Update report to the Ministerial Marine Science Group (2012)

UPDATE PROGRESS REPORT - THE MARINE SCIENCE CO-ORDINATION COMMITTEE

Summary:

This report outlines progress with the work of the Marine Science Co-ordination Committee (MSCC) and its delivery of the UK Marine Science Strategy, since the Strategy's publication in February 2010. It has been prepared by the MSCC and covers the activities of MSCC itself and of its related groups, such as the UK Marine Monitoring and Assessment (UKMMAS) groups[1] and the Marine Environmental Data and Information Network (MEDIN)[2]. It includes information on public marine science spend in 2010/11 and 2011/12 (at Annexes I and II).

The UK Marine Science Strategy sets a 15 year vision. In its first two years MSCC and its member organisations have addressed a targeted set of issues related to high level science priorities and barriers to delivery. This includes initiating work on six new activities agreed by the Ministerial Marine Science Group in March 2011, which focus particularly on opportunities for efficiencies through sharing resources and making good use of existing evidence. Despite it being early days in the Strategy's delivery, significant progress has been made on a range of fronts.

The MSCC's activities are being delivered within the context of the current financial constraints, which brings additional challenges – and opportunities. While the MSCC's work is positive and should save money in the longer term, it requires substantial staff resources now – at a time when effort is being spread very thinly - in order to work together to develop and deliver the actions needed for the future.

Joint working

A major factor in the progress achieved by the MSCC has been the strong engagement by partner bodies, both directly in MSCC and in related initiatives such as joint research programmes. The MSCC plays a key role as a common platform for co-ordination between the different administrations. At the same time, there is recognition that the MSCC's work strands will need to continue to take account of different Departmental and Devolved Administration needs. MSCC has also worked closely with external stakeholders from industry, NGOs, the research and academic sectors and international partners. In addition, the MSCC has seen a range of softer but notable successes – such as the way the MSCC provides space for discussions which encourages collaborative working, the proactive engagement of partners, the creation of virtual communities for communications and other issues, and the application of modern

[1] The MSCC merged with the Marine Assessment Policy Committee, which oversaw UKMMAS, in summer 2010, reducing bureaucracy and creating financial savings.
[2] http://www.oceannet.org/

technology to hasten activities and disseminate information. MSCC members themselves have reported a renewed sense of common purpose that has come from working together.

Examples of co-ordination and progress include:

Monitoring, assessment and research

- Strong and continued co-ordination of monitoring and assessments, through the UKMMAS groups, which has delivered Charting Progress 2[3], as a comprehensive and authoritative assessment of the state of UK seas, providing the basis for the UK's initial assessment under the EU Marine Strategy Framework Directive and underpinned the marine aspects of the National Ecosystem Assessment;
- A new initiative to co-ordinate marine observatories around the UK – UK-IMON - which will help to improve the co-ordination of non-statutory monitoring and provide potential cost savings;
- Sharing of research priorities at an early stage between Government funders of marine science, and joint research programmes between members, such as the 5 year ocean acidification programme[4] and the shelf sea biogeochemistry programme[5]. This avoids duplication of research effort and leads to better research programmes;
- A co-ordinated view on climate change and knowledge gaps from the Marine Climate Change Impacts Partnership (MCCIP), which will help to focus future research on climate change;
- Increased co-ordination of marine renewables research and data, which is helping to identify critical gaps in knowledge and avoid unnecessary duplication of effort;
- The development of a transparent evaluation process to make funding decisions on cross-cutting, non-statutory monitoring programmes;
- Improved certainty on long-term funding for key monitoring programmes which will reduce bureaucracy and help to retain key researchers;

Better use of evidence and more efficient operations

- Significant progress by MEDIN in establishing and consolidating an operational framework for making available and ensuring good management of marine data from all marine organisations;
- Work in progress on opportunities to co-ordinate further the management and operation of Government marine research vessels, including using commercial vessels where appropriate, to make them more effective and efficient;

[3] Charting Progress 2 (http://chartingprogress.defra.gov.uk/)was published by the UKMMAS community in July 2010, immediately prior to its merger with MSCC.
[4] http://www.nerc.ac.uk/research/programmes/oceanacidification/
[5] http://www.nerc.ac.uk/research/programmes/shelfsea/

- A new online system for sharing expensive scientific equipment and laboratory facilities between MSCC member bodies. This should lead to expenditure savings for those participating;
- MEDIN has provided the basis for authoritative and influential UK input to European and International data initiatives, helping to ensure cost-effective and best practice approaches are taken;

Better communications and stronger partnerships

- A UK Marine Science Communications Strategy, including an e-alert system for highlighting UK marine science to the press and wider marine science community, which has speeded up the communications process by using the latest technologies;
- The MSCC's Underwater Sound Forum (USF)[6] has used the expertise within its large membership to provide high quality advice on underwater noise to inform key UK and international initiatives, such as ASCOBANS which is working to save Europe's small whales, dolphins and porpoises.
- An industry subgroup of MSCC, the Marine Industries Liaison Group, which is ensuring that relevant industry issues are highlighted to the MSCC for action;
- A new subgroup looking at international issues, including promoting UK marine science and associated technologies in international markets;
- Discussions in progress on partnership working with a UK-based Aquarium to promote marine science within the national curriculum.

Further activities are described in the main report.

Next steps:

The MSCC will be focussing over the next year on a number of issues:

- completion of current key Strategy actions, in particular work to align science programmes on ecosystem modelling and the continued co-ordination of monitoring and assessments via UKMMAS to provide key information for the implementation of the Marine Strategy Framework Directive and other initiatives;
- Identification of future issues though horizon scanning, linking to forward looks being planned by a number of learned societies;
- how marine science can contribute more strongly to the growth agenda, including green technologies and international markets.
- a review of the working and performance of MSCC.

[6] The USF became a sub-group of the MSCC on the MSCC's creation. Its membership has since expanded to include 80 key stakeholder organisations from Government, academia, NGOs, industry and other EU countries.

UPDATE PROGRESS REPORT - THE MARINE SCIENCE CO-ORDINATION COMMITTEE

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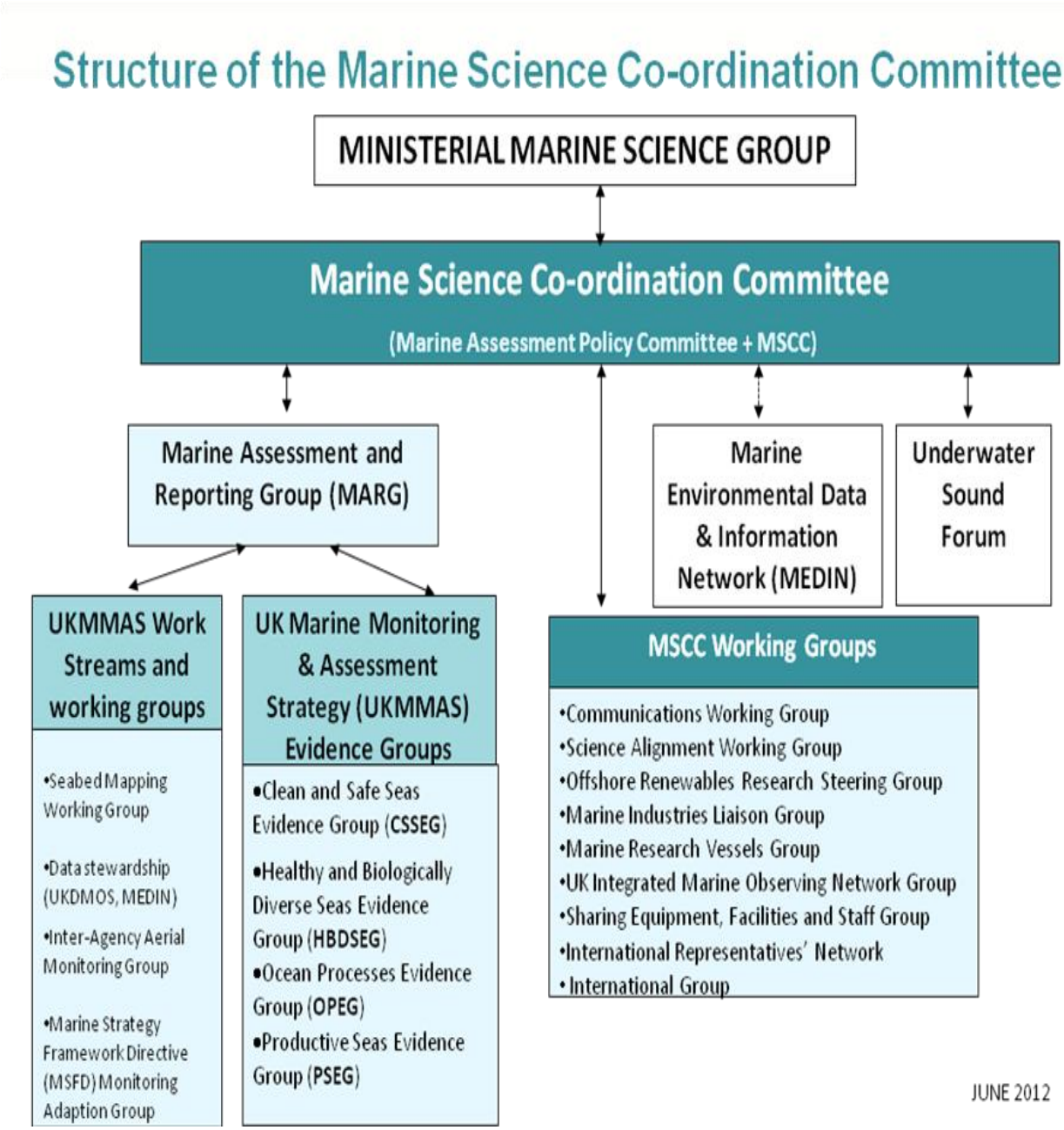
Structure of the Marine Science Co-ordination Committee
MINISTERIAL MARINE SCIENCE GROUP
Marine Science Co-ordination Committee
(Marine Assessment Policy Committee + MSCC)
Marine Assessment and Reporting Group (MARG)
Marine Environmental Data & Information Network (MEDIN)
Underwater Sound Forum
UKMMAS Work Streams and working groups
•Seabed Mapping Working Group
•Data stewardship (UKDMOS, MEDIN)
•Inter-Agency Aerial Monitoring Group
•Marine Strategy Framework Directive (MSFD) Monitoring Adaption Group
UK Marine Monitoring & Assessment Strategy (UKMMAS) Evidence Groups
•Clean and Safe Seas Evidence Group (CSSEG)
•Healthy and Biologically Diverse Seas Evidence Group (HBDSEG)
•Ocean Processes Evidence Group (OPEG)
•Productive Seas Evidence Group (PSEG)
MSCC Working Groups
•Communications Working Group
•Science Alignment Working Group
•Offshore Renewables Research Steering Group
•Marine Industries Liaison Group
•Marine Research Vessels Group
•UK Integrated Marine Observing Network Group
•Sharing Equipment, Facilities and Staff Group
•International Representatives' Network
•International Group
JUNE 2012

1. Delivery of the UK Marine Science Strategy

1.1. Background to the UK Marine Science Strategy

The UK Marine Science Strategy is a framework for co-ordinating delivery of world class marine science for the UK, though identification of priorities and tackling barriers to delivery. It runs from 2010 – 2025 and is delivered by the MSCC, reporting to the Ministerial Marine Science Group. The Strategy was a recommendation of the House of Commons Science & Technology Select Committee's Report, '*Investigating the Oceans'(2007).*

1.2. Delivery of the high level science priorities:

The UK Marine Science Strategy identified three high-level science priorities:

- *Understanding how the ecosystem functions;*
- *Responding to climate change and its interaction with the marine environment;*
- *Sustaining and increasing ecosystem benefits*.

These have been taken forward through individual and joint research projects and monitoring funded by MSCC member organisations and through related initiatives, such as the Living with Environmental Change partnership's Flood and Coastal Erosion Risk Management Research Strategy[7] and the Scottish Marine Science Strategy 2010 - 2015[8]. Brief examples are given below. The MSCC recognises that the UK cannot service all its marine science evidence needs from within its own resources. It therefore also seeks to achieve maximum leverage from its external interfaces with the European Union and broader international fora.

The MSCC's science alignment working group will be producing a highlights report, collating details of the top 5 actions taken by each MSCC member in the three priority areas. The report will be prepared ahead of the March 2013 MSCC meeting.

a) Understanding how the ecosystem functions:

Knowledge of how the marine ecosystem works is essential for informing management decisions, such as marine planning and licensing. The MSCC and partner organisations have:

- through the UKMMAS framework, made extensive technical input to the development of robust targets and indicators for defining the good environmental status of UK Seas, as required under the Marine Strategy Framework Directive;
- established joint research programmes, to improve understanding of carbon and nutrient cycling in shelf seas and their overall role in global biogeochemical cycles, and will be investigating the impacts of marine food webs on ecosystem services;

[7] http://www.lwec.org.uk/activities/uk-first-flood-research-strategy
[8] http://www.scotland.gov.uk/Publications/2011/03/02092716/0

- increased understanding of deep sea ecosystems through NERC research cruises, such as to the East Scotia Ridge, beneath the Southern Ocean, where new species of crab, starfish, barnacles and anemone were discovered around hydrothermal vents[9] and through the joint work of Marine Scotland and JNCC in the Rockall Trough and Marine Scotland's monitoring in the Faroe-Shetland Channel;
- conducted a review of marine social and economic data and tools, jointly funded by the MMO and Marine Scotland and managed by MEDIN, which included the preparation of a metadata catalogue of social and economic data, to help facilitate decision making.
- made significant improvements to the physical and biogeochemical models used at the Met Office to predict physical parameters in UK waters on a daily basis[10];
- provided leadership in the UK and Europe on revisions of the Common Fisheries Policy (CFP), to move away from the current annual quota setting focus on fish stocks towards multi-annual management advice for fisheries, and an ecosystem approach to fisheries management. The UK has led on innovations such as catch quota trials and new designs of fishing gear, and leads the way in Europe on reducing fisheries discards, an important part of UK ambitions for a reformed CFP.
- developed new models for assessing human pressures so as to assess impact and thus influence spatial planning, with a specific focus on the renewable energy industry around Scotland.

b) *Responding to climate change and its interaction with the marine environment:*

Changes in the oceans, as a result of climate change, have important consequences on the marine ecosystem. The MSCC and partner organisations have, in this context:

- developed a major jointly-funded research programme on ocean acidification which will provide a greater understanding of the actual changes taking place, the implications of these changes and risks to ocean biogeochemistry, biodiversity and the whole Earth system;
- improved understanding of climate change impacts through the work of the Marine Climate Change Impacts Partnership (MCCIP), including on fisheries and foodwebs;
- enabled the introduction of seasonal assessments and predictions of Arctic sea-ice at the Met Office[11];
- generated the first UK marine and coastal climate change projection report, and improved forecasting of storm surges and extreme events;

[9] http://noc.ac.uk/news/%E2%80%98lost-world%E2%80%99-discovered-around-antarctic-vents-0
[10] http://www.metoffice.gov.uk/research/news/marine-predictions
[11] http://www.metoffice.gov.uk/research/news/sea-ice

- supported the international Argo programme. This has for the first time made sub-surface observations of the World's oceans available at a spatial and temporal resolution needed to estimate its evolving state and to validate predictive models on timescales that are useful operationally and climatologically.
- supported the Inter-governmental Panel on Climate Change - UK marine scientists are playing a lead role in drafting the text for the 5th assessment report.

c) Sustaining and increasing ecosystem benefits:

It is essential to understand the implications of different management options in marine planning. To this end, the MSCC and partner organisations have:

- developed standardised methods for the analysis and mapping of fishing effort data across national boundaries to provide advice on the interactions between fishing activity and proposed Marine Conservation Zones and European Marine Sites across Europe;
- developed reliable ecosystem models that allowed the UK to take the lead in OSPAR[12] and establish the relative impact of different nutrient sources in the North Sea. This work has supported policy decisions about the most appropriate measures to achieve the OSPAR aim of no 'problem area' status;
- improved confidence in sea bed mapping through more advanced techniques, and more coherent approaches and standards, including through UKMASS's Seabed Mapping Group, to support policies such as designation of marine conservation zones and marine planning;
- developed collaborative work on marine renewable energy research, including a four year research programme funded by NERC and Defra, MMO work on cumulative effects, and a portfolio of projects funded by Marine Scotland addressing interactions with Natura species. Programmes are co-ordinated through the Offshore Renewables Research Steering Group.

1.3. UKMMAS – UK Monitoring and Assessment Strategy

The successful delivery of the UK Marine Science Strategy and the wider work of the MSCC and partner organisations depends significantly on the work and membership of the UK Marine Monitoring and Assessment Strategy (UKMMAS)[13] groups. UKMMAS provides essential and continued co-ordination of marine monitoring and assessment between the Devolved Administrations, UK government departments and their agencies, with the overall aim of ensuring the cost-effective provision of information needed for policy, operational and

[12] The OSPAR Commission works to protect and conserve the North East Atlantic and its resources.
[13] http://www.defra.gov.uk/environment/marine/science/ukmmas/

management decisions to deliver the UK marine vision of clean, safe, healthy, productive and biologically diverse oceans and seas.

The work of UKMMAS is steered by the Marine Assessment and Reporting Group and technical co-ordination of monitoring and assessment work is carried out in four active thematic evidence groups: The Clean and Safe Seas Evidence Group, the Healthy and Biologically Diverse Seas Evidence Group, the Productive Seas Evidence Group and the Ocean Processes Evidence Group. The evidence groups draw together scientific and technical experts responsible for marine monitoring and observation programmes in government agencies in each of the four UK administrations as well as partners drawn from research and academic organisations and, where relevant from non-governmental bodies, both green and industry.

Immediately prior to being brought within the frame of MSCC, the UKMMAS groups delivered Charting Progress 2 (CP2). CP2 provides a comprehensive and authoritative assessment of the state of UK seas to inform policy decisions on their future management. CP2's findings have underpinned the marine aspects of the National Ecosystem Assessment and provided the basis for the initial assessment of UK Seas under the EU Marine Strategy Framework Directive. The CP2 evidence base has been drawn on to inform development of national marine planning, for example in the preparation of Scotland's Marine Atlas and the development of the OSPAR Quality Status Report 2010 at the scale of the North-East Atlantic. The technical capacities developed through the three year preparation of CP2 enable UK scientists to lead and influence international scientific collaboration in bodies such as the International Council for Exploration of the Sea and the implementation processes for European Directives.

Since 2010 UKMMAS groups have focused on addressing the recommendations from Charting Progress 2 so that future marine monitoring and assessments can deliver information relevant to policy goals and marine management, including marine conservation, planning and the regulation of activities. UKMMAS has made substantial technical input to the national implementation of the EU Marine Strategy Framework Directive.

A key achievement has been the considerable technical development work for UK Government Departments, to define targets for good environmental status in UK seas. In particular, the Healthy and Biologically Diverse Seas Evidence Group has led groundbreaking work to define targets for the environmental quality status of biodiversity and foodwebs, which has enabled the UK to lead the thinking in Europe on the implementation of the Directive. This is important as it ensures that the overall implementation of the Directive is in line with UK approaches and capacities. Alongside this the Productive Seas Evidence Group has supported the improved analysis of the social and economic value of the UK's marine sectors and their use of the marine environment. UKMMAS is now commencing work to co-ordinate the way that marine agencies adapt monitoring programmes to monitor progress towards these MSFD targets in a cost-efficient way.

The Marine Environmental Data and Information Network (MEDIN) provides important support for UK work of UKMMAS and there is a strong synergy between UKMMAS work on monitoring and the work on improving sharing and use of data by MEDIN. These and other UKMMAS activities have required a substantial commitment of staff time from the organisations involved. The priority with which UKMMAS work is treated reflects its key importance to Government, the wider UK marine science community and beyond.

1.4. Progress with addressing the three key barriers:

The Strategy identified three key barriers to delivery of UK marine science and actions for addressing them. These have been a focus of MSCC's activities to date.

1.4.1 Alignment of science effort:

Strategy actions: to develop a rolling programme of marine science alignment where greater collaboration and alignment between MSCC members' programmes will have the largest impact. The alignment process will identify gaps in scientific knowledge, areas of duplication and areas for further collaboration and alignment. The capacity and capability to deliver the science will also be assessed. The initial group of science issues will be identified during the first quarter of 2010.

Research and monitoring of the marine environment is generally expensive. The **Science Alignment Working Group**, chaired by Prof Ed Hill (NERC), is focussing on four issues – marine renewables, ecosystem models, joined-up technologies and access to industry data – where greater co-ordination could have a significant impact. It is also considering how MSCC members are delivering the three high-level science priorities noted above.

a) Marine renewables - Work to align publicly funded research programmes on the environmental impact of marine renewables is led by the MSCC's **Offshore Renewables Research Steering Group (ORRSG)**[14], which is co-chaired by the MMO and Marine Scotland, working with the MMO's joint industry-Government Offshore Renewable Energy Licensing Group. ORRSG has compiled a list of projects being funded by its members, enabling it to identify gaps and overlaps in current and planned research. ORRSG is also working jointly with NERC's Knowledge Exchange programme on marine renewables, and its work will be relevant to marine aspects of the Government's recent review of implementation of the EU Habitats and Birds Directives. Further details of ORRSG are provided on its webpage[15].

b) Ecosystem models – ecosystem management will require increasingly sophisticated decision tools for operational management and scenario planning. The working group is bringing together modelling experts in a workshop to identify a) the options for improving existing

[14] ORRSG has a membership spanning the Devolved Administrations, a range of Whitehall Departments, NERC bodies and The Crown Estate.
[15] http://www.defra.gov.uk/mscc/groups/offshore-renewables-research-steering-group/

models without additional research, b) which developments would be a priority if additional funding allowed, and c) how models can generate the information needed to inform economic/social models/assessments. The sub-group is hosting the workshop with the Marine Alliance for Science and Technology for Scotland (MASTS)[16], later in the year.

c) Alignment of Joined-up technologies – The deployment of buoys, autonomous floats (such as ARGO floats) and gliders, while often collaborative[17], is still expensive; it therefore makes sense to maximise the number of sensors that each of these platforms hosts. A sub-group will use a provider-led workshop to promote opportunities to deploy additional sensors on a range of platforms (buoys, autonomous floats, gliders, etc). This work is currently commencing.

d) Access to industry data

A large volume of relevant data is collected and owned by industry and others. The Marine Management Organisation (MMO) – with the support of the Working Group – is developing thinking on how to access these data. This activity will link with related work being taken forward by MEDIN. In addition, the MMO recently commissioned work to create a set of corporate GIS data layers to define the spatial location and associated attribution of legacy MMO licences providing a summary of the supporting data and documentation supplied by industry as a part of the licence application process.

1.4.2 Sustained long-term monitoring:

Strategy action: to make the process for selecting long-term monitoring and observation systems for funding more transparent and provide secure, longer-term and cross-cutting funding for priority datasets.

The MSCC has led work to identify a programme of key monitoring and observations needed to deliver the Marine Strategy Framework Directive, to help achieve the aspiration of '*clean, healthy, safe, productive, and biologically diverse oceans and seas',* and to inform strategic decision making on climate change and other issues. It has done so primarily through its member bodies and through UKMMAS and has built on knowledge gathered during the production of Charting Progress 2.

The Strategy action is aimed at improving the process for selecting individual monitoring projects and for providing longer-term funding for key projects. A working group of representatives from Government, industry and an NGO, was established, under the chairmanship of Prof Howard Roe. Its recommendations were agreed by MSCC, including:

- establishing longer-term funding for priority monitoring programmes – to reduce bureaucracy and provide greater security of funding for the researchers concerned; and

[16] http://www.masts.ac.uk/
[17] http://www.ncof.co.uk/ODAS-buoy-recovery.html

- the provision of an evaluation process to make funding decisions on cross-cutting, non-statutory monitoring programmes more transparent, through the use of a differentially-weighted scorecard and a Committee of Funders to help assess proposals and reach joint decisions.

The Group ceased operation on completion of the Strategy action.

Some key monitoring programmes have now received longer-term contracts, including the Continuous Plankton Recorder (funded by NERC and Defra). In addition the Government Chief Scientist, with Departmental CSAs, has been looking at funding mechanisms for nationally critical cross-cutting observation programmes, such as Argo, and seeking to agree principles for co-funding. The outputs from the Long-Term Monitoring Working Group - of the differentially weighted score card and Funders Committee approach - have been fed into the Forum's work. The MSCC is jointly providing the Secretariat to this Forum.

1.4.3 Communications:

1.4.3.1 UK Marine Science Communications Strategy

Strategy action: to develop a pro-active communications strategy for strengthened two-way engagement with the public on the importance of marine science and deliver an action plan for improving communication between scientists and policy makers.

The MSCC's Communications Working Group, under the chairmanship of Prof Dan Laffoley, published a low-cost Communications Strategy, '*Communicating UK Marine Science*'[18] in April 2011. The Group is highly dynamic and includes public and private sector communications experts, and a leading scientific journalist.

*The **UK Marine Science Communications Strategy's** aim is to raise awareness of the importance of the marine environment and the central role that marine science plays in our understanding of it. It will operate until 2020 and the target audiences include the public, policymakers, politicians, industry and other users of the marine environment, and the wider scientific community. The Strategy sets out a series of key messages about the marine environment, our impact on it and the importance of marine science. These messages will be communicated via the implementation of nine specific actions, delivered in a phased approach.*

A number of practical outputs have already been generated:

- an E-alert system for publicising UK marine science discoveries and research – this alert is now received by over 240 organisations and people including national journalists, Government policy advisors, Government agencies, NGOs, academics and members of the public;

[18] http://www.defra.gov.uk/mscc/files/mscc-comms-strat.pdf

- an online marine science events calendar for publicising events across UK bodies and avoiding wasteful date clashes;
- strong interest in the communications strategy – and its potential use as a communications strategy template - from Australia and from Europe;
- agreement, in principle, by the Defra Marine Science Minister to host *ad hoc* meetings on marine science with Parliamentarians, to help raise awareness. The Devolved administrations are considering their approaches;
- MSCC members have been working to strengthening science ↔ policy interactions. For example, NERC has updated guidance[19] to help scientists interact with policy makers and runs regular science into policy workshops[20] every six months.

and further actions are in train:

- Members of the group are identifying opportunities for internships, job shadowing and studentships, to increase exposure of scientists to policy makers and *vice versa*;
- Discussions are underway with a UK-based Aquarium on partnership working to promote marine science within the national curriculum;
- Training is ongoing in a range of MSCC bodies to help policy makers and scientists understand how best to engage with each other;
- Options are being considered for delivering a web portal, to help the public and others access information on marine science.
- The group is investigating the possibility of a unified UK Marine Science identity to help showcase the world-leading capabilities and growth potential of UK marine organisations, particularly at international events.

1.4.3.2 International Representatives' network

Strategy action: to establish a network of UK marine science representatives to identify common marine science issues and to exchange views on the latest scientific thinking.

The International Representatives' Network shares information on emerging scientific issues across a wide range of intergovernmental marine science fora. Issues discussed by the Network include ocean fertilisation and the restructuring of the Global Ocean Observing System Programme (GOOS) by the International GOOS Committee and Intergovernmental Oceanographic Commission (IOC).

1.5 Working with others

1.5.1 ***Effective access to data –***

[19] http://www.nerc.ac.uk/publications/corporate/policy.asp?cookieConsent=A
[20] http://www.nerc.ac.uk/site/guides/policymakers/workshop.asp?cookieConsent=A

Strategy action: The MSCC will work with UK stakeholders, in particular MEDIN, and, where appropriate, European and International bodies to address the data access issue. MEDIN should consider whether to develop an Information Strategy to help improve the discovery and accessibility of data, the harmonization and promotion of marine data policies and data management.

1.5.1.1 MEDIN

The MSCC has worked with a range of bodies in seeking to strengthen data access and re-use. The **Marine Environmental Data & Information Network (MEDIN)**, has been brought under the MSCC, as the primary route for Government to make available and source marine data. Optimising data sharing is essential to ensure the maximum return on resources invested in marine science and ensure that the most comprehensive evidence base is available to support policy, science and marine operations, and their regulation. MEDIN is the means for delivering the UK Marine Data and Information Strategy, on behalf of the MSCC. The key objectives of this strategy are:

- to deliver improved discovery and accessibility of marine data;
- to establish good data management practices across the UK marine sector; and
- to establish a common set of policies on marine data, to provide consistent and clear terms and conditions for data use.

MEDIN was identified by the Habitats and Birds Directives Implementation Review as a key mechanism for improving the use and development of the marine evidence base.

Significant progress has been made by MEDIN over the past two years in establishing and consolidating an operational framework for making available marine data from all marine organisations and ensuring these data are consistently managed through use of common standards. MEDIN now provides a single webportal through which data from all marine organisations, including the private sector can be accessed. Substantial progress is being made to extend the range of data that can be accessed through this portal. Through this work, MEDIN has:

- put in place an operational marine data framework which includes:
    - a network of specialised marine Data Archive Centres (DACs) to provide secure long term management of marine data, and easy access to quality assured, authoritative data;
    - a suite of standards for marine metadata and data, so that they can be easily discovered, accessed and re-used. MEDIN has worked directly with all Government bodies to ensure they are able to apply the appropriate data management standards;
    - a central marine data discovery webportal, now containing information on over 3500 marine data sets which is growing rapidly;

In addition the MEDIN framework has:

- supported Government initiatives on data and transparency, including data.gov.uk and marine implementation of the EU INSPIRE[21] Directive;
- played a key role in validating the data used in Charting Progress 2[22];
- provided the basis for authoritative and influential UK input to European and International data initiatives, helping to ensure cost-effective and best practice approaches are taken; and
- MEDIN is engaging with industry to encourage sharing of data collected by the commercial sector.

The MEDIN framework for data management and access is now fully operational, but to ensure that the MSCC data and information strategy is fully implemented it is essential to secure full engagement from all key members of the marine community, by the adoption of best principles for good data management as codified by MEDIN. These principles cover the use of standards, publication of metadata, making arrangements for data archival, and establishing clear terms for data access and re-use. There is also a need to continue to work with industry to gain better access to data collected by the commercial sector.

1.5.1.2 Other data access activities

Other activities by MSCC members to improve access to data include work by the Foreign and Commonwealth Office (FCO) to collate information from research cruises. The FCO, being the conduit for the securing of diplomatic approval required for foreign flagged vessels to conduct marine scientific cruises in UK waters, has introduced a new database. The database can easily identify and track the cruises by different types of marine research, and highlight where research cruise reports have never been forwarded, so retrospectively collect these data reports.

1.5.1.3 The Underwater Sound Forum

The **Underwater Sound Forum** has a membership of 80 key stakeholder organisations from Government, academia, NGOs, industry and other EU countries; the Forum has grown in membership since it became a sub-group of the MSCC in 2008. Its purpose is to enable Government and stakeholders to share knowledge about the effects of underwater noise on marine life. It has had a number of notable successes/outputs which include:

- input by Forum members to the development of the Marine Strategy Framework Directive (MSFD) indicator on noise, ensuring that it is based on sound evidence;

[21] http://data.gov.uk/location/inspire
[22] http://chartingprogress.defra.gov.uk/

- a yearly conference to share knowledge on underwater noise issues – the 2011 conference focussed on ambient noise in UK and European waters and was attended by over 80 delegates from seven countries, while the 2010 piling noise workshop, funded by The Crown Estate, was oversubscribed;
- The provision of a pool of expertise for providing timely and balanced input to regulatory consultations on underwater sound, for example on ASCOBANS [23]and OSPAR;
- Expert input to developing standards for underwater noise with the National Physics Laboratory, the British Standards Institute and ISO – helping to ensure they are meaningful.

1.5.2 *Future skills needs –*

The availability of skilled staff is of key importance for UK marine science. NERC led a Review of Skills Needs in the Environment Sector[24] on behalf of the Environment Research Funders' Forum (ERFF) in 2010. The review identified 224 skills needed by businesses, government and academics and 15 critical skills in short supply, including numeracy, computer modelling and field research. NERC and other bodies have used the review's findings to inform their actions. NERC is currently carrying out a further 'Skills Review 2012'[25], to update the work.

Section 1.6.2 of this report includes work to promote sharing of the skills and time of specialist staff between organisations, which should help to address immediate skills gaps in organisations and enable more to be achieved.

1.5.3 *Development of a Marine Industry Strategic Framework –*

The importance of UK marine industries was highlighted in the UK Marine Science Strategy, particularly noting their value to the UK economy, their employment of graduates and postgraduates in marine science and their research and monitoring programmes. The Department of Business, Innovation and Skills (BIS has since published, in liaison with the marine industries, a Strategy for Growth for the UK Marine Industries[26]. This is being delivered through the Government-industry Marine Industries Leadership Council (MILC).

The MSCC, working closely with BIS, has developed an industry group focussed on marine science – the Marine Industries Liaison Group (MILG) – drawn from a range of marine industry sectors. The Secretariats to MILG and MILC work closely to ensure that the groups are complementary. Further details of the MILG's work are in section 2.1.3 below.

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[23] Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas.
[24] http://www.nerc.ac.uk/funding/available/postgrad/skillsreview/
[25] http://www.nerc.ac.uk/funding/available/postgrad/skillsreview/review2012.asp
[26] http://www.bis.gov.uk/assets/biscore/business-sectors/docs/s/11-1310-strategy-for-growth-uk-marine-industries.pdf

1.6 Horizon Scanning and future actions:

1.6.1. ***Horizon scanning –***

Strategy action: options for commissioning 'horizon scanning' projects will be considered by the Marine Science Co-ordination Committee during 2010/11.

MSCC routinely includes some form of forward look activity during its meetings. The MSCC meeting in March 2011 included a workshop session on horizon scanning, during which there were initial discussions of potential options for taking forward horizon scanning exercises. The options ranged from the MSCC undertaking an independent, major forward look exercise in order to identify future marine science issues and needs, to the MSCC engaging with a number of existing and planned forward look exercises by partner bodies, including learned societies, to provide the framework of an horizon scanning programme, with any remaining gaps in coverage to be addressed by the MSCC.

The MSCC will now build on its initial discussions to identify a clearer view of the likely critical issues for the MSCC and UK marine science for the future. It will also take stock of wider initiatives, drawing on the work of the Centre for Environmental Risks and Futures, to avoid duplication and overlap and on the findings of the current UK National Ecosystem Assessment marine work package that is considering horizon scanning through the development of scenarios.

1.6.2 ***Further Strategy actions –***

Strategy action: Further actions will be developed during the life of the Strategy.

In March 2011, the Ministerial Marine Science Group agreed six new activities for the MSCC to deliver, following a Ministerial write-around. The actions were developed in the context of pressures on marine science budgets, and aim to strengthen the ways in which MSCC members work together, in order to achieve efficiency savings. The six activities, which are at different stages of delivery, are summarised below, with an indication of current progress.

Six new MSCC activities:

i. **Marine Research Vessels** – to assess options for increased co-ordination of the operation and maintenance of large Government research vessels. Some co-ordination already occurs, and this project is building on existing knowledge to identify actions needed to effect significant cost savings. *A draft assessment has been produced and is currently being developed further.*

ii. **Monitoring and Observation programmes** – to ensure that the non-statutory evidence programmes, covering physical, chemical and biological development of marine ecosystems, are fit-for purpose and co-ordinated. *A programme for integrating the UK's marine observatories – UK-IMON – has been established.*

iii. **Sharing and/or pooling of Government-funded equipment and facilities,** including high cost equipment such as Remotely Operated Vehicles and underwater gliders. This could

offer rapid savings. *A table detailing equipment and facilities available for sharing between MSCC members is provided on the MSCC website.*

iv. **Sharing staff, skills and technology development** between research organisations. This builds on *work by the Marine Alliance for Science & Technology for Scotland (MASTS) and Defra and is in progress.*

v. **Strengthened data co-ordination through the Marine Environmental Data & Information Network (MEDIN)** – to achieve better access to marine data through stronger engagement by Departments and the Devolved Administrations with MEDIN, the existing marine data management system. *This work is ongoing.*

vi. **Data mining of past research and monitoring** – to develop guidelines to ensure that, prior to commissioning new work, checks are undertaken to identify whether the data already exist from old research projects. *This work is being taken forward by MEDIN and will commence shortly.*

The MSCC has also recently established an **International Group**, which is complementary to the work of the International Representatives' Network, and will address international issues of relevance to the MSCC. This includes the UK's participation in international marine science activities, such as the Inter-Governmental Oceanographic Commission (IOC), and identifying opportunities for promoting UK marine science abroad. The Group has developed a Strategy for International Engagement which seeks to promote increased and more effective international engagement by MSCC organisations, in the first instance. It has identified a series of low cost activities that, if implemented, could raise the level of international engagement - and the benefits accruing from it - significantly.

2. Other activities undertaken by the MSCC

2.1 Links with the marine science community:

Strategy action: MSCC members to be nominated to act as 'links' to industry, the research and academic sector and Non-Governmental Organisations (NGOs), to develop networks with these communities and to grow an integrated relationship with them.

2.1.1 Research & Academic sector link (Prof Howard Roe, non-executive member)

Organisations have been kept informed about MSCC activities, and invited to provide feedback, via a regular email newsletter and through a series of talks and presentations.

2.1.2 NGO sector link (Prof Dan Laffoley, non-executive member)

NGOs have provided input to both the development and delivery of the UK Marine Science Strategy via workshops. A regular E-bulletin is now being sent to NGOs.

2.1.3 Industry sector link (Prof Laurence Mee, non-executive member)

The Marine Industries Liaison Group (MILG), including representatives from major industry sectors, provides advice to MSCC on marine industry issues. It has developed a joint industry-Government funded project, currently out-to-tender, to identify Government and industry marine science needs, industry's capabilities and opportunities for green growth. MILG members are also providing input to other Government/MSCC initiatives, such as the Communications Strategy's delivery. Links have been established between the MILG and BIS's Marine Industries Leadership Council.

2.2 Website development:

The MSCC's website is fully operational and its content is being expanded and updated on a regular basis. It is hosted by Defra on behalf of the MSCC organisations as a cost saving measure. It can be found at: http://www.defra.gov.uk/mscc/.

2.3 Join–up with other organisations:

The MSCC works closely with a range of other organisations and individuals, and experts from research, academic, industry and NGO sectors have also joined some delivery sub-groups. For example, MSCC members are involved with bodies such as the Marine Climate Change Impacts Partnership, the UK Earth Observation Framework (UK-EOF)[27], the LWEC partnership, and the Institute of Marine Engineering, Science & Technology (IMarEST) - they are currently developing a conference on Operational Oceanography with IMarEST and the Society for Underwater Technology (SUT) for January 2013.

In addition, the MSCC merged with Marine Assessment Policy Committee (MAPC) during the summer of 2010, to reduce bureaucracy and generate cost savings. Representation on the UKMMAS Marine Assessment and Reporting Group (MARG), which had reported directly to MAPC, has been strengthened and MARG now reports directly to the MSCC.

2.4 Delivery Plan

A Delivery Plan has been developed and will be placed on the MSCC website shortly.

2.5 Success indicators

Strategy action: more detailed success indicators will be developed during 2010

Success is being measured against the delivery of the individual actions identified in the UK Marine Science Strategy and any subsequent additional actions identified.

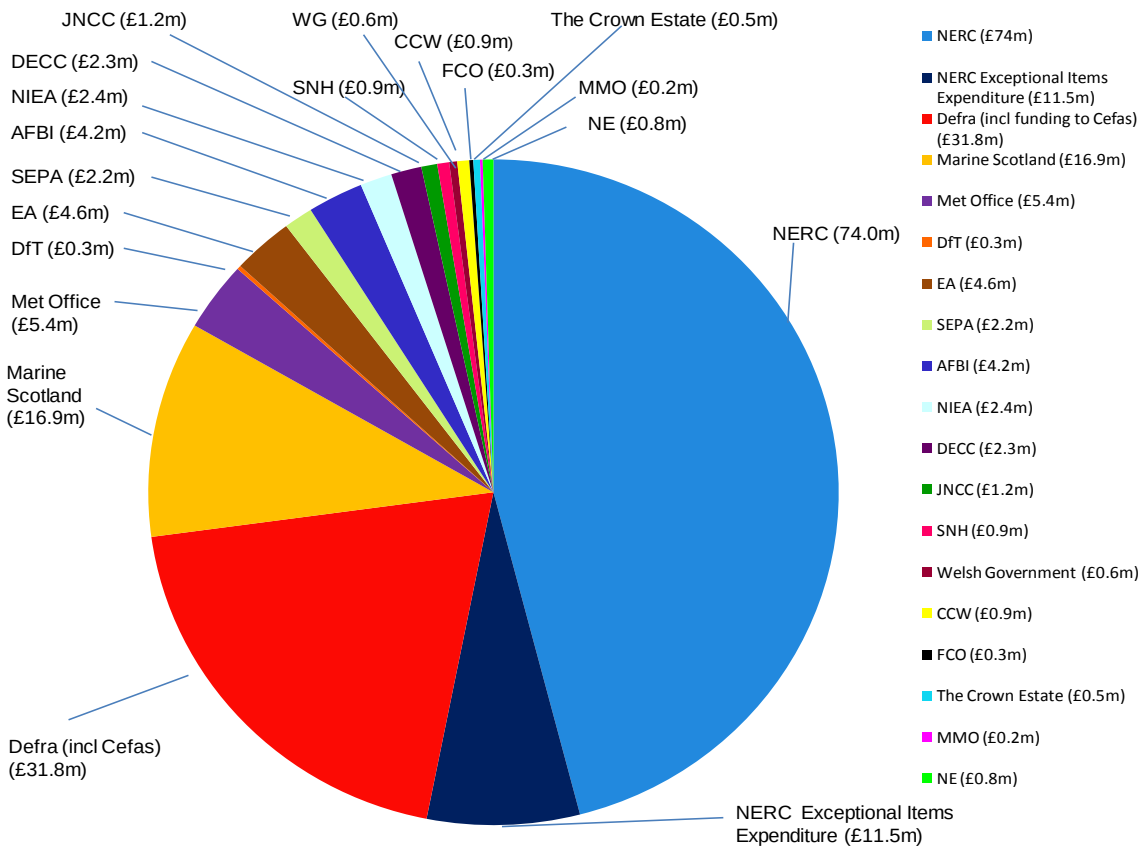
[27] http://www.ukeof.org.uk/

2.6 Public Sector Expenditure

Strategy action: Latest available details of public sector expenditure on marine science will be published with the update report.

Details of public sector spend on marine science in 2010/11 and 2011/12 are provided at Annexes I and II.

Annex I: Marine science funded by MSCC member organisations 2010/11 (£m)



Total spend: £160.9m

[Total spend excluding NERC 'Exceptional items expenditure': £149.4m]

Notes:

It is difficult to obtain accurate data from past years that are consistent across MSCC members because of different ways that organisations categorise their spending. The figures in the pie chart are the most accurate available but should be viewed with caution. In particular:

- **NERC** has reviewed and revised its 2008/09 expenditure data to incorporate some previous omissions. The revised NERC spend in 2008/09 was c. £67.1M. The increase in spend in 2010/11 is due to the addition of NERC's responsive mode expenditure and some exceptional costs, such as building and replacement research vessel costs.
- **Defra's** 2010/11 spend takes into account the re-imbursement received from the E.C. for DCF-related monitoring, and no longer includes the disbursement of the Aggregate Levy Sustainability Fund.
- Defra, Marine Scotland, EA, SEPA and AFBI figures include vessel operating costs.
- The **SEPA** marine science budget of £2.24m for 2010/11 should be compared with a figure of £2.25m for 2008/09 when calculated on the same basis.
- **MOD** funds occasional environmental research projects - none was carried out in 2010/11. The research previously included in the 2008/09 spend chart (£11.4m) is no longer classified as marine research.
- The corresponding spend by the **Met Office** on observations in 2008/09 was £2,300k. The 500k drop between 08/09 and 10/11 is a combination of improvement in efficiency of maintenance of MAWS buoys and a drop in spend on Argo.
- **DfT** funding is directed through the Maritime and Coastguard Agency but the maritime component of the

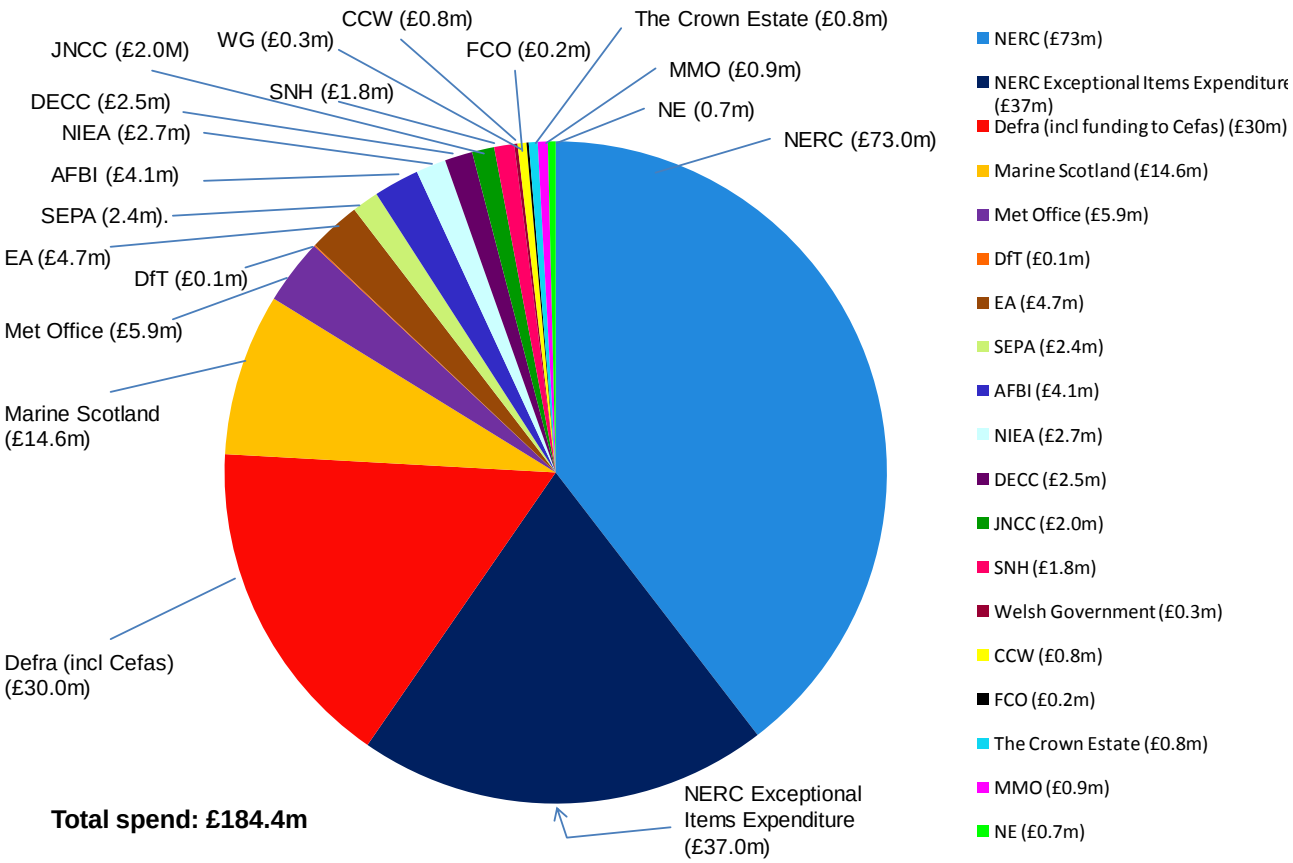
Public Weather Service is excluded from the figure shown. However, the **Met Office** figure does include spend within the Public Weather Service programme on marine R&D.

- The **MCA** has rationalised its spend on research by combining its efforts with **DfT** to provide a more focussed and targeted strategy. The reduction in DfT/MCA's Marine Evidence budget also reflects the changes to DfT/MCA's overall budget allocation over this period.
- The **EA** figure does not include any additional marine expenditure by regional offices for conducting investigations. The reduction in spend since 2008/09 is a result of lower investment in research projects in some areas of EA business, associated with a move to a new Evidence Directorate which has led to better use of available information. Investment in monitoring activities has slightly increased.
- **DECC** spend in 2010/11 included: co-funding (£1.4m) for observations (Argo, Advanced Along-Track Scanning Radiometer (AATSR) and Jason) and Ocean Acidification programmes; and funding (£0.9m) for other marine research including the costs and benefits of offshore wind, wave and tidal energy to the marine environment and research to inform broader environmental assessment of marine energy plans, programmes and projects.
- The **FCO** spend figure represents a best estimate as the FCO has no dedicated R&D fund and spend details are not recorded against R&D criteria.
- The **Scottish Government** figure excludes development and testing of wave and tidal energy technology (£13m spread over 2008/09, 2009/10, 2010/11).
- Fisheries Research Services ***(FRS)*** was merged with parts of Scottish Government and the Scottish Fisheries Protection Agency on 1st April 2009 to become Marine Scotland, a Directorate within the Scottish Government. As such the figures for 2008/09 and 2010/11 are not directly comparable.
- Marine Scotland has invested £15.2M in a new science building in Aberdeen in 2009/10 and 2010/11.
- The **Welsh Government** figures do not include wider EU regional development funding or EU fisheries funding. Details of the spend on research that the Welsh Government has commissioned are included. This research is focussed on Wales-specific requirements. The research budget is not devolved and is managed by Defra and DECC on an England and Wales basis.
- The **MMO** is working with others to build a robust marine evidence base to inform its decision making. Most of the evidence the MMO uses is gathered from a variety of existing sources, including commercial sources, research councils and academia. Critical gaps in this evidence are filled by the MMO's evidence programme to inform MMO functions, particularly marine planning and licensing.
- **JNCC** provides UK level coordination on MSCC for the country conservation agencies including **Natural England (NE)**. The majority of the NE marine science spend is on statutory monitoring of Natura 2000 sites in English waters. Where these cross the 12nm boundary, NE works in partnership with JNCC to collect sound evidence on the location and monitor the state of MPAs.

*To note: A number of **additional MSCC organisations** have been included in the 2010/11 pie-chart compared with those represented in the 2008/09 pie chart (in Annex II of the UK Marine Science Strategy). The additional organisations are: CCW, MMO, FCO, NE and The Crown Estate.*

Key: NERC: Natural Environment Research Council; BIS: Department for Business, Innovation and Skills; Defra: Department for Environment, Food and Rural Affairs; Cefas: Centre for Environment, Fisheries and Aquaculture Science; EA: Environment Agency; AFBI: Agri-Food and Biosciences Institute; NIEA: Northern Ireland Environment Agency; DECC: Department of Energy and Climate Change; SEPA: Scottish Environment Protection Agency; JNCC: Joint Nature Conservation Committee; NE: Natural England; SNH: Scottish Natural Heritage. CCW: Countryside Council for Wales; FCO: Foreign and Commonwealth Office; DfT: Department for Transport; MCA: Maritime and Coastguard Agency; UKHO: United Kingdom Hydrographic Office; MOD: Ministry of Defence.

Annex II: Marine science funded by MSCC member organisations 2011/12 (£m)



Total spend: £184.4m

(Total spend excluding NERC 'exceptional items expenditure': £147.4m)

Notes:

It is difficult to obtain accurate data from past years that are consistent across MSCC members because of different ways that organisations categorise their spending. The figures in the pie chart are the most accurate available but should be viewed with caution. In particular:

- **NERC** has reviewed and revised its 2008/09 expenditure data to incorporate some previous omissions. The revised NERC spend in 2008/09 was c. £67.1M. The increase in spend in 2011/12 is due to the addition of NERC's responsive mode expenditure and some exceptional costs, such as building and replacement research vessel costs.
- **Defra's** 2011/12 spend takes into account the re-imbursement received from the E.C. for DCF related monitoring.
- The reduction in Defra's Marine Evidence budget reflects the changes to Defra's overall budget allocation over this period. In addition to Defra funding, Cefas also receives funding from the Food Standards Agency.
- Defra, Marine Scotland, EA, SEPA and AFBI figures include vessel operating costs.
- **MOD** funds occasional environmental research projects - none was carried out in 2011/12. The research previously included in the 2008/09 spend chart (£11.4m) is no longer classified as marine research.
- **DfT** funding is directed through the Maritime and Coastguard Agency but the maritime component of the Public Weather Service is excluded from the figure shown. However, the **Met Office** figure

does include spend within the Public Weather Service programme on marine R&D.

- The **MCA** has rationalised its spend on research by combining its efforts with **DfT** to provide a more focussed and targeted strategy. The reduction in DfT/MCA's Marine Evidence budget also reflects the changes to DfT/MCA's overall budget allocation over this period.
- The **EA** figure does not include any additional marine expenditure by regional offices for conducting investigations. The reduction in spend since 2008/09 is a result of lower investment in research projects in some areas of EA business, associated with a move to a new Evidence Directorate which has led to better use of available information. Investment in monitoring activities has slightly increased. For 2011/12 there is a slight increase in research spend compared with 2010/11.
- Examples of marine research being developed include: ocean acidification and satellite and in situ observations of ocean temperatures, salinity and sea levels; the costs and benefits of offshore wind, wave and tidal energy to the marine environment; and research to inform broader environmental assessment of marine energy plans, programmes and projects.
- The reduction in spend for **Scottish Government (Marine Scotland)** is due to restructuring and a reduction in staff numbers.
- The **FCO** spend figure represents a best estimate as the FCO has no dedicated R&D fund and spend details are not recorded against R&D criteria. This figure does not include small amounts of indirect support for marine science.
- The **Welsh Government** figures do not include wider EU regional development funding or EU fisheries funding. Details of the spend on research that the Welsh Government has commissioned are included. This research is focussed on Wales-specific requirements. The research budget is not devolved and is managed by Defra and DECC on an England and Wales basis.
- The **MMO** is working with others to build a robust marine evidence base to inform its decision making. Most of the evidence the MMO uses is gathered from a variety of existing sources, including commercial sources, research councils and academia. Critical gaps in this evidence are filled by the MMO's evidence programme to inform MMO functions, particularly marine planning and licensing.
- **JNCC** provides UK level coordination on MSCC for the country conservation agencies including **Natural England (NE)**. The majority of the NE marine science spend is on statutory monitoring of Natura 2000 sites in English waters. Where these cross the 12nm boundary, NE works in partnership with JNCC to collect sound evidence on the location and monitor the state of MPAs.

To note: A number of additional MSCC organisations have been included in the 2011/12 pie-chart compared with those represented in the 2008/09 pie chart (in Annex II of the UK Marine Science Strategy). The additional organisations are: CCW, MMO, FCO, NE and The Crown Estate.

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Annex C: The Marine Management Organisation

- The Marine Management Organisation (MMO) is a non-departmental public body established and given powers under the Marine and Coastal Access Act 2009, The MMO is remitted to make a significant contribution to sustainable development in the marine area and to promote the UK government's vision for clean, healthy, safe, productive and biologically diverse oceans and seas.
- The MMO incorporated the work of the Marine and Fisheries Agency (MFA) and acquired several new roles, principally marine-related powers and specific functions associated with the Department of Energy and Climate Change (DECC) and the Department for Transport (DFT).
- The MMO is sponsored by the Department for Environment, Food and Rural Affairs (DEFRA), the Ministry of Defence (MOD), the Department for Communities and Local Government (DCLG), DECC and DFT.
- The MMO has a wide range of responsibilities, including:
    - Implementing a new marine planning system designed to integrate the social requirements, economic potential and environmental imperatives of our seas;
    - Implementing a new marine licensing regime that is easier for everyone to use with clearer, simpler and quicker licensing decisions;
    - Managing UK fishing fleet capacity and UK fisheries quotas;
    - Working with Natural England, Joint Nature Conservation Committee (JNCC) and other managing authorities to manage a network of marine protected areas (Marine Conservation Zones and European Marine Sites) designed to preserve vulnerable habitats and species in UK waters;
    - Responding to marine emergencies alongside other agencies;
    - Delivering fair and impartial decisions based on the best available evidence and robust, transparent processes.