MARINE SCIENCE CO-ORDINATION COMMITTEE

STRATEGIC IMPLEMENTATION PLAN 2015-2025

Contents

INTRODUCTION

The Marine Science Co-ordination Committee (MSCC) is a steering committee aimed at identifying opportunities for the alignment and development of marine science in the UK for the purposes of informing policy and forwarding implementation of the UK Marine Science Strategy (Strategy). Its terms of reference and membership can be found at https://www.gov.uk/government/groups/marine-science-co-ordination-committee#members.
This implementation plan outlines key strategic actions developed from a systematic horizon scanning exercise undertaken by the Committee and its subgroups and through discussions by the Executive Committee. The actions have been identified for the short-, medium- and long-term in each of the four strategic areas considered by the MSCC. This approach has enabled the Committee to identify key areas for it to focus on in the next phase of its work.

This strategic implementation plan outlines the key topics for policy decision-making and implementation of the Strategy identified in the areas of science alignment, monitoring and data assessment, economic growth and communication. Actions have been developed for implementation over the short-, medium- and long-term and these will be reviewed annually by the MSCC.

PART 1: IMPLEMENTING THE STRATEGY

1.1 STRATEGY FOR UK MARINE SCIENCE

The Strategy was published by the MSCC in 2010 and provides a framework for the identification of high level priority areas and removal of cross-cutting barriers, thereby enabling the delivery of world class marine science for the UK that is shaped, supported and co-ordinated.[1] The Strategy assists in the production of scientific evidence required to achieve the UK Government's vision of having 'clean, healthy, safe, productive and biologically diverse oceans and seas'.[2] Furthermore, it supports the Marine Strategy Framework Directive (2008/56/EC) (MSFD) which provides a legislative framework to sustainably manage human activities in the marine environment and promotes an ecosystem approach to reach Good Environmental Status (GES) by 2020.[3]

The Strategy sets out three key scientific priorities which are important to policy decision-making: understanding how the marine ecosystem functions; responding to climate change and its interaction with the marine environment and, finally, sustaining and increasing ecosystem benefits. Each of these wide-ranging areas requires an input from natural, social and economic science to generate a sound evidence base necessary for effective policy decisions.

1.2 MARINE SCIENCE CO-ORDINATION COMMITTEE ACHIEVEMENTS

The MSCC itself, or its member organisations, have established or been involved in initiatives which have added benefit to a number of cross-cutting areas:

- overseen the production of a new UK-wide marine monitoring programme which will support the UK's targets and indicators for the MSFD, and other policy objectives. The UK's MSFD targets and indicators were themselves coordinated through the MSCC structure;

- improved access to marine data through the Marine Environmental and Data Information Network (MEDIN);

- strengthened delivery partnerships, for example in the establishment of a single UK ocean observing and monitoring network, UK-Integrated Marine Observing Network (UK-IMON), and in use of research vessels;

[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/183310/mscc-strategy.pdf

[2] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69322/pb3654-marine-policy-statement-110316.pdf

[3] http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32008L0056

- initiated a funded Government-industry needs and capability study which identified the potential for strengthened collaboration between private and public sector marine science to secure economic opportunities;

- established the Marine Ripple Effect, an email and Twitter-based news alert system to encourage the communication across the marine science community, and the UK Marine Science Events Calendar, a free online and Twitter-based events calendar for the publication of marine science events.

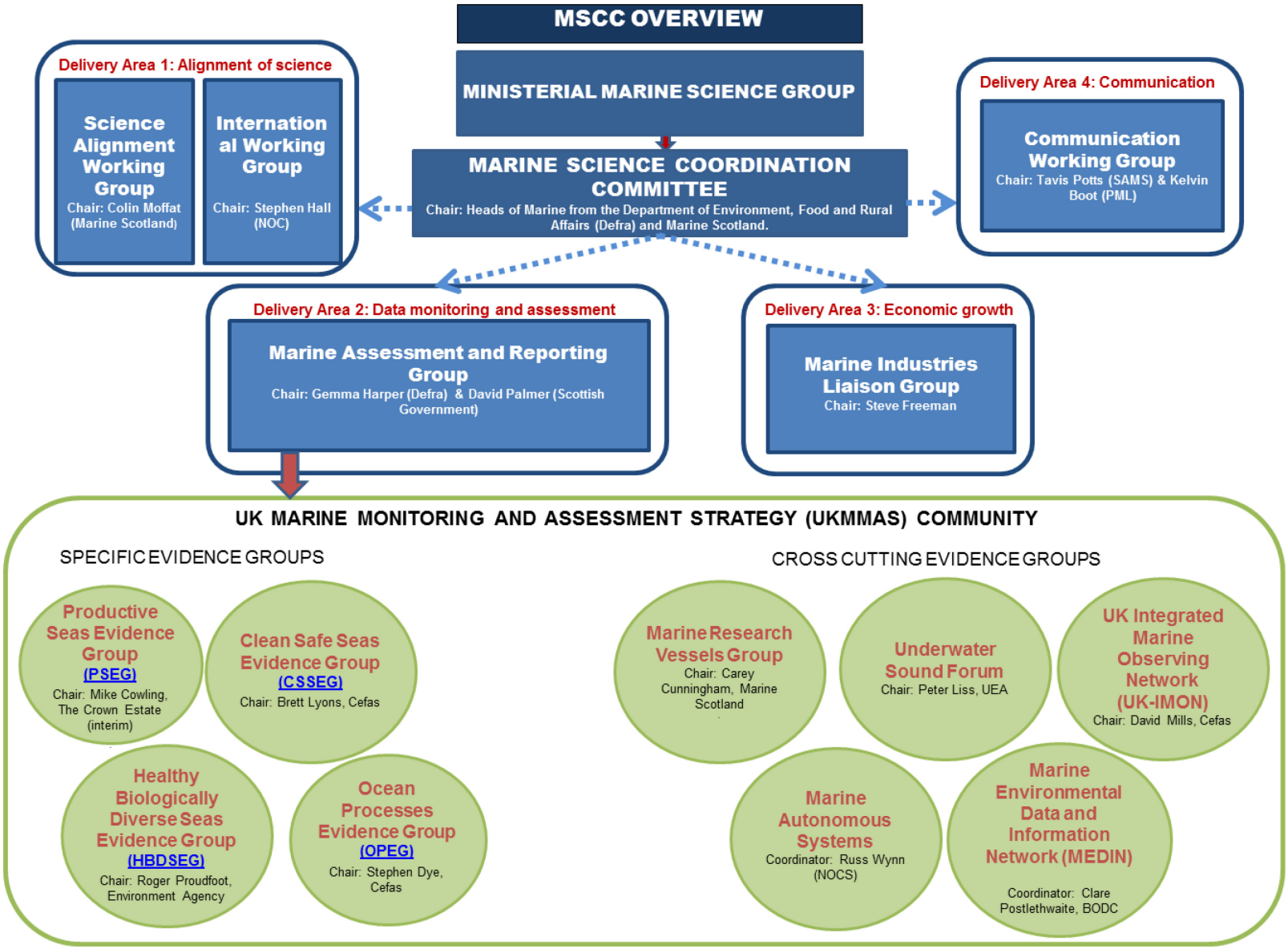
1.3 IMPLEMENTATION OF THE STRATEGY

The MSCC has identified four cross-cutting strategic areas where collaboration and co-ordination between the main funders, providers and users of marine science can be improved and strengthened to produce evidence adequate for UK policy and marine management needs: the alignment of scientific effort; monitoring and the assessment of data, industry growth and communications. A working group for each of these strategic areas has undertaken a systematic horizon scan to identify current priorities, new and emerging issues, and agree actions required to be undertaken by the UK marine science community to ensure opportunities are seized (Figure 1).

A collaborative approach by stakeholders across these delivery areas forms the basis of the implementation of the Strategy. The implementation plan itself provides a range of current and future activities identified through systematic horizon scanning where the MSCC considers added value can be achieved through improved collaboration and co-ordination within UK marine science. These activities are presented as action plans for each of the four strategic areas.

The action programme will be reviewed annually by the committee to monitor the progress of activities and the value added by the MSCC through improved communication and co-ordination of UK marine science. Subsequent annual horizon scanning exercises will continue the identification of new and emerging topics for inclusion in the strategic action programme and development by the MSCC.

Figure 1 MSCC Strategic Areas and Working Groups



PART 2: STRATEGIC AREAS

2.1 SCIENCE ALIGNMENT

Marine science has an increasingly wide scope and policy makers and marine managers rely on high quality scientific information to support evidence-based decision making. The Science Alignment Working Group takes an overview of alignment of scientific effort across MSCC members in areas of high impact, and assessing the related capacity and capability to deliver robust and impartial scientific evidence suitable for policy purposes. As part of process, scientific alignment would identify current and future gaps in scientific knowledge and policy development, duplication of effort and areas for potential collaboration.

The Science Alignment Working Group has considered whether the UK Marine Science Strategy's three key scientific priorities are being fully addressed and identified where UK scientific capability is being advanced or is insufficient to meet the UK policy needs (Table 1). A number of areas were identified for further MSCC work. The nature and timing of such work will now be defined further by the working group.

Table 1. Science Alignment Action Plan

The following table captures progress made under the three science priorities of the UK Marine Science Strategy and allows the MSCC Science Alignment Working Group to obtain an overview of the progress of activities and identify next steps.

1. Understanding how the marine ecosystem functions				
Key: UK scientific capability 1: Acceptable; UK scientific capability 2: Issues to be resolved but processes in place; UK scientific capability 3: Significant concern that the UK is lagging behind				
Policy question	**Activities completed**	**Forthcoming opportunities**	**MSCC summary assessment'**	**Assessment of UK scientific capability**
1. What are the impacts of increased human activity on seabed habitats, especially vulnerable deep sea ecosystems ?	Over the past decade many studies have investigated inshore and shelf seas impacts of specific gears on specific habitats. Meta-analyses have provided broader principles for use in conservation management and forecasting. Much less work has been conducted beyond 200 m depth, though engagement with the industry, and high seas bodies such as the North East Atlantic Fisheries Commission (NEAFC) and the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), has led to designation of important and vulnerable high seas habitats. Sea floor mapping through consortia such as MAREMAP, EMODNET's EU Seamap, and funded by EU LIFE+, has allowed UK to build high	Applied management tools linking pressures of human activities to expected impact on seafloor habitats are supporting implementation of management of Habitats Directive species and habitats. R&D funding from EU, Scottish Government and Natural Environment Research Council (NERC) will lead to more detailed understanding of seafloor processes in the deep sea, shelf edge and on shelf seas, and implications of human activities. Post-authorisation monitoring of licenced human activities will continue to add evidence, and the role of offshore industries in data provision will also grow. Liaison with stakeholders and relevant industry groups (possibly through PSEG) should provide further evidence.	Sufficient evidence is available to support existing management, and new demands from UK marine plans will drive future needs. Successful programmes of measures, both on shelf seas and in vulnerable deep seas ecosystems, are planned, progressing at an acceptable rate, or are already in place.	2

	quality mapping capability.			
2. Are different human uses of the marine environment sustainable?	2011 National Ecosystem Assessment; MSFD Initial Assessment; Charting Progress 2 Scotland's Marine Atlas England East Marine Plans Marine Management Organisation (MMO) Marine Planning Portal Northern Ireland State of the Seas Report	UK NEA follow-on work packages – the NEA is now 4 years old and there is a need to access recent assessments or to update existing assessments Scotland's National Marine Plan – Regional Planning Authorities National Marine Plan interactive (Scotland) England South Marine Plans and rest of plan areas to 2021 Improved understanding of cumulative human impacts (OSPAR ICG-C)	Further consideration needed by MSCC to look at identification and coordination of long term strategies.	2
3. Are we supporting development of Good Environmental Status (GES) indicators?	UK obligations to the EU under the MSFD have been completed to time, with the necessary stakeholder engagement and consultation. Commitment to MSFD indicators and monitoring programmes have been made through UKMMAS evidence groups. Coordination of national observing systems to deliver supporting evidence by UK-IMON is in hand, with data quality assured via the adoption of the MEDIN principles, a recognised UK standard.	UK coordination of evidence needs will be needed for the OSPAR Intermediate Assessment (2017) and resulting national status assessment. Programmes of UK measures to achieve good environmental status (GES) will be implemented in 2016. A JNCC-led national biodiversity monitoring programme will provide valuable supporting evidence and options to develop evidence collection further.	The EU considers the UK contribution to the MSFD Initial Assessment to be one of the strongest of all Member States.	1
4. What is the role of biodiversity in maintaining ecosystem functions?	Development of various biodiversity indicators and metrics for MSFD Good Environmental Status e.g. Large Fish Index (LFI) MCZ programme & Natura 2000	NERC ecosystems collaboration; MERP (marine ecosystem and research project) Joint Nature conservation Committee (JNCC)Department for Energy and	Further consideration needed by MSCC in respect of providing guidance to establish how information from individual [biodiversity] indicators translate into an overall assessment of state of UK seas.	2

	National and EU research Regular surveys of species and habitats e.g. seals, birds, commercial fish species etc. However, regular may refer to intervals of one to ten years with resources becoming increasingly limited.	Climate Change (DECC)-led UK biodiversity monitoring programme Scottish Biodiversity Strategy – Indicators Programme Indicators for Descriptors 1, 2, 3, 4 and 6 of the MSFD	Furthermore, MSCC require to consider the limited amount of data on habitats and the associated research requirements associated with biodiversity.	

2. Responding to climate change and its interaction with the marine environment				
Key: UK scientific capability 1: Acceptable; UK scientific capability 2: Issues to be resolved but processes in place; UK scientific capability 3: Significant concern that the UK is lagging behind				
Policy question	**Activities completed**	**Forthcoming opportunities**	**MSCC summary assessment'**	**Assessment of UK scientific capability**
5. How will changes to oceanographic conditions caused by climate change affect marine ecosystems and society?	Good progress has been made in identifying changes in marine climate with some progress on the impacts of these on ecosystems and a bit less on societal impacts. Much of this has been reported in the 2013 Marine Climate Change Impacts Partnership (MCCIP) Report Card and its 33 supporting documents. The Intergovernmental Panel on Climate Change (IPCC) AR5 (WG1&2) reports published in 2013 & 2014. WG1 summarises the current understanding of the physical changes that have happened and are anticipated. The	National Adaptation Programme Climate Ready (EA) UK Met Office Climate Service In 2015 MCCIP will publish a 'special topic' report focussing on *Climate Change, Good Environmental Status, and marine protection areas* with a particular focus on UK seas. Seafish is currently working with MCCIP to submit their ARP report in 2015, with a view to following this up with an MCCIP climate smart working report card to make this work more accessible to the wider industry.	The Science Alignment Working Group (SAWG) considers that the question is very broad and so seeks endorsement from MSCC for SAWG to consider what specific areas may be most useful for further work. The societal implications, adaptation and response of coastal communities is perhaps covered by the effect on society, but clarification is sought.	2

	impacts are reviewed in WG2 with relevant chapters (5) Coastal systems and low-lying areas, (6) Ocean systems, (23) Europe, (30) The Ocean. New marine climate change projections (physical variables) for NW European shelf have been produced. With ensemble runs that start to quantify uncertainty ranges. [Led by Met Office- ME5213 Minerva].	NW European Shelf projections will be extended to include biogeochemistry and simple low trophic level ecosystem response (Met Office, National Oceanographic Centre (NOC), Plymouth marine Laboratory (PML), Centre for Environment. Fisheries and Aquaculture Science (Cefas). NERC RECICLE project funded, subject to various other funding decisions pending)		
6. How much will sea level rise around the UK in the next few decades and what will be its effect?	UKCP09 marine projections focus largely on late 21st century rather than the next few decades. Sea-level rise and coastal flooding have received considerable attention and research focus with several significant assessments and policy documents published in the last 5 years. These include Met Office 'Climate: Observations, projections and impacts' (2011); UK Climate Change Risk Assessment (CCRA) (2012); National Adaptation Plan (NAP) (2013); ASC reports (2013,2014); TE2100. More work needed on regional to local differences in Relative Sea-Level Rise and its impacts. Contribution of Greenland and western Antarctic ice-sheet melting to UK sea level remains a key uncertainty.	CCRA 2 (2017) Focus on next few decades (requires attention to natural climate variability as well as forced climate change). Assess implications of new CMIP5 climate models for regional sea level.	No additional work for MSCC	1
7. How will	MF1113 - PLACID research project	No additional work for MSCC		

ocean acidification affect plankton productivity and other marine organisms?	(monitoring, modelling, laboratory studies and economics) International OA coordination centre established (in Monaco) Ecosystem monitoring site off Stonehaven, Scotland Scottish Government five year research programme on OA International council for the Exploration of the Sea (ICES)/OSPAR Study Group on Ocean Acidification (SGOA) – report due in the summer of 2015.			
8. What climate adaptation measures should be adopted?	Whilst many of the government activities required to address specific climate change threats (CCRA 2012) have been identified through the National Adaptation Programme, little applied science has been directed towards assisting adoption of practical adaptation solutions. Defra project Economics of Climate Resilience (ECR) reports addressed a subset of the threats identified in the CCRA (2012). They set out the case for further adaptation given anticipated climate change. They found many examples of action already taking place and identified underlying capability and capacity under which effective actions are more likely. There are 2 reports specifically on marine topics (namely sea fisheries	National Adaptation Programme MCCIP adaptation reports MCCIP extending adaptation work initially with fisheries and fish processing sector through Seafish on their ARP. A climate-smart report card will be produced following publication of the ARP. Marine plans in the UK use MCCIP work to inform policies MSFD uses MCCIP work to inform the baseline assessment of GES	No additional work for MSCC	2

	and coastal flooding) with some coastal issues covered in their other reports. Various policy documents on adaptation have appeared in the last 5 years including: IPCC Working Group 2 report (impacts, adaptation, vulnerability) MCCIP adaptation card on Climate Change and the UK Marine Leisure Industry in February 2014. Programmes exist within the EA (Climate Ready) & UK Met Office (Climate Service).			
9. Should we use the oceans to mitigate climate change and sequester carbon?	UK successfully led an amendment to the London Protocol for the regulation of ocean fertilisation. Following publication of the Royal Society Report 'Geoengineering the climate', several initiatives have been instigated but the opportunities and implications remain speculative. Progress has been documented through IPCC assessments identifying feedbacks from changes in the ocean carbon sink under climate change. Assessments to date have concluded that ocean fertilisation/liming is unlikely to be effective in enhancing the ocean carbon sink in the long term. Beyond deliberate geoengineering	A number of projects in progress to better quantify and understand variability of ocean carbon sink. In view of current knowledge suggest this is the most important focus for work in this area.	No additional work for MSCC	2

	the natural sources and sinks for carbon are being investigated through various research projects including the NERC/Defra Blue Carbon work package (part of wider sea shelf biogeochemistry programme).			
10. Are we undertaking longer-range climate projection, risk analysis and advice, to support practical decision making for all sectors?	Recent improvements have been made in the availability of climate change projections on temporal and spatial scales that are useful for policy and adaptation, but still lag behind those available for terrestrial environments. UKCP09 projections are widely available, with user guidance. New marine climate change projections (physical variables) for NW European shelf have been produced. With ensemble runs that start to quantify uncertainty ranges. [Led by Met Office- ME5213 Minerva] Met Office reports 'Our changing climate: Trends, extremes, attribution and projections' (2012) Defra/Cefas/MetO project ForeDec will explore causes of variability and scope for predictability better than the plausible futures given in projections.	Defra funded project looking at 5-10 year impacts Maybe scope for more direct interaction of experts in projections with decision makers. EU project has just started called High-End cLimate Impacts and eXtremes (HELIX) focussing on the implications of warming by 2, 4 and 6°C. Could yield useful 'high end' scenario information for BECC. DECC have started to work on high H++ type scenarios for non-sea level rise variables 'RISES-AM' project is an EU FP7 sister to HELIX, looking at high-end scenarios for coasts. Has been running for the past year, includes relevant case studies and methodologies. A new NERC standard grant has been awarded involving NOC, PML, Met Office, MCCIP & Cefas Resolving Climate Impacts on shelf and Coastal sea Ecosystems that will develop new high resolution climate change models in UK shelf waters.	No additional work for MSCC	2
11. What are the implications of natural	There remain significant challenges in our ability to attribute causes of changes that we see in marine	Defra R&D; NERC Programme Defra/Cefas/MetO project ForeDec will	Further consideration needed by MSCC. Specifically, long term time series are essential for this aspect of	2

climate variability and how can we distinguish it from anthropogenic causes?	environments and ecosystems. Attribution studies to understand whether observed climate change is a result of anthropogenic greenhouse gas emissions or natural variability are available in IPCC WG1 reports. Also see Met Office report 'Our changing climate: Trends, extremes, attribution and projections' (2012). Few of these types of attribution studies have been done in marine environments particularly at regional and shelf sea scales. Secondly attribution of changes in the ecosystem to climate change or other human pressures (e.g. fishing, eutrophication, contaminants, aggregate extraction etc.) have made some progress but significant unknowns remain. For example fishing versus climate impacts have been widely studied including in Defra Ecosystem Connections and Defra FizzyFish projects. EU Vectors programme coordinated by PML has improved our understanding of how environmental and man-made factors are impacting marine ecosystems now and how they will do so in the future. NERC MERP will include modelling responses of marine ecosystems	explore causes of variability and scope for predictability. Some work also at PML under EU funding. Discussions planned on coordinating these efforts.	marine science, and MSCC should be ensuring that the need and nature of the long-term time series are clearly established to provide a basis for such monitoring Furthermore, the pivotal aspect is distinguishing natural and anthropogenically forced changes and this should be a focus of one of the UKMMAS Groups, most likely UK-IMON.	

	and food webs to explore the implications of change in multiple pressures.			

3. Sustaining and increasing ecosystem benefits				
Key: UK scientific capability 1: Acceptable; UK scientific capability 2: Issues to be resolved but processes in place; UK scientific capability 3: Significant concern that the UK is lagging behind				
Policy question	**Activities completed**	**Forthcoming opportunities**	**MSCC summary assessment**	**Assessment of UK scientific capability**
12. In which locations will marine protected areas (MPAs) best protect biodiversity and enhance surrounding fisheries?	Marine conservation zone (MCZ) programme; Scotland MPAs OSPAR Hatton & Rockall Banks MPA Designation of new European Marine Sites Various studies on Fisheries Displacement/core environmental conditions around MCZs and MPAs. However, few have established appropriate monitoring programmes to answer this question. The few small scales studies in temperate waters i.e. Lundy have been inconclusive. Agri-Food Biosciences Institute, Northern Ireland (AFBI)/Seafish review of fisheries displacement	MCZ tranche 2 and 3 The establishment of MCZs and MPAs does present an opportunity to establish the appropriate monitoring/ research to inform an ex poste evaluation of whether the designation process was correct. Last year, due to the Defra Fisheries in MPAs project, 17 byelaws were put in place to prevent bottom-towed fishing over sensitive reef and seagrass features. There is an opportunity to select areas to study – though evidently baselines would need to be considered. Marine Scotland studies in the deep water to the west of Scotland. Ongoing AFBI studies with DOE of proposed MZCs in inshore waters around Northern Ireland, which links	SAWG feel that the question is very broad. SAWG requests that MSCC endorse SAWG considering what specific areas may be the most useful in respect of further work. This includes the need to understand the difference that MPAs are making.	1

	effects around proposed mud MCZs in Irish Sea. It is assumed that this policy question is focused on the designation process of the MPA network. If this is the case, then it is green as the designation process for MPAs, MCZs and EMSs is well understood and either complete or in train. There is a separate issue around the effectiveness of management measures within MPAs which is addressed through other policy questions around the impacts of human activity and the success of both baseline and operational monitoring	closely to an ongoing Department of Agriculture and Rural Development (DARD), Northern Ireland funded Evidence and Innovation project to define and catalogue "essential fish habitat" in Northern Ireland waters.		
13. How should the choice be made between MPAs and other conservation measures?	Common Fisheries Policy Reform Marine and Coastal Access Act Spatially defined feature protection lends itself to an MPA – such as an MCZ, which will in turn ensure (through statute) that there are mechanisms to protect from the full range of anthropogenic activities.	Multiannual fisheries plans Programme of measures – summary of what is being done Assessments will be done on environmental status and from this should be able to say what has changed. This should be linked to natural variation and also allow an assessment of the pressures and the measures.	No additional work for MSCC	2
14. What are the environmental effects of renewable energy technologies?	Department for Business Innovation and Skills Technology Strategy Board (BIS TSB); Department for Communities and Local Government (DCLG) Planning Practice Guidance	WATSIP programme (wave & tidal) Consistent use of appropriate license conditions to specify appropriate pre and post monitoring.	MSCC to ensure that the plethora of work streams are appropriately coordinated and that a coherent, holistic picture is prepared.	2

	MMO review of post-consent offshore wind farm monitoring data Offshore Renewables Joint Industry Programme (ORJIP) Most studies have been undertaken on a site by site basis and focus wind. Tidal and wind less developed. Direct impacts better understood. Issues such as EMF are still raised and further research required. Noise may an issue. MMO1031 – review of environmental data associated with post consent monitoring of licensing conditions for OWF. This study looked at evidence from 18 UK projects and other notable European projects. The aim was to see whether monitoring conditions associated with licensing this development are fit for purpose, and what we have learnt regarding environmental effects. The receptors reviewed includes benthos, physical effects, noise, seals, fish, and birds. All stages of OWF development were reviewed.			
15. How do we assess cumulative effects of multiple human activities, and link to	Some progress made with Cumulative health risk assessments (HRAs). NB DEFRA Marine Evidence Group- cumulative refers to multiple impacts from the same activity. Where Different activities are concerned use “in Combination	[Defra to work with regulators on alignment] HRA Process and development MMO work to date will help in formulating more specific plan policies relating to cumulative effects and will inform marine planning during various	Further consideration needed by MSCC especially in respect of linking outputs from OSPAR, MILG and PSEG.	2

	managemen t action?	Effects" Initially MMO research considered the impact of marine activities within the East marine plans. The main issues identified based on the needs of marine planning were a lack of baseline information and a need to ascertain the impact of all the round three wind farms on the East marine plan area - MMO1009 Cumulative effects (CE) of wind farms. A second cumulative effects project (MMO1055) was developed based on needs identified by marine planning staff as well as wider requirements of other MMO functions. For marine planning, the work sought to explore environmental, social and economic aspects of cumulative effects. Given the findings of the initial evidence project, this work was progressed at a high level to help identify particular issues for more detailed consideration. MMO1055 – A strategic framework for scoping cumulative effects. AFBI routinely conducts cumulative HRAs and in combination HRAs.	phases of the process (identifying issues, gathering evidence, options development, implementation monitoring and review, and the sustainability appraisal). The work provides a useful starting point in scoping of environmental issues to allow high level identification of specific potential effects for more detailed investigation. In addition, the work on responsibilities for mitigation can support marine licensing and may also inform marine planning in terms of framing questions to facilitate identification of and solutions for where cumulative effects and mitigation issues may preclude activities from certain areas. However, further work is required before the assessment framework can be applied fully at a practical level (in particular for scoping in of social and economic issues). Any such work will be taken forward with relevant partner organisations and through such forums as are appropriate (e.g. PSEG, ORJIP).		
16.	With what precision can we predict the ecological /	With regards to the economic impact, government policy should be evaluated as part of the policy cycle. Any such work is normally taken forward through the Policy	Defra SEG Policy Evaluation Fund To be confirmed once question is clarified	SAWG seek the endorsement of MSCC to consider a review by SAWG of what areas merit further work.	2

	economic impact of different policy options and resulting management action?	Evaluation Fund by Defra. That being said, there are areas of delivery where standalone impact assessments are carried out before measures are implemented. These include: - MSFD - Nature conservation byelaws - MCZ / MPA designation - Marine Plans in England			
17.	Can we use ecosystem models for operational forecasting?	OSPAR trans-boundary nutrient transfer; EA WaveNet forecasting network; Ecosystem models have been applied for the carrying capacity of Sea Loughs/Lochs at a bay scale for managing shellfish aquaculture and the interaction with wild species MMO1048 – implementing an ecosystem approach in marine planning with East plans case study (to be published autumn 2014) AFBI has developed carrying capacity models (SMILE) for sustainable management of the five sea loughs in Northern Ireland. These are in operational use, for example in informing HRAs on aquaculture licensing applications.	MSCC Ecosystem Modelling workshop Action Plan NERC ecosystems research programme Evidence to support detailed implementation of an ecosystem services approach is lacking and MMO will be working in collaboration with others to improve that.	Already being addressed by MSCC	2
18.	How do we engage with local communities	This question has two components to it: 1) How do we engage with communities?	There is ongoing work from the MMO on the social impacts of the south marine plans and the marine plan areas to be planned up to 2021.	SAWG seek the endorsement of MSCC to consider a review by SAWG of what areas merit further work.	2

on the implications of the different managemen t options in marine planning?	2) With what information do we engage communities? On the first question there are very good examples of community engagement from the MMO's work on the east and south marine plans, both of which have had statements of public participation attached to them and have undergone significant levels of engagement. On the second question, the MMO has undertaken much work looking at the social impacts of the marine plans as they are developing. These include - MMO1001– maximising coastal socio-economic benefits through marine planning, MMO1012– data and tools for socio-economic work in marine planning and management, MMO1013 MMO1043 MMO1064– recreation activity and modelling with stakeholders, MMO1035 MMO1060- social impacts and interactions of marine sectors, MMO1061– monitoring social outcomes of marine plans, MMO1037- Seascape character and visual amenity of the South plan areas, MMO1038– tourism data for the South plan areas and links to sustainable development and ecosystem approach MMO1039 MMO1051– future predictions for marine policy statement sectors, MMO1042 MMO1066– shipping data for	Further work could be done to coordinate this work into a coherent programme to support marine planning in the UK (including Scotland , Wales and NI) up to 2021		

	decision making and options, MMO1073			
19. What are the key ecosystem services provided by the marine environment and what are the limits on sustainable use?	Defra-funded work on value of benthic environments EU Knowseas project MMO1048 – implementing an ecosystem approach in marine planning project is referred to key ecosystem services considering recent work (e.g. NEA). The report highlights that 'empirical data is urgently needed to quantify the underlying functional relationships, including when thresholds are likely to be approached and quantification of the consequences of crossing thresholds.'	NERC MERP Research questions such as 'limits on sustainable use' present major challenges in terms of defining limits and trade-offs.	Further consideration needed by MSCC	3

2.2 DATA, MONITORING AND ASSESSMENT

The Marine Assessment and Reporting Group (MARG) provides overall direction to UK monitoring programmes; in particular, it oversees implementation of the UK Marine Monitoring and Assessment Strategy (UKMMAS). It defines monitoring programmes required to meet national, European and international obligations and commitments for assessing the state of, and managing, the marine environment. Further, MARG commissions, manages and approves periodic assessments of the marine environment, as required for national, European and international purposes. In previous years, MARG has overseen production of Charting Progress 2, a comprehensive assessment of the state of UK seas, and development of the UK's targets, indicators and monitoring programme under the EU marine strategy framework directive.

The group also ensures monitoring methods and quality assurance procedures are fit for the purpose of providing comparable monitoring data across the UK. It also oversees and coordinates the activities of four UKMMAS evidence groups (Clean and Safe Seas Evidence Group, Healthy and Biologically Diverse Seas Evidence Group, Productive Seas Evidence Group, and Ocean Processes Evidence Group).

MARG is co-chaired by Defra and Marine Scotland. Representatives on MARG include policy leads from England and the Devolved Administrations, Government Agencies, Marine Institutes, and is supported by the Marine Environmental Data and Information Network (MEDIN), UK Integrated Marine Observing Network, the Research Vessels Working Group. MEDIN provides secure long-term management of marine data sets through a network of specialist Data Archive Centres, and guidance, contractual clauses and software tools to support best practice data management. UK-IMON is developing the national marine observatory, and the Research Vessels Working Group facilitates the efficient use of UK public sector research vessels.

The current work plans of the UKMMAS evidence groups and MEDIN were developed by MARG, the MEDIN Executive Team and through horizon scanning exercises and are presented in a single action plan (Table 2). The main activities are the development of monitoring programmes under MSFD and associated data management plans, and the establishment of a co-ordinated approach for the storage and retrieval of UK marine data.

Table 2. Data, Monitoring and Assessment Action Plan

The following table indicates the activities being undertaken or planned through the Marine Science Co-ordination Committee to deliver the three key scientific priorities of the UK Marine Science Strategy, or fulfil the objectives of the UKMMAS Strategy.

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
Clean and Safe Seas Evidence Group (CSSEG)	1. Technical development of monitoring programmes for targets and indicators for Good Environmental Status (GES) descriptors 5 (eutrophication), 8 & 9 (contaminants), 10 (litter) and 11 (noise).	Development of monitoring programmes and data management plans for each GES descriptor at different stages; reviewed on a meeting by meeting basis to ensure they meet the target dates set out in the MSFD. Much of the monitoring for MSFD is based on common indicators agreed within OSPAR; monitoring programmes exist for most of the indicators but need to be adjusted to new MSFD requirements.	Ongoing	Work has already taken place with the FSA to develop a monitoring programme to address GES 9. Focus has now shifted to litter and noise programmes to deliver MSFD requirements liaising with other evidence groups to provide an integrated approach through the Monitoring Adaption Group. In addition CSSEG will be looking to align eutrophication monitoring across different drivers. Focus in 2016 will be to gather QA'ed data for indicators and where appropriate assess as national leads.	December 2016
	2. Assessment and reporting requirements for both OSPAR and national indicator reports	OSPAR Intermediate Assessment process well underway and CSSEG members involved as indicator leads in some instances. National assessment requirements now defined in document 'Guidance for completing The UK Indicator Assessment Sheet and Two-page Summary required for the MSFD Article 8 Assessment in 2018'	New		December 2016
	3. Developing integrated monitoring programme for chemicals and their	CSSEG continues to work towards defining monitoring requirements for MSFD. Meeting between EA/NRW/Cefas is scheduled for early 2016 to specifically tackle this	New		April 2016 (review)

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	effects across WFD, MSFD & OSPAR policy drivers	issue. Similar meetings are being held in Scotland and Northern Ireland.			
	4. Maintenance of UK QA/QC programmes to support major marine biological effects data.	UK QA/QC programmes in place for a number of bio effects techniques. Risk of losing key staff and skills.	Ongoing	BECME as a sub-group of CSSEG will continue to support Defra and DAs with the ongoing maintenance of existing QA/QC schemes and the development of new schemes as required.	Ongoing
	5. Update and maintain *Green Book* as a monitoring manual for hazardous substances, biological effects and eutrophication	All Competent Monitoring Authorities undertaking monitoring for the Clean Seas Environmental Monitoring Programme use the programmes' monitoring manual, the *Green Book*. The sampling requirements for each determinant / matrix combination are outlined along with sampling frequencies and procedure guidelines for sample collection and analysis.	Ongoing	Recent updates from Marine Scotland incorporated; comprehensive review will be required in 2016. Annual update to take into account MSFD and OSPAR requirements.	May 2016 (annual review)
	6. Marine Monitoring data provision and sharing	Development of facilities for management and access to CSEMP data. Submit updates to UKDMOS as requested.	Ongoing	Now an annual standing agenda item to review and co-ordinate UKDMOS updates via CSSEG. Link to MEDIN on data provision and sharing, and maintain operability of MERMAN. Provision of initial assessment for WISE, and the provision of MERMAN data to EMECO, ICES, EMODnet.	Ongoing
Ocean Processes Evidence Group (OPEG)	7. Input to EC reporting sheet regarding UK Programme of Measures.	Requested by Defra.	Ongoing	Assessment sheet template drafted and timeline for submission detailed. Confirmed OPEG assessment sheets required for water column waves, water column turbidity, water column salinity, water column acidification, water column temperature and hydrographic characteristics (currents and mixing).	February 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	8. Assessment and reporting requirements for national indicator reports (MSFD). Overview of input to OSPAR Physiographic Conditions Chapter (2).	OPEG parameter leads are undergoing work to update information and relevant D7 characteristics for the MSFD updated initial assessment. Progress update will be provided at the next OPEG meeting in spring. UK is the lead on Chapter 2 of the OSPAR IA (2017)	Ongoing	The new OPEG ToRs have been signed off and clarify OPEG's focus on the updated MSFD Article 8-9-10 assessment. The group made progress on planning "OPEG variables" for the MSFD assessment. Each variable was scoped in terms of feasibility and data availability and a lead OPEG member for each variable has been identified. Also, OPEG's draft 2016/17 work plan includes an item to draft a paper describing prevailing conditions and identifying gaps/needs to provide evidence on ocean processes as required for the upcoming assessments. OSPAR IA Ch2 – Marine Scotland & Cefas began work on this in December 2015.	December 2016
	9. Update sustained observation programme document.	6-monthly update summaries of 54 sustained observation programmes in parallel with MEDIN, Met Office, NOC – ongoing.	Ongoing	Next OPEG meeting date set for April 12th in Edinburgh. Agenda to include completion of status report on the sustained observation programmes.	May 2016
Healthy & Biologically Diverse Seas Evidence Group (HBDSEG)	8. Provide support to delivery of marine biodiversity assessments	HBDSEG will support Defra and the Devolved Administrations to provide necessary technical input and capacity to carry out the assessments needed for various drivers with a current focus on OSPAR and MSFD.	New		December 2016
	9. Undertake programme of R&D for biodiversity indicators for the MSFD.	HBSDEG continues to oversee the development of biodiversity indicators and their progress to operational status, although the issue of lack of funding persists, particularly for benthic habitats, deep- and coastal fish.	Ongoing	HBDSEG prioritised a number of pieces of MSFD related R&D for 2015/16, amounting to over £500k worth of work, but the MSFD Funders Group was unable to identify the necessary funding, apart from a £20k contribution from Defra to fund two workshops taking forward the work developed on habitat area indicator development. Other avenues for funding are being explored. A number of reports	March 2017

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
				have recently been signed off and are due to be published in the coming weeks: • ME5218 – Validating an Activity-Pressures Matrix • ME5318 – MSFD Habitat Area Indicator Development • ME5311 – Cephalopod Indicators for the MSFD	
	10. Develop monitoring and assessment programmes for biodiversity indicators	HBDSEG continues to support DEFRA and the DAs in refining proposals for MSFD monitoring including raising awareness and supporting MARG members with implementation.	Ongoing	HBDSEG, with support from JNCC, and sub-group leads, are drafting monitoring options papers. Options have been developed for seabirds, cetaceans and deep sea benthic habitats as part of the UK Marine Biodiversity Monitoring Programme. Other benthic habitats are in progress and pelagic, fish and seals are under discussion. The biodiversity monitoring strategy, to cover biodiversity monitoring requirements for all legislative/policy drivers (e.g. MSFD, Habitats/Birds Directives, Marine Acts, site management advice needs), both within and outside MPAs, is in the final stages of technical sign off.	May 2016
	11. Contribute technical input to the consultation on the regulatory standards for the biological elements of the Water Framework Directive and begin to integrate WFD and MSFD	The second rounds of River Basin Management Plans (RBMPs) will be published in early 2016.	Ongoing	Scotland, Wales and England gave an overview of the WFD outcomes for estuarine and coastal waters at the October HBDSEG meeting and are putting together a lessons learned document that will help to support MSFD implementation. A third round of inter-calibration of the biological tools used by different member states in the North East Atlantic is still underway and was expected to be complete by June 2015. Further funding from Member States will be needed to complete the work.	April 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	12. Technical input to the development of monitoring programmes for Marine Conservation Zones and Marine Protected Areas.	HBDSEG continue to support JNCC in refining and developing proposals for MPAs including setting consistent standards through the NMBAQC scheme.	Ongoing	In parallel with preparation of monitoring options for cetaceans, seabirds and habitats (see item 9 above), JNCC, SNCB's and HBDSEG partners have been continuing to collect new data through survey (principally on seabed habitats), focussing on R&D and monitoring needs for MPAs. This work will also contribute data to improve assessments against objectives for the wider environment under MSFD, WFD, Habitats Directive and Marine Acts.	March 2017
	13. Quality assurance and protocol development support to major marine biological programmes (National Marine Biology Analytical Quality Control Committee (NMBAQC)	NMBAQC as a sub-group of HBDSEG will continue to support DEFRA and DAs with the ongoing maintenance of existing assurance schemes and the development of new schemes as required. The committee will also facilitate the development of consistent field and laboratory methods and produce nationally consistent guidance.	Ongoing	The issues surrounding the financing of the NMBAQC scheme have been negated after the scheme returned a significant profit with a forecast to continue to do so in 16/17. The turnaround is a measure of the success of the scheme (and its committee) in attracting participants and of the increasing importance of quality assurance in biodiversity monitoring programmes. The scheme has now changed its name to the North East Atlantic Marine Biology AQC Scheme with a view to attracting wider European participation.	Ongoing
	14. Facilitate exchange of information on the Marine Environmental Change Network (MECN)	A report of the workshop "MECN 2014: long-term benthic monitoring and the MSFD" is available and highlights a lack of funding to continue the series.	Ongoing	Funding for the MECN continues to be a concern for HBDSEG. HBDSEG are working with the UKMMAS secretariat to promote the importance of the MECN monitoring programme within NERC and to influence its ongoing support.	Ongoing
	15. Facilitate exchange of information on the MCCIP and ensure findings provide underlying knowledge to underpin HBDSEG advice on marine	HBDSEG is required to be aware of links between information gathered for assessments of marine climate impacts and monitoring work coordinated through HBDSEG on which much of the MCCIP information is drawn.	Ongoing	The Partnership has published work on impact of climate change on marine biodiversity legislation. Main focus is MPAs (MCZs, SSIs, Scottish MPAs) but there is also an MSFD focus. The Partnership is also working on a 10 year retrospective analysis of trends and forward look with a view to reporting in early 2016. The report card for 2015 was also published in September.	Ongoing

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	biodiversity assessment & monitoring.				
	16. Work with MEDIN, the Data Archive Centres (DACs) and UK Directory of the Marine Observing Systems (UKDMOS) to ensure data infrastructure meets policy requirements.	HBDSEG continues to utilise the MEDIN and UKDMOS infrastructure, including the MEDIN network of Data Archive Centres to ensure the availability of data and metadata.	Ongoing	MEDIN is continuing to offer support to UKMMAS with a focus on modifying UKDMOS as necessary to support MSFD and entering/updating new data and information, archiving data in Data Archive Centres and making data available through INSPIRE compliant platforms. The questionnaire reported previously has led to some improvements to UKDMOS which are currently being tested with UKDMOS contacts.	Ongoing
Productive Seas Evidence Group (PSEG)	17. Improve the consistency and co-ordination of data on human activities	PSEG will consider the requirement for greater consistency and co-ordination of data collection for human activities; and identify, recommend and implement improvements as appropriate, as part of their 2016/17 work plan. Specific areas of attention might include inshore fisheries and tourism and recreation.	Ongoing		Mid-2016
	18. Facilitate wider access to industry data	PSEG "Review of Access to Industry Marine Environmental Data" was published in December 2015. The recommendations are currently being reviewed.	Ongoing	Following the publication of the PSEG "Review of Access to Industry Marine Environmental Data", MEDIN held an open meeting aimed at the commercial sector to demonstrate how MEDIN data centres can work flexibility to accommodate issues such as commercial confidentiality. Marine industries are generally positive about sharing data.	Ongoing
	19. Improve consistency and co-ordination of socio-economic assessment guidance	Publication of *'Social and Economic Assessment Requirements for Development Projects Affecting the Marine Environment'* and subsequent *'Social and Economic*	Ongoing	Marine Scotland has commissioned a project to develop guidance for developers to use when compiling the socio-economic elements of EIAs. The work is due to finish end-2015. Although commissioned to specifically inform Scottish	Ongoing

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
		Assessment Sub-group - PSEG Response and Recommendation Plan'		licensing guidance, the underlying concepts and techniques should be applicable across the UK.	
	20. Improve consistency and co-ordination of socio-economic evidence options	Various groups / networks exist within the UK with specific remits – e.g. Marine Economics Evidence Network	Ongoing	Possible development of a database of relevant research / evidence. Ongoing communication with other relevant groups re. environmental economics, ecosystem services etc.	Ongoing
	21. Contribute technical input on targets and indicators for all GES descriptors, including in particular required work on Articles 13 and 14	PSEG will support the process for MSFD and the MSP Directive as required, including contributions to an updated Initial Assessment (2018). Consideration/advice will also be given on Articles 13 (programme of measures – sustainable development aspects) and 14 (disproportionate costs).	New		2017
Marine Environmental Data and Information Network (MEDIN)	22. Promote best practice in UK marine data management through adoption of MEDIN framework across the UK. a) Establish co-ordinated approach for archiving/ retrieving data. b) Increase the number of organisations including the 'data management	MEDIN currently provides: a network of specialist, accredited data archive centres; standards for archiving data; a 'data management clause' to help organisations contracting the collection of marine data to specify best practice for data management; promotes the re-use of data.	Ongoing	a) The MEDIN DAC working group have agreed a coordinated approach for archiving data. This will be signed off at the next DAC meeting (Q1 2016/17) and then implemented by the DACs b) The 'data management clause' has been updated. c) MEDIN members continue to attend conferences/meetings to articulate the benefits of re-using data. d) New resources demonstrating the value of using the MEDIN framework are available	a) March 2016 b) March 2019 c) Ongoing d) Ongoing

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	clause'. c) Better articulate the benefits of re-using data. d) Demonstrate the value of using the MEDIN framework.				
	23. Support the UK in meeting marine data policy obligations. a) Work closely with MARG Evidence Groups and manage data for MSFD reporting. b) All relevant MEDIN DACs to have INSPIRE compliant facilities. c) Ensure MEDIN framework is prepared for any new marine policy initiatives. d) Annual update of UKDMOS content.	MEDIN data archive centres (DAC's) are developing INSPIRE view and download facilities; MEDIN provides a database of UK marine monitoring programmes to help MSFD reporting (UK Directory of Marine Observing Systems).	Ongoing	a) MEDIN involved with data task group to capture any risks associated with availability of data required for MSFD reporting b) UKHO is INSPIRE compliant; BGS, Met Office and FishDAC (Scotland) have some INSPIRE compliant services; these are planned or under development at BODC, Cefas and DASSH. c) MEDIN continues to liaise with DEFRA and Devolved Administrations d) Request for update expected to occur in Q1 2016/17	a) 2018 b) 2017 c) Ongoing d) Ongoing
	24. Provide a single place to search for UK marine data. a) Expand	The MEDIN portal provides comprehensive coverage of marine data, reference data, view and download services and other data	Ongoing	a) MEDIN is approaching 10,000 records in the portal and is looking for ways to celebrate this significant milestone. b) The MEDIN Gazetteer is currently being	a) Ongoing b) Ongoing c) March 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	coverage of marine data in MEDIN portal b) Maintain and grow the catalogue of key reference datasets. c) Non-commercial data products to be discoverable in portal.	products in line with user requirements.		updated. This provides a definitive list of sea areas, bays etc. around the UK coast, combining information from several sources. c) The existing MEDIN tools are being assessed to see what is necessary to allow this to happen.	

2.3 ECONOMIC GROWTH

The Marine Industries Liaison Group (MILG) has been set up to support the MSCC in the delivery of the Marine Science Strategy. It provides advice and guidance to the MSCC on matters relating to the marine and marine science industries, in order to help shape and increase the effectiveness of UK marine science. MILG is mainly concerned with cross-cutting strategic issues.

In 2012 MILG commissioned a report titled '*A review of private and public sector marine science and evidence needs, the capability of the UK's private sector marine science and technology sector to meet or support meeting of these needs, and opportunities for growth'.* The report (capability statement) was designed to address a specific aim of the Marine Science Strategy – 'develop measures for promoting the growth of marine industries' - and to identify synergies between public and private sectors in a way that helps to develop the UK's competitive science base by:

- Identifying key public and private sector marine science needs and priorities over the short, medium and long term.
- Assessing the capability of the UK's private sector marine science and survey sector to meet these needs and priorities, identify gaps in capabilities and barriers and opportunities for growth.
- Identifying where synergies between the public and private sectors would enhance the UK's competitive science base.
- Exploring (a) whether the needs should be met by the private sector, the public sector or both and (b) barriers to growth.

The capability statement provided MILG with an outline action plan broadly divided into Strategic Actions to support efficient delivery of marine science and removing barriers to growth which MILG have been progressing over since 2013.

MILG has also conducted two horizon scanning exercises looking at how far private and public sector marine science was coordinated on topics of particular relevance to economic sectors. Five areas were initially identified and four of these (assessment of cumulative impacts of development; sea bed mapping; carbon capture and storage; deep sea mining) were further considered by MILG. It was agreed that cumulative impacts appears to be an area where MILG can add particular value in the future. A further three areas (ballast water management, biofouling and underwater unexploded ordnances) were identified in 2016. These are becoming relevant in the context of imminent ratification of the Ballast Water Management convention, possible opening of new shipping routes through the Arctic and increasing development in the marine environment respectively.

The outcomes from MILG's Strategic Actions and horizon scanning exercises, together with other areas of MILG work, have been developed into an action plan (Table 3).

Table 3. Economic Growth Action Plan

The following table indicates the activities being undertaken or planned through the Marine Science Co-ordination Committee to deliver the three key scientific priorities of the UK Marine Science Strategy.

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
Access to industry data	1. Building on previous work to date and ensuring there is no duplication, MILG will provide a forum for industry to engage and comment on UK Govt. initiatives to promote access to industry data.	Access to industry data is facilitated by resources such as MEDIN and The Crown Estate initiatives. The MSCC via PSEG commissioned the review of data collection in the UK with plans to initiate a scoping project to investigate issues such as: • Any additional / new infrastructure needed to archive / access industry data • Assess volume of existing and, going forwards, new data • Understand better the feasibility / viability of any next steps proposed The overall objective of the scoping project is to ensure that data collected by industry for consenting, monitoring or other purposes that has a re-use value is	Ongoing	1. Following the publication of the Access to Industry Data Report, which the MILG provided input to at various stages of its production, the MILG will assist in consolidating the existing data sharing initiatives and overcoming the key obstacles identified: (i) raising awareness of what data is currently available and (ii) making it easier for industry to deposit data and metadata in appropriate public repositories. An event was held by MEDIN to promote the awareness of the MEDIN archive and gather views on facilitation of industry data access and sharing.	October 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
		stored in a secure, long term archive and is made as widely available as possible, as quickly as possible. MILG members participated in project steering group.			
Reducing monitoring costs	2. MILG will act as a forum for established, new and emerging industry sectors to share best practices, efficiencies and lessons learned.	There are many areas that may be of interest to MILG: • Continued work by UKMMAS, including implementation of the new UK marine monitoring strategy, produced under MSFD, which of course focuses on key areas for monitoring; • UK-IMON and work on autonomous systems, both of which were discussed at the last MSCC meeting;	Ongoing .	2. The MILG will proceed with the production of a paper to showcase the good examples of industry and institutional collaboration in reducing monitoring costs.	Ongoing

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	3. MILG to review UKMMAS revised strategy to look for opportunities where it can contribute to delivery of the strategy, including any update to MEDIN Marine Data Strategy / MEDIN MSCC Action Plan. MILG expect further update Summer 2015.	• Reviews of post-consent monitoring (note OWF report produced by MMO and Defra April 2014); • Work of the MSCC research vessel working group which has engaged with the private sector.	Ongoing	3. MILG contributed to the UKMMAS Strategy refresh in Summer 2015 and will review any future amendments to the Strategy.	Autumn 2016
	4. MILG will work closely with the MSCC Marine Research Vessels Group (MRVG) to help foster greater collaboration between the public and private sectors. MILG to look into potential of closer links with Engineering & Physical Science Research Council and the Catapult		Ongoing	4. The previous Chair of MILG provided expert advice to the MRVG. The MILG will seek to increase engagement with Catapult Programme and Research Councils	Autumn 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	Programme.				
Horizon scanning	5. MILG, in association with the Marine Industries Leadership Council (MILC), will undertake a horizon scanning programme to match science needs with UK economic growth and commercial opportunities (such as marine biomass, sustainable deep sea resource exploitation) and, as part of this, consider future scientific and technical needs, arising from new marine developments and industries.	MILG have undertaken the horizon scanning exercise and are currently looking at the following areas: • Cumulative Impacts • Deep sea mining • Carbon capture and storage • Sea bed mapping • Decommissioning For each area we are looking at: • what are the key issues for which evidence is needed • current activity on evidence need in UK (and internationally if appropriate) • challenges/issues and whether these are being addressed • MILG role going forward	Ongoing	5. MILG have considered additional items to their Horizon Scanning exercise to encompass: • Ballast Water Management • Biofouling • Underwater Unexploded Ordnances	Spring 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	6. MILG to review work of the Science Alignment Working Group for any future MILG horizon scan topics as required.		Ongoing	6. MILG reviewed the Science Alignment Questions and will continue to monitor any changes to inform its Horizon Scans	Winter/ Spring 2017
Cumulative impacts (CI)	7. MILG to understand ongoing and previous work, bringing outputs together to understand where MILG can derive benefit / provide input. MILG will act as a forum to assist in the external review of CEAWG products and possibly provide input into the WG's initial scoping as required.	Building on previous work to date plus ongoing work by MMO (NIRAS) and Defra (Cefas). New Government / Regulator Cumulative Effects Assessment Working Group (CEAWG) tasked with improving efficiency and effectiveness of CI assessment.	Ongoing	7. MILG has viewed the ToR for the CEAWG and will contribute its expertise as required. The updates from the CEAWG will inform whether the MILG should assist in the organisation of a workshop on CEA.	Summer 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	MILG will assist in the development of a workshop supported by the Seabed Users Development Group and attended by a cross- section of industry. The purpose of the workshop is to look in particular about how industry can take account of CI in applications. MILG will liaise with the CEAWG as the timing of this workshop could be an opportunity to promote / discuss emerging CEAWG products.				
Deep-sea mining	8. MILG to better understand industry activity and economic benefits. MILG expect further update Summer 2015.	No work has been undertaken in UK continental shelf, though work by UK companies (skills) undertaken abroad including overseas territories. .	Ongoing	MILG concluded that this was a very specific area of interest to particular companies and not an area where MILG was likely to add much value. MILG will keep in touch with this area through inviting industry (e.g. Soil Machine Dynamics) to attend a future MILG	Autumn 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
		Marine E-tech, a £4.2M research programme funded by NERC (UK) and FAPESP (Brazil), will assess deep ocean ferromanganese deposits – a major resource of elements that include cobalt, tellurium and the rare earths used in E-technologies.		meeting.	
Carbon capture and storage	9. MILG to better understand industry activity and economic benefits. MILG to attend CCSA meeting January 2015 to explore topic further and agree if further MILG input required. 10. MILG to investigate closer links to The Crown Estate and the Oil & Gas Regulator.	Work by the Carbon Capture Storage Association (CCSA) Recognises North Sea alone has 100+ years of capacity in terms of UK emissions.	. Ongoing	9. MILG attended CCSA meeting in January 2015 and now has representation from CCSA in the MILG. MILG to produce factsheet of the state of play for Carbon Capture and Storage, the key issues for which evidence is needed and the UK capacity for delivering the evidence needs. The future of this sector is unclear following the government's announcement to cease the tendering process for CCSA technologies. The MILG will maintain engagement with the group to identify any future input requirements.	Complete

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
Decommissioning	11. MILG to better understand industry activity and economic benefits	Decommissioning for the UK Continental Shelf alone will cost an estimated £1.5bn a year (2014 to 2023) to remove 104 platforms. Cleaning, removal and disposal of assets will affect a diverse range of maritime industries and users; many areas for which evidence is needed. A number of joint industry/sector bodies looking at requirements for and impact of decommissioning. For example, the LiNSI and industry-sponsored initiatives such as INSITE.	Ongoing	11. MILG is actively seeking to invite input from industry on the current and future potential of decommissioning across all offshore sectors, as this is a significant area for research, business growth, application and export overseas. MILG to produce factsheet of the state of play for Decommissioning, the key issues for which evidence is needed and the UK capacity for delivering the evidence needs.	Spring 2017
	12. MILG to engage with Living North Sea Initiative (LiNSI) (e.g. invite to MILG meeting) MILG expect further update Summer 2015		Ongoing	12. The group has formed links with LiNSI and will invite to MILG meeting for presentation in Summer 2016.	Autumn 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
Ballast Water Management	13. MILG to promote better evidence base to underpin future exemptions from management obligations under the Ballast Water Convention, which is due to be ratified imminently.	The UK has not yet signed up to the convention due to procedural obstacles in the political sphere. Exemptions are allowed under the convention which may possibly apply to small ships and ships operating between the same ports on a regular basis, but it is unclear what evidence will underpin the exemptions.	New Item	13. MILG to produce factsheet of the state of play for Ballast Water Management, the key issues for which evidence is needed and the UK capacity for delivering the evidence needs.	Summer 2016
	14. Encourage development of portable ballast water analysis equipment to assist compliance assessments and enforcement.		New Item		Summer 2017
Biofouling	15. MILG to raise awareness of the impacts caused by biofouling and the potential impact this has on industry. This will require both better understanding	It is unclear at present what the effect of antifouling coatings is on the ecosystem and there is an issue for industry with selecting the right antifouling agent with an appropriate hull cleaning programme.	New Item	MILG to produce factsheet of the state of play for Biofouling, the key issues for which evidence is needed and the UK capacity for delivering the evidence needs.	Summer 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	of the impact caused by non-native species and appropriate information dissemination to industry.	The profile of the impact of biofouling in the introduction of non-native species remains low, but may become elevated if new shipping routes are to open through the Arctic.			
Underwater Unexploded Ordnance (UXO) Management	16. MILG to improve coordination of UXO survey activity in the UK and to develop best practices in the UK to develop an international market for UK expertise on UXO management	There is little coordination of mapping of UXOs in the UK (e.g. digitised databases) which could provide better value for money in risk assessments for marine activities.	New Item	MILG to produce factsheet of the state of play for Underwater Unexploded Ordnances, the key issues for which evidence is needed and the UK capacity for delivering the evidence needs.	Summer 2016
UK Seabed mapping initiative	17. MILG to engage in current initiative exploring viability and need for a single project to map the UK seabed which is being led by the Marine Industries Leadership Council (MILC). MILG expect further update summer 2016.	Ongoing MILC work Ongoing CHP/CCO work Ongoing MCZ evidence collection programme Historical Marine ALSF REC data	Ongoing	A paper has been produced by MILC in conjunction with BIS on a study to further scope out idea of a single co-ordinated programme into a full business plan (including what happens during mapping and data dissemination). The report is expected to be published in March 2016 and the findings presented at Civil Hydrography Annual Seminar 2016 on 22nd March in Southampton.	Summer 2016
Skills gap	18. MILG to consider next steps following	MILG conducted its own research via a pilot study	Ongoing	MILG to input to IMarEST plans (as required) for marine sector survey	Summer 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	decision to "park" previously drafted MILG survey questionnaire and link with wider marine sector survey instead. MILG expect further update Summer 2016.	questionnaire and is now working with the Institute of Marine Engineering, Science & Technology (IMarEST) who are taking the lead on a marine sector survey.		and ensure it is relevant for Science sector. Following IMarEST developments, MILG to decide if it still wishes to undertake its own independent survey following the initial pilot.	
Establishment of a UK marine brand	19. MILG will act as a forum to consult / provide feedback on any marine branding initiatives. Through MILG, BIS colleagues to check if UK Trade and Industry info can be expanded for marine science. MILG expect further update Summer 2016.	MILC leading on this area and working with the marine and maritime sectors (including marine science) to develop a single brand that everyone (private and public) recognises. UKTI have produced leaflet for maritime industries. BIS UK Marine Export Strategy.	Ongoing	Marine Science and Technology has been considered by UKTI and appears in the Maritime Growth Study. MILG is to build on recommendations of the Maritime Growth study and increase visibilty	Summer 2017
Marine Industries Technology Roadmap	20. MILG to ensure it is kept informed of progress and is aware of opportunities for marine science	Innovate UK is leading on this roadmap which is to be revised early 2015 (Institute of Manufacturing Commissioned to undertake work). Workshops planned	Ongoing	The Roadmap was circulated and presented to the MILG. Innovate UK will keep the MILG informed of further updates.	Summer 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	funding and stakeholder engagement. MILG expect further update Summer 2016.	for 2015.			
Marine autonomous systems	21. MILG to ensure it is kept informed of work, developments and progress on the topic and is aware of opportunities for funding and stakeholder engagement. MILG expect further update Summer 2016.	MILC is leading on this area: • Innovate UK R&D collaborative competition (October 2014, £5m) with DSTL; • BIS looking to co-ordinate work through a 1 year project (Centre of Maritime Intelligent Systems) and is working with MCGA on producing codes of practice; • Ongoing NERC NOC work and workshops planned for February 2015. • NERC, Defra and WWF forming workshops for joint strategic research programme for improving ways that MAS are used in monitoring worth £3m	Ongoing	MILG had been kept informed of the opening of the new facilities for MAS at NOC and the progress made in this field. Updates will be provided at MILG meetings with further focus as required.	Summer 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
		• NOC opened the Marine Autonomous and Robotics Systems facility			

2.4 COMMUNICATION

The Communication Working Group supports the MSCC and its working groups to increase awareness and visibility of the Committee and its activities, and of the importance of the marine environment to our lives and, within it, the role of marine science. It is responsible for delivering bespoke communication products agreed by MSCC to promote the contribution made by marine science to the UK economy, and a UK marine science identity to strengthen the UK competitive presence in international markets.

In 2011, the Communications Working Group published a MSCC marine science communications strategy, '*Communicating UK Marine Science*', as a priority of the UK Marine Science Strategy. The communications strategy addresses communications with the general public, scientists, policymakers, politicians, industry and other users and beneficiaries of the marine environment, to increase understanding of marine issues and marine science and influence positively the ways in which we interact with the marine environment.

The group has undertaken a horizon scanning exercise and identified the improvement in communication between policy makers and the marine science community, the provision of advice to other MSCC working groups, and promotion of the UK Marine Science Strategy as areas where it can currently add value (Table 4).

Table 4. Communication Action Plan

The following table indicates the activities being undertaken or planned through the Marine Science Co-ordination Committee to deliver the three key scientific priorities of the UK Marine Science Strategy.

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
Communication from policy makers to marine science community	1. To improve communication from policy makers to the marine science community	Good links between policy makers and scientists are demonstrated by the operation of UKMMAS, the development of the Marine Alliance for Science & Technology for Scotland, and in the production of Scotland's Marine Atlas.	Consult with MSCC community to identify examples of good and poor practice, and routes / mechanisms for marine scientists to leverage links to policy. Develop a position paper with suggestions for best practice for discussion at MSCC.	The Communications Working Group was tasked with communicating Defra's Marine Evidence Action Plan (EAP) to the wider community, but this was put on hold following Defra re-organisation during which the EAP progression was put on hold.	September 2016
Provision of communications advice to MSCC working / sub groups	2. To identify topics in the strategic implementation plan requiring advice on communication matters and strengthen lines of communication between MSCC working / sub groups.	Not applicable	Review key issues that arise from the strategic implementation plan and consult with the Chairs of the science alignment working group, MILG and the UKMMAS evidence groups reporting to MARG on the need for advice on communication matters both within and external to MSCC. Where required, develop communication pathways / brief for these working / sub groups.	The Chair of the Communications Working group has suggested embedding Communications in the various MSCC subgroups rather than holding an independent group. To be reviewed following Plenary recommendations.	April 2016
MSCC and the UK marine science strategy	3. To promote the UK marine science strategy and the function	None	Produce a brief on the activities of MSCC in overseeing implementation of the UK marine science strategy. This will be published through	Put on hold while the EAP communication was being developed.	September 2016

Delivery Area	Action	Current Activity in UK	New / Ongoing MSCC Initiative	Progress since last update	Timing
	of MSCC, improve understanding of the Strategy and encourage its uptake by the UK marine science community.		appropriate media to engage with marine scientists, academia and policy makers with an interest in marine science, accompanied by the MSCC strategic implementation plan.		

PART 3: CONCLUSION

The MSCC strategic implementation plan provides a programme of actions for consideration as part of policy decision-making and implementation of the Strategy. A number of important areas have been identified in the implementation plan as requiring attention by the MSCC and its working groups in the next year. For example, development in UK scientific knowledge on ecosystem services and their sustainable use, the impacts of multiple human activities and sustainable human use of the marine environment, the effects of climate change on marine ecosystems and biodiversity, and improvement in communication between policy makers and the marine science community to develop stronger links and a greater understanding between these groups.