poole Harbour (S. Haven Pt) but was changed to Handfast Pt (Old Harry). Why? So that the Bay would not already be in an MPA and therefore excluded from MCZ designation.
- (b) NE have influenced the whole process from the start. By this I mean the Regional Assessment team—Finding Sanctuary (FS) and The Scientific Advisory Panel (SAP) which reviewed the recommendations made in the FS Report. It is not surprising therefore that the NE/JNCC Report to Defra of mid July reflects the advice and guidelines NE laid down at the start.
- (c) The same people (names withheld) have been influential throughout the whole process and they are all influenced by a group of Divers who want Studland Bay free of boats. These same consultants

are now employed by ABPmer who are in the process of doing an “Independent Assessment” for Defra. How Independent can that be?

## 10. CONCLUSION

The NE/JNCC Report to Defra has been heavily influenced by a few people who want Studland Bay as an MCZ. The best evidence (Seastar Report, Simons’ papers) have conveniently been ignored as they dramatically explode the myth of Anchor damage in Eelgrass. We believe NE is guilty of bias, manipulating the evidence and misrepresentation of the facts in their report to Defra. This was pointed out to the previous Head of Marine NE who failed, on our advice, to influence the process which went off course some months ago.

## 11. RECOMMENDATION

That an Inquiry be held to investigate NE’s malpractice, manipulation of the evidence and misrepresentation of the facts on Studland Bay as submitted to Defra. NE should be instructed to issue an Addendum to their Report using the robust best evidence now available.

September 2012

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### Written evidence submitted by Dr Michael Simons

#### 1. SUMMARY OF SUBMISSION

1.1 This submission concerns the Marine Conservation Zone designation process.

1.2 Concerning the Marine Management Organisation, it is suggested that its remit should explicitly recognise the economically and socially important marine leisure industry to help strike a better balance of interests between the marine leisure sector and nature conservation.

1.3 In answer to the question about the evidence put forward to identify Marine Conservation Zones (MCZ’s), it is argued that the evidence for feature condition (a key part of the process), which was almost entirely based on a process called Vulnerability Assessment, is clearly neither robust nor scientific. Supporting documentation and a specific example are quoted. The example is of a particular Vulnerability Assessment, and it is suggested that such a subjective and poorly documented, almost secretive, assessment is no way to inform public policy on matters which may seriously affect public freedom of enjoyment of the coast. Concern is expressed about a delay in publication of an officially commissioned on-site survey which produced real evidence which conflicted with the Vulnerability Assessment used in that particular case. Although this real evidence was in the hands of Natural England several weeks before they started their evaluation of the site using the Vulnerability Assessment, and at least ten weeks before their own proclaimed evidence deadline, the real evidence was not taken into account, and publication of the evidence in the survey was delayed until nearly four months after the evidence deadline and over six months from the time it first became available to Natural England. Proper evidence was available, but was not used.

1.4 In respect of the balance between scientific evidence and socio-economic considerations, it is argued that the current methodology, as used by Natural England, is simply not capable of striking any such balance, as it identifies only two states of condition, “Favourable” which in practice means completely unblemished in any way, and “Recover” which means conservation measures can be applied. This is highly biased in favour of conservation restrictions, and makes no provision for cost-benefit analysis. The management measures adopted after MCZ designation are what will have the socio-economic impact, and it is noted that Natural England will advise the regulatory authorities on these. If any sensible balance between conservation gain and socio-economic cost is to be achieved, a different, more quantitative assessment will be required for that stage of the process. And it must be based on evidence, not Vulnerability Assessment.

1.5 Comments are also made on communication with local coastal communities, and in particular local marine leisure interests, in parts of the *Finding Sanctuary* and *Balanced Seas* project areas.

#### 2. WHO I AM

2.1 My name is Michael Simons, I worked for 40 years as a research scientist in an international industrial research laboratory, in the fields of chemistry, imaging science and printing, and am now retired. I hold a PhD in physical science (chemistry) from Reading University.

2.2 My interests include sailing, these days in a cruising yacht especially in the Chichester area, the Solent, and the Dorset coast. To declare my position and interests, I am a member of the Boat Owners’ Response Group (BORG), which is a stakeholder representing boaters’ interests especially in the Studland Bay area. I became aware of possible restrictions on anchoring boats in Studland Bay as the MCZ process took place, and learned that the views of local boating stakeholders were not being taken seriously enough by the organisations driving the MCZ process because they were not “scientific” enough. I offered my own scientific knowledge and understanding to BORG, and have been helping stand against what many of us regard as an agenda-driven process to reduce or prevent anchoring in Studland Bay based on very inadequate evidence. All members of BORG act on a self-funded voluntary basis, and BORG itself has no funds.

2.3 While the points I make in this submission are not specifically concerned with anchoring, it is worth pointing out that the freedom to anchor in sheltered and often beautiful places is an important part in the enjoyment of leisure boating, and undue restrictions on anchoring would have a very negative effect on the leisure boating industry. There are also safety issues involved. Part of the appeal of staying at anchor is the closeness to the natural world and wildlife, and boaters in general are sympathetic to sensible and proportionate conservation measures.

2.4 I have been actively involved only since November 2011, but have written and submitted two short informal (non-peer-reviewed) technical papers around issues of evidence, and made a number of other submissions, comments and arguments. Although these are often contrary to the “official” line—and it is through robust challenge that good science emerges—I wish to acknowledge the consideration given to these by Natural England and others, and the helpful way in which they have met our enquiries. However major differences of view remain, and some of my concerns about the MCZ processes are spelled out below. I appreciate the sheer complexity of the task and the difficulties involved in getting it right, but that is no reason to accept faulty or questionable process.

3. *Question 3: How effective have the Marine Science Co-ordination Committee (MSCC) and Marine Management Organisation been, and what improvements could be made?*

3.1 Concerning the MMO:

During my involvement with the MCZ process it has become clear that the dice are loaded in favour of conservationists. Good efforts have been made to consult and listen to stakeholders whose interests might be threatened with some conservation proposals, but almost all the technical expertise lies with bodies whose principal interest is nature conservation, and whose marine scientists probably chose their career path through an interest in wildlife and its conservation.

3.2 In the MCZ process, the MMO has a role to advise stakeholders, and it is the MMO who arrange meetings between stakeholders in the area which I know (Studland Bay). In the post-designation stages of the MCZ process, the MMO will have an important role as the regulatory authority responsible for consulting on and implementing conservation management measures, which are what will actually impact sea users. I would suggest that the MMO’s role, which already recognises some particular interests, should also explicitly recognise the marine leisure industry and activities. In its statements of Mission and Strategic Outcomes there is acknowledgement of conservation interests (protecting biodiversity) and of fisheries, but none of the important marine leisure industry:

“Mission: Enabling sustainable development in our seas”—which is fine—but

“Strategic outcomes

1. Marine resources are managed effectively and regulated proportionately.
2. People and customers of our services are engaged and understand decisions which impact on the marine area.
3. Marine biodiversity is protected and maintained.
4. Fish and shell fish stocks are managed sustainably.
5. European funding brings benefits to the fishing industry and coastal communities.
6. Marine emergencies are responded to in a prompt and co-ordinated way.
7. Decision making is based on the best available evidence.
8. Data and information are well managed and disseminated.
9. Corporate services governance and control procedures drive efficient use of resources.
10. Staff and board members are fully equipped to contribute to sustainable development of the marine area.”

3.3 Marine leisure is a significant factor in the economies of coastal communities. To quote from the Department for Business, Innovation and Skills, UK Marine Industries Strategic Framework, March 2010:

“The leisure sector

This is made up of 4,200 businesses (primarily SMEs) employing around 34,300 people and earning £3.16 billion of revenue per year including £1.25 billion from exports. It includes globally-recognised motor and sailing yacht manufacturers and associated supply networks, equipment manufacturers, marinas and holiday companies. The sector has grown by 14% over the past four years. In the reporting period 2008–09, international activity grew 13.6% and superyacht activity 15.3% from the previous year’s activity. (*Source: British Marine Federation.*)”

In addition to these direct positive impacts, holiday makers and anglers with small boats boost local economies by staying in or near coastal resorts and using local facilities.

Further, wide participation in boating activities, as well as providing valuable recreation in its own right, also fosters interest and enthusiasm which attracts entrants into various marine activities and businesses—as well as into water sports at which this country excels. Marine leisure is a significant activity of broad and valuable impact.

The remit of the MMO should actively recognise the economically and socially important marine leisure sector so as to help strike a balance between its interests and the often over-zealously promoted interests of nature conservation.

4. *Question 4: Part A: Has the selection of proposed Marine Conservation Zones (MCZs) been based on robust scientific evidence?*

4.1 In answering this question, it should be explained that the selection process considers two elements—first, the actual presence of the feature (eg habitat or species) in the zone, and second, a judgement of “condition”, ie whether the feature is in near-perfect condition, for which is used the term “Favourable”, or whether it falls in any way short of this ideal condition, in which case the condition is described as “Recover”. As will be explained in paragraphs 5.3—5.5, we (BORG) consider this binary, yes-or-no classification of Condition to be a serious impediment to achieving sensible outcomes in the MCZ process.

4.2 In answer to the question has the judgement of Condition been based on robust scientific evidence, the answer has to be unequivocally NO. To quote from the document “JNCC and Natural England’s advice to DEFRA on recommended Marine Conservation Zones”, dated July 2012, (hereinafter referred to as “NE Final Advice”), which is their official formal advice to Government on the MCZ proposals:

“For all but 19 features JNCC and Natural England advise that there is a low confidence in the assessment of condition. We expected this low result because the process was designed to use best available evidence, which for all but one feature relied upon assessments of vulnerability. Detailed evidence on the condition of species and habitats is sparse except, perhaps within existing designated sites.”

This is on p.10 of the report, and means that of the hundreds of judgements of Condition, only one is based on direct evidence. All the others were based on a Vulnerability Assessment (VA) which basically means an opinion, or put more crudely, informed (?) guess. The outcome of such a process will depend on who gives the opinion or guess.

Such a process can be neither robust nor scientific.

4.3 This is illustrated by the assessment of condition of the seagrass *Zostera marina* in Studland Bay, our area of particular interest. NE Final Advice classed the condition as “Recover” with “moderate confidence” on the basis that the anchoring occurs in Studland Bay (true) and that seagrass has been given a Vulnerability Assessment in a “sensitivity matrix” as being “highly sensitive to surface penetration/disturbance” with “high confidence”<sup>8</sup>

That report is over 900 pages long, covering many VA’s, and reveals that this particular Vulnerability Assessment was made by “expert judgement” in a working party. There seems to be no serious documentation or scientific evidence cited in the report to support that judgement, no record of who or how many people were actually in the working party, and no record of any separate opinion or dissent within the working party. Such a subjective and poorly documented VA process is open to abuse, is not robust, is not scientific, and is no way to inform public policy on matters which may affect seriously public freedom of enjoyment of the coast.

We (BORG) have protested to Natural England about this almost secret VA process, but their intention is to let the report stand, although they do state that new evidence will be considered at the public consultation stage.

4.4 We also note that Natural England had received an advance copy of the Seastar Survey report, commissioned by The Crown Estate and Natural England, which reports direct and detailed observational evidence, gathered over two years, on the condition of the seagrass in Studland Bay, and clearly shows it is NOT “highly sensitive” to anchoring. This was received in December 2011, well before the VA-based assessment for Studland Bay rMCZ began on the 20 February 2012, yet the assessment took no account of the report, whose publication was inexplicably delayed until 3 July 2012. Further, the NE Final Advice reports states (p11) that they “used the evidence available to us until 16 March 2012 to complete our assessments”. It seems unlikely that the Seastar report was overlooked under pressure of other business, as Studland Bay is a particularly high profile proposed MCZ, which raises the question of just why it was ignored in favour of the evidence-free and poorly documented sensitivity-matrix “Vulnerability Assessment”.

4.5 The question as to whether the selection is based on robust scientific evidence is also addressed by the following quote from SNCBs’ MCZ Advice Project Technical protocol F, the protocol used to guide the process, on p3:

“A feature’s vulnerability to damage or deterioration is an indicator of current likely condition. This should not be interpreted as a statement of fact that the feature is known to be damaged or deteriorated or otherwise. The VA process provides a proxy of feature condition; there are inherent assumptions made and steps involving expert judgment which introduce levels of uncertainty into the assessment of feature condition. In the absence of direct evidence of feature condition, a VA is the best available evidence.”

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<sup>8</sup> <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=16368&FromSearch=Y&Publisher=1&SearchText=mb0102&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

All but one of the assessments were based on the VA process. While, in the absence of actual evidence, a VA might be the “best available evidence”, that does not make it good evidence, nor robust, nor scientific.<sup>9</sup>

5. *Question 4: Part B: How well has the scientific evidence been balanced with socio-economic considerations and communicated to affected coastal communities?*

5.1 In answering this question, again an explanation of the process is needed. The present phase of the process will result in a public consultation starting in December, following which the initial batch of MCZ’s will be confirmed. However the conservation measures, if any, will not have been identified at that stage and will be agreed later. It is of course the conservation measures which will have socio-economic impacts, and the impacts will not be apparent at the designation stage as, at that stage, the conservation measures will be unknown.

5.2 To understand the pre- and post-designation stages, it is helpful to quote from the DEFRA website (<http://www.defra.gov.uk/environment/marine/protect/mpa/mcz/>):

“Natural England and the JNCC submitted their formal advice, including the Impact Assessment, to Defra on 18 July 2012.

Ministers will now examine the advice alongside the other evidence before them, before deciding which of the recommended sites should be among those candidates being considered for designation in the first tranche in summer 2013. These sites, and all the others recommended by the regional projects will be included in the public consultation that will be launched in December 2012. The public consultation, which will run for three months, will be an opportunity for stakeholders to make their views known, and to submit any new additional evidence they feel ought to be taken into account by Ministers when making their final decisions.

Once a site has been designated as an MCZ by Defra, Natural England and the JNCC will provide advice to the appropriate regulators (Marine Management Organisation (MMO) and Inshore Fisheries and Conservation Authorities (IFCAs)) advising them as to vulnerability of the features included within the designation order and activity that is currently occurring that will negatively impact on the conservation objectives of that site. The appropriate regulator will undertake a public consultation on appropriate management measures, and then implement them accordingly.”

5.3 So, in the case of inshore sites such as Studland, it would seem that Natural England will provide advice to the MMO (and possibly the IFCA). If Natural England use the same methodology they have used to date, ie assessing Condition of a feature on the simple basis of either “Maintain” or “Recover”, then a rational balancing of evidence against socio-economic impact will not be possible. The reason: it seems that evidence of any damage at all to the feature will result in a designation of Unfavourable Condition and hence a “Recover” recommendation. This is stated explicitly on p5 of Technical Protocol F:

“Where we do not have a full understanding of the condition of a site, we will assume that its features need to function unimpaired in order to be in favourable condition. We also know that damage (natural or otherwise) to a feature can affect its functioning. Therefore, observed signs of damage will be treated as an indicator of unfavourable feature condition.”

There are then just two states of “feature condition”, Favourable or Unfavourable, and any evidence at all of damage, however small, can result in a Recover designation and conservation measures.

5.4 To use the Studland Bay eelgrass beds as an example: if, for example, it was found that 1% of the area was damaged, this could in principle trigger conservation measures which would cost significant money in provision and maintenance of special eco-friendly moorings, and a serious loss of boating amenity and enjoyment, with knock-on economic effects, if anchoring were seriously limited. The benefit, a possible increase of 1 part in 100 in the already extensive eelgrass beds, would not even be noticed, as it is well within the natural fluctuation of eelgrass beds. (We are not talking about a critically endangered species here: eelgrass is common, widespread and reasonably resilient, although the scientific literature shows it is vulnerable to a number of pressures, which, incidentally, do not include anchoring.)

5.5 In any other walk of life, policy decision making includes a balancing of the costs of an action against the likely benefits. It will cost this, we expect to gain that. In the MCZ methodology, this all-or-nothing judgement could mean significant costs for trivial or negligible gain. There would seem to be no reason why marine conservation should be exempt from striking a balance between conservation gain and socio-economic costs, but the existing methodology does not seem to make provision for this.

The present process seems to make no provision for balancing nature conservation gains against the socio-economic costs of conservation measures. In order to allow a rational analysis of conservation gain against socio-economic cost, a method of quantifying the conservation benefit will be essential. And it must be based on evidence, not the potentially biased guesswork of a “Vulnerability Assessment”.

5.6 As regards communication of socio-economic considerations to coastal communities, as these are in general not yet identified, I cannot comment. However, the process does seem to have listened to the views of stakeholders, at least in Studland Bay in the *Finding Sanctuary* area. But I note the comments of my colleague Jon Reed, the founder of BORG, about representation of local leisure boating interests in the *Balanced Seas*

<sup>9</sup> [http://www.naturalengland.org.uk/Images/protocol-F\\_tcm6-28377.pdf](http://www.naturalengland.org.uk/Images/protocol-F_tcm6-28377.pdf)

area, and find that the meeting report for their final local stakeholder group meeting for the Solent, Isle of Wight and Hampshire area, the very heart of UK sailing and boating, shows the presence of the Royal Yachting Association and the Cruising Association, but no local groups representing leisure boating interests.

5.7 Finally, while I, and BORG, clearly have different opinions from Natural England in several areas, it must be said that Natural England and other parties are maintaining an open dialogue with us and responding fully to our questions and comments, which we welcome.

September 2012

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### Written evidence submitted by British Geological Survey

#### DECLARATION OF INTERESTS

1. The British Geological Survey (BGS) is a part of the Natural Environment Research Council and is its principal supplier of national capability in geoscience. Our research is primarily associated with the earth beneath the oceans rather than traditional marine sciences. However the sea bed and sea floor geology plays a crucial role in ecosystem research, evidence for climate change and underpins many of our marine industries. BGS works closely with many marine research institutes, government departments and the marine industries in all aspects of marine geosciences. BGS also leads the European operations to support the Integrated Ocean Drilling Programme (IODP), in conjunction with our partners at the universities of Leicester, Bremen, Montpellier and Aachen.

*Q1. Since 2007 has there been improved strategic oversight and coordination of marine science?*

2. BGS has not contributed directly to the Marine Science Coordination Committee or its working groups but has developed strong links with other research and government organisations working in the marine environment (e.g. National Oceanography Centre (NOC), Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Scottish Association for Marine Sciences (SAMS), Channel Coastal Observatory (CCO), DEFRA, Marine Scotland, the conservation bodies and universities). BGS provided the lead author for one of the sections of Charting Progress 2 (covering progress on sedimentary processes and sea floor mapping) and is more integrated with the UK Marine Monitoring & Assessment Strategy (UKMMAS) Evidence Groups, leading the UKMMAS Seabed Mapping Working Group. There has been significant progress in co-ordination of marine science activities in the UK from data acquisition/survey planning (Civil Hydrography Annual Seminar and website); data archiving (the Marine Environmental Data Network—MEDIN), data sharing (DEFRA MOU (see section 4)) and, for the marine geosciences, improved co-ordination of outputs through MAREMAP (section 5). At a European level, the EC's European Marine Observation and Data Network (EMODnet) is co-ordinating marine activities in hydrography, geology, chemistry, physics, biology and habitat mapping. BGS and other NERC organisations participate in EMODnet with BGS leading the geological network. The more coordinated approach to marine science has strengthened the links between Earth and marine sciences.

*Q2. What progress has been made in delivering the 2010 Marine Science Strategy?*

3. The UK Marine Strategy has a focus on the environment, ecosystems and climate change and its impact on the oceans, and the NERC submission highlights the wider aspects of progress in these areas. BGS would like to highlight progress on understanding the seabed in terms of ecosystems, habitats and the marine industries.

4. DEFRA has led the development of an MOU to allow easy sharing of multibeam (high resolution seabed imaging data) across government research organisations. This now includes all the survey groups for all reasons—and has made it much more efficient to use the data to produce new maps and models of the seabed to map and understand sea bed environments. The UKHO, Marine Scotland and many other organisations have or are moving towards free access to these data.

5. BGS, along with NOC, SAMs and others are now leading MAREMAP (Marine Environmental Mapping Programme) to deliver the science from these data and produce the next generation of detailed maps and models of sea floor habitats. There is much work to do to complete collection and interpretation of the UKCS using this high resolution data. MAREMAP has led to new research projects including collaborative surveys and assessment of new, cost effective techniques for sea bed mapping.

6. BGS also works with the marine industries and undertakes research on the shallow geology and sea bed. This is crucial work to support the renewables industry, and has tremendous science spin-offs, including processes of ice sheet retreat during global warming, and assessment of submarine geohazards. Three new PhD students are starting in September 2012 as a joint venture between BGS, Queen Mary London, Leeds and Manchester universities working on industry supplied data.

*Q3. How effective have the Marine Science Co-ordination Committee (MSCC) and Marine Management Organisation been, and what improvements could be made?*

7. The Marine Science Co-ordination Committee has probably helped to provide the greater willingness of marine research funders and providers to work more closely together. Our area of science is on the margins of the main focus of the MSCC, and there may be a need to strengthen the cross-disciplinary links to Earth sciences. The focus of the MSCC and the Marine Science Strategy is towards environmental science. There is scope to expand the resource aspects of marine research, including deep sea minerals, marine geothermal energy, hydrates and indeed the deep biosphere (micro-organisms living in sediments and rocks beneath the sea).

8. The Marine Management Organisation is a relatively new organisation and so far its contribution to marine science has been limited. It has a tight timetable to prepare plans for regions and has not had the time to develop close working relationships across the science community. We would like to see a more collaborative approach than has thus far been achieved.

*Q4. Has the selection of proposed Marine Conservation Zones (MCZs) been based on robust scientific evidence? How well has the scientific evidence been balanced with socio-economic considerations and communicated to affected coastal communities?*

9. BGS has not played a direct role in the selection of MCZs or other conservation areas but has helped to provide marine geological information and new surveys for some of the conservation agencies. We would question whether the designation of MCZs and other conservation zones is based on enough detailed mapping of the sea floor, given how changeable the sea floor is both seasonally or in the longer term. BGS has contributed to discussions on particular sea-bed features, but is unclear how the UK is balancing conservation and marine developments. The lack of robust scientific evidence in the selection of MCZs is clearly recognised by UK Government, who have recently commissioned NERC (NOC and BGS) to test different methods of data acquisition for the purpose of designating MCZs, which will help assess the scientific and cost benefits of various survey techniques.

*Q5. How effectively does the Natural Environment Research Council (NERC) support marine science in polar and non-polar regions?*

10. The details of the NERC contribution to marine sciences are included in the NERC/RCUK submission. These comments relate to geological aspects of marine science. BGS receives NERC funding for its contribution to MAREMAP (sea floor mapping) and the geology of the wider North Atlantic. This has allowed BGS (and its NERC partners) to contribute very effectively to the aims of the Marine Science Strategy. NERC is also supporting the development of a new remotely operated sea floor drill which will be capable of coring up to 50 m holes in rocks and sediments in water depths up to 4000 m. This will provide a unique facility for marine geological research. A final crucial part of the NERC Earth sciences budget supports the Integrated Ocean Drilling Programme (IODP) which supports excellent international science in the fields of understanding the Earth's climate system, seafloor life, the sensitivity of ecosystems and biodiversity to environmental change, the carbon cycle and marine geohazards.

11. NERC funds a substantial amount of research on Carbon Capture and Storage, both in its National Capability programme at the BGS and as part of its Research Programme in Sustainable Use of Natural Resources. BGS National Capability provides a focus for partnerships with universities (including our partnership with the University of Nottingham (NCCCS) and with the Scottish CCS Centre) and research centres across Europe, and levers funding from various sources including Government Departments, ETI, EPSRC, the European Commission and industry. With its research partners NERC and BGS are developing world leading know-how on "whole chain" CCS which is being exploited by research partnerships internationally, including in China and India. Much of the BGS National Capability CCS research focuses on storage capacity below the North Sea, which has the huge potential to sequester not only UK emissions but also those of neighbouring European countries without viable capacity beneath their own territories. It is essential that Government and the EC continue to support and foster the multi-disciplinary and trans-national research partnerships needed to develop and, if appropriate, implement this complex technology. The energy and longevity of these research partnerships will be essential in the future to support and implement regulatory and development decisions that balance CCS opportunities with management of potential environmental and ecosystem impacts.

12. The deep seafloor has the potential to meet future societal needs for key mineral resources including strategic metals. As an analogous "frontier technology", the approaches to start up and development of CCS research in NERC (i.e. building up capacity from its research centres and thematic programmes) could provide a model to build the necessary understanding, research infrastructure and partnerships to address the complex technological and environmental challenges associated with potential exploitation of these resources.

Q6. *How well are the current and potential impacts of global warming on the oceans (for example temperature changes and acidification) being monitored and addressed by Government and others?*

13. These and other essential measurements and parameters continue to be monitored with funding from NERC and other sources. The evidence for ocean acidification, changes in ocean circulation, sea level change, sea temperatures and changes in sea ice are well known and supported by these measurements to date. It is important to maintain these measurements and gather further evidence on rates of change of these parameters to test predictive models and develop mitigation strategies. The development of unmanned autonomous vehicles and new technologies for automatic recording of parameters is a key area for continued research to both reduce costs and improve the quality of data available.

September 2012

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### Written evidence submitted by the Boat Owners Response Group

#### 1. WHO WE ARE

BORG, the Boat Owners Response Group came in to being after its founder Jon Reed was invited by MMO to represent the interests of visiting yachtsmen at the MMO Studland Workshop meetings in Poole. BORG is Internet based, working primarily through the IPC Media boating forum YBW.com. The YBW forum is recognised as the largest Internet boating forum with over 50,000 registered members. BORGs purpose is to provide a channel through which Boat owners can voice their opinions and feedback information as it becomes available. Our primary involvement is in those MCZ areas where leisure boating activities are likely to be directly affected by Conservation Management Protocols. Our main concerns at present are those areas used as anchorages in which Eelgrass (*Zostera Marina*) is present and designated for MCZ protection, such as Studland Bay in Dorset, recognised as the UKs most heavily used sea anchorage.

2. BORG was recognised as a Stakeholder by Finding Sanctuary, and is also recognised by and works closely with the Royal Yachting Association. We were refused recognition by Balanced Seas, as we came into existence about three weeks after the deadline for Stakeholder registration in October 2010.

#### 3. DECLARATION OF INTEREST

Neither BORG, nor any of its constituent members and advisors have any financial or commercial interest in the matters under review.

4. We wish to comment on two questions posed by the MSCC:

MSCC Q3. *How effective have the Marine Science Co-ordination Committee (MSCC) and Marine Management Organisation been, and what improvements could be made?*

5. Our involvement has been largely at regional level, apart from our direct contact with the MMO. We were not aware of the MSCC until now.

6. Our existence stemmed from the MMO seeking factual information about activities and views of yachtsmen visiting Studland Bay, and at that level communication has been very good. Our activity has generated much interest amongst south coast yachtsmen in the work of the MMO and how the Marine Plan proposals are likely to affect our sport. Prior to that, very few yachtsmen we are in contact with had heard of the MMO or were aware of its powers. A very common criticism is that it is extremely difficult to locate information within the MMO website without knowing how it is referenced. There is no means by which members of the public to browse for information even if knowing fairly specifically what they are looking for. It has been described to us as a “masterpiece of Disinformation Technology.”

*Example:*

7. (E1) English Heritage established a new Buoyed bathing safety zone in Osborne Bay, Isle Of Wight. Over-zealous EH staff attempted to prevent boats from approaching or anchoring in the vicinity, in contravention it turned out, of the terms of the MMO licence. Many tried but were unable to locate the information they were looking for on the MMO website, and found the site unhelpful in the extreme. It also transpired that the RYA legal department had to remind MMO of a fundamental legal aspect of the EH licence application, concerning the right of free navigation in the vicinity.

MSCC Q4a. *Has the selection of proposed Marine Conservation Zones (MCZs) been based on robust scientific evidence?*

8. We are very concerned about the claims of damage caused by anchoring in Eelgrass, which is present in several important south Coast anchorages. Only one species of seagrass is present in UK waters, *Zostera Marina*, known as Eelgrass. This specific variety of seagrass appears to be much more robust and able to recover rapidly, and we have a range of reports from around the world evidencing this. However, throughout the debate, Natural England has insisted on referring generically to seagrass, and in particular to the much more fragile and slow growing Mediterranean variety, *Posidona Oceanica* which clearly is very vulnerable to

abrasion damage. They give it as their “expert opinion” that seagrass is vulnerable to damage, and insist that UK south coast Eelgrass beds are at high risk from anthropogenic activity. They earmark such locations as Studland Bay in Dorset for early MCZ designation to limit ongoing damage.

9. We have repeatedly asked for the scientific evidence that such damage is anything other than superficial, or causing or threatening to cause unsustainable damage in the specified locations. Natural England have only referred us back to the opinion of their experts, and have been unable to provide any scientific evidence to back their claims. With little difficulty we found many papers relating specifically to *Zostera Marina*, which provide substantial evidence that it is relatively unaffected by damaging events, and even where entire beds have been wiped out, they have rapidly re-established. We were only able to find one paper which even mentioned anchoring as a threat to Eelgrass, although most studies identify a range of potentially damaging factors.

10. Yachtsman Dr Michael Simons produced two papers earlier this year for BORG, summarising these findings. However Natural England still maintain their view that Eelgrass Beds in popular anchorage locations like Studland are at “serious risk”.

11. The Seastar Survey sponsored by Natural England, and Crown Estates, and conducted to a model laid down by NE concluded there is no direct link between the health of the Eelgrass Beds at Studland in Dorset, and the ongoing anchoring activity there. NE ignored this report, and delayed its publication until too close to their own Final Report publication to be able to include it. We now find they are distancing themselves from it, because the Control area was set up in part of the anchorage, and was not “virgin” eelgrass, although Natural England representatives were involved with the process and selection of the control site.

*Examples:*

12. (E2) *Z. Marina* Beds in Japan were destroyed in a “red tide” event. It was observed that it re-established quickly, and within two years had almost fully recovered.

(Ks Lee, Ji Park, Yk Kim, Sr Park, Jh Kim, Recolonization of *Zostera Marina* following destruction caused by a red tide algal bloom: the role of new shoot recruitment from seed banks.)

13. (E3) An anoxia event in Denmark destroyed Eelgrass growth almost completely. Again it had re-established and had nearly recovered within two years.

(Greve T., Krause-Jensen D., Rasmussen M., Christensen P., Means of rapid eelgrass (*Zostera Marina* L.), Recolonisation in former dieback areas, *Aquatic Botany* (2005) 82, 2, 143–156)

14. (E4) An experiment carried out on the American Pacific coast, involved raking out and destroying controlled areas of eelgrass *Z. Marina* under controlled conditions. Again within two years, growth was fully re-established .

(Boese B.L., Kaldy J.E., Clinton P.C., Eldridge P.M. and Folger C.L., Recolonization of intertidal *Zostera Marina* L. (eelgrass) following experimental shoot removal, *Journal of Experimental Marine Biology and Ecology*, 374, 1, 15 June 2009, 69–77)

15. (E5) A number of similar reports are listed in and commented on by Dr Simons in his paper on Eelgrass Recovery, previously submitted to the SAP.

CONCLUSION

16. It is clear to us that at least as far as this particular species is concerned the scientific basis for Natural England’s recommendation is based on the opinion of small number of scientific staff, and ignores the scientific reports and data available through the Seastar Survey, as well as the other reports we have drawn their attention to.

17. More worryingly it increasingly appears that there is a deliberate attempt to suppress and discredit any scientific data which does not accord with the “official” view. We have to ask why the Seastar Survey results were delayed for at least six months, although NE received the first draft in December 2011.

18. DEFRA called for a review of the data in March this year, which was due for publication in June 2012. It is still unpublished, with only weeks before the Public Consultation period, barely giving time for it to be assimilated.

19. MSCC Q4b. *How well has the scientific evidence been balanced with socio-economic considerations and communicated to affected coastal communities?*

20. In our view there has been little or no attempt to balance socio economic considerations with perceived conservation needs, at least as far as leisure boating is concerned. RYA have been extremely active throughout the process but have had to work very hard to ensure their views were noted. Beyond that there seems to have been little or no attempt to take local views in to account. Studland Bay Protection Association are making their own representation to you, because apart from the MMO’s Studland Bay workshop, and an inconclusive meeting they asked for with members of NE and the SAP, there has been little or no consultation with them as representing the local community. In the UK’s premier leisure boating area, the Solent, the only input has

been via the RYA. Balanced Seas claim to have consulted a number of Yacht Clubs, and assured us that the leisure boating sector was “adequately and fully represented”. However. We have yet to find any Solent Based boat owners who know anything about what is proposed, other than through what BORG or RYA has told them. As one owner said—” I found that Balanced Seas had spoken to two members of my club. They had not been given anything to bring back to the club committee or members’

21. The main input from the Conservation sector has been to tell us what they propose to do, regardless of the implications for local residents and boat owners. Only where there has been organised opposition to proposals by stakeholders has any modification of proposals taken place.

*Examples:*

22. (E5) Newtown River on the Isle of Wight, the only estuarine anchorage in the West Solent and heavily used by boats from the neighbouring Harbours of Lymington and Yarmouth, as well as boats waiting for passage west through the Needles channel. Its contains extensive Oyster beds, which are already protected by local harbour byelaws. Natural England wished to recommend a Reference MCZ involving the entire estuary, United opposition from all Stakeholders eventually forced NE to limit the RMCZ area to the existing No anchor zones, although their report continues to recommend that the whole area should really be considered for RMCZ status.

23. (E6) Osborne Bay, Isle Of Wight, east of Cowes is another important anchorage containing Eelgrass. NE again wanted to make the entire area an RMCZ. Heavy pressure from stakeholders brought an agreement to move the Reference area East to Kings Quay, but the future of the anchorage still hangs in balance as they have designated it as “recovery” area, clearly intending that anchoring will be limited or stopped altogether, although this would seriously affect the boating community who use it as an overspill from Cowes.

24. (E6) Falmouth: The Royal Cornwall Yacht Club has mounted a campaign to oppose the placing of a Reference MCZ in Falmouth Estuary, which would seriously disrupt the traditional sail racing events which have taken place for generations in this location. Again the outcome is uncertain, and the recommendation stands.

25. (E7) Studland Bay: No records or studies exist for the Bay prior to 1996 when it was surveyed for an Oil company. However many local residents know the Bay intimately, and have observed it for most of their lives. They would willingly offer their knowledge to support any investigation of the Eelgrass growing there. The Science Advisory Panel disallowed any such evidence as “serendipitous” and unreliable. This seems to us scandalous in the absence of any other knowledge of past conditions in the Bay, and has caused much local hard feeling. Local residents asked for a meeting with representatives of the Science Advisory panel to discuss this, but SAP and NE would not admit any of the historical evidence SBPA and BORG wished to put forward. Nobody has yet answered or attempted to answer the fundamental question: If the Eelgrass is at risk, why is it still not only present, but healthy and apparently spreading after 60 years as the UKs most heavily used Sea anchorage?

## CONCLUSION

26. Consultation has in many people’s experience very largely consisted of local communities being “told” what is to be proposed, sometimes only if the local groups have asked what is happening, after reading the reports. Stakeholder input was a part of the process, but many people were unaware of the importance of registering as stakeholders. Stakeholder views at the local level were recorded, it seems that those views were rarely taken into account In the final reports, except in the most general of terms. Specifically the leisure boating sector appears to have been grossly under-represented, the RYA being in some cases the only participant. This is in some part due to the very disparate and independent nature of much of the boating community, many of whom have no club or association affiliation.

27. The vast majority of yachtsmen have a deep knowledge and love of the marine environment, and this forms a fundamental part of the enjoyment of our sport. Most of us welcome the MCZ process as a well overdue first step towards preserving the marine environment against modern pressures. We remain deeply concerned that the science being used to identify specific areas for conservation is biased and inaccurate. The consequences could be that several important anchorages may be closed to us for no good reason, and that complex and expensive mitigation measures are proposed which make at best a marginal difference on the areas they are intended to protect.

28. Those of us who have followed the process closely have seen that at all stages, Natural England are advocating a “no compromise” conservation regime, which demands complete recovery of all MCZ areas to a full “natural” condition. Nowhere is allowance made for the sustainable continuation of anthropogenic activity unless such activity is seen to be having no affect anyway. It seems to us to be fundamental that in certain places of particular value to sections of the community a compromise should be allowed which allows conservation of species but at a reduced level to the “natural” state. There are many land based examples where agriculture has modified the environment. Sheep grazing keeping downland open is a clear example. Dr Simons pursues this theme in his second paper arguing that the unique nature of Studland Bay could arguably be the result of anthropogenic input to the environment

29. We are deeply concerned that large sums of money are being spent on marine surveys to prove what appear to be the “pet theories” of certain scientists and conservationists, while local knowledge, observation and clear historical evidence are not only being ignored, but deliberately suppressed.

September 2012

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### Written evidence submitted by Captain Alex Gibbons

*Has the selection of proposed MCZs been based on robust scientific evidence? How well has the scientific evidence been balanced with socio-economic considerations and communicated to affected coastal communities?*

1. As one of the founding members of the Studland Bay Preservation Association, for the past 3 years I have been involved with questioning the selection of Studland Bay, Dorset as a proposed MCZ. My family have lived and fished in the bay for the past 100 years and have owned and established several small boat moorings since the early 1920s, and subsequently I have collected a great deal of local knowledge, historical accounts, observations and anecdotal evidence to counter the reasons why Finding Sanctuary and Natural England feel Studland Bay needs to be a managed MCZ.

2. I have been disappointed and dismayed by the attitude of some of the Conservationists and Marine Scientists involved with the rapid progress of pushing forward Studland bay as a pMCZ and feel the whole process has been rigged in their favour, from day one, without due regard time or respect to the coastal communities in the surrounding area.

3. There has not been enough time and emphasis given to collating every relevant fact from all the stakeholders and communities concerning socio-economic reasons why Studland Bay should remain unmanaged and unrestricted. This process should have been allocated a minimum five year planning and consultation period so that local residents, Parish, District Councils and County Councils, the Marine Industry, Rural Industry, Maritime and Coastguard Agency, RNLI, Boat Owner Groups, MOD, Fishermen, MMO and Natural England could have enough time to collate as much information, history and robust scientific material as possible so that no stone was left unturned in finally deciding in a properly informed and democratic process which areas should become rMCZs.

4. It is apparent that in the initial stages of selection too much priority was given to the Wildlife Trusts, Conservationists and Marine Scientists and that they were given “first choice” in selecting areas without any regard for stakeholders or the coastal communities. There appeared to be a KLONDYKE style GOLD RUSH and LAND GRAB in full motion around our coasts as huge areas were claimed by conservationists and scientists as zones of vital importance without proper scientific investigation or solid data even if these zones contained important commercial features. An example of this, the rMCZ at Bembridge, Isle of Wight which was recommended by BALANCED SEAS. This huge area was put forward with several smaller “no go” reference areas within it, but also contains a Marine Aggregate Dredging Licence, two important commercial shipping anchorages and deep water approaches to both Portsmouth and the Port of Southampton. In their final report BALANCED SEAS state “In particular further discussions are necessary to determine how the two large commercial anchorages in the site (particularly the one in the north) that are both socially (refuge anchorages) and economically critical and that areas close to the proximity to features that might be damaged by this activity can be rationalised with an MCZ”. As a Master Mariner I am extremely concerned by this proposal and find it very insulting and disrespectful to both professional seamen and the operators and customers of the huge commercial shipping and harbour operations of Portsmouth and the Port of Southampton and the H.M. Naval base at Portsmouth. The area referred “in the north” of this rMCZ is known as St Helen’s Anchorage and is a vital safety and shelter anchorage for smaller coaster type Merchant Vessels who find themselves in difficulty in South westerly gales in the mid English Channel. They can divert here for safety and shelter from their passages in the South west lane of the Dover Strait and English Channel traffic Separation Schemes without the need of costly pilot age services. Having had to seek shelter here on many occasions I can confirm that during a South West Gale 8 or above you can find yourself anchored in amongst 30 vessels because they cannot make head way in the rough seas and risk foundering or losing their deck cargoes causing potentially environmental disasters on the South Coast. Therefore selection of this area as a rMCZ is a prime example of the whole selection process lacking basic common sense, practical maritime know how, Nautical Science and the important and vital input of the Maritime and Coastguard Agency and the RNLI. I am very concerned that I cannot find any reference anywhere in the whole of the rMCZ selection process used by Natural England that the MCA or RNLI were ever consulted or invited to take part in any discussions or meetings with NE, Natural England or the MMO. These two organisations are responsible for the overall protection of Human Life at Sea. Rescues, Sea Safety Regulations and Pollution Control and salvage but were excluded from the MCZ process and this needs to be rectified urgently otherwise it will appear that the safety of life at sea has been overlooked and indeed compromised for the sake of Marine Wildlife Conservation.

5. If the correct procedures had been in place, the initial selection would have involved NE, The Crown Estates, MMO and MCA sitting down with the complete folio of British Waters Admiralty Charts and going over every proposed MCZ site with a fine tooth comb checking charted features, nature of the seabed, high traffic density and important shelter and anchorage areas, commercial and fishing interests. However it’s

obvious the Marine Scientists and Conservation Groups were given top priority completely ignoring any wider impacts MCZs may have on the rest of us. An Example of this is Studland Bay, the initial data on seabed features Finding Sanctuary and Natural England had was incorrect, but had they looked at the Admiralty Chart and purchased a guide to the symbols used they could have easily determined the nature of the seabed. Once again just a bit of common sense and nautical science know how had got missed in all the Biological, Scientific and Conservation jargon and detail.

6. Natural England did bow to local concerns at Studland Bay when stakeholders expressed outrage at conservationists claims that unregulated small boat anchoring was destroying the Seagrass Beds in the Southern half of the bay. Together with the Crown Estates (owners of the seabed) they funded a two year independent survey to monitor anchoring effects on the Studland Bay Seagrass which was conducted by SEASTAR Surveys of Southampton and involved a Buoyed Voluntary No Anchor Zone so comparisons could be made. This survey commenced in October 2009 and was concluded in October 2011 and was supervised by NE throughout. Several Conservationists and Marine Scientists were opposed to the Seastar Survey but the locals and residents welcomed the procedure and indeed kept a close eye on the position of the marker buoys for the VNAZ, reporting any changes after easterly storms etc. Unfortunately, in their final report on the survey to NE Seastar, complained that they had no help or assistance from Marine Conservationists or the Wider Marine Scientific Community involved with the selection of Studland Bay, in working together to build a broad and detailed reference data base on the local marine environment and eco-systems within the bay. Sadly this was a missed opportunity and highlights serious flaws in the way small sectors of the Marine Scientific Community conduct and present themselves for the benefit of all stakeholders. The final report was made available to The Crown estates and Natural England in January 2012 but was only made public in July 2012 and as locals and other stakeholders had correctly predicted from day one, showed no concrete evidence of anchoring doing any noticeable damage to the sea grass beds.

7. Within two weeks of the Seastar Survey on Studland Seagrass beds being made public, NE submitted their final advice and recommendations to DEFRA on rMCZs. Studland Bay was recommended because of the following features and data;

- (a) SEAGRASS BEDS are a fOCI habitat and unrestricted small craft anchoring within the sea grass that contain Short Snouted Seahorses, Native Oysters and Undulate Rays.
- (b) The status of these features within Studland Bay are Seagrass Beds—RECOVER, Short- Snouted Seahorses—RECOVER, Undulate Rays—Maintain and Native Oysters—MAINTAIN.
- (c) The available data confidence for these features is Seagrass beds—Moderate Confidence, Short-Snouted Seahorses—Low Confidence, Native Oysters—Low Confidence and Undulate Rays—Low/NO Confidence.

Which appears to indicate to the ordinary public that Studland Bay has been selected as a Marine Conservation Area on mainly Low Confidence Data, but that the Seagrass Beds do exist and need to be in a recovery status and thus managed and restricted due to suspected anchor damage. Unfortunately even though the Seastar Survey on the Studland Bay Seagrass was delivered to NE in January 2012, some six months before they (NE) submitted final recommendations and advice to DEFRA, Natural England decided not to include the findings of the survey or adjust the status of the seagrass to MAINTAIN instead of RECOVER. Had this occurred we feel the need to recommend Studland Bay as a MCZ would have greatly been reduced as there was now no management requirements. At a meeting with NE in January 2012 we had advised them to remove Native Oysters from the features list because there were no historical or anecdotal evidence of any Native oysters within the limits of Studland Bay, but yet again this has been overlooked in their final advice to DEFRA. Its easy to assume that Natural England isn't operating correctly as a competent impartial, democratic government agency and that there has either been gross negligence in updating the data on Studland Bay or they are going to create an MCZ here come what may, just because conservationists demand it. As we see it, with the data updated the reasons for creating the Studland Bay MCZ should now read, SEAGRASS BEDS—MAINTAIN, UNDULATE RAYS—MAINTAIN, and with only three individual SHORTED SNOURED SEAHORSES alleged to have been recorded within the bay this year its hardly a reason to turn one of the most important and popular small boat anchorages into a huge MCZ with associated management costs that could run into millions of pounds if eco-mooring systems are put in amongst the sea grass.

8. It is quite incredible that the sea grass meadows are still intact and expanding after 74 years of busy recreational boating activity. But again conservationists have denied the seagrass expansion witnessed by locals even though it is quite evident by comparing images on Google Earth with Historical Aerial Photographs taken over the last 12 years which are available online at the Dorset Explorer Website. These images also counter claims that there are 20 metre bare sand scare circular areas around the fixed chain moorings within the bay. If you zoom in close on Google Earth you can spot the mooring buoys in the sea grass areas(off the South Beach) and see that there is hardly any bare patches of sand. Surrounding them. It does feel at times as though the conservationists and some Marine Scientists have declared war on the users and locals of Studland Bay for challenging their views and research. The BBC featured the Studland Bay Seagrass and Seahorses frequently from 2008 until 2011 which lead to the MCZs High Profile which again felt as though we were being treated very unfairly.

9. The newly formed MMO had the task of bringing stakeholders and conservationists together at a series of Working Group Meetings to try and find an agreed solution for the future of Studland Bay. A very difficult

task considering many of us considered we were at war and were fighting to protect our home turf. However the meetings were well organised and controlled despite some heated arguments between the two sides. It would have been preferable if the MCA, RNLI and Purbeck District Councils had been invited to take part to hear their valued input, but overall the meetings have been well run even if no agreements have been reached and the MMO have been totally impartial and professional throughout.

10. In July 2012 Studland Bay was recommended as a MCZ in Natural England's final Advice to Defra, yet two months on and there have been no official notices published in the local press or leaflets delivered through the doors of every resident in the Purbeck District Council to indicate that such a recommendation has been made and what it might mean for the local communities. Even Studland Residents have not received any formal notification through their doors or even any advice on how to object to such a recommendation. Then there are the yacht clubs in Poole, Christchurch, Wareham, Lymington, and Angling Clubs, Fishermen Poole Harbour Authority, Dorset Police, MCA, Swanage Coastguard, RNLI, Swanage Lifeboat and not even the Local District Council has been formally notified. Again this highlights the lack of respect for coastal communities and authorities by keeping everyone in the dark which is more indicative of a government department in the former USSR.

11. In the case of Studland Bay in the last three years a large amount of Public Money has been used to finance scientific investigative surveys into the impact of anchoring on the sea grass beds, checking the status of all the conservation features mentioned in the MCZ recommendations and the general local marine environment. At the last count there have been three with two more still ongoing. Natural England part funded (£14,000) Dorset Wildlife Trust to run two public engagement surveys, not with the residents and locals of Studland, but with Holiday makers visiting the South Beach and what their views were on a proposed MCZ for the bay, and the second was aimed at the local boating community, visiting yacht clubs in Poole and going out by kayak to boats anchored in the bay during the summer. They made no attempt to offer funds for a survey of what the locals and Studland residents views were on the MCZ which was conducted by a former official of the Parish Council nor has any government body offered to assist locals with their travelling expenses to MMO meetings and the associated costs of collating local historical and anecdotal evidence to counter conservational and scientific claims. So yet more evidence to suggest priority was given to the conservation and scientific groups rather than to the local community. Therefore a investigation needs to be conducted into how much Public Money has been spent on this project so far, why none was ever offered to the coastal community and where has it gone who has directly benefited from it, and was it value for money. Perhaps a watchdog body could be formed to audit these marine conservation and scientific projects funded by Natural England.

12. In summary, the whole MCZ selection process needs to be investigated and overhauled because there certainly seems to be lack of basic Nautical Science missing particularly by not involving the Maritime and Coastguard Agency and the RNLI, the two main organisations responsible for protecting life at sea, sea safety, and protection of our coastlines. There also appears to be evidence that priority has been given to conservationists and marine scientists in deciding the locations of these rMCZs which is quite evident in the cases of Studland Bay and Bembridge, where the major socio-economic factors have been quite disrespectfully ignored. For this reason it is quite obvious that conservationists have become far too powerful in the UK and seem to have an ever increasing and unhealthy influence and control on our ordinary lives particularly rural and now coastal communities. This threatens basic democracy and if not checked could even choke any chance of economic recovery in the present down turn. Conservation has become almost SECT like and it appears to be the key work to get things done these days without too many objections. One must ask the question do Conservationists Exist to Sustain Wildlife or does Wildlife Exist to Sustain Conservationists?

*September 2012*

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### **Written evidence submitted by Harry L. Bryden**

#### **SUMMARY OF MAIN POINTS**

1. 2010 *Marine Science Strategy* lacks an overview and strategy for future UK marine science research to underpin the 2010 Marine Science Strategy.

2. Challenger Society organized a Prospectus Meeting at the Royal Society in 2011 where eight young to mid-career marine scientists presented their visions. These papers are meant to be helpful to the MSCC and to NERC in developing future marine science strategy documents.

3. There is effectively no Delivery Plan. And changes within NERC since 2010 make delivery of the 2010 *Marine Science Strategy* more difficult.

4. The case for merging NOC and BAS has not been made. The merger will have major effects on NERC's future support for strategic research in polar and non-polar regions.

## BACKGROUND OF THE AUTHOR

Harry L. Bryden FRS is emeritus Professor at University of Southampton, having formally retired in September 2011. He worked in the United States from 1968 to 1992 when he moved to Southampton to be part of the new Southampton Oceanography Centre formed following recommendations by the House of Lords Select Committee on Science and Technology. Since 2009, Harry L. Bryden has been President Elect (2009–10), President (2010–12) and now Immediate Past President (2012–13) of the Challenger Society for Marine Science. The Challenger Society for Marine Science is the largest scientific society for marine scientists in the United Kingdom. This statement is made both on behalf of the Council of the Challenger Society and on a personal basis. When matters have been discussed and broadly agreed by Challenger Society Council, the text will use “We” or state that it comes from “the Challenger Society”. When the statement is made personally, the text will use “I” to make this clear.

The Committee seeks submissions on the following matters:

1. Since 2007 has there been improved strategic oversight and coordination of marine science?
2. What progress has been made in delivering the 2010 *Marine Science Strategy*?
3. How effective have the Marine Science Co-ordination Committee (MSCC) and Marine Management Organisation been, and what improvements could be made?
4. Has the selection of proposed Marine Conservation Zones (MCZs) been based on robust scientific evidence? How well has the scientific evidence been balanced with socio-economic considerations and communicated to affected coastal communities?
5. How effectively does the Natural Environment Research Council (NERC) support marine science in polar and non-polar regions?
6. How well are the current and potential impacts of global warming on the oceans (for example temperature changes and acidification) being monitored and addressed by Government and others?

1. *With respect to Question 1*, the 2010 Marine Science Strategy represents a good initial effort to develop a strategy for the UK marine science sector. The weakness of the 2010 Marine Science Strategy is that it focuses on a sub-set of marine science. The major omission as far as Challenger Society is concerned is the lack of a strategy for future scientific research in marine science. In the development stage for the 2010 Marine Science Strategy, Challenger Society wrote to MSCC to recommend that an overview and strategy for UK marine scientific research was needed to provide the background to underpin the 2010 Marine Science Strategy: what are the challenges and opportunities for marine science? what are the advances in marine research required to address critical societal issues? The view of the Challenger Society is that the published 2010 Marine Science Strategy still lacks an overview of the upcoming challenges and opportunities in marine science research that are needed to address societal issues such as climate change, ocean acidification, sea level rise, melting of Arctic sea ice. We also think that NERC, which supports most of the UK marine science research, lacks a forward look on strategic marine science research.

2. To try to help remedy this deficiency, the Challenger Society organized a meeting at the Royal Society entitled “Prospectus for UK Marine Science for the next 20 years” where eight young to mid-career scientists presented their visions for the future challenges in marine science. Their contributions are written up as a series of scientific papers to be published in *Philosophical Transactions of the Royal Society* in November 2012. It is the Challenger Society’s view that such a forward look is necessary in the development of future UK Marine Science Strategy documents. The Challenger Society would be happy to help MSCC in preparing an element on marine science research strategy for future iterations of the 2010 Marine Science Strategy.

3. *With respect to Question 2* in terms of delivery of the 2010 Marine Science Strategy, we cannot identify a current Delivery Plan. There is a Delivery Plan dated February 2010 with deliverables due in May 2010 but we cannot find any evidence for the deliverables or for any more recent progress. By its nature, the 2010 Marine Science Strategy requires strategic activities. There have been several backward steps in strategic marine science since 2010. NERC, which according to the 2010 Marine Science Strategy funds 40% of marine activity in the UK, has de-emphasized strategic marine research: NERC’s strategic research programme Oceans2025 (noted in the 2010 Marine Science Strategy) has ended and there is no replacement programme on the horizon; a sizeable number of strategic research staff at NOC have been made redundant; and nearly all marine research funded by NERC is now in short-term, three-year duration projects. In the past NERC has funded blue-skies marine research via short-term, three-year research grants and strategic marine research in rolling five-year strategic research programmes principally at NOC and BAS. In ending Oceans2025 and switching research funding to blue-skies work, there is effectively now little long-term strategic research funded by NERC. In reducing the number of strategic research scientists, there is now less capability to do long-term strategic work. Finally, I would maintain that it is not possible to do proper strategic marine research with three-year funding. To deliver the 2010 Marine Science Strategy, there is a need to support longer-term strategic marine science programmes, and indeed to enhance strategic marine research. In summary there is a clear need for a Delivery Plan for the 2010 Marine Science Strategy that stresses strategic marine science activities and how they will be carried out.

4. My personal view is that a re-organization of UK marine science is needed to deliver the 2010 Marine Science Strategy. Considering experience gained during 20 years work in the United States, I suggest that a

NOAA-like agency is needed in the UK to deliver strategic marine and environmental science. In the US, National Science Foundation (NSF) supports blue-skies marine science research, while NOAA supports strategic marine research. In addition, Office of Naval Research support strategic military marine research. In the past two years, NERC has re-oriented its profile to emphasize blue-skies research to be more like NSF. The 2010 Marine Science Strategy, however, requires strategic marine science activities in its three priority areas: Understanding how the marine ecosystem functions; Responding to climate change and its interaction with the marine environment; and Sustaining and increasing ecosystem benefits. All of these activities in the United States would be primarily supported within NOAA with links to related blue-skies research projects supported by NSF.

5. *With respect to Question 5*, NERC has effectively supported marine science in polar and non-polar regions in the past through a combination of rolling five-year strategic research programmes developed at NOC and BAS and short-term blue-skies research projects proposed competitively principally by university-based scientists. In polar regions BAS has built strong links between its strategic programmes and blue-skies research projects focusing on polar science. In non-polar regions, NOC has built strong links between its strategic research programmes and European and internationally funded research projects. And NOC's strategic research programmes have often encouraged and enabled UK scientists to carry out high quality blue-skies research projects broadly related to the strategic research programme. In my view, the effectiveness of NERC's support for marine science in polar and non-polar regions derives principally from the initial focus of the strategic research programmes to identify a critical area of research and to put in a baseline of effort to address the central scientific issues, around which additional blue skies research proposals can then be developed. Oceans2025 is a good example of such synergy. With the demise of NERC's strategic research programmes, the outlook for marine science in polar and non-polar regions is highly uncertain. Undoubtedly, the best blue-skies research will continue to be supported by NERC; but long-term strategic research priorities such as those in the 2010 Marine Science Strategy do not appear to be supportable under current NERC funding structures.

6. Presently NERC is merging NOC and BAS and consulting only on the merger terms. The case for merger has not been made. The view of the Challenger Society is that there are advantages to having separate NOC and BAS organizations: some things are done better by BAS, some better by NOC; and the brands are important, BAS has a longstanding identity in international polar science that has great value while NOC is building its brand with internationally recognized programmes to monitor the Atlantic meridional overturning circulation, to maintain sustained international sea level observations, etc. We appreciate the diversity provided by separate BAS and NOC organizations with different marine science missions. The primary argument for merger appears to be to save costs. I would maintain that any projected cost savings will come about only as a result of downsizing existing operations and not from consolidating management functions. Any small cost savings in joining ship or centre operations will be overtaken by the considerable time and costs of centre management staff to commute regularly among three sites.

7. *With respect to Question 6*, the current and potential impacts of global warming on the oceans (for example temperature changes and acidification) are being monitored and addressed by UK scientists. Already, UK scientists contribute annual reports on the state of the Atlantic meridional overturning circulation to the "State of the Climate" published in Bulletin of the American Meteorological Society and to annual ICES summaries on the state of the North Atlantic Ocean salinity, temperature etc; sea level rise results are part of periodic IPCC assessments; Continuous Plankton Recorder results on ecosystem changes are summarized annually. Perhaps it would be useful to consolidate these UK contributions into an annual State of the Ocean document published by the MSCC to demonstrate what UK marine scientists are doing to monitor the current and potential impacts of global warming on the oceans.

September 2012

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### Written evidence submitted by English Heritage

#### DECLARATION OF INTEREST

English Heritage is the Government's advisor on all aspects of the historic environment in England. English Heritage is an Executive Non-departmental Public Body sponsored by the Department for Culture, Media and Sport (DCMS) and we report to Parliament through the Secretary of State DCMS. The National Heritage Act (2002) gave English Heritage defined responsibilities for the marine historic environment in the English area of the UK Territorial Sea.

#### 1. *Since 2007 has there been improved strategic oversight and coordination of marine science?*

1.1 Although we consider that good reference was made to the marine historic environment in the strategy, the UK Marine High Level Objectives, the UK Marine Policy Statement, and programmes such as the UK Marine Monitoring and Assessment Strategy, constant attention has to be paid to ensure that Government attention does not revert to particular natural environment obligations (e.g. EU Marine Strategy Framework Directive) that do not specifically include cultural heritage or marine historic environment objectives.

1.2 A significant issue is the definition and scope of terms such as "ecosystem services" and "cultural services" in relation to the historic environment and as referenced in the above initiatives.

2. *What progress has been made in delivering the 2010 Marine Science Strategy?*

2.1 The Marine Science Strategy includes some reference to the marine historic environment e.g. understanding the importance of historic wrecks for ecosystems, marine archaeology as an academic discipline, and the impact of past sea-level change on submerged archaeology. However, we consider that the potential and benefits of marine archaeological science are much wider, particularly as the definitions appended the Higher Level Marine Objectives state that the historic environment of the seas includes individual sites and assets of historic, archaeological, architectural or artistic interest, whether or not they are afforded statutory protection by heritage protection legislation (Defra 2009).

2.2 In 2010, the UK Government published its vision (Department of Culture, Media and Sport 2010) that the value of the historic environment is recognised by all who have the power to shape it; that Government gives it proper recognition and that it is managed intelligently and in a way that fully realises its contribution to the economic, social and cultural life of the nation, with six aims for the future including: Strategic Leadership, Protective Framework, Local Capacity, Public Involvement, Direct Ownership, and Sustainable Future. In addition, the vision recognises that the marine historic environment is equal to other types of heritage:

*“Our history is equally reflected in the homes of ordinary people, in the street plans of historic towns and cities, in farm buildings and factories, in our public places, the landscapes we have created, and sites beneath our seas”.*—Department of Culture, Media and Sport, 2010.

2.3 More could be done in identifying the benefits of defining the marine historic environment in relation to the effects of climate change, impact on sustainable food supply management, and protecting “ecosystem services”—all evidence challenges referenced in Defra’s *Evidence Investment Strategy 2010–13*. This point is reinforced by the direct reference to the marine historic environment in the Marine and Coastal Access Act 2009, for example in section 54, the duty to keep relevant matters under review.

2.4 Since the publication of the UK Marine Science Strategy, English Heritage has developed the National Heritage Protection Plan (NHPP), a new framework to protect the historic environment of England (English Heritage, 2011).

2.5 The NHPP is a strategy for protection, with four key interwoven stages:

- Assessing threats to the historic environment.
- Understanding the resource and identifying and assessing its character and significance.
- Developing protection responses.
- Managing change.

2.6 Marine heritage science is embedded in the NHPP: in measures including addressing strategic threat assessment and response, resource exploitation threats; in the investigation of unknown marine assets and landscapes; the assessment of significance; and, assessment of significance; and developing marine heritage management structures including our input to planning and licensing.

2.7 The NHPP provides a coherent national framework to bring together work by English Heritage and other partners within the sector to: protect the historic environment; re-align and apply the full range of our expertise and resources towards protection activities carried out directly by English Heritage or by supporting others; and to protect what is most significant, most valued, and most threatened.

2.8 Another significant initiative is the National Heritage Science Strategy (NHSS), developed following the House of Lords Science and Technology Committee inquiry into heritage and science in 2006 recommendation, states that the understanding and preservation of the UK’s extraordinary rich and varied material cultural heritage will be enhanced by better use of science and technology, and that the humanities and the sciences will be developed and enhanced by this collaboration (National Heritage Science Strategy Steering Group, 2010).

2.9 The NHSS identified two key strategic aims and eight strategic objectives which it recommended were delivered through the creation of a National Heritage Science Forum.

2.10 The NHSS confirmed that archaeological material is found offshore, it is under threat with impacts including resource development (including fishing). Further work is needed to determine the impacts of the exposure of previously buried marine archaeological remains to chemical, physical and biological processes, and current requirements, identified within existing strategies and in consultation for the NHSS reports, included improved monitoring techniques for marine archaeological sites.

2.11 English Heritage’s Science Strategy (EHSS) which is in preparation, pulls out the main recommendations from the National Heritage Science Strategy reports, and aligns these to our existing and planned work.

2.12 In responding to the House of Lords Science and Technology Committee for Science and Heritage Follow-up Report, Government has reiterated its recognition of the intrinsic value of our cultural heritage, of the sector’s importance to the social, cultural and economic life of the UK, seeing heritage as having a clear role in supporting growth (Department of Culture, Media and Sport 2012). Government recognised how the EHSS will respond to NHSS objectives and it will underpin the operation and development of the NHPP.

3. *How effective have the Marine Science Co-ordination Committee (MSCC) and Marine Management Organisation been, and what improvements could be made?*

3.1 Charting Progress 2, through the Productive Seas Evidence Group, does include English Heritage's marine historic environment assessment work carried out previously under the Aggregates Levy Sustainability Fund, but now under the English Heritage NHPP, as referred to above. Monitoring programmes, sponsored by English Heritage, are included within the Long Term Observation Programme.

3.2 English Heritage would welcome the opportunity to further engage with the work of the MSCC.

4. *Has the selection of proposed Marine Conservation Zones (MCZs) been based on robust scientific evidence? How well has the scientific evidence been balanced with socio-economic considerations and communicated to affected coastal communities?*

4.1 With reference to socio-economic considerations regarding MCZs English Heritage has provided detailed comment in the preparation of the accompanying Impact Assessment exercise and we consider that the definition of the historic environment, its benefits and requirements for investigation and access, needs more clarity and attention. In particular when the Minister addresses any 'social consequences' of MCZ designation there should be recognition of activities directed at sites of historical or archaeological interest (cf s. 117(8) Marine and Coastal Access Act 29); this approach would support the Minister's statement of May 2009 given by Lord Hunt of Kings Heath during the Committee stage debate on the Marine and Coastal Access Bill in the House of Lords:

*"I understand that noble Lords want to ensure that we are not only recognising and considering heritage in marine planning licensing and nature conservation, but that management of marine conservation zones will not undermine the work of bodies such as English Heritage which are tasked with protecting wrecks and other historic features. I therefore reassure noble Lords that the Government are extremely committed to ensuring that the nature conservation provisions are compatible with the vital licensing and management work carried out by English Heritage in the preservation of historic wrecks within UK waters."*—Source: *Hansard*, 5 May 2009, column 473.

5. *How effectively does the Natural Environment Research Council (NERC) support marine science in polar and non-polar regions?*

5.1 No comment.

6. *How well are the current and potential impacts of global warming on the oceans (for example temperature and acidification) being monitored and addressed by Government and others?*

6.1 No comment.

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<sup>10</sup> [http://www.google.co.uk/url?q=http://www.parliament.uk/documents/lords-committees/science-technology/ScienceandHeritage/HeritageGovtResponse.pdf&sa=U&ei=LwhXULPyOefH0QXB04HYBA&ved=0CBcQFjAB&usg=AFQjCNE\\_6HDUF—J7ULgYbHHLpqj54\\_Rbg](http://www.google.co.uk/url?q=http://www.parliament.uk/documents/lords-committees/science-technology/ScienceandHeritage/HeritageGovtResponse.pdf&sa=U&ei=LwhXULPyOefH0QXB04HYBA&ved=0CBcQFjAB&usg=AFQjCNE_6HDUF—J7ULgYbHHLpqj54_Rbg)

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<sup>12</sup> [www.heritagesciencestrategy.org.uk](http://www.heritagesciencestrategy.org.uk)

<sup>13</sup> [http://www.google.co.uk/url?q=http://www.publications.parliament.uk/pa/ld201012/ldselect/ldscitech/291/29102.htm&sa=U&ei=pgtXUN\\_hA-ih0QWk44EI&ved=0CB0QFjAC&usg=AFQjCNFMEBtNkBnfurwTF16SXPdN73t8A](http://www.google.co.uk/url?q=http://www.publications.parliament.uk/pa/ld201012/ldselect/ldscitech/291/29102.htm&sa=U&ei=pgtXUN_hA-ih0QWk44EI&ved=0CB0QFjAC&usg=AFQjCNFMEBtNkBnfurwTF16SXPdN73t8A)

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September 2012

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**Written evidence submitted by the Society for Underwater Technology**

1. The Society for Underwater Technology<sup>15</sup> is an international learned society concerned with understanding the use of technology in the subsea environment. Headquartered in London, we have 1,306 individual members from 40 nations, 176 corporate members, and a thriving network of nine overseas branches. SUT contributed to the previous inquiry “*Investigating the Oceans*” in 2007, with former CEO Ian Gallett called as a witness.

Q1 *Since 2007 has there been improved strategic oversight and coordination of marine science?*

2. Yes. The financial constraints imposed upon the public-sector marine science community in the UK have coincided with the formation of the Marine Science Coordination Committee to encourage and support collaboration. The emergence of new legislation such as the Marine and Coastal Access Act 2009, Marine (Scotland) Act 2010 and the requirement to work towards the achievement of “Good Environmental Status” under the European Marine Strategy Framework Directive have provided a direction to marine science that has brought the community together to a larger extent than in the past, though there are notable exceptions—the Department of Energy and Climate Change seems less joined-in to the marine science community than Defra and DBIS, perhaps because the offshore hydrocarbon industry was excluded from the remit of the Marine and Coastal Access Act.

Q2 *What progress has been made in delivering the 2010 Marine Science Strategy?*

3. SUT representatives attended the launch of the UK Marine Science Strategy in 2010 and members have provided input to some of the working groups set up by the MSCC to deliver the Strategy.

*In terms of the Strategy’s High Level Science Objectives*

4. Understanding how the marine ecosystem functions—work required under “Charting Progress 2” and the establishment of a UK baseline assessment for the Marine Strategy Framework Directive has helped marine scientists make good progress on the understanding of marine ecosystems. Similarly the process of establishing Marine Conservation Zones has required new insights into how the system works. However there are gaps in capability and it is unclear to what extent work is being carried out in waters outside the UK continental shelf—for example how much underpinning science has been carried out in the British Overseas Territories? This is especially pertinent given that the UK has established large marine protected areas in British Indian Ocean Territory and the Southern Ocean—it is essential that sound science supports these designations.

5. Responding to Climate Change and its interaction with the marine environment—As per the point above, progress has been made but much remains to be done. There are major gaps in our knowledge of how the loss of sea ice in the Arctic will impact on climate, and in the opportunities and risks for carrying out industrial activities in hitherto inaccessible waters.

6. Sustaining and Increasing Ecosystem Benefits—again, some progress made but at a slow pace, and the huge impact on ecosystems from the fisheries industry would seem to outweigh the impacts of all other activities, including oil and gas, yet fishers are not expected to conduct environmental impact assessments, bear the cost of regulation, or bear the costs of restoration of the environment.

*In terms of “Tackling the Barriers to Delivery”:*

7. Alignment of Science Effort—it is not clear how much progress has been made. The private sector is effectively excluded from discussions and almost all of the assets available to the public sector marine science community (ships, specialist staff, deep sea equipment) continue to be sourced from the public purse when there are often commercial off-the-shelf solutions available. For example, the deep sea ROV “Isis” is owned and operated by NERC and was offline for a considerable period. A private-sector vehicle could have been made available to cover the gap in capability. Similarly NERC continues to own and operate a research ship fleet when there are private sector vessels available to do the job at a competitive price.

8. Sustained Long-Term Monitoring—we understand that major concerns surrounded the ability of the current funding system to meet the cost of provision of sustained long-term observation systems such as the “Argo” network. SUT welcomes the technology lead provided by UK public sector investment (e.g. the Autosub autonomous underwater vehicle programme and similar) but would question why private sector suppliers are excluded from discussion about how to service sustained long-term observation needs. There are

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<sup>14</sup> [http://www.google.co.uk/url?q=http://www.publications.parliament.uk/pa/ld201012/ldselect/ldstech/291/29102.htm&sa=U&ei=pgtXUN\\_hA-ih0QWk44EI&ved=0CB0QFjAC&usq=AFQjCNFMEBtNkBnfyurwTF16SXPdN73t8A](http://www.google.co.uk/url?q=http://www.publications.parliament.uk/pa/ld201012/ldselect/ldstech/291/29102.htm&sa=U&ei=pgtXUN_hA-ih0QWk44EI&ved=0CB0QFjAC&usq=AFQjCNFMEBtNkBnfyurwTF16SXPdN73t8A)

<sup>15</sup> [www.sut.org](http://www.sut.org)

many opportunities for non-state sector operators to carry out sustained observations, either on a volunteer basis or under contract, and SUT believes that the expertise and technical ability to do so is widespread in industry.

9. Communications—the need to engage with a full range of stakeholders, the public, policy makers, industry etc. is very great and SUT welcomed the opportunity to contribute to the work of the MSCC Communications Working Group, who have produced an excellent communications strategy. However they are under-resourced so that only three out of nine proposed activities can be funded. Our members have made extensive use of the Marine Science Events calendar and SUT Branches use it to advertise forthcoming lectures and meetings.

10. Working with Others—despite good intentions this aspect of the Strategy is almost entirely confined to the UK public sector. SUT with IMarEST, the Marine Biological Association and Challenger Society for Marine Science has been able to work to some extent in support of the Strategy, but it needs to be much more engaged with the full spectrum of the marine science, technology and engineering community—which is largely private sector.

11. Horizon Scanning—as far as we are aware no Horizon Scanning work has yet been carried out or commissioned. SUT together with IMarEST intends to carry out an internal Horizon Scanning exercise, the results of which will be made fully available at no charge to the wider marine community. Work has begun with the re-establishment of the SUT Policy Advisory Group, and joint work with IMarEST’s Science and Technology Advisory Group, to address this gap in capability.

*Q3 How effective have the Marine Science Co-ordination Committee (MSCC) and Marine Management Organisation been, and what improvements could be made?*

12. As a private sector organisation we are excluded from membership of MSCC so have to base our understanding on our interactions with them, and with members of their Secretariat and Working Groups. MSCC does seem to have been effective in the initial stages of delivering most aspects of the UK Marine Science Strategy, and in attempting to coordinate the varied strands of public-sector marine science capability. This is very welcome in times of limited funding. As a consequence we are beginning to see more joined-up working from the marine science community though to what extent this is the consequence of MSCC as opposed to the new statutory regime (requirement to designate marine protected areas, deliver “Good Environmental Status” etc.) is unclear.

13. SUT has been invited to meetings of the MSCC’s Communications Working Group and Marine Industrial Liaison Group (MILG) however it is clear that those of us outside the public sector are not “full” members of the MSCC structure. There is no Learned Society or Professional Body membership of the MSCC which is entirely limited to public sector funding bodies, not the delivery organisations or those members of private industry or academia who also fund marine scientific activity or who have very well-developed abilities to be able to deliver data independently.

14. Industrial participation seems to be somewhat of an afterthought for the MSCC—there are NO industry members on the MSCC (whereas the old IACMST did have industry representation) and even the Marine Industries Liaison Group, which was added after MSCC was started, is chaired by an able academic rather than somebody with solid industry experience. MILG has no representation from sectors such as deep sea mining, ship building, leisure sector, waste disposal, and the meetings so far have not been given much sense of the MSCC knowing what to do with industry.

15. The exclusion of oil and gas from the remit of the Marine and Coastal Access Act has tended to see DECC take an arm’s length approach to non-energy marine activity so that they operate in a “bubble” seemingly unaware of other marine sector user needs. We would encourage DECC to play a more active role in MSCC to try and redress this balance.

16. Placing the secretariat and website mainly within Defra makes MSCC feel like a branch of Defra, as even the website is hidden within the Defra domain, and meetings normally take place at Defra premises. We would prefer if the old “marine.gov.uk” domain could be resurrected. On the positive side the secretariat have tried hard to engage with the marine community within the constraints of their limited resources, and the inclusion of some secretariat support from the National Oceanography Centre has ensured that there is expert marine scientific input and a link outside Whitehall to the marine Learned Societies and Professional Bodies. Without the NOC link it is possible that bodies such as SUT would have been entirely excluded from MSCC working group activity.

17. In terms of outputs, we note that MSCC has not been as productive as the old IACMST. We haven’t seen the equivalent of the Pugh and Skinner report on UK Marine sector economic activity (update came from Crown Estate not MSCC), and the highly regarded MSCC Underwater Sound Forum is a left-over from IACMST days rather than a new creation. We welcome efforts by MSCC to start an Operational Oceanography Forum and are supporting the proposed MSCC conference in January 2013 to kick-start an Operational Oceanography community in the UK.

18. We have had little interaction with the Marine Management Organisation to date, perhaps because it is a young organisation located away from mainstream maritime and marine players and not staffed by people

with industry or even marine backgrounds. We would expect this to improve as the organisation beds-in and begins to take on more of its licensing, maritime safety and conservation activities.

*Q4 Has the selection of proposed Marine Conservation Zones (MCZs) been based on robust scientific evidence? How well has the scientific evidence been balanced with socio-economic considerations and communicated to affected coastal communities?*

19. We are not convinced that there is a good enough database about the seabed conditions in many areas for completely sound scientific decisions to be made, however we believe that selection is being based on best available evidence—just that there isn't that much of it! We are concerned that MCZs may not take into account the mobile nature of species, which may migrate to new geographical locations as a consequence of climate change. We also believe that “win-win” situations should be possible for co-location of MCZs with some industrial activity such as offshore power generation, carbon capture and storage, and aquaculture. For example by excluding mobile fishing gear from areas where offshore energy is produced, new nursery and habitat areas may become available.

*Q5 How effectively does the Natural Environment Research Council (NERC) support marine science in polar and non-polar regions?*

20. NERC has for many years applied the “Haldane Principle” to the undertaking of marine and polar science. This has produced some spectacular and important results such as the discovery of the ozone hole, but has produced relatively little in terms of wealth creation. We would welcome a stronger push to match scientific capability to industry and societal needs such as energy production, food production, and provision of underpinning scientific evidence for designation of marine protected areas that are multi-use and accommodate some degree of commercial wealth creation.

21. NERC, with the other Research Councils, must take into account the needs of industry when supporting postgraduate training in the UK. The marine industrial sector has an ageing workforce and the supply of high quality numerate young people into our sector is not being fully met by UK universities. There are basic gaps in numeracy that start at junior school level and work up through the system, and too few students are choosing to study engineering degrees or hard sciences. NERC and RCUK must do more to encourage young people to study science and engineering, and perhaps a more joined-up approach between NERC, EPSRC and BBSRC would encourage cooperation across the engineering and environmental science divide.

22. SUT notes that in 1988 and 2007 the previous inquiries into marine science recommended the establishment of a marine agency. We would very much like to have seen this and feel that the creation of the MSCC was a “sticking plaster” response. We would welcome the establishment of closer links between NERC, the Met Office, Marine Management Organisation, Marine Scotland and British Antarctic Survey to create a sort of “Wet Office” or mini-NOAA. Essentially a “UK-NOAA” could emerge by merging NOC, BAS and also the NERC Centre for Atmospheric Science or Met Office.

23. NERC provides essential underpinning National Capability in the form of specialist ships, equipment, staff and facilities. They undertake long-term strategic research that would be difficult for a commercial organisation to perform and still return a profit. NERC Institutes provide training, experience and test-bed facilities for the people and technologies that later are used by the private sector. SUT welcomes these activities and would hope that NERC is allowed to continue with them, rather than try and operate as a commercial rival to private sector offshore survey organisations.

24. In view of the importance of NERC's National Capability (NC) assets to the whole community of marine researchers, including the private sector, we are concerned that NC has suffered spending cuts relative to other areas of NERC funding, resulting in redundancies of highly experienced marine scientific staff (nearly one quarter of NOC scientists for example) and inevitable weakening of capability. In marine science it is often argued that high biodiversity is essential to protect against unforeseen impacts of climate change, invasive alien species, or other “surprises” by giving the system in-depth resilience. In the same way we believe that a healthy level of funding for underpinning National Capability provides the green shoots of diverse research outcomes that, properly managed, can strengthen the whole marine sector and enhance prospects of growth and wealth creation for UK.

25. Notwithstanding the excellence of much of NERC's marine and polar science, SUT believes that there is a strong case for increased private sector involvement in the gathering of routine oceanographic and environmental data, freeing the NERC specialist facilities to push the boundaries of marine and polar science and open new pathways of knowledge and wealth creation for the sector as a whole.

26. SUT notes the announcement in September 2012 of a possible merger between NOC and the British Antarctic Survey. Such a merger seems a sensible move in a time of restricted budgets, but as stated earlier we would go further and recommend that NOC and BAS be combined with NCAS, MMO and others—possibly even PML and Marine aspects of BGS—to form an enhanced UK equivalent of NOAA which offers a full marine, atmosphere and cryosphere centre of excellence, possibly outside NERC and reporting directly to BIS to ensure strong alignment with private sector needs as well as essential public services.

*Q6 How well are the current and potential impacts of global warming on the oceans (for example temperature changes and acidification) being monitored and addressed by Government and others?*

27. There is a strong UK programme of research into changes in global thermohaline circulation, building on work carried out by the WOCE (World Ocean Circulation Experiment) back in the 90's via RAPID and other programmes right up to the present day. Collaborative work between NERC, the Met Office, universities and international partners has undoubtedly led to very large improvements in our understanding of the extent and possible impacts of global warming and ocean acidification. A new generation of high resolution models and improved understanding of underlying physics is leading to ever more realistic simulations and predictions of the earth-ocean-atmosphere-cryosphere systems, and continued investment into these sciences by government is producing excellent results.

28. The MCCIP Annual Report Cards provide good snapshots of the state of the seas around the UK, and in particular give honest appraisals of the gaps in knowledge. On a similar basis the 2011 "Scotland's Marine Atlas"<sup>16</sup> was a very good publication that provided handy data of value to industry and the general public—we would like to see an equivalent Atlas for the whole of UK waters.

29. The programme of work required to ensure "Good Environmental Status" under the Marine Strategy Framework Directive is bound to ensure that UK waters are monitored to a high standard. It is unclear however if equivalent programmes of study and monitoring will be available for the very large marine areas covered by Britain's Overseas Territories. In particular the British Indian Ocean Territory Marine Protected Area and the South Georgia and South Sandwich Islands Marine Protected Area cover huge volumes of ocean, and it is not obvious how these areas are going to be adequately investigated or protected from illegal fishing and other activities, especially as neither the Royal Navy or the NERC research fleet are funded to survey or protect these areas.

30. As far as Impacts are concerned, although the scientific understanding of processes is constantly improving the ability to assess the full range of impacts has gaps. More work is needed to join up the science with socio-economics and industry, and better long-term Vision would be welcome. It seems increasingly clear that we are headed towards a +4C world, with consequences on sea level rise, coastal infrastructure, fisheries, energy needs and military threats that require solid strategic thinking and long-term planning so that the UK and our industries are well prepared for the challenges that lie ahead.

September 2012

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#### **Written evidence submitted by the Scottish Environment Protection Agency (SEPA)**

1. *Since 2007 has there been improved strategic oversight and coordination of marine science?*

Yes. As an organisation that has been closely involved in the delivery of marine science since the 1970s, SEPA is of the view that strategic oversight and coordination has improved since 2007.

There have been several reasons for the improvement, starting from the close working relationships that developed during the 1980s and 1990s between marine science staff in SEPA, Marine Scotland Science, DEFRA, CEFAS and DoENI in fulfilling the UK's obligations for OSPAR monitoring, ICES intercalibrations, and EC Directives.

These close working relationships continued into the groups responsible for developing and implementing the UK National Marine Monitoring Plan, which became the UK Marine Monitoring and Assessment Strategy (UKMMAS), with its Evidence Groups organised around the new Government vision for clean, safe, healthy, biologically diverse and productive seas. The development of this unifying vision was undoubtedly another step to improved co-ordination and to providing a clear strategic focus for marine monitoring and research in the UK.

These close working relationships continued through the production of a series of reports on the status of UK seas, Charting Progress and Charting Progress 2, and at the strategic level in MARG and MAPC, which has now been merged with the Marine Science Co-ordination Committee (MSCC). This merger brought together marine science staff in Government funded marine monitoring organisations across the UK with staff in the NERC family and more widely, including industry. This was another positive step bringing further integration at the more strategic level, since it brought together people with various backgrounds in marine science, the economy, governance, policy and industry to work together on a range of marine issues.

More recently, the production of the UK marine science strategy document by staff in the MSCC member organisations promoted further integration at the strategic level.

2. *What progress has been made in delivering the 2010 Marine Science Strategy?*

Good progress in delivering the 2010 Marine Science Strategy has been made in Scotland through the marine monitoring organisations working closely together both on strategy development and co-ordinated marine monitoring and research.

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<sup>16</sup> [www.scotland.gov.uk/marineatlas](http://www.scotland.gov.uk/marineatlas)

Firstly, in strategy development, a Scottish marine science strategy was published in 2011 by marine monitoring organisations working together under the CAMERAS umbrella (Co-ordinated Agenda for Marine, Environmental and Rural Affairs Science), and in March 2011 Scotland's Marine Atlas was published by Marine Scotland, SEPA, SNH and JNCC as the scientific evidence base for the National Marine Plan.

Secondly, the creation of MASTS (the Marine Alliance for Science and Technology for Scotland) which brings together Marine Scotland with several of the Universities with strong delivery of marine science, has provided a focal point and a delivery mechanism to take forward the implementation of the various strands in the UK and Scottish marine science strategies.

Thirdly, the existing close working relationships between marine scientists and survey vessel skippers at SEPA, Marine Scotland Science, Millport and SAMS (the Scottish Association of Marine Science) have been developed to provide a coordinated marine monitoring programme for Scotland, designed to implement the strategies and meet the on-going marine monitoring and research needs of the participating organisations.

Recent financial pressures have served to confirm the value in close co-operation and co-ordination such as that which has developed in marine monitoring, and this has been extended to scientific analyses and reporting of data.

*3. How effective have the Marine Science Co-ordination Committee (MSCC) and Marine Management Organisation been, and what improvements could be made?*

The MSCC has been very effective in promoting the UK Marine Science Strategy and in the involvement of industry, through its working groups. It was good to see the MSCC prioritising key areas for attention, such as the need for long-term datasets to be maintained, the need for all organisations to send their monitoring metadata to UKDMOS and the need to work with MEDIN to have their monitoring data archived in the network of Data Archive Centres (DACs), following the "collect once, use many times" principle.

SEPA cannot comment on the MMO, since this is an England and Wales body.

*4. Has the selection of proposed Marine Conservation Zones (MCZs) been based on robust scientific evidence? How well has the scientific evidence been balanced with socio-economic considerations and communicated to affected coastal communities?*

SEPA has no comments on this point.

*5. How effectively does the Natural Environment Research Council (NERC) support marine science in polar and non-polar regions?*

SEPA has no comments on this point.

*6. How well are the current and potential impacts of global warming on the oceans (for example temperature changes and acidification) being monitored and addressed by Government and others?*

SEPA has no specific comments on this point.

September 2012

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**Written evidence submitted by The Geological Society of London**

1. The Geological Society is the UK's learned and professional body for Geoscience, with more than 10,500 Fellows (members) worldwide. The Fellowship encompasses those working in industry, academia and government with a broad range of perspectives on policy-relevant science, and the Society is a leading communicator of this science to government bodies and other non-specialist audiences.

2. We have not attempted to answer all the questions raised in the Terms of Reference for the inquiry. The main points raised below are:

- (i) The role of the geosphere in ecosystems, and of geoscience in marine science policy, are not fully recognised.
- (ii) This may have damaging consequences because of the importance of the geosphere in provision of ecosystem services, discovery and production of natural resources, understanding and mitigating natural hazards and understanding environmental change.
- (iii) Constraints on the Natural Environment Research Council's (NERC's) budget represent a serious threat to the UK's leading role in major international marine research projects.

*Since 2007 has there been improved strategic oversight and co-ordination of marine science?*

3. The publication of a UK Marine Science Strategy (MSS) is a welcome step towards coordinating marine research across a wide range of disciplines. The introduction of Marine Conservation Zones (MCZs) is also a potentially important development in taking a joined-up approach to marine conservation. It is important that

the holistic approach espoused in general terms in the MSS and in the description of MCZs is given substance and is fully implemented.

4. In both cases, we are concerned that abiotic elements of ecosystems are undervalued in comparison with biotic elements; and that the significance of the geosphere (that is, the solid Earth) within the wider Earth system, and its interactions with the hydrosphere (oceans, rivers and lakes) and the atmosphere, are not fully recognised. These aspects are not extensively explored in the MSS, and appear to be regarded as being of secondary importance. In the case of MCZs, the Joint Nature Conservation Committee's (JNCC's) definition explicitly recognises the need to protect geology and geomorphology alongside marine wildlife and their habitats, but the capacity may not be in place to ensure that this is done in practice. Furthermore, the information page about MCZs on DEFRA's website does not mention the geosphere or geoscience.<sup>17</sup> See further comments on MCZs at paragraph 19.

5. This shortcoming is shared by several other recent high-level environmental policy documents based wholly or partly on an "ecosystems services" approach.<sup>18</sup> These include DEFRA's flagship Natural Environment White Paper (The Natural Choice: securing the value of nature, 2011). The National Trust highlighted this issue in its September 2011 evidence to the Environment, Food and Rural Affairs Committee's inquiry into the White Paper, saying that "the conservation of our geological heritage is almost entirely missing from the NEWP and we are in danger of overlooking this vitally important asset". The Geological Society wholeheartedly supports the ecosystems services approach. However, we believe that its efficacy is significantly diminished if the contribution of the geosphere to ecosystem service delivery and its interactions with other elements of the system are neglected.

6. Priorities set out in top-level policy documents such as the MSS and the DEFRA White Paper are likely to be reflected in subsequent implementation, especially as the geoscience community has limited influence and capacity to address such shortcomings further downstream. We raise these concerns not to promote the interests of professional geoscientists, but because it is vital that there is recognition of the underpinning and dynamic role of the geosphere for the provision of ecosystem services, discovering and producing the energy and mineral resources on which we depend, understanding and mitigating natural hazards and understanding environmental change.

7. *Ecosystem services.* The geosphere acts as a first-order control on marine habitats and the ecosystem services they provide, in both coastal and deep sea environments. Some instances of this are far from obvious. For instance, oceanic nutrient cycling as a supporting service is dependent on geochemical interactions between various components of the marine system (bedrock, superficial sediments, biota, the water column and the atmosphere). This in turn influences provisioning services (commercial farmed seafood such as cockles, oysters and mussels) and cultural services (appreciation of marine environments and biodiversity).

8. Coastlines in the UK exhibit not just high levels of biodiversity, but also exceptional geodiversity, as recognised through designations such as the Giant's Causeway and Dorset Coast World Heritage Sites. In coastal zones, rivers, sea, land and submarine geology interact dynamically, shaping these environments, the biosphere and human interaction with them. A wide range of anthropogenic effects risk causing marine habitat loss through the interaction of geosphere, hydrosphere, atmosphere and biosphere. Sediments are transported in and out of estuaries by the tides, carrying with them pollutant loads, and interacting with seawater chemistry. (Understanding these processes and their effects on organisms depends on both the marine collection and geochemical analysis of such sediments.) Fishing can cause disturbance to the sea floor, disrupting ecosystems. The construction of coastal defence structures can change current patterns and resultant sediment distribution. MCZs represent a powerful tool to protect and understand these complex systems in coastal environments, if properly applied to their abiotic as well as biotic elements.

9. *Natural resources.* Understanding of submarine geology and development of technologies which operate in demanding environments at the interface between the oceans and the subsurface are essential to the UK's oil and gas supplies. They will also underpin carbon capture and storage (CCS), if this vital part of our carbon emissions mitigation strategy is to become a reality. Oil and gas exploration and production are increasingly taking place in the deep ocean, at depths of over 2,500m (and increasing), and in other technically challenging environments. Meeting these challenges while maintaining the highest levels of environmental protection will depend on research and the training of skilled scientists and engineers. While continued use of fossil fuels without CCS is unsustainable, we will continue to depend on these fuels to meet the needs of a growing global population for several decades.

10. It is now widely accepted that substantial metal ore deposits lie beneath mid-ocean ridges (eg in the Atlantic). Mining of these will soon become technologically feasible, and is increasingly likely also to be economically viable. Appropriate scientific and technological skills need to be developed to support research into the occurrence and extraction of such ore deposits.

11. Closer to home, the UK is also dependent on the seabed for extraction of large volumes of aggregates (sand and gravel) used in construction materials.

<sup>17</sup> <http://www.defra.gov.uk/environment/marine/protect/mpa/mcz>

<sup>18</sup> See the UK National Ecosystem Assessment for an explanation of this approach (<http://uknea.unep-wcmc.org/>). This is cited as the theoretical framework for the DEFRA Natural Environment White Paper.

12. *Natural hazards.* Our understanding of hazards such as submarine earthquakes and landslides, and our ability to prepare for and mitigate their effects (including tsunamis), depends on marine geoscience. Such hazards are principally natural in origin, although some are increasingly influenced by human behaviour. (A potentially significant threat is the release of sediment-bound methane as Arctic permafrost melts with rising global temperatures, most rapidly at the poles.) The human cost of natural hazards, however, is strongly shaped by human behaviour, most notably through settlement patterns (highly concentrated in coastal regions) and concomitant destruction of natural defences such as mangrove forests.

13. *Understanding environmental change.* The addition of large amounts of carbon dioxide to the atmosphere and increasing global temperatures are closely linked with other major changes to the Earth system. Increased levels of dissolved CO<sub>2</sub> in the oceans will cause them to become more acidic, and this in turn will have extensive impacts on ecosystems and wider Earth systems—for example, by affecting planktonic organisms' ability to build calcium carbonate shells. Coral reefs, which host vast numbers of species in some of the world's most biologically diverse ecosystems, and provide ecosystem services such as tourism, fishing and coastal protection, are particularly vulnerable to changes in ocean chemistry, and are already deteriorating rapidly. Ocean circulation patterns are likely to change significantly, with warm water displaced towards the poles, affecting species distribution including food fish such as cod.

14. The geological record provides extensive evidence that rapid atmospheric carbon emissions in the deep past have been associated with such environmental changes, profoundly affecting not just the atmosphere but also the oceans and life itself.<sup>19</sup> Developing a better understanding of these past changes and their impacts remains an urgent research priority.

15. Although global warming of the atmosphere has slowed in the past decade, warming of the ocean has continued. Because the oceans are the “flywheel” of the climate system, slowly redistributing heat around the world, understanding and forecasting climate change depends on observations and measurements of the oceans by ships, satellites, buoys, moorings and autonomous vehicles like gliders and “autosubs”—work which can only be achieved through international collaboration. Our knowledge of the oceans and of ocean-atmosphere interactions is currently sparse. More accurate data, collected more frequently, are required to populate models which are poorly constrained, in order to improve forecasting of climate change and impacts.

16. Deep sea drilling to explore what lies under the sea bed also depends on international collaboration. The Integrated Ocean Drilling Program (IODP) has an outstanding record of achievement in this area. It has revolutionised our understanding of plate tectonics, the evolution of the ocean floors and their mineral potential (see paragraph 10). Through exploration of deep ocean sediments, it has also provided vital evidence of the history of climate, and together with polar ice cores has demonstrated the susceptibility of the Earth's climate to major changes, stemming both from tiny changes in solar energy caused by wobbles in the Earth's orbit, and from changes in atmospheric CO<sub>2</sub>. It has also delivered huge economic benefits by demonstrating the oil and gas potential of continental margins globally. The UK has been an active participant in IODP from its inception, and UK scientists still figure prominently. Participation of young Earth scientists in IODP provides unique training in the geosciences and invaluable experience of working in international teams, which has led to a sterling record of high quality research outcomes.

17. With the prospect of global environmental change posing the greatest threat to those countries which can least afford to mitigate the effects, it is imperative that industrialised nations like the UK continue to provide the bulk of the effort to monitor ocean change and learn from the submarine geological record.

*What progress has been made in delivering the 2010 Marine Science Strategy?*

18. In common with other Research Councils, NERC has been faced with difficult funding choices as a result of the cash freeze on the UK's Science Budget. It has chosen to reduce some elements of national capability spending in order to increase the amount available for competitive research funding. This has resulted in reductions in the budgets of the British Antarctic Survey (BAS) and the National Oceanography Centre (NOC), and the loss of experienced ocean science researchers. There is serious concern that this will have a significant impact on collaborative international survey and research programmes such as those outlined above.<sup>20</sup> There have also been reductions in infrastructure, and given the prospect of further budget cuts, effective UK involvement in these international programmes appears vulnerable. Loss of national capability in marine science as a short-term financial measure is likely to have long lasting strategic consequences, to the detriment of the UK and the wider international community.

*Has the selection of Marine Conservation Zones (MCZs) been based on robust scientific evidence?*

19. As noted above, JNCC's definition of MCZs explicitly recognises the need to protect geology and geomorphology alongside marine wildlife and their habitats. We understand that geoscientists are involved in the regional committees to identify candidate MCZs, but not in steering implementation at a national level. It remains unclear what restrictions will be put in place in MCZs, and how these will be policed. Those geoscientists who are involved in the process are keen to convey, for example, the dynamic nature of the sea

<sup>19</sup> See the Geological Society's Climate Change Statement (November 2010) for further information [www.geolsoc.org.uk/climatechange](http://www.geolsoc.org.uk/climatechange)

<sup>20</sup> (See Nature News article at <http://www.nature.com/news/uk-oceanography-cuts-make-global-waves-1.10367>, for example.)

floor. This means that aggregate extraction outside a MCZ but near its boundary is likely to have adverse effects inside it. It is not apparent that such issues are given due attention. A possible concern is proximity or overlap of MCZs with wind turbine arrays and hydrocarbons licensing areas. Marine conservation could suffer if evidence relating to the geosphere is ignored as an integral part of ecosystem functionality.

*How effectively does the Natural Environment Research Council (NERC) support marine science in polar and non-polar regions?*

20. We note NERC's proposal to combine the management structures of BAS and NOC, which is currently a matter of public consultation. More effective strategic integration of marine science in polar and non-polar regions is a sensible driver, but any potential benefits are not likely to be felt if this coincides with the loss of significant numbers of experienced researchers (see paragraph 18, above).

#### CLOSING COMMENTS

21. The Society would be pleased to discuss further any of the points raised in this submission, to provide more detailed information, or to suggest oral witnesses and other specialist contacts.

*September 2012*

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### **Written evidence submitted by the Marine Alliance for Science and Technology for Scotland (MASTS)**

#### 1. SUMMARY OF THE MAIN POINTS

There is a need for marine science co-ordination at both national and UK level.

The MSCC has had limited impact since its inception.

Reasons for lack of progress probably hinge upon a lack of appropriate investment in the leadership and resources required to deliver co-ordination of the scale and focus required to drive this process forward. A better defined remit with clear objectives that are both measurable and time-bound would be helpful. In defining this remit, the resources likely to be available to deliver it must be considered. At the very least, the MSCC should provide a forum through which its members raise awareness of each other's activities; on-going and planned. Key areas where co-ordination is required should be defined. The resources allocated to such co-ordination should be commensurate with the potential impact in terms of science, additionality or cost savings etc. The distinction between publicly funded research conducted by HEIs and that conducted through Government laboratories and major research providers will become increasingly blurred. The MSCC should recognise this continuum and it should be reflected in its membership.

#### 2. INTRODUCTION

The opportunity to respond to this consultation was advertised to the Marine Alliance for Science and Technology for Scotland (MASTS) which is a consortium of research institutions and Universities listed below. MASTS includes: a community of an estimated 700 researchers; accounts for an annual public investment of £66 million and; represents the majority of Scotland's marine research capacity. MASTS role is to facilitate co-operation, collaboration and co-ordination of marine research in Scotland to deliver scientific excellence and contribute to achieving the objectives of the Scottish Marine Science Strategy.<sup>21</sup>

This response is limited to those members that took this opportunity and cannot be said to represent the views of the entire MASTS community.

#### Members of MASTS:

- University of St Andrews.
- University Marine Biological Station Millport.
- University of Aberdeen.
- University of Stirling.
- University of Strathclyde.
- University of Glasgow.
- University of the Highlands and Islands.
- Scottish Association for Marine Science.
- Edinburgh Napier University.
- Heriot Watt University.
- Marine Scotland Science.

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<sup>21</sup> Further details can be found on the MASTS website: <http://www.masts.ac.uk>

### 3. FACTUAL INFORMATION FOR THE COMMITTEE

Marine Scotland Science is a member of MASTS and of the MSCC. Professor Lawrence Mee is the Director of a MASTS member institution—the Scottish Association for Marine Science and he is an independent member of the MSCC. The MASTS Directorate has taken part in a Communications related meeting of the MSCC.

### 4. RECOMMENDATIONS TO THE COMMITTEE

1. The MSCC Secretariat requires a level of leadership, staffing and resources commensurate with the scale of the co-ordination task—this is currently not the case.

2. The MSCC needs to dovetail with existing co-ordination initiatives at regional and international level more effectively

3. Further to point 2—the MSCC should build on and support existing co-ordination initiatives—rather than duplicate effort.

4. Organisations such as MASTS which represent formally constituted HEI and research consortiums should be formally represented on the MSCC.

5. Critical to effective co-ordination is good communication. Most of the marine research community in the UK are probably unaware of the MSCC or its activities. This constituency needs to be provided with a clear understanding of the role, remit and objectives of the MSCC and its wider context in relation to the wider EU and International “co-ordination” landscape.

### 6. RESPONSE TO THE COMMITTEE ON THE FOLLOWING MATTERS

#### 6.1 *Since 2007 has there been improved strategic oversight and coordination of marine science?*

There is some evidence of improved strategic oversight of marine science within Scotland and the UK as evidenced by the formation of MASTS, the MSCC and other co-ordinating bodies. However, the strategic alignment of institutions and the investment that is required to deliver marine science to underpin policy and more sustainable economic development has been slow or has not taken place. Effective strategic co-ordination will require considerably more investment in the human resources needed to drive this process, coupled to strong political support for the structural changes required. In the current and foreseeable economic climate this process will require leadership, prioritisation and managed change.

An annual assessment of achievements towards the aims of the UK Marine Science Strategy would be helpful including information on on-going projects that contribute to the aims of the Strategy. The MSCC could potentially be provided with a budget to be used to provide incentives to encourage work towards achieving the aims of the Strategy.

No UK level assessment of marine research capacity in terms of infrastructure, equipment and expertise exists. Whilst the MSCC have commissioned work on infrastructure and equipment of its members this does not appear to have been pulled together in a coherent format. This is not a trivial undertaking and requires dedicated resources to ensure that appropriate information is captured and subsequently made available in a form that will permit access by relevant target audiences.

MASTS has undertaken this process within its members and we anticipate this information will help to ensure that existing resources are used more efficiently, reduce duplication and guide future investment.

There has not been enough effort to engage the HEI sector in providing scientific support to the policy sector.

There are a number of EU level infrastructure assessments and co-ordinating actions that have or are being undertaken and should be taken into account by the Committee.

- The EU Report of the expert group on Marine Research Infrastructures (MRIs) led by Rudy Herman will report in September 2012.
- Eurocean.<sup>22</sup>
- SEAS-ERA—Towards Integrated Marine Research Strategy and Programmes due to be completed 2014.<sup>23</sup>
- EEA-GISC (for GMES in-situ needs) An EU web portal for marine environmental data.<sup>24</sup>
- *European Strategy Forum on Research Infrastructures*—Marine ESFRI<sup>25</sup> projects, Jerico, SeaDataNet, EMODNET, GMES). It will refer to the SEAS-ERA and EEA-GISC reports for more detailed analysis. Hopefully in this way we will not duplicate the work already done and add some value, in terms of describing and analysing the big picture, the challenges we face in terms of governance and how they could be addressed.

<sup>22</sup> <http://www.eurocean.org>

<sup>23</sup> <http://www.seas-era.eu>

<sup>24</sup> <http://gisc.ew.eea.europa.eu/gmes-services/marine>

<sup>25</sup> <http://ec.europa.eu/research/esfri/>

- European Marine Observation and Data Network (EMODNET).<sup>26</sup>
- At the beginning of September another consultation from DG MARE is taking place—“Marine Knowledge”, it will be running for three months. This is basically about EMODNET’s future. The EU Marine Board of which MASTS is a member worked hard with DG MARE, DG ENTR and DG ENV to use this consultation as the vehicle to develop a common vision for integrated ocean observation in European, responding to societal needs, building on EMODNET and encompassing GMES (marine part), and all other marine observation initiatives of European scale. It is important that the marine scientific community and the Marine Board make a coordinated contribution to the “Marine knowledge” consultation because it should lead to a common vision laid down in a Communication in 2013.

### 6.2 What progress has been made in delivering the 2010 Marine Science Strategy?

Steady progress is being made in Scotland, but as a general observation, there needs to be greater alignment between policy requirements and the science that is delivered through government’s Main Research Providers (MRPs) and Higher Education Institutions (HEIs). The metrics used to judge academic performance and the principal sources of research funding are not well suited to encouraging the academic community to undertake research which will be important in delivering aspects of the marine strategy.

With limited resources, strategic co-ordination and prioritisation of public expenditure in these areas will be critical. Credible incentives to stimulate private sector investment in marine research are also required. UK industry has a poor record of investment in R&D with the vast majority of science being funded from the public purse. This balance will need to change, particularly with respect to funding for research related to economic development in the marine environment.

We need to ensure that UK activities are aligned with EU and ultimately global objectives—but with the EU in particular as much of our marine resources are “shared” with other EU states.

Food and energy security, together with climate change and ocean acidification remain key drivers, but historic disconnects in the co-ordinated commissioning of relevant science, subsequent outputs and the way that these are translated into public policy or economic reality need to be addressed.

The cost of sustaining long-term monitoring is an on-going challenge, but rationalisation, although inevitable in some cases, could be tempered through the use of emerging automated and remotely operated monitoring systems. Investment in the development of this technology should of itself, be a priority for the UK.

There is evidence of improved communication in respect of data archive and access through MEDIN for example, together with a range of large publicly funded web portals which provide access to data. However, it is important to recognise that raw data is only useful once it is analysed and interpreted in a format appropriate for the target audience. This process is often additional to the cost of primary acquisition and interpretation and is often not recognised by those requesting access to data.

In the absence of a strategic resource map of the skills and capacity that exists within the marine science community, coupled to a defined process for identifying potential future skills requirements it is not possible to allocate resources to meet skills gaps effectively.

The development of marine industry may be underpinned by marine science, but ultimately it is driven by the potential for commercial gain. Metrics of academic success and the majority of publicly available research funding are not well aligned with rewarding scientists for undertaking commercially relevant applied R&D which will be important in delivering aspects of the Marine Strategy. The MSCC could help to influence and encourage Government and the Research Councils to support a co-ordinated research agenda which is designed to deliver the Strategy.

### 6.3 How effective have the Marine Science Co-ordination Committee (MSCC) and Marine Management Organisation (MMO) been, and what improvements could be made?

No comments submitted to us regarding the MMO.

The impact of the MSCC has been limited. This is largely due to lack of investment in the human resources required to drive co-ordination at this level. The MSCC needs to have a much clearer remit and clear policy support through both UK Government and Devolved Administrations to ensure that it can be an effective co-ordinating body at UK level. Credible representation from the wider marine stakeholder community should also be encouraged—Scotland’s Marine Strategy Forum for example could usefully feed into the MSCC.

<sup>26</sup> <https://webgate.ec.europa.eu/maritimeforum/category/162>

6.4 *Has the selection of proposed Marine Conservation Zones (MCZs) been based on robust scientific evidence? How well has the scientific evidence been balanced with socio-economic considerations and communicated to affected coastal communities?*

MCZ are not being taken forward in Scotland. Marine Protected Areas (MPAs) are the Scottish equivalent of MCZs.<sup>27</sup>

6.5 *How effectively does the Natural Environment Research Council (NERC) support marine science in polar and non-polar regions?*

Many economically emerging states are actively trying to establish “research bases” in Antarctica. There is little doubt that such ambitions have more to do with staking future claims on resources than they do with advancing scientific knowledge. However, the UK should seek to maintain a viable and credible scientific presence in these regions to help to ensure that they remain, as far as possible, protected from the impact of direct and indirect anthropogenic impacts.

The UK must also seek to forge strong alliances with those countries seeking to establish “scientific” bases in Polar regions to maximise the potential for useful collaborations and cost sharing.

The UK support for marine science via provision of ships and equipment is extremely strong in per capita terms. Assets of this magnitude can only be supported at a national level, no single organisation could fund this level of capital investment and operational costs. This investment has resulted in the UK maintaining its position as a world leader in this field, producing high quality science that has global significance and continues to attract the brightest minds to UK institutions.

NERC supports UK marine science in a global arena via directed and non-directed funding, and via various specific-remit surveys and centres such as the British Antarctic Survey and National Oceanography Centre. A key limit on science at sea is ship time. The newish RRS James Cook and soon-to-be-delivered RRS Discovery are world-class vessels, and ship capability is good in parts, but it still takes approximately five years to move from funding application to getting instruments wet. The technical support provided on the ships via NMF is mixed, and the disciplines that are supported is more a product of history than of an enthusiasm to embrace new capability that would keep UK science at the fore internationally. For example, whereas benthic trawling is well supported, pelagic fishing is not, and although traditional CTD-based oceanography is well supported acoustic capability is hampered by a lack of engagement.

6.6 *How well are the current and potential impacts of global warming on the oceans (for example temperature changes and acidification) being monitored and addressed by Government and others?*

There has been concerted effort to examine aspects of global climate change (eg IPCC) and related factors such as Ocean Acidification but the level of coordination and integration between national government remains patchy and the science concerning OA, for example, is still relatively immature. There is currently some effort to work better on an international scale and this should be further supported since it is only through international effort can these global issue be addressed. However, the scientific community should also learn lessons from the experience of the climate change debate. There is a danger of making radical statements (beloved by the press) too rapidly and without solid support and damage the credibility of the science and scientists. It is not an easy task to separate the research from the politics and media but there is a requirement for balanced and well supported research on the medium rather than short term to provide more information on global change impacts and soon there should be a strategic aim to shift the focus from effects to the management of system to mitigate these. There should also be an emphasis on international cooperation and the sharing of data with concomitant reduction of redundancy of effort.

September 2012

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### Written evidence submitted by Energy UK

#### ABOUT ENERGY UK

Energy UK represents a wide spectrum of interests across the sector. This includes small, medium and large companies working in electricity generation, energy networks and gas and electricity supply, as well as a number of businesses that provide equipment and services to the industry.

We appreciate the opportunity to contribute to the Committee’s inquiry and have addressed Question 4.

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<sup>27</sup> <http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork> describes the current state of development of MPAs, with case study areas and work to develop an ecologically coherent network of MPAs.

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 RESPONSE TO INQUIRY QUESTIONS

4. *Has the selection of proposed Marine Conservation Zones (MCZs) been based on robust scientific evidence? How well has the scientific evidence been balanced with socio-economic considerations and communicated to affected coastal communities?*

1. We are concerned that the use of marine and estuarine waters by existing and potential future coastal thermal power stations has been insufficiently or possibly inconsistently considered within the recommended Marine Conservation Zone (rMCZ) process. Whilst “renewable energy” appears to have been well represented in the stakeholder process, we are concerned that, despite our efforts, representation of thermal power generation (using coal, gas, biomass and nuclear fuels) has not been sufficiently strong.

2. Our primary concern is that, in the absence of quantitative statements of the science underpinning the designation, Conservation Objectives and Management Plans and Guidance of MCZs, and with insufficient recognition of the operation of existing and possible future coastal thermal power stations, the designation and subsequent management of MCZs could lead to unwarranted restrictions, or undue consenting risks, for such power stations. We consider that this could lead to the loss of the socio-economic and environmental benefits such power stations provide.

3. Where local considerations permit, in line with Best Available Technique (BAT) principles, thermal power stations are able to make use of salt waters for once-through cooling, which provides a significant improvement in the thermal efficiency of electricity production compared with other cooling techniques. This in turn leads to a range of other benefits, such as decreased emissions to air per unit of electricity produced, reduced use of fuel per unit of energy produced (with consequent benefits for affordability and resource use as well as a reduction in the environmental footprint of “upstream” activities). The ability to site existing and future power stations at the coast offers diversification compared with freshwater sites alone (which are principally tower-cooled power stations on rivers), which contributes to the robustness of the power system as a whole. In the future, certain coastal locations may be advantageous because of their proximity to Carbon Capture and Storage (CCS) pipelines, hubs and disposal sites.

4. Benefits associated with water cooling apply to all fossil-fired (coal, gas), biomass-fired and nuclear-fuelled power stations.

5. The direct financial benefits arising through the improved thermal efficiency resulting from the use of once-through cooling by current coastal thermal power stations have been quantified as contributing a benefit of £150Mpa (Saunders, J, Tinch, R, and Hull, S (2010)).<sup>28</sup> Overall, the use of coastal locations by current and potential future thermal power stations offers significant socio-economic benefit, not all of which has been captured within the Crown Estate benefit evaluation.

6. There are many examples of existing thermal power plants operating within or near Natura 2000 sites and other locations of conservation interest. Thus the operation of a water-cooled thermal power station within or near an MCZ need not be precluded. However, in recent years there have been cases in which the permitting of such plant has been difficult or contentious because of the perception by some stakeholders of adverse effects on the integrity of a Natura 2000 site, possibly as a result of the precise wording of specific Conservation Objectives. Typical potential considerations include the effects of thermal discharge, effects on water quality arising from the chemical treatment of cooling water systems and direct effects on biota arising from intake operation, though, in some cases, issues associated with structures and dredging can arise. These are linked to factors (such as temperature, water quality, biota populations, etc and, in some cases, “power stations”) which are often indicated in the site “pressure”/activity collations we have seen as having potential effect on an rMCZ

7. We note that whilst the locations associated with nuclear power stations have been recognised in some documents, the occurrence, potential development and the benefit to society of thermal power stations of all fuel types does not appear to have been given sufficient prominence in the documentation visible to us. “Renewable energy” has been considered explicitly as an activity heading in all cases. However, “thermal power generation” has not been given the same standing. Broad headings such as “coastal development” and “water abstraction and discharge” may not give an appropriate steer to document users.

8. Our experience of the permitting process for thermal power stations leads us to suppose that many stakeholders will assume that the operation of a thermal power station within, or with the potential to influence, an rMCZ is causing “damage”. Where the Conservation Objective of an rMCZ is given as “maintain”, it may not necessarily lead to pressure for the mitigation of existing operations. However, it may cause difficulties for proposed new thermal power plant operation, since the assumed “damage” will be additional. Stakeholder pressure may become greater should the Conservation Objective be “recover”, since it will be argued that any reduction in “damage” will make a contribution to recovery.

9. In our view, the nature, scale and extent of the power station induced effects are likely to be “small” given the scale of the rMCZ. The views stated in some rMCZ documentation also suggest that the influence of existing thermal power stations will not impact on the overall attainment of rMCZ Conservation Objectives. However, our experience suggests that some stakeholders will not take this view. Armed with the Precautionary

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<sup>28</sup> Saunders, J, Tinch, R, and Hull, S (2010). Valuing the Marine Estate and UK Seas: An Ecosystem Services Framework. The Crown Estate, 54 pages, March 2010. ISBN: 978-1-906410-15-5.

Principle and statements of Conservation Objectives and Management Plans which are not quantitative or explicit on scale, they may seek to place a heavy burden of proof on a thermal power station operator or developer to demonstrate the absence of effect on “site integrity” or Conservation Objectives. If no further environmental mitigation is required because all existing generation installations are adequately controlled via regulation and relevant marine features are adequately protected, it is important that this should be stated clearly in the MCZ process in order to reduce the risk of unbalanced and unwarranted conditions being placed on thermal power generation in future.

#### Examples of references to Thermal Power Stations in MCZ Documents

10. We note and support the heading “generation of electricity”<sup>29</sup> in “Balanced Seas”<sup>30</sup> and support the assertion (in Annex C) that in the Thames Estuary and Medway Estuary sites the level of activity is unlikely to impact on features protected by the rMCZ, though the specific basis for the assertion is not stated. However, in the “Balanced Seas” Summary recommendation leaflet, whilst the importance of the port activity in the Thames Estuary and Medway Estuary is explicitly recognised as having

*“immense economic importance for the ports sector “,*

linked to the statement that the sites

*“would be managed in close collaboration with the Port of London Authority and Medway Ports”*

No analogous recognition of the importance of the Thames and Medway for electricity generation by thermal power stations occurs. Whilst some comfort is provided by the statement that “generation of electricity” is unlikely to impact on protected features, our experience suggests that this view will not be shared by all stakeholders active within the thermal power station permitting process. Such views may be reinforced by statements such as the following (from Thames Estuary rMCZ5 Selection Assessment Document)

*“The rMCZ lies in an area of particularly high economic importance and many sectors, notably ports, have expressed concern about the potential impact on their sectors.”*

11. We therefore look to the final statement of the Conservation Objectives and site Management Guidance for wording which will reduce the potential for unwarranted restrictions on thermal power station operation and unwarranted consenting risks to thermal power station development.

12. The activity “generation of electricity” does not appear in the Irish Sea,<sup>31</sup> Net Gain<sup>32</sup> (North Sea) or Finding Sanctuary<sup>33</sup> (South West) activity lists.

13. The Final Recommendations document of Net Gain lists “production of electricity (on land power stations including nuclear)” in relation to NG2 (Cromer Shoal Chalk Beds) and NG8 (Holderness Inshore) among pressures which would need to be managed, though details are unclear.

14. The Net Gain vulnerability assessment lists features within NG13 as being vulnerable (low vulnerability) to “atmospheric climate change”, “temperature”,<sup>34</sup> “emergence regime” and “wave exposure changes” associated with the activity of production of electricity (on land power stations including nuclear) with a note relating to a “Future proposal for cooling water biomass plant intake for estuary outfall.”

15. The Net Gain stakeholder feedback (Annex 6) included a submission from EDF Energy regarding “zones of influence” associated with Hartlepool and Sizewell nuclear power stations. Although there may be some issues specific to nuclear power stations, similar “zones of influence” could be considered relevant to all coastal and estuarine power station locations at which once-through cooling is used or would be suitable.

16. The Irish Sea project noted the influence of existing and possible thermal power stations (eg rMCZ 11 Cumbria Coast, Wyre-Lune Complex) suggesting that the level of influence would not be significant for the rMCZ. Whilst we support this view, the basis of the assertion is unclear. We support the Irish Sea group’s stated view that no additional “mitigation” would be required because relevant features are already protected sufficiently under existing legislation. However, again we look to the final statement of the Conservation Objectives and site Management Guidance for wording which will reduce the potential for unwarranted restrictions on thermal power station operation and unwarranted consenting risks to thermal power station development.

#### CONCLUDING REMARKS

17. As there are relatively few coastal margin locations suitable for the development of thermal power stations, we would urge such locations to be recognised and factored into the MCZ process in order that MCZ

<sup>29</sup> As this occurs separately and not under the heading “renewable energy”, which includes “wind farms”, tidal and wave energy, we assume that ‘generation of electricity’ includes coastal thermal power stations.

<sup>30</sup> “Regional MCZ Projects IA: Annex C1—Balanced Seas”, 17 July 2012, <http://publications.naturalengland.org.uk/file/2010086>

<sup>31</sup> “Regional MCZ Projects IA: Annex C3—Irish Seas Conservation Zones”, 16 July 2012, <http://publications.naturalengland.org.uk/file/1957182>

<sup>32</sup> “Regional MCZ Projects IA: Annex C4—NetGain”, 17 July 2012, <http://publications.naturalengland.org.uk/file/1996538>

<sup>33</sup> “Regional MCZ Projects IA: Annex C2—Finding Sanctuary”, 16 July 2012, <http://publications.naturalengland.org.uk/file/1964016>

<sup>34</sup> 7 Temperature is assumed to relate to water temperature.

boundaries, Conservation Objectives, Management Plans and Guidance can be written so as not to preclude or impose unwarranted restrictions or burdens on the development and operation of suitably sited, designed and operated coastal thermal power stations using once-through cooling.

18. Overall, we are not confident that the societal value of, and the practicalities for owners and operators associated with, developing and operating thermal power stations at coastal locations within, or with the perceived potential to influence, an rMCZ have been consistently and explicitly recognised in the rMCZ documentation. Coastal thermal power stations have a vital and continuing role in the UK Government's objective to achieve an 80% reduction in greenhouse gas emissions by 2050. Failure to recognise and account for this adequately could lead to unwarranted restrictions on the operation of existing coastal and estuarine thermal power stations or present unnecessarily increased consenting risk for future coastal and estuarine thermal power station projects, thus adversely affecting societal, economic and wider environmental interests.

September 2012

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### Written evidence submitted by the North Sea Marine Cluster

1. The North Sea Marine Cluster (NSMC) was created in 2009 by an association between the University of East Anglia in Norwich and the Gardline Group based in Great Yarmouth, and combines academic excellence with hands on worldwide marine experience. The cluster has a strong interest in marine science professionally and academically. It has been active in promoting more cost effective use of resources in order to improve the knowledge base and to secure a better managed marine environment.

2. We, therefore, welcome this further inquiry by the Science and Technology Committee and this opportunity to offer comments. In response to the questions asked:

*Since 2007 has there been improved strategic oversight and co-ordination of marine science?*

3. The Committee recommended in its report "Investigating the Oceans" that a new marine science agency be set up. The Government set up instead the Marine Science Coordination Committee (MSCC) which reports to the Ministerial Marine Science Group. This alternative arrangement appears to have made some headway—the marine science strategy and communication strategies are in place—but the pace of change has been disappointingly slow. It took over two years before the Marine Science Strategy appeared following the Government's response to the Committee's recommendations and the communication strategy was equally slow to emerge. Whilst various sub-groups have been established and there appears to have been quite a bit of activity, there is little evidence that this has yet produced any substantive and positive outcomes of the kind needed. The UK Marine Science Strategy promised a "step change". In our view this has yet to materialise.

4. The need for improved coordination and cost effectiveness in the delivery of marine science is today even more pressing than when the Committee previously looked at this. In a sense, the Committee's report five years ago anticipated many of the developments that are upon us now: implementation of the Marine and Coastal Access Act 2009, the introduction of marine planning, establishing an extensive network of marine protected areas in order to meet EU and international commitments and implementing the Marine Strategy Framework Directive. All of these require good science and evidence, but many of the challenges and needs identified in "Investigating the Oceans" remain much as there were. As a consequence problems have arisen.

5. Although marine planning is now underway, with the first two draft marine plans expected to appear early next year and another two areas recently announced, the paucity of key data is likely to be a serious problem. Access to and availability of data was identified as critical when the Marine and Coastal Act was being prepared. Some years later, in 2010, CEFAS, in their report "Marine Survey Needs to Underpin Defra Policy", drew attention to the lack of basic data and pointed out that the Marine Management Organisation was dependent upon broad scale predictive habitat maps where confidence in the accuracy of some of the material was as low as 20%. Charting Progress 2 has similarly commented that current habitat maps cover only 10% of the UK continental shelf. At a time when the Marine Management Organisation is introducing a system to plan the use of our seas very little is known about the shape and makeup of the seabed to the level of granularity required for marine planning. Even less is known about the water column. In our view, more effective co-ordination and a stronger focus on cost effectiveness by the MSCC is required to help ensure that marine planning can overcome this problem and to enable plan lead licensing decisions to draw on a well informed and wide knowledge base.

6. Another field where the MSCC could usefully play a more prominent role is helping to assemble evidence for the designation and future management of marine protected areas. The introduction of marine conservation zones in English waters has been seriously delayed because an independent Science Advisory Panel concluded that the science and evidence base was not good enough and that "significant additional work" was needed. The Science and Technology Committee will not need reminding that they commented five years ago on the importance of sound evidence to select and designate marine protected areas. That conclusion seems remarkably prescient in the light of subsequent events. The problems that arise from poor and inadequate base data do not stop at designation. Once designated MPAs have to be managed and monitored. This will be a substantial undertaking and will be reliant on strong evidence systems. A remodelled and re-energised MSCC could play a valuable role in enabling the relevant information to be collected, collated and assessed. The benefits would

go wider than MPA management. Among the other areas of relevance are the Marine Strategy Framework Directive (MSFD) and fisheries management post CFP reform. The fact that the MSCC is a UK body is also germane. The legal obligations and international commitments to establish a network of MPAs apply to the UK as a whole and, therefore, the strategic oversight and co-ordination of the relevant marine science needs to be UK wide.

7. The same considerations apply to the MSFD. Charting Progress 2 is testament to the ability of those involved to draw together a comprehensive and well founded report covering a highly complex set of issues. It has meant that the UK is well placed to begin to satisfy the initial stages of the MSFD. Much of this work was initiated before the MSCC had gathered steam and produced the UK Marine Science Strategy. However, the MSCC has the opportunity to build on the useful progress made and to draw together the resources required to enable the evidence gaps identified in Charting Progress 2 to be plugged. In its response the Government acknowledged the need for more research. Delivery of the MSFD implementation programme will be a huge undertaking which will be highly dependent upon the UK having a robust scientific information base. The MSCC should play a lead role in bringing this together. We would like to see the MSCC adopting a proactive and vigorous approach with lead responsibility for co-ordinating all the relevant marine science and monitoring and for ensuring that economy, efficiency and effectiveness are at the core of the evidence delivery programme. We suggest that to strengthen the ability of the MSCC to achieve this and to improve value for money, resources should be pooled and the MSCC should become a central commissioning body for marine science and monitoring.

8. The substantial and immediate needs of marine planning, marine protected areas and implementation of the Marine Strategy Framework Directive, along with other areas such as fisheries research, may require a strategic shift in direction given that there is a limit on the total resources available. The utility of other areas of expenditure should be tested against these requirements.

9. The private sector with experience in offshore oil, gas and more recently renewables extending over 40 years has a substantial depth of cost effective science capability that could be utilised across all areas of interest. The predominant focus on public sector involvement in marine science by the MSCC is unnecessarily restrictive and represents missed opportunities for building knowledge and providing the foundations for sound decision making.

*What progress has been made in delivering the 2010 Marine Science Strategy?*

10. Unfortunately, there is only a limited amount of publicly available information about what has happened following publication of the 2010 Marine Science Strategy or as a consequence of the Strategy. And some of this appears to be out of date. There was the promise of “actions and not just words”. The published delivery plan falls short in this respect. It has not been updated for well over two years and there appears to be no information about recent activities and developments. The original concept seemed to be that the Strategy could be assessed against published actions and outcomes achieved. But the absence of any of this information means that it is difficult to arrive at an assessment of progress by applying the tests proposed in the Strategy itself. This seems a fundamental flaw and could be regarded as indicative of other issues concerning progress.

11. In the same vein, we have been unable to trace the annual reports of MSCC to the Ministerial Marine Science Group, which oversees the work of the MSCC. The reports are supposed to be published. We assume that the Ministerial Group looks to the MSCC to report on progress on delivering the Strategy and on levels of public sector expenditure on marine science.

12. It would be helpful to stakeholders, would strengthen accountability and would give impetus to delivery of the Strategy if the MSCC was more open and transparent about its activities and achievements. We suggest that the MSCC communications strategy needs to be revisited to address these gaps in information sharing with the outside world. At present external communication appears to be low priority and low key.

*How effective have the Marine Science Co-ordination Committee (MSCC) and Marine Management Organisation been, and what improvements could be made?*

13. This question is partly addressed above as far as the MSCC is concerned. We have made a number of suggestions as to where improvements might be made. We would like to see the MSCC have a fuller and more authoritative role than at present, capable of driving the marine science programme and in a position to undertake a commissioning function in the collective interests of the UK. As part of this new enhanced role we believe that the MSCC should include representatives from the private and voluntary sectors as full members in order to enrich the breadth of understanding and offer valuable insights. The North Sea Marine Cluster embraces the concept of collaborative working between different sectors and would like the MSCC to do the same. Broadening the membership would recognise the valuable contribution made by NGOs and the substantial investment by marine industries in the UK’s science base. As acknowledged in the Marine Science Strategy, marine industries deliver much core research and data through their own major research, monitoring and development programmes. It is sensible that this knowledge and experience is tapped into and encouraged to play a part in delivering the Strategy. Bringing on board senior figures from outside the public sector accustomed to results driven disciplines could strengthen the MSCC’s focus on outputs and outcomes. Although

there was an undertaking by Government that marine industries would be represented on the MSCC this has yet to happen. We believe that at least one of the independent members should come from industry.

14. There is a Marine Industries Liaison Group (MILG). This has the potential to make a useful contribution and, after a hesitant start, there are beginning to be signs that it will be able to do so. However, the MILG should not be regarded as a substitute for industry representation on the MSCC.

15. Value for money is always important. In the current economic climate it is vital that every pound is spent wisely and to best effect. The MSCC should be doing more to champion cost effectiveness in marine science and research. It should be a high priority with clear evidence that the MSCC is constantly seeking ways of securing more from finite resources.

16. Earlier we have mentioned commissioning. This is an approach that so far does not appear to have touched public sector marine science, which relies upon either direct spend (eg through CEFAS) or traditional procurement practices. We would urge the MSCC to look at what is happening elsewhere in the public sector—in local and central government—and adopt a commissioning strategy building on best practice from elsewhere.

17. The Marine Management Organisation (MMO), though a major user of marine science (eg for fisheries management, marine planning and licensing, protecting the marine environment) has a relatively modest budget for collecting and analysing evidence. To obtain the evidence it requires it is largely dependent on its ability to influence and benefit from the Defra Marine Evidence programme. The MMO might find that its ability to influence is restricted in a field of competing priorities and where budgets are heavily loaded away from UK domestic needs. The absence of an active MSCC delivery programme—or at least an observable one—makes it harder to ensure that resources are aligned with policy priorities.

18. The Marine Science Strategy provided an overview of the total public sector spend on marine science and research and how this was divided up. We would like to see this information regularly up-dated and used by the MSCC as a tool for monitoring and steering the future distribution of resources, to ensure that it is aligned with the key priorities and how it relates to the needs of, for example, marine planning and the marine strategy framework directive.

*September 2012*

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### Written evidence submitted by the Met Office

#### INTRODUCTION

1. Although split into named zones, a single ocean covers approximately three quarters of Earth's surface. As well as being a key source of transport, food, fuel and leisure, the ocean acts as a moderator for Earth's climate with complex geo- and biochemical interactions, both internally and with atmospheric processes. Having such a significant and diverse set of impacts on humankind, marine science is carried out across a large number of Government organisations and industry and effective coordination of scientific developments is both an important and a challenging task.

2. The significance and the challenge of coordinating marine science were recognised in an earlier report, *Investigating the Oceans*, by the Science & Technology Committee. The Marine Science Coordination Committee (MSCC) was subsequently formed in 2008, and subsumed the Marine Assessment Policy Committee. The MSCC generally involves higher level representatives who are able to make decisions on behalf of their organisations than its predecessor (Inter-Agency Committee on Marine Science and Technology (IACMST)), and has a clearer mandate to address issues than IACMST enjoyed. A second, and important, advantage for the MSCC is of reporting to, and being able to raise issues with, the Ministerial Marine Science Group (MMSG).

*Since 2007 has there been improved strategic oversight and coordination of marine science?*

3. The initial priorities for the MSCC rightly focused on developing a marine science strategy. The now mature strategy provides a good foundation from which to focus on specific priority areas and challenges. This is being done through a number of working groups.

4. Under MSCC there has been steady progress in improved coordination of the groups implementing the UK Marine Monitoring and Assessment Strategy (UKMMAS). The UK Integrated Marine Observing Network (UK-IMON) is a new initiative which should improve the coordination of the observation network for UK shelf waters over the coming years. However UK-IMON is not in itself configured to resolve issues of sustained funding for key monitoring activities, nor to coordinate UK contributions to global open-ocean observing programmes. This remains a significant area of concern.

5. The coordination for marine science between NERC and the Met Office has improved in several respects since 2007 through the National Centre for Ocean Forecasting<sup>35</sup> (NCOF) and the Joint Weather and Climate Research Programme<sup>36</sup> (JWCRP). NCOF agreed a new strategy and implementation plan in 2010 and started to review progress against the plan and update it on an annual basis. NCOF's science strategy will also inform a marine science strategy for JWCRP.<sup>37</sup>

6. A JWCRP initiative is in progress to develop the UK's next-generation global Earth System Model, used for climate change projections, as a joint development between the Met Office and NERC. This will enable more rapid and effective pull through of fundamental science and model developments across the UK research community into improved climate prediction capability.

7. The coordination of physical ocean modelling in the UK has improved greatly following a strategic decision in January 2006 that the UK ocean modelling community (including NERC, the Met Office and the Higher Education Institutes sector) would use the NEMO model as its primary work-horse for ocean modelling. A NERC/Met Office Joint Ocean Modelling Programme (JOMP) was started in 2010 and has resulted in implementation of a shared configuration for global ocean modelling (short term ocean forecasting and climate prediction), with annual co-ordinated plans for assessment and development. The coordination of work on physical shelf-seas modelling between National Oceanography Centre staff at Liverpool and the Met Office has also been extremely productive and constructive over a number of years, and work is in progress to formalise that relationship in a similar way to JOMP.

8. In previous years the UK coordination of bio-geochemical modelling has given cause for concern. This year the Defra agency, Cefas (Centre for Environment, Fisheries and Aquaculture Science) and the Plymouth Marine Laboratory (PML) have started on a coordinated approach to development of a shelf-seas bio-geochemical model through the NERC/Defra Shelf-Seas Biogeochemistry Research Programme (SSBRP). NOC, UEA, PML and the Met Office have also started a coordinated assessment of the performance of open ocean bio-geochemistry models that will deliver the ocean biogeochemistry component of the next UK Earth System Model.

9. A number of staff exchanges and secondments have contributed to improved bilateral links. For example from 2009–13 Richard Wood has been seconded part-time from the Met Office to NERC as its Theme Leader for Climate System, while continuing his role as Science Strategic Head for the Met Office in Oceans, Cryosphere and Dangerous Climate Change. Part-time staff secondments from the Met Office are in place during 2012 to Defra Marine and Fisheries and to Cefas, to explore the potential for improved marine services for the UK shelf seas.

*What progress has been made in delivering the 2010 Marine Science Strategy?*

10. The MSCC set up three working groups in line with its strategy. One of these, the Long-Term Monitoring Working Group, was set up to address what is widely perceived to be the most important issue for MSCC to resolve. This issue has now been taken up by a group led by the Government Chief Scientific Advisor, Sir John Beddington.

11. A UK Integrated Marine Observing Network (UK-IMON) initiative was instigated in November 2011 to ensure that a national marine observatory is in place to improve the evidence base for future assessments of environmental status. This has very strong support from senior managers within NERC and the most relevant Government agencies and departments. Although it is too early to say how successful this initiative will be, the agreement of the overall purpose and the will to take initial pragmatic steps are promising.

12. Following consultation with the MMSG the MSCC has also started some fairly small but carefully chosen initiatives which are well aligned with its Science Strategy. The initiative to improve coordination of major resources (including research vessels) is a good example of an initiative aiming to make progress with minimal bureaucracy.

13. It is worth noting that not all delivery of strategy has to be undertaken by MSCC directly. The improvements in coordination described in the answer to question 1 are well aligned with the Marine Science Strategy but are not MSCC initiatives as such.

*How effective have the MSCC and MMO been and what improvements could be made?*

14. The MSCC has a number of Monitoring and Assessment groups (MARG and its evidence groups), networks (such as MEDIN and the International working group) and fora (such as the Underwater Sound Forum) that report to it. Given that MSCC meets only twice a year its effectiveness will largely depend on the

<sup>35</sup> The National Centre for Ocean Forecasting (NCOF) is a consortium agreement between the Met Office, the NERC Environmental Systems Science Centre, Plymouth Marine Laboratory, Proudman Oceanographic Laboratory and the National Oceanography Centre, Southampton. NCOF draws on the expertise of these institutions in order to provide a UK centre of excellence for operational oceanography.

<sup>36</sup> The Joint Weather & Climate Research Programme (JWCRP) is a joint programme between NERC and the Met Office. The overarching goal of this programme is to ensure that the UK maintains and strengthens its leading international position in weather and climate science, and hence in weather and climate forecasting and provision of advice for policy.

<sup>37</sup> The progress made within NCOF in 2011 is illustrated at [www.ncof.co.uk/NCOF-Successes.html](http://www.ncof.co.uk/NCOF-Successes.html).

progress made within its sub-groups with support from its secretariat. A key priority for the MSCC therefore is to ensure it has the right groups in place and that it is supporting and challenging them effectively.

15. It may strengthen the MSCC's role in coordination of marine science if NCOF reported to it in the same way as MARG and its evidence groups. The Marine Working Group of the UK GMES Forum could also report to the MSCC in the same way as the Underwater Sound Forum. The MSCC is organising a Conference on "Setting the Course for UK operational oceanography" in January 2013. This promises to be a useful meeting and the Met Office welcomes this MSCC initiative.

16. There is scope to improve the exploitation of marine predictions by Government and commercial companies. Building on the successful collaboration between the Environment Agency and the Met Office in development of the Joint Flood Forecast Centre, NERC, several members of the Defra family and the Met Office have recently implemented a Natural Hazards Programme (NHP) focused on services to Category 1 responders. A similar framework for collaboration to deliver a wider range of services (including commercial services) is now being developed within the Environmental Science Service Partnership (ESSP). The NHP and ESSP provide good examples of vehicles for improved exploitation of marine predictions.

17. The Met Office has held some exploratory discussions with colleagues within the Marine Management Organisation (MMO) on its priorities for information on near-surface and sub-surface marine information.

*How effectively does NERC support marine science in polar and non-polar regions?*

18. The Met Office's strategy for marine science (and many other fields required for Earth system modelling) is to develop all its key capabilities through strategic and collaborative partnerships. As outlined in some detail in response to question 1, the coordination of marine science between NERC and the Met Office has greatly improved over the last five–10 years. NERC institutes such as NOC and PML now provide excellent quality and greatly valued support to the marine science within the Met Office.

19. A specific example of NERC-Met Office scientific collaboration is research on the Atlantic Meridional Overturning Circulation, a key factor controlling UK climate. Close collaboration between the NERC RAPID programme, which has developed a method to monitor the circulation, and the Met Office Hadley Centre Climate Programme, is resulting in new insights into how changes in the circulation may affect future climate in the UK.

20. Overall, there has been an increase in recent years in the links between NERC research programmes and the Met Office, both at the strategic level and via individual research collaborations. Marine examples include NERC research programmes on the Arctic, next generation atmospheric and oceanic prediction systems, ocean mixing, and shelf seas biogeochemistry.

21. The Met Office has re-organised to take full advantage of its support from NERC and to avoid duplication of effort. This means that the Met Office is becoming increasingly dependent on NERC for assessment and development of its future modelling systems. These modelling systems include coupled ocean-ice-atmosphere models for simulation of climate variability and climate change, and seasonal forecasts. The Met Office expects to introduce coupled models for short-range weather forecasting within the next five years.

22. Consequently, the Met Office is concerned that a critical mass of NERC-funded expertise in ocean modelling, available to contribute to strategic model development work, is retained and developed, notwithstanding current financial constraints and organisational restructuring. To achieve this it is important to recognise that high-quality model development work does not always deliver high scores against traditional academic performance metrics such as publications.

*How well are the current and potential impacts of global warming on the oceans (eg temperature changes and acidification) being monitored and addressed by Government and others?*

23. The OceanObs09 conference<sup>38</sup> provides a detailed view of the international monitoring of various aspects of the global ocean circulation. UK authors contributed to many of the observing programmes and to the interpretation of the resulting time-series.

24. Despite intensive discussions over almost a decade, UK contributions approaching GNI levels to the funding of the Argo programme and the Jason altimeter satellites have not been secured for these valuable international marine observing systems for ocean climate monitoring. These observations have instead been supported through a patchwork of marginal calls on a range of departmental budgets. For Argo, the funding has been subject to substantial year-to-year uncertainty.

25. The Met Office Hadley Centre Climate Programme, funded by DECC and Defra, includes substantial elements on modelling and assessing changes in the ocean's circulation, heat and water content, ice, and how these influence climate, sea level, and uptake of carbon by the ocean—both globally and regionally.

26. The Environment Agency commissioned a major study to provide evidence on the need to update the Thames Barrier, which protects London from flooding by North Sea storm surges. The Met Office led on the provision of climate science with other institutions also taking part. The final package of advice assembled by

<sup>38</sup> <http://www.oceanobs09.net/>

the EA included recommendations for a flexible adaptation plan plus the need for regular monitoring of the ocean and ice sheets.

27. The UK Climate Projections 2009 (UKCP09), which were led by the Met Office in collaboration with a range of institutions, included assessments of some of the likely impacts of climate change on the marine environment around the UK. These include changes in the incidence of extreme coastal water levels through storm surges, in surface waves, and in seasonal stratification, important for the development of ecosystems and fisheries. Where scientifically and technically possible projection information included some estimate of uncertainty, which is important for making risk based decisions. The UKCP09 marine projections were an important input to the development of the first UK Climate Change Risk Assessment (CCRA) in 2011.

28. There is potential to develop more integrated assessments in the future of how the climate of the marine environment changes on a range of scales. This would involve putting observed changes into a broader context, taking into account the effects of climate variability and change alongside other drivers of change such as fishing and nutrient inputs, to provide a better evidence base for regulation and management of the marine environment. This will require a coordinated research effort across a number of agencies.

September 2012

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### **Written evidence submitted by the Royal Yachting Association**

1. The RYA is the national body for all forms of recreational and competitive boating. It represents dinghy and yacht racing, motor and sail cruising, RIBs and sportsboats, powerboat racing, windsurfing, inland cruising and personal watercraft. The RYA manages the British sailing team and Great Britain was the top sailing nation at the 2000, 2004 and 2008 Olympic Games.

2. The RYA is recognised by all government offices as being the negotiating body for the activities it represents. The RYA currently has over 100,000 personal members, the majority of whom choose to go afloat for purely recreational non-competitive pleasure on coastal and inland waters. There are an estimated further 500,000 boat owners nationally who are members of over 1,500 RYA affiliated clubs and class associations.

3. The RYA also sets and maintains an international standard for recreational boat training through a network of over 2,200 RYA Recognised Training Centres in 20 countries. On average, approximately 160,000 people per year complete RYA training courses. RYA training courses form the basis for the small craft training of lifeboat crews, police officers and the Royal Navy and are also adopted as a template for training in many other countries throughout the world.

4. The RYA invites the Committee to consider the following submission.

*How effective have the Marine Science Co-ordination Committee (MSCC) and Marine Management Organisation been, and what improvements could be made?*

5. The RYA has dealings with the Marine Management Organisation (MMO) through its remit to deliver marine planning, marine licensing and marine conservation zones. We also work with their data team to share information of mutual benefit where applicable. We have no comments on the MSCC to offer at this time.

6. Since its creation the MMO has experienced a period of considerable flux as it has sought to become established in terms of staff, modus operandi and interaction with stakeholders within both Government and industry. Whilst we accept that any new regulatory body requires a period of time to “find its feet” it does seem that the MMO has struggled with certain elements of its remit, in particular the delivery of the new marine licensing system.

7. In relocating to Newcastle the MMO failed to retain many of the experienced staff from its predecessor the Marine and Fisheries Agency (MFA). Whilst the RYA has no view on the specific location of the MMO head office we have together with a number of other stakeholders experienced the drop in service level resulting from the loss of these staff resources. It is our understanding that the MMO has only recently managed to recruit a full quota of staff necessary to manage the licensing workload. The under-resourcing during the intervening period has led to some significant delays in processing licence applications, problems with communication and a lack of consistency in applying the relevant elements of the Marine and Coastal Access Act 2009.

8. Notwithstanding the above it is our view that the senior management at the MMO continue to make efforts to improve this situation and in relation to marine planning in particular have established excellent links with their stakeholders.

9. We would anticipate that now the MMO is more fully resourced it will become more effective, particularly in relation to their marine licensing remit. We hope that this improvement will result from ensuring all licensing officers are equipped with a sound baseline knowledge of how and why regulation applies in the marine environment. This will enable them to understand the context of most licence applications and subsequent comments from various stakeholders. It should also empower them with a greater appreciation of how and why certain elements of the Act should be applied.

10. Other minor areas of improvement could be achieved by better quality assurance procedures. On numerous occasions data provided with licence applications for consultation contain errors or are not obtainable through the MMO Marine Licence Portal. Significantly although coordinates are usually provided to locate proposed works (albeit often incorrectly) these are often not plotted onto an admiralty chart or similar graphic; it is therefore incumbent on the consulted party to undertake this element of work. Provision of this information by the MMO would expedite the consultation process improving service delivery for both the applicant and the stakeholders.

*Has the selection of proposed Marine Conservation Zones (MCZs) been based on robust scientific evidence? How well has the scientific evidence been balanced with socio-economic considerations and communicated to affected coastal communities?*

11. The RYA has been engaged in the MCZ process since the inception of the Finding Sanctuary project in the south west of England. We have been a stakeholder at the local, regional and national level throughout. This has included representation on the Regional Steering Groups (RSG) for each of the four regional projects (Net Gain, Balanced Seas, Finding Sanctuary and the Irish Sea Conservation Zone Project) and the MPA Stakeholder Forum.

12. The RYA is broadly supportive of the UK Government's plans to establish a coherent network of Marine Protected Areas to achieve their goal of "clean, healthy, safe, productive and biologically diverse oceans and seas". In particular, the RYA welcomes the provisions in the Marine and Coastal Access Act 2009 that enable Ministers to take socio-economic factors into account when designating new Marine Protected Areas (Marine Conservation Zones (MCZs) in England and Wales).

13. The RYA's primary objectives of engaging in the consultation process regarding the development of MCZs are to protect the public right of navigation and to ensure, as far as possible, that recreational boating interests are not adversely affected by the designation of such MCZs. The "Additional Guidance for regional MCZ projects on planning for areas where licensed, planned or existing socio-economic activities occur" published by Natural England in July 2010 states that "there should be fair treatment of the range of socio-economic interests throughout the planning process". The RYA believes that this approach should be encouraged in all MCZ planning and understands that effective dialogue between stakeholders and UK Government is essential to facilitate this.

14. The RYA developed its policy position on the identification and enforcement of MPAs in October 2010 and has maintained this position throughout its engagement with the MCZ process in England. A copy of this policy position has been included with this evidence for completeness.

15. It has been clear since the beginning of the MCZ process in England that there have been issues around the quality and robustness of available scientific evidence. The RYA is cognisant of Defra's policy to draw upon "best available evidence" and the view that "the absence of data should not be a reason not to protect a valuable marine habitat" however it is our view that in some cases the quality of data being used to recommend certain areas for designation is questionable.

16. For example, Alum Bay on the Isle of Wight has been recommended as a Reference Area (RA) within the Balanced Seas regional project area to protect the stalked jellyfish (*Lucernariopsis campanulata*). It is our understanding that this recommendation has been made on the basis of a single record which is some 10 years old. Furthermore there is no local knowledge of any stable population occurring in this location in the present day.

17. Alum Bay is an essential anchorage for recreational vessels making passage across the English Channel and is considered to be the last and first safe haven for mariners travelling to or returning from France or the Channel Islands in the event of inclement weather. Should it be designated as a RA it is likely that restrictions will be placed on anchoring in this location. It is our view that taking forward such a recommendation on the basis of questionable data is erroneous.

18. It should be noted that the Balanced Seas regional project team have flagged up the need for further survey work in this location and recommend doing so prior to any designation. Indeed in recognition of the uncertainty of the location of the feature based on the single record a site boundary for this recommended RA was not defined.

19. The consideration of socio-economic factors throughout the MCZ process has been somewhat mixed. The four regional projects endeavoured to engage all relevant stakeholders to facilitate the provision of socio-economic data. The RYA for example provided each project with their "UK Coastal Atlas of Recreational Boating" which defines the cruising routes, general sailing and racing areas used by recreational craft around the UK coast.

20. It is our understanding that difficulties were experienced in obtaining these data from other stakeholders due to a lack of clarity on the potential implications of MCZs for socio-economic activities. Certain stakeholders were reluctant to provide data in case it were used to illustrate level of impact on interest features rather than to understand the potential impact(s) of MCZs on their activities. It is possible therefore that the quality of socio-economic data used in the Impact Assessments (IAs) undertaken by the regional project teams was not as high as it might have been and that impacts may therefore have been underestimated.

21. Furthermore it is our view that in the absence of detailed proposed management measures in relation to each recommended MCZ it is not possible to undertake a full impact assessment in any location.

22. This lack of detail on management measures has been a concern of the RYA throughout the MCZ process and has in our view hindered and continues to hinder the engagement of stakeholders on this issue. In particular communicating the concept of MCZs to affected coastal communities without the detail on associated management measures has proved extremely difficult. We at the RYA have found it challenging to help our members understand the value of engaging on this matter as it has not been possible to articulate what designation of MCZs may mean for them with any certainty.

23. Despite strong and legitimate concerns being raised by a number of stakeholders about the implications of the proposed MCZs, it appears that the Government does not currently intend to include in the forthcoming consultation process details of management measures that are likely to be introduced in relation to each MCZ. Yet, given that it is the management measures that will determine what activities may or may not take place within each MCZ, it is these management measures that are of greatest concern to the wide range of stakeholders who have been working hard over the last three years as part of the Government's four MCZ projects. As the Government has committed to taking socio-economic impacts into consideration whilst designating MCZs, in our view it would be inappropriate to seek stakeholder input in a public consultation without provision of the full information required to form an informed opinion.

24. The RYA is extremely concerned that without knowledge of the proposed management measures for each site it will be impossible for stakeholders to fully understand the implications of any proposed MCZs and therefore the consultation will be flawed. Instead of being able to provide detailed information about the potential impact, positive or negative, on their respective sector by any proposed MCZ, the majority of stakeholders are likely to be forced to take a precautionary position of objecting to particular MCZs in the absence of further detail.

25. The RYA remains supportive in principle of MCZs and continues to contribute to the Government's objectives of achieving clean, healthy, safe, productive and biologically diverse oceans and seas. Having been engaged in the MCZ process since the projects began in 2009, we would be disappointed to be unable to contribute fully to the next stage of the process due to inadequate information in the public consultation process.

26. On behalf of our members and the wider recreational boating public we strive to protect the public right of navigation and to ensure, as far as possible, that recreational boating interests are not adversely affected by the designation of MCZs. If the consultation documents published in December 2012 do not contain detail about management measures and the justification for them for each proposed MCZ we will be forced to take a "worst case scenario" approach and object to any sites that could have the potential to detrimentally affect recreational boating. Given that we have been a pragmatic and constructive participant in the MCZ process to date it would be disappointing if our contribution at this pivotal stage has to become so one-dimensional.

27. The RYA recognises that the finer detail of management measures will need to be worked out with the support of the local community on a site by site basis however it is our view that there are a number of options available to Government to enhance the December 2012 consultation process. These might include:

- Bringing forward for public consultation only those sites where no management measures are currently being considered; and making it clear that there will be no public consultation on any site where management measures are being considered until the management measures have been worked out and can be included in the consultation;
- Making it clear that where management measures are currently being considered, these will only be introduced on a voluntary basis after consultation with stakeholders; and that if subsequently statutory management measures are considered necessary, these will only be introduced after further public consultation with stakeholders; and
- Consulting on the basis that the public consultation is a first stage only, leading to provisional designation; and that where management measures are deemed necessary, there will be further public consultation on these once they have been worked out.

28. It is our view that the matters of data quality and management measures needs urgent reconsideration to avoid an extremely negative reaction from stakeholders across England. Moreover given the investment of time and resources across Government on the development of MCZ proposals to date it would be unfortunate if the end product was flawed due to unsound evidence.

*November 2012*