The Marine Biological Association's (MBA) contribution to the UN Decade societal outcomes

1. A **clean ocean** whereby sources of pollution are identified, quantified and reduced and pollutants removed from the ocean

There is a long history in identifying pollution sources at the MBA but the main gap for society is in work that focuses on solutions. The underpinning fundamental research is still but from plastics to CO2 to Non-Native Species (NNS), the focus needs to be more on solutions.

As an example, improved policy and governance to tackle sources of pollution is vital. The MBA has for example a strong track record in identification of Non-Native Species but there are few examples of eradication of already established NNS. Focus has recently shifted therefore to working with numerous partners to develop biosecurity training and advice. As an Association the MBA also works with its members across the world to support important policy aims such as the ratification and implementation of the IMO's Ballast Water Convention.

Other solution based approaches include projects such as the EU-funded 'Integrated biotechnological solutions for combating marine oil spills' (http://www.killspill.eu/) that aims to find such solutions to oil spills (i.e. biodegradation or bioremediation).

It is also worth noting that adequate monitoring will continue to be vital in order to assess the efficacy of solution-based approaches. The Continuous Plankton Recorder (CPR, https://www.mba.ac.uk/fellows/cpr-survey) project works with partners across the globe and provides analysis of and access to data on a global scale. A recent project looked at 60 years of data collected over 6.5 million nautical miles, that revealed the extent of plastic pollution in the North Atlantic and showed a significant increase in large plastic items. This work that was done collaboratively (e.g. with contributions from International Marine Litter Research Unit shows the ongoing need for large-scale multi-disciplinary approaches to marine monitoring as exemplified by the CPR. Increasing effort should therefore be made to support partnerships such as POGO and MARS that seek to bring time-series projects together to improve collaboration.

2. A **healthy and resilient ocean** whereby marine ecosystems are mapped and protected, multiple impacts, including climate change, are measured and reduced, and provision of ocean ecosystem services is maintained

The MBA hosted Marine Life Information Network (MarLIN) is a multi-partner initiative with a website that hosts the largest review of the effects of human activities and natural events on marine species and habitats ever undertaken. Its information and methodology is utilised across Europe and beyond and by a wide variety of stakeholders from government agencies to the public, independent researchers and industry. Its model of being funded via a wide range of stakeholders from government and elsewhere, along with its commitment to utilising new technologies to evaluate and deliver information (https://www.marlin.ac.uk/)

makes it an ideal model to be better resourced for international engagement and roll-out. The move to increase the number of Marine Protected Areas worldwide would benefit enormously from MarLIN methodologies).

3. A **predicted ocean** whereby society has the capacity to understand current and future ocean conditions, forecast their change and impact on human wellbeing and livelihoods

The MBA maintains some of the world's longest marine biological time-series. It works with other marine monitoring partners at the local level, such as with Plymouth Marine Laboratory as part of the Western Channel Observatory (WCO) (https://www.westernchannelobservatory.org.uk/). The data from the WCO from biological and physical-chemical measurements is then supplied nationally (e.g. to the UK Met Office for operational oceanography applications) and internationally. The strength of the observatory is that it is multi-discipline in nature with a wide range of parameters being observed and integrated into ecosystem models in order to improve predictive capability. Novel technologies are also being investigated to add to the monitoring capabilities.

Future funding is being sought so that the data from the MBAs time-series and the WCO can be integrated more fully with observations from other marine time-series nationally and globally. The work is already being used to inform policy outcomes such as achieving GES under the European Marine Strategy Framework Directive and predicting changes in ecosystem services.

Global networking funding could enhance the ability of the MBA to better integrate its work in initiatives in which it is already involved including the European Institute of Marine Stations (MARS), Partnership for Observation of the Global Ocean (POGO), International Association for Biological Oceanography (IABO), EMBRC (European Marine Biological Resource Centre) and then into GOOS.

4. A safe ocean whereby human communities are protected from ocean hazards and where the safety of operations at sea and on the coast is ensured

5. A sustainably harvested and productive ocean ensuring the provision of food supply and alternative livelihoods

6. A transparent and accessible ocean whereby all nations, stakeholders and citizens have access to ocean data and information, technologies and have the capacities to inform their decisions

The Data Team of the MBA provides expertise in the archiving, management, visualization and dissemination of quality-assured marine biodiversity datasets and metadata. The team operates the national biodiversity Data Archive Centre, DASSH, and provides guidance on compliance with UK and International legislation relating to data governance. Data are published to a range of portals and aggregators including the Ocean Biogeographic Information System (OBIS). In addition to data provision, the MBA promotes awareness through its ocean a literacy work done in tandem with a range of European counties through projects such as Sea Change (http://www.seachangeproject.eu/seachange-about-2/ocean-literacy) that involves a broad consortium of European partners.

3/ Please elaborate possible contributions of your organization with regard to the following four cross-cutting themes: a. Capacity building and technology transfer; b. Partnerships and financing; c. Access to information, data and knowledge d. Communication and awareness raising

As outlined under societal outcome 6, the MBA is working from the national to the international level to promote standards for marine biodiversity data collection and use (cross-cutting theme c).

The MBA also works with its members in over 40 countries promoting communication to the public and policy (cross-cutting theme d) makers via its expert database that allows the MBA to utilise members from across disciplines and across the globe. The unique role of the MBA as a Learned Society with communication and awareness raising as a core remit allows us to provide an independent voice at the international level. We also work with other societies in India, Italy and beyond. The Ocean Decade needs to communicate its values and engage widely and the MBA as an international learned society is well-placed to deliver this.

4/ Please identify, if you think it is needed, additions/modifications to the current R&D priority areas as formulated in the Roadmap.

A useful R&D priority would be to seek a degree of rationalisation amongst umbrella organisations and projects working at the science-policy interface. One of the major hindrances in providing a clear pathway from observations / hypothesis-led science to changes in policy and governance is the complex architecture that currently exists to support goals such as delivery of SDG 14. The bewildering number of actors involved in ocean observing, data collation and conservation advocacy, to name but a few makes it difficult for a) policy-makers to determine the most useful sources and b) scientists to know who to engage with in capacity building and knowledge transfer. Some explanation and simplification at the international level would allow national bodies to be more targeted in funding engagement and knowledge transfer activity. This R&D priority should result in the full use of the mazing science capacity that currently exists in marine research across the globe and facilitate the sort of ‘bottom-up’ process articulated in clause 41 of the roadmap and the integration and linking outlined in clause 42.

This focus on network rationalisation would also inform R&D priority 2 where again, the complex nature of ocean observing networks and lack of integration between public and private monitoring across countries and between disciplines (e.g. the physical focused oceanographic community vs the biologically focused coastal community) is a hindrance to having an overall system, which is fit fir purpose.

5/ If feasible, you may wish to provide brief information about any potential commitment(s) of your institution, to the preparation for and implementation of the Decade.

The MBA, through its current leadership of, and ongoing involvement in MARS is working with partners across the globe to establish the World Association of Marine Stations (WAMS) on a secure footing. A World Congress of Directors’ is planned for 2020 that would seek to harness the potential in the worldwide network of c. 1000 marine stations. Many of

these stations maintain marine time-series, have world-class research facilities and are centres of training for specialist experts. MARS has already received support from many other countries and networks and has articulated its aims to the IOC.

6/ From your perspectives, who else, or which institutions/programmes/ networks shall be further engaged into the preparations for and implementation of the UN Decade?

A key gap in engagement is the Learned and Professional Societies. These societies often have members numbering in the hundreds to thousands and who represent a wide range of disciplines. In addition to the MBA examples worldwide include the Marine Biological Association of India; SIBM (Italian Society of Marine Biology); Israeli Association for Aquatic Studies (IAAS) and many others. These societies are ready-made networks that could be utilised to promote the aims of the Decade as well as meet objectives under(cross-cutting theme D.

Do you wish to make your contribution publically available on the UN Decade web site?

Yes